

City of Ballarat

**Ballarat Bicycle
Strategy**

JULY 2008



City of Ballarat

Ballarat Bicycle Strategy

July 2008

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Executive Summary

Arup, in conjunction with Design Cycle was appointed by the City of Ballarat in July 2007 to develop a Bicycle Strategy. The overarching goal of the strategy is to make Ballarat a more cycling friendly environment that caters for all types of potential bicycle riders.

Improved walking and cycling infrastructure is identified as a strategic priority by the community in Blueprint Ballarat as part of their vision for Ballarat in 2030. Cycling is a core component and mechanism with which Council has an opportunity to realise fundamental aspirations and policy objectives articulated in Blueprint Ballarat, the Council Plan and the Municipal Public Health Plan.

Ballarat is expanding rapidly and its age composition changing as the city becomes a place for individuals to retire. The transport and health needs of the community will be a challenge which can be strongly supported by the benefits that cycling has to offer.

Encouraging active and equitable travel is essential in delivering social inclusion, health and wellbeing, safety and integrated mobility/transport outcomes for the community. The promotion and support of active forms of travel are important in fostering an environmentally sustainable, liveable and less car orientated community. Furthermore, cycling can reduce the financial burden and risk associated with increasing fuel costs.

The vision is a community that embraces cycling as a real transport choice realising the health and social benefits. The vision is a Ballarat with significantly greater tourism and recreational opportunities realising the economic benefits. The vision is a community that does not rely on excessive private motorised transport realising the environmental benefits.

Council requires a major shift in its view and recognition of cycling as a significant mode of daily travel. Whilst cycling is recognised under Council, State and Federal policies, significant commitment falls short. Commitment is required in terms of allocation of staff resources, resource for application/acquisition of funds, capital works funding and maintenance funding under the road management plan.

The Strategy is based on a review of existing conditions, consultations and site surveys. The strategy focuses on the development of strategic measures supportive of all levels of cyclists and identifies the importance of developing conditions that will enhance commuter and novice cyclists as critical to achieving the aim of more people cycling more often. The study builds a comprehensive Strategic Network that ensures continuity and connectivity and thereafter outlines a 5 year Implementation Plan (Section 5.3).

Key initiatives include the development of a cohesive infrastructure network, establishing a focal person for cycling, a Social Marketing Program (including safety training and TravelSmart), audits and maintenance, monitoring, signage, information and town planning opportunities.

Implementation Plan

The successful progression and execution of a Bicycle Strategy requires the coordination of Council and key stakeholders. It is recommended that the responsibilities of Cycling Coordination be integrated into existing roles with the potential to have a part-time individual appointed as a Cycling Officer in the future. This would create a focal point within Council for all cycling issues and to coordinate key stakeholders. It is critical that the Cycling Officer is an experienced individual supported by Council and VicRoads, and that the political will exists to develop Ballarat as a key cycling city. Assistance from a junior engineer would ensure a cost effective use of a staff resource.

The Cycling Officer's role would involve the implementation of the Bicycle Strategy covering education, promotion, infrastructure development, information, monitoring and maintenance. The acquisition/identification of funding supportive of the strategy is a key role for the Cycling Officer and a significant challenge for Council.

Infrastructure

The bicycle network could be improved by addressing the missing links between key destinations. There are few high quality bicycle routes that connect two or more key destinations without

significant gaps or barriers. Ballarat lacks well connected quality off-road routes which provide the greatest potential to attract new cyclists.

The infrastructure items that build to create a comprehensive Strategic Network are outlined within Section 5.1 and illustrated within Figure 1. Items involve a combination of quick wins (short term easier projects) but also flagship projects (that require planning, significant capital funding and coordination across departments and governments).

A 5 year Implementation Plan was developed through the prioritisation of projects using a set of key weighted performance metrics; details are found within Section 5.2 and illustrated on Figure 2. Prioritisation is based on the ability of an item to improve safety, develop an interconnecting network and connect with activity centres and key destinations. Typically, routes to employment centres, routes to schools/universities and routes to stations are given the highest priority on the basis that these provide infrastructure that benefits more individuals on a daily basis, as well as having the greatest opportunity to attract new cyclists.

The 5 year Implementation Plan is detailed within Section 5.3. Core components of the plan include:

- Peel Street cross city connection
- Sturt Street on-road provision
- Western Growth Area bicycle infrastructure and connections
- City centre connection with Ballarat Skipton Rail Trail (via Gregory Street)
- Connections with existing and proposed rail stations
- Canadian Trail improvements
- Ballarat Skipton Rail Trail (in hand)

Beyond the 5 year program, the Strategy Network defines a clear network that can be extended and augmented as opportunities allow. Corridors through new growth areas require particular protection.

The five year program of projects should be considered as indicative only and may change as a result of competing future budget priorities. The timing of the recommended projects and initiatives may be impaired by external factors unknown during the development of this strategy. All proposed projects outlined in this report will be considered and prioritised against other competing projects during the annual budget development process.

Off Road Recreational Circuits

Through connecting proposed off-road opportunities outlined under the strategy, it is evident that off-road recreational opportunities can be developed covering the entire city as illustrated in Figure 3. The circuits would link and enhance Ballarat as a tourism destination delivering economic benefits. It is proposed that circuits are numbered for ease of applying continuity markers. On completion of the 5 year implementation program, the west and south/east circuit would be complete, and a large part of the north and south circuits would be in place.

On Road Training Circuits

The Ballarat Commuter and Touring Map outlines a series of on-road training and recreational touring routes 48-67 Kilometres in length. It is recommended that improvements are delivered under the programmed maintenance/resurfacing works. This would include the provision of a 1.5-2.0 metre wide sealed shoulder and farm tracks sealed a short distance to minimise debris brought into the main carriageway. Close coordination is required with VicRoads in order to improve these routes. A priority corridor should be Geelong Road given its connection with the University of Ballarat and Buninyong.

It is recommended that 2-3 key training circuits are chosen for wayfinding treatments. An audit and design is required for each circuit. It is suggested that BalBUG is consulted on the corridors that best serve recreational, training and competitive routes, particularly those favoured by tourists.

Funding

Funding support for the 5 year Implementation Plan is a significant challenge. Each recommendation includes the likely source of funding; this is included within Section 5.3. All potential funding sources are outlined within Section 6.3.1.

Funding is also required to deliver education, events, promotion, training, information, monitoring and maintenance programs. It is recommended that a routine budget is established that supports ongoing activities supportive of cycling.

The adoption of this strategy does not financially commit Council or other funding sources to the identified projects or initiatives outlined within this report.

Wayfinding

Clear bold signs should be placed to indicate to drivers the presence of cyclists and to advertise the start of off-road trails to all road users. Low cost self adhesive continuity way-markers and bicycle symbols to the carriageway would improve the legibility of routes particularly along local streets.

The use of information boards and maps are recommended at key bicycle cross-roads, railway stations and universities to inform users and serve to advertise the immediate cycling environment to potential users.

It is important that naming or numbering conventions are adopted for off-road trails and that these are clearly illustrated on the Ballarat Commuter and Touring Map.

Bicycle Parking

The lack of trip end facilities, in particular secure bicycle parking is a key barrier to cycling. It is recommended that:

- Schools and universities have secure sheltered bicycle parking
- Shopping precincts, hospitals and the railway station have secure sheltered parking
- Sports grounds and parks should also have bicycle parking facilities

The Strategic Network plan (Figure 1) identifies key locations that should be targeted with high quality bicycle parking facilities with shelter/shade and good natural surveillance/security. It is recommended that Council lead by example through the introduction of secure workplace parking.

Maintenance

A proactive approach is essential in terms of addressing bicycle infrastructure degradation and alignment with current standards. The lack of a continued maintenance program exposes Council to liability issues and claims. It is recommended that audits are undertaken and that a maintenance fund is allocated to cover a broad range of maintenance issues, including those raised by the community. Audits provide an important proactive instrument in identifying the maintenance requirements of the existing off-road network and safety issues.

Social Marketing Program

It is recommended that a Social Marketing Program be developed that provides continued engagement with the community throughout the year. The program initiatives would be driven, co-ordinated and monitored by the City of Ballarat and the nominated Cycling Officer. The components of a Social Marketing Program would include promotion, education, events organisation and marketing initiatives. The program would focus on key segments of the community (schools, universities and key employers) and tailor events, education (including safety training) and promotion activities to the specific needs of these markets. Safety training would be a key component of the program.

Schools and universities should be treated through a combined approach of education (Travel Smart), safe routes to schools (infrastructure), ride to school event and trip end facilities (secure bicycle parking). A starting point would be to approach universities and schools that returned school questionnaires during the development of the strategy.

It is recommended that Council develop a Green Travel Plan including improvements to trip end facilities and provide encouragement and support to key employers to do the same. Key local employers include hospitals, Masterfoods and McCain's. Green travel plans involve in-depth staff travel surveys and thereafter manage and support a change in travel behaviour.

Council should maximise the impact of their efforts by “piggy backing” on marketing efforts of a wider program which may support larger and wider ranging media and community engagement campaigns. It is recommended that a program is developed around the following events:

- Ride to Work Day (BV) (National Day on 17th October)
- Ride to School Day (DPCD & BV) (start of school year)
- Ballarat Autumn Day Ride (BAD) (first Sunday of May)
- Come to Life Cycle event (2008)
- Time to Ride (BalBUG & Council) (not currently running)
- Bike Path Discovery (BV) – eg Ballarat Skipton Rail Trail Ride

Considering the ageing population and a growing number of retired individuals living in Ballarat, it is recommended that the Time to Ride event is re-commenced. The event targets older individuals and would provide an increasing opportunity to encourage retired individuals to ride for transport and their health reasons.

Over the 5 year program, it is recommended that Council promote its achievements. This would involve highlighting new cycle routes, cycling events, new funding and success stories surrounding increased ridership and at the same time promote the health, economic and environmental benefits of cycling.

Information

It is recommended that a Council cycling webpage that is easy to find, serving as a one-stop shop for cycling in Ballarat for residents, schools and employees with links to Bicycle Victoria and VicRoads is developed. This would also provide an important tool and reference for the Social Marketing Program. Council should work cooperatively with BalBUG to prevent duplication of information production and dissemination.

The development of the Ballarat Commuter and Touring Map represents a significant step in information provision. It is recommended that the next revision of the map include train/bus stations, improved clarity of tourist/recreation destinations, naming/numbering of trails, bike hire locations and contact numbers, and Gong Gong Reserve as a destination.

Planning

Town Planning applications provide unique and, in many cases, the only opportunity to provide pedestrian and bicycle connections. To fail these opportunities can often result in no connection or costly retrofitting by local and regional authorities, which in turn represents a significant cost to the community. Development applications should aim to add and enhance the existing and proposed pedestrian/bicycle network.

It is critical that provision is made to allow the bicycle network to expand beyond the boundaries of each individual development in order that each phase of development connects and contributes to a wider network of bicycle corridors. Short direct intercommunity connections are essential for pedestrians and cyclists if Ballarat is to move away from a car oriented environment.

Further advice is provided under Section D1.4.

Professional Training

It is recommended that professionals are briefed on the Council's cycling aspirations and how design and planning can contribute and provide opportunities for improving the cycling environment. This should be combined with the VicRoads run course on bicycle facility design.

Monitoring

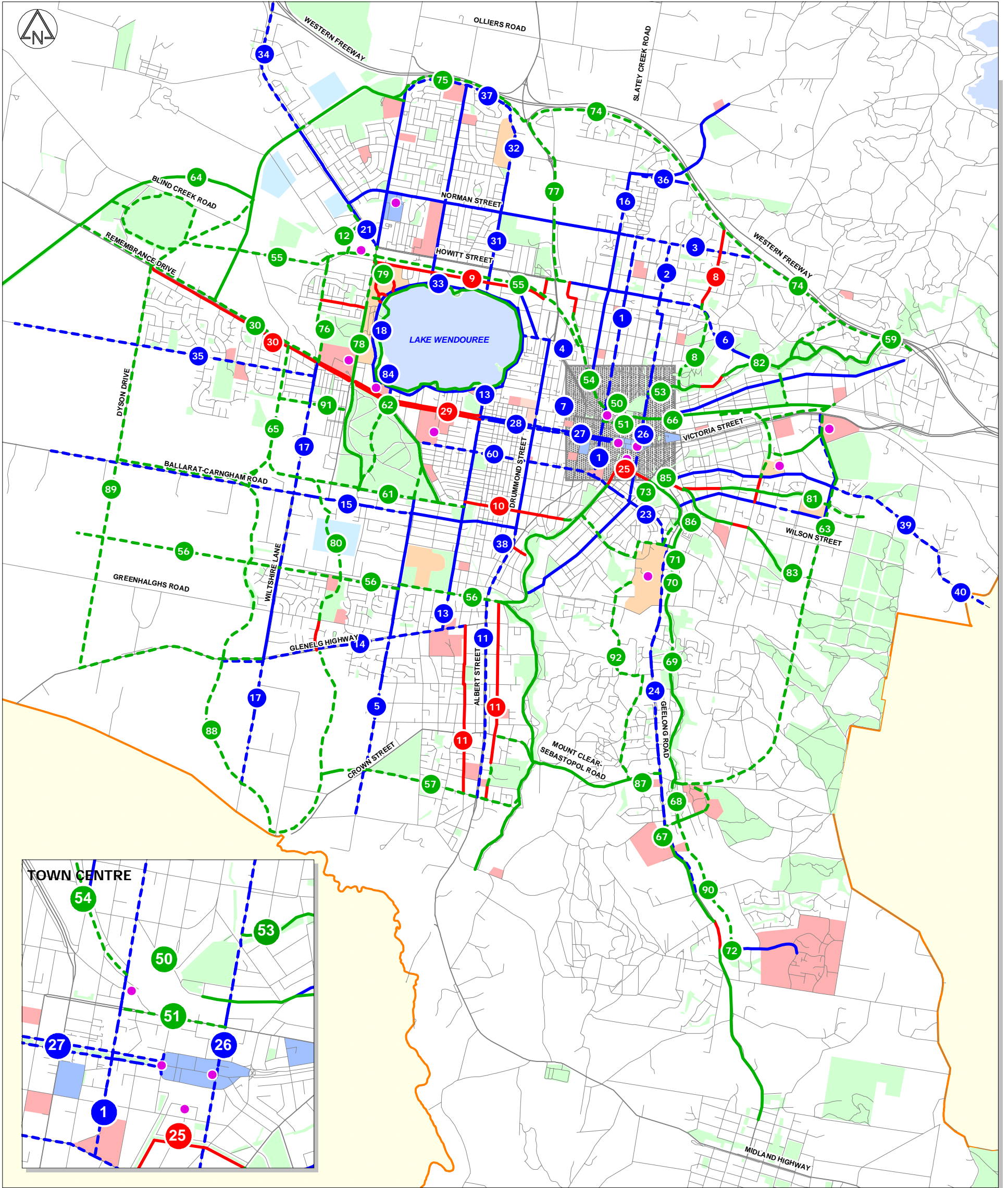
Monitoring provides a powerful tool that measures the success of cycling infrastructure providing grounds for future funding and further improvements. Despite the 1999 Strategy recommending the need to monitor cycling, no monitoring has been undertaken.

It is recommended that a monitoring plan be developed, and that annual bicycle flow and bicycle parking are conducted along a number of key corridors and locations. The first counts should take place prior to the implementation of the strategy in coordination with VicRoads, BV and BalBUG. A

number of key indicators supportive of a sustainable future are outlined under the Ballarat Health and Wellbeing Plan, these can form components of a monitoring program.

Roundabouts

Ballarat's road network includes a significant number of roundabout intersections. Council have requested advice on improving bicycle safety at roundabouts based on current standards and existing research. The study has examined worldwide research and design guidelines. Sources include VicRoads, Bicycle Victoria, Austroads, Sustrans (UK) and other international research. Recommendations are outlined within Section 3.5



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SOURCE: VicRoads Land Information and Survey Group

**Ballarat
City Council**

**Figure 1:
Strategic Bicycle
Network**

LEGEND

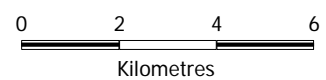
- Highways/Main Roads
- Local Roads
- ▭ Ballarat Municipality
- Proposed Quality Bicycle Parking
- ▭ Schools, Colleges & Universities
- ▭ Major Shopping Centres
- ▭ Tourist Attractions
- ▭ Major Employment Centres
- ▭ Open Space/Parks/ Recreational Areas

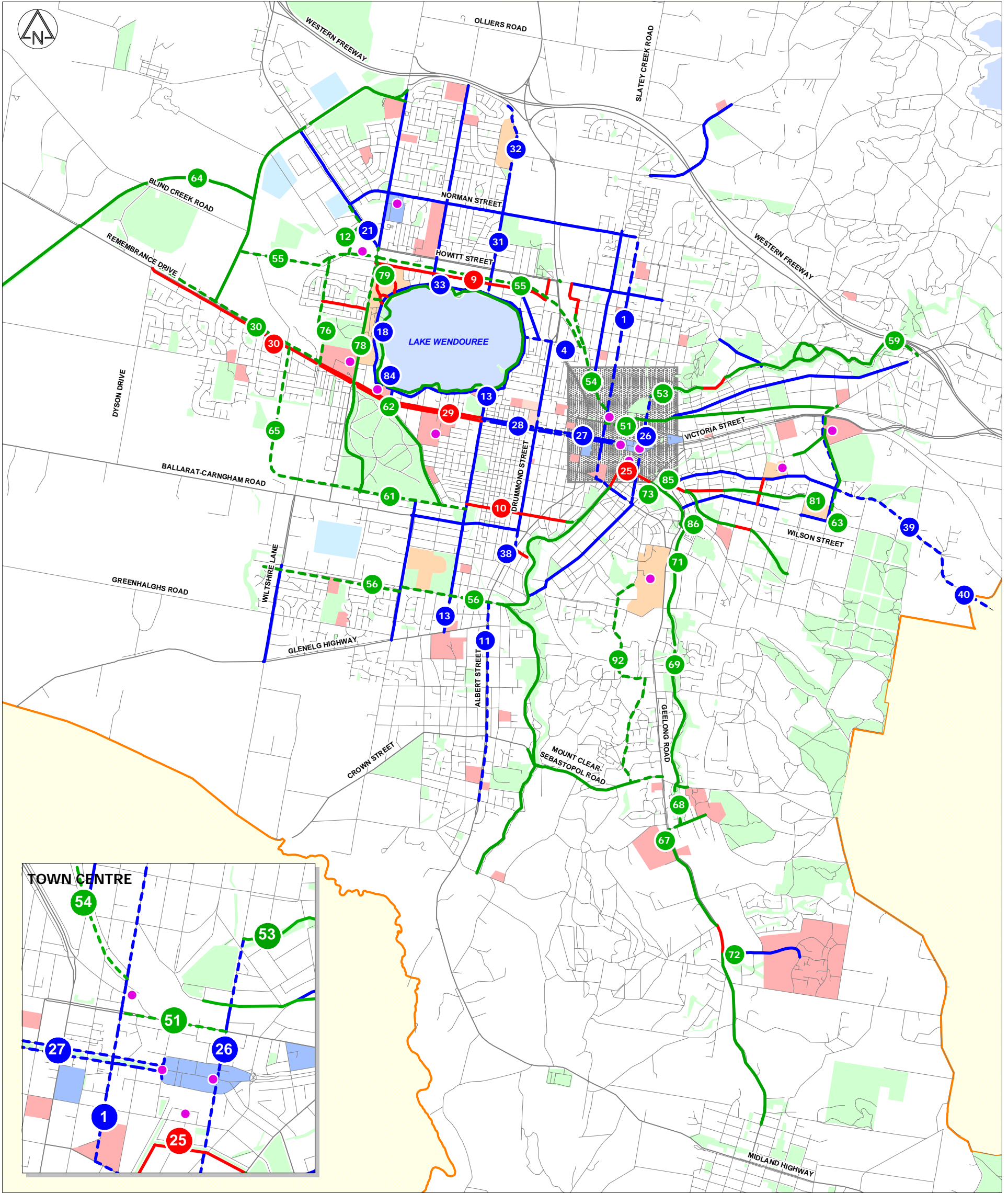
Existing:

- On Road Bicycle Path
- On Road Shared Route
- Off Road Bicycle Path

Proposed:

- - - On Road Bicycle Path
- - - Off Road Bicycle Path





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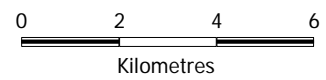
SOURCE: VicRoads Land Information and Survey Group

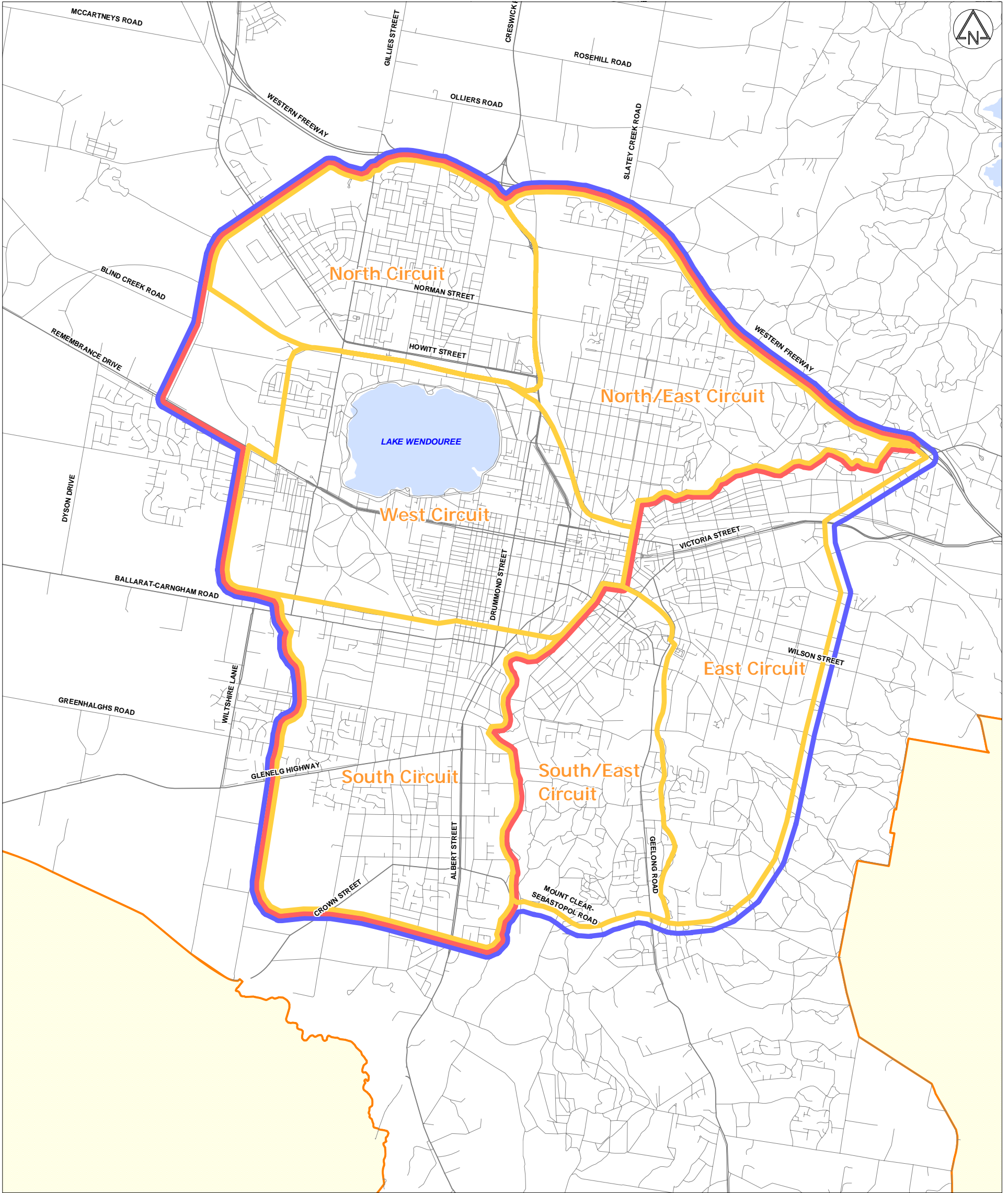
**Ballarat
City Council**

**Figure 2:
5 Year
Implementation
Plan**

LEGEND

- | | |
|--|-------------------------|
| — Highways/Main Roads | Existing: |
| — Local Roads | — On Road Bicycle Path |
| — Ballarat Municipality | — On Road Shared Route |
| ● Proposed Quality Bicycle Parking | — Off Road Bicycle Path |
| ■ Schools, Colleges & Universities | Proposed: |
| ■ Major Shopping Centres | — On Road Bicycle Path |
| ■ Tourist Attractions | — Off Road Bicycle Path |
| ■ Major Employment Centres | |
| ■ Open Space/Parks/ Recreational Areas | |





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Ballarat
City Council

LEGEND

- Highways/Main Roads
- Local Roads
- ▭ Ballarat Municipality

SUGGESTED CIRCUITS:

- ▭ Inner Circuits
- ▭ "Sovereign" Circuit
- ▭ "Eureka" Circuit

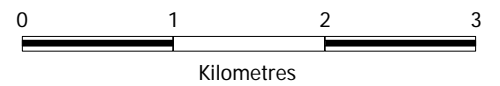


Figure 3:
Recreational/
Tourism Circuits



1 Introduction

Arup, in conjunction with Design Cycle, was appointed in July 2007 to develop a Bicycle Strategy for the City of Ballarat.

This report summarises the steps taken in developing the strategy, and will list the social and physical infrastructure recommendations, together with supporting documentation such as funding and education opportunities. The recommendations have been prioritised and included within a five year works program, 2008 to 2013.

1.1 Background

The study process has been divided into five phases:

- Stage One: Inception
- Stage Two: Existing Conditions Review
- Stage Three: Consultation
- Stage Four: Draft Strategy
- Stage Five: Final Strategy

In developing the strategy, Arup has reviewed existing conditions as part of stage two of the study. This was inclusive of existing documents, crash analysis and demographics.

Stage three of the study involved an extensive consultation process with members of the local community; schools, Council officers and key stakeholders.

In preparing the draft strategy, Arup considered information presented under stages two and three. Site surveys were undertaken by car and by bicycle examining potential opportunities together with existing constraints. Stage four of the strategy delivered a set of practical and integrated recommendations.

This document represents stage five and the final report issue prior to public exhibition. The report incorporates feedback from Council and key stakeholders following the draft strategy report.

2 Overall Goal and Guiding Principles

The Bicycle Strategy will seek to achieve an overall goal:

The overall goal of the strategy is to make Ballarat a more cycling friendly environment that caters for all types of cyclist.

Arup has developed a set of associated guiding principles that will form the foundations for driving the strategy and reaching this goal, as outlined below.

2.1 Guiding Principles

The guiding principles have been categorised into three key areas; Infrastructure, Safety and Continued Development. The principles recognise the need to cater for all levels of cyclist.

2.1.1 Physical and Social Infrastructure

Physical infrastructure influences every aspect of the cyclist's journey; the path/route that they cycle upon, way-finding, facilities en route and trip end facilities.

The strategy will aim to outline a cycle network that offers a comprehensive provision and high quality of physical infrastructure, providing inclusive connectivity to the key activity centres and attractors. This will be achieved through adopting the following key principles:

- Legible (easy to follow) and direct corridors, through improving the coverage, continuity and quality of the cycling network including signage and surface markings
- Provide infrastructure to accommodate and encourage riders of all levels, and
- Connectivity between central amenities and transport opportunities, together with connections to new growth areas.

The design, introduction and development of the social infrastructure should be approached with a view to achieving a cohesive integration with the physical infrastructure.

The focus of the social infrastructure will be to recruit and sustain cyclists. The following principles will mould the social infrastructure:

- Targeted behavioural change programs (eg ride to work, Travel Smart, Bike Ed, ride2school, seniors riding)
- Information (maps, websites, leaflets, etc)
- Policies (Integrated Transport Strategy, Council policies, integration with State and Federal Government.)
- Improve awareness and promotion of health and sustainability benefits of cycling; and
- Supporting community and competitive cycling events and encouraging community participation.

2.1.2 Safety

The incentives for improving safety on Ballarat's cycle routes are considerable; in addition to reducing the number and severity of crashes relating to cyclists, a safer cycle network will also encourage more people to cycle and will enhance the public perception of cycling. The following principles will be adopted to enhance safety for users of the cycle network:

- Identification of locations with crash clusters that require road safety audits;
- Targeted infrastructure improvements at crash locations and potentially high risk sites;
- Encourage consideration of cycling safety in all infrastructure design;
- Education initiatives within schools, workplaces and within residential communities;
- Improved casual surveillance and actual/perceived security.

2.1.3 Continued Development

The future of cycling in Ballarat will be influenced by the actions that are recommended within the Strategy's five year timeframe. The Strategy document needs to be an easy reference document that communicates the key aspirations and direction of a plan aimed at improving the cycling environment in and around Ballarat.

It is essential that the strategy looks beyond the immediate requirements of Ballarat's cycle network, and gives consideration to the long-term implications of each action.

The following principles will shape the long-term ambitions of the strategy:

- Ownership of strategy by key stakeholders with a central person responsible for implementation of the strategy and attainment of funding;
- Co-ordinate the provision of bicycle facilities across relevant agencies and organisations;
- Encourage consideration of cycling and cycle safety in all infrastructure design and look for opportunities to improve facilities and extend the bicycle network;
- Planning that integrates cycling with transport and land use planning;
- Ensure that potential cycle corridors are identified and protected with particular reference to links to new growth areas;
- Improve integration with, and facilities at, key trip attractors;
- Monitor cycling volumes and condition of facilities; and
- Audit and maintenance of existing facilities and development of remedial action plans.

2.2 Catering for all Cyclists

It is recognised that different riders have different predominant needs. Safety is considered a predominant need for all cyclists together with end of trip facilities. The following table summarises the overarching need of each broad cycling group considered within the Strategy development.

Table 1 Overarching Needs of all Cyclists

Cycling Group	Overarching Needs
Competitive Cyclists	On-road consideration in road design. Safe training routes.
Recreational Cyclists	On and Off road infrastructure supportive of all levels of cyclist. Signs to amenities and transport opportunities. Supporting facilities including water fountains and cycle parking. Safe routes.
Commuter Cyclists	On and Off road infrastructure supportive of all levels of cyclist.. Direct connections from residential areas to employment centres. Good trip end facilities at place of work. Safe routes.
Tourism Cyclists	On and Off road infrastructure with clear legible signage to amenities and tourism attractions. Good and easily accessible information. Supporting facilities including water fountains, cycle parking and cycle shops/hire. Safe routes.
Novice Cyclists	Off road cycling opportunities with safe negotiation of conflict locations with vehicles. Access to safe cycling information. Supporting facilities including water fountains, cycle parking. Safe routes.

3 Background and Development

3.1 Appendix A - Strategic Context

Arup conducted a documentation review of all relevant strategies at federal, state and local levels. A number of key objectives, recommendations and themes were repeatedly raised and were subsequently given consideration.

3.2 Appendix B - Existing Conditions

This appendix provides a summary of existing conditions, detailing the key conclusions and aspects of each element considered within Stage Two of the study.

3.2.1 Study Area

Ballarat is a major inland regional city. Located 105 kilometres North West of Melbourne, Ballarat is bounded by the adjacent councils of Golden Plains Shire, Hepburn Shire, Pyrenees Shire and Moorabool Shire.

The City of Ballarat covers an area of 740sq kilometres and is home to 35,000 households, providing residence to 90,000 people.

The population of the municipality is predicted to increase by over 6,000 people before 2021. The Ballarat West and Canadian Valley development areas are the most prominent residential growth areas.

3.2.2 Demographics

The key findings of the demographic analysis are as follows:

- 15,600 school aged children reside within Ballarat. From the school questionnaire survey response, see Appendix C, only approximately 2.5% currently cycle to school.
- 9% of households within Ballarat do not own a car, and 36% own one car.
- Approximately 95% of the population lives within 5 kilometres of their place of work, yet only 400 individuals cycle to work.

3.2.3 Existing Cycling Participation

There is currently limited information on the participation rates for cycling in Ballarat. Australian Bureau of Statistics data provides the best indication of bicycle usage for the municipality. Out of a population of over 88,000, only approximately 400 individuals cycle to work.

3.2.4 Crash Statistics

In the City of Ballarat between 1/1/2001 and 31/12/2005, there was a total of one hundred and three (103) reported casualty crashes involving a cyclist. There were no locations within the City of Ballarat that exhibited more than two reported casualty crashes, accordingly there are no clusters attributed to any one location. However, a large number of crashes are attributable to roundabout locations.

3.2.5 Promotion and Education

Arup reviewed the current cycling information available to the community. A summary of the review is found within the Appendix.

3.2.6 1999 Bicycle Strategy

Arup have completed a review of the recommendations outlined within the 1999 Bicycle Strategy. Details of the review are found within the Appendix

3.3 Appendix C - Consultation

The consultation process consisted of a number of integral components, as follows:

- Community Workshop

- Stakeholder Workshop (Stakeholder Site Visit)
- Bicycle Victoria Meeting
- School Questionnaire.

Appendix C provides an overview of each consultation, and a summary of the key issues and findings of all discussions.

3.4 Appendix D – Toolkit

The toolkit provides an indication as to the design and specification of facilities. It is intended that this information reflects the standards to which the Ballarat cycle network should aim to achieve.

The toolkit provides details regarding:

- Paths, Lanes and Intersections
- End of Trip Facilities
- State of the Art and Alternative Concepts
- Planning/Development Considerations

3.5 Appendix E – Roundabout Design Conclusions

A review of roundabout guidelines, standards and best practices has been conducted, and is detailed in the Appendix. A summary of the findings of the study is presented in this section, including recommendations for roundabout design in Ballarat.

The study has examined Australian and worldwide research and design guidelines. Review sources include VicRoads, Austroads, Sustrans (UK) and other international sources. The following paragraphs present advice based on the information outlined and reviewed.

It is recommended that designated bicycle corridors avoid roundabout intersections as far as possible, particularly if the circulatory carriageway of a roundabout is two plus lanes in widths. However, the continuity of a route should not be compromised to simply avoid a roundabout. A convoluted corridor may provide a route that is not used or may expose cyclists to greater risk of conflict.

Consideration towards cyclists is required in the choice of intersection, particularly if a new intersection arrangement is being considered within the proposed strategic bicycle network. Should bicycle crashes increase at specific locations, it is recommended that Council consider a change in intersection arrangement.

It is noted that Sustrans (UK) guidelines, US research and German research are not advocates of installing cycle lane to the outer side of the circulatory carriageway. Austroads guidelines indicate that cycle lanes within the circulating carriageway have been withdrawn in some circumstances, as there have been no detectable benefit to cyclists and cyclists are kept on the outer edge 'the most hazardous area of the circulating carriageway'.

Consequently, it is recommended that engineers and designers avoid the installation of on-road bicycle lanes at the periphery of the circulatory carriageway of the roundabout. Where traffic volumes, traffic speeds or the number of inexperienced cyclists is high and dedicated cycling facilities are required, the provision of a separated off-road bicycle paths is recommended.

Two general roundabout arrangements are identified within the municipality of Ballarat as follows:

- Single Lane Roundabouts - an arrangement is recommended in which cyclists and motorists mix within low speed environments; and

- Multiple Lane Roundabouts - an arrangement is recommended that allows an alternative corridor bypassing the circulatory carriageway.

3.5.1 Single Lane Roundabouts

For roundabouts on local roads with low speeds (speed limit of 50km/h or less) and low volumes, roundabouts should be of a 'continental design' encouraging cyclists and motorists to merge before the circulatory carriageway of the roundabout. Recommendations including:

- Minimise vehicle speeds on the approach and through the roundabout by providing appropriate deflection and minimal flaring (widening of approach lane on entry to the roundabout)
- Prevent motorists attempting to overtake cyclists within the roundabout through constrained circulating carriageway widths, entry and exit lanes
- Where urban roundabouts need to cater for both cyclists and heavy vehicles they should have a constrained circulating carriageway with over-run strips for large vehicles around the central island
- Raising driver and cyclist awareness of the need to merge before the circulatory carriageway
- Entry and exit lane widths of between 4 and 5m and a circulating carriageway width of 4 to 6m (subject to turning manoeuvres of design vehicles)¹
- A central island of between 20m and 40m diameter usually provides the best geometry for continental style roundabouts²

3.5.2 Multiple Lane Roundabouts

Multiple lane roundabouts generally occur where traffic volumes and vehicular speeds are higher, typically on arterial roads. This design should reduce vehicle speeds through the roundabout to allow highly skilled cyclists (e.g. training and commuter cyclists) to safely mix with traffic and claim their lane. However, this design should also provide safe segregated facilities for less skilled cyclists.

In circumstances where pedestrian/cyclist volumes are high, traffic volumes and speeds are high, the intersection falls along a strategic bicycle route or where the crash history warrants further treatment, consideration should be given to the following:

- Redesign of intersection or change to traffic signals
- Control of vehicle speeds on the approach and through the roundabout by providing appropriate deflection and minimal flaring
- Provide separated off-road bicycle paths for cyclists of limited skills that allow cyclists to leave the road at safe speeds, cross the approach arms of the roundabout and safely rejoin the road with minimal delay
- The location may warrant the installation of pedestrian operated signal crossings with flashing lights where traffic volumes and bicycle crash rates are high.

In areas of high pedestrian activity, attention should be paid to the potential for conflict between cyclists and pedestrians. Advisory signage, centre line marking and pavement symbols can assist in raising pedestrians' awareness of cyclists. Particular attention should be paid to the point where cyclists cross from the road to the shared path. This intersection point should be located away from high pedestrian volume areas or pedestrian waiting areas.

¹ Sustrans (UK), 1997, Junctions and Crossings

² Department for Transport, 2007. Cycling Infrastructure Design, Local Transport Note Consultation Draft

4 The Strategy

The existing conditions review, consultation process and further discussions with Council and key stakeholders have identified a variety of bicycle infrastructure issues. Arup have conducted a set of site visits to assess these issues, and have highlighted a number of opportunities and constraints for improving cycling within Ballarat.

These opportunities and constraints are discussed in this section.

4.1 Constraints/Barriers

4.1.1 Lack of Ownership of Bicycle Strategy

Although the 1999 Ballarat Bicycle Strategy was widely considered to set out an effective program of infrastructure recommendations and proposals, a significant number of these items have not been implemented by Council, particular the off-road initiatives.

Discussions with Council have indicated that the recommendations suffered from a lack of ownership within Council, whereby a particular proposal was not allocated to a particular department or individual. No key individual has been designated to coordinate the requirement of cyclists in maintenance, planning, or infrastructure design. Consequently, many recommendations were not allocated funding and have not been implemented.

There is potential to improve this system within Council, with the aim of ensuring that each proposal is attached to a nominated individual.

4.1.2 Lack of Planning and Maintenance Programs

Much of Ballarat's existing cycling network requires maintenance. Steps, bollards and pot holes are all evident on off-road routes, whilst poor and inconsistent surfacing, faded line marking and pot holes are prevalent on on-road routes.

There are a number of residential growth areas in the region, and it is essential that all new developments consider cycling from design to completion. There is currently limited clear bicycle planning guidance for new residential areas, as well as a lack of a review procedure prior to acceptance of developer proposals.

4.1.2.1 Roundabouts

Many of Ballarat's roundabouts have been designed with flared entries (widening of approach lane) and wide circulatory carriageways that encourage higher traffic speeds and reduce the presence of cyclists. Where entries are wide, motorists and cyclists are not encouraged to merge before entering a roundabout and as a result are not appropriately acknowledged by drivers.

4.1.2.2 End of Trip Facilities

There are currently a lack of basic end of trip facilities at key destinations, such as shopping centres, major employment centres and community amenities. This deficiency compromises the effectiveness and value of the existing cycling network, and therefore deters cyclists from using cycle routes as they are not offered secure cycle parking, or storage lockers, showers, etc, at their final destination. A successful bicycle network should include adequate provision of trip end facilities to complement the routes themselves.

4.1.3 Funding/ Cost of Works

A large constraint on the development of a bicycle strategy is funding availability. Whilst other funding opportunities are available, it is likely that Council will be the single largest financial provider. However, Council has the potential to use its spending to leverage funding from other organisations (e.g. VicRoads, Federal Government, Department of Planning and Community Development) to improve cycling facilities within the municipality. Often, \$ for \$ funding agreements can be achieved between Council and other organisations.

The adoption of this strategy does not financially commit Council or other funding sources to the identified projects or initiatives outlined within this report.

4.1.4 Safety

The crash analysis summarised all of the reported bicycle crashes within Ballarat over the last five years. Safety issues do exist, particularly along highly trafficked streets. Anecdotal evidence indicates that perceived safety issues are often regarded as a potential barrier to cycling.

In particular, Ballarat suffers from safety issues at roundabouts. Unfortunately, an effective safety treatment for cyclists at roundabouts has not yet been achieved, and this remains a significant obstacle in achieving safe cycling routes, particularly within the city centre.

The routes connecting key residential areas to schools and public transport and could also be considered to have safety issues as they often require cyclists to cycle on busy roads, or to navigate through intimidating intersections.

4.1.5 Physical Barriers

There are a number of obstacles throughout Ballarat that limit the expansion of the bicycle network. Geelong Road runs north-south and is bordered by education centres and residential areas on both sides. Crossing of this high speed/volume road hinders connectivity for students cycling to school, and is of particular concern given that some students may be of a young age and lack cycling experience and confidence.

There are a limited number of existing crossings of the railway line running across Lydiard Street and north towards Howitt Street. This hinders the design of an east-west off-road cycle route, and reduces scope for easy connectivity to Ballarat Railway station and the city centre.

Further, arterial highways are difficult to cross safely, particular given their high speed and high traffic volume.

4.2 Opportunities

4.2.1 School Aged Population

The demographic analysis indicated that there are 15,600 school children currently residing within Ballarat, and results from the school questionnaire indicate that between 2% and 5% of students regularly cycle to school. This section of the population has more limited transport opportunities available to them and cycling provides the opportunity for pupils to gain some independence and achieve road awareness.

There is the potential to encourage pupils to cycle to school and all surveyed schools agreed that providing an improved bicycle network is the best way to achieve this. A number of schools are located adjacent to existing shared pathways which offer key linkages to the schools.

It was also noted from the school questionnaire results that the majority of schools do not run cycling promotion programs or road safety education programs.

The survey also found that around 2% of university students commute via bicycle, mainly due to the students having the alternative of driving. However, behavioural change programs and partnerships with the university offer a real opportunity to persuade more students to cycle.

4.2.2 Linear Corridors

Ballarat presents a number of linear corridors that enable good cycle route continuity. These include rail lines, freeways and rivers. These corridors are particularly appropriate in developing an off-road network of trails.

4.2.3 Topography

Generally, Ballarats topography is relatively flat with only small hills to climb, with the exception of the north-eastern part of the city.

4.2.4 Rural Roads

The Ballarat Commuter and Touring Map outlines a series of long distance rural circuits for recreational long distance cycling and competitive cyclists.

There is an opportunity to gradually upgrade each corridor as maintenance programs allow with suitable shoulders for cyclists to use. Discussions should be conducted with VicRoads to ensure that maintenance programs gradually allow for the upgrade of corridors to include 1.5 metre wide shoulders.

4.2.5 Trip end facilities

Introduction of additional trip end facilities provides a significant opportunity to encourage increased cycling participation.

4.2.6 Recreational Needs of an Ageing Population

There is a notable increase in the number of individuals approaching retirement age within Ballarat. Anecdotal evidence also suggests that Ballarat is attracting retirees from beyond the municipality. Ballarat needs to plan to accommodate the recreational needs of a growing proportion of retired individuals. The provision of recreational cycling opportunities that deliver health and vitality benefits also provide greater levels of mobility.

There is a significant opportunity to encourage this group to choose cycling as a means of transport and exercise.

4.2.7 Green Travel Plans at Workplaces

A review of the existing social infrastructure highlighted the current lack of workplace behavioural change programs and green travel plans. Indeed, Council do not currently operate any cycling promotional programs, despite the large number of Council employees at a city centre location.

A real opportunity exists for Council to become a leader in commuter cycling and to set precedents for other workplaces in Ballarat to follow.

4.2.8 Traffic Calming along Residential Corridors

There are a number of residential streets that could be upgraded via implementation of a set of traffic calming measures to form part of a safe, low traffic volume cycling corridor.

Isolated road closures with a bicycle bypass arrangement would aim to reduce traffic volumes and traffic speeds, and would only be introduced in locations where alternative, major roads offer a faster and safer option to vehicular traffic.

4.2.9 Tourism Opportunities

The City of Ballarat has a number of tourist attractions, located centrally and regionally throughout the area. Although the Ballarat Commuter and Touring Map has presented a number of on-road cycling routes of approximately 40-70k in length, there is considerable scope to further develop and promote cycling in Ballarat as an exciting tourist attraction in itself.

An upgrade of the Ballarat Skipton Rail Trail and off-road recreational circuits within Ballarat would serve to attract bicycle tourists that may be less confident on the road or may indeed be seeking a stress free family friendly environment.

4.2.10 Bicycle Sales

Ballarat per capita has a very high level of bicycle sales. Consequently, there is an opportunity to encourage individuals to use their bicycles given the appropriate infrastructure.

4.2.11 Educating All Road Users as to the Needs of Cyclists

The crash analysis indicates that a number of accidents have occurred as a result of driver awareness issues, whereby road users do not anticipate that cyclists will be sharing the road, and are unsure of how to interact with the cyclists. In particular, crashes at

roundabouts should be addressed with consideration given to awareness/educational issues, as well as infrastructure improvements.

Promoting the presence of cyclists and their requirements could be achieved by highlighting the needs of cyclists in the Council bulletin / local newspapers. Increased infrastructure for cyclists, either bicycle lanes or improved signage will also alert motorists to the possible presence of cyclists and create better cyclist awareness.

4.3 Recommendations

The Strategy recommendations have been categorised into three sections, as follows:

- Section 5 - Infrastructure Recommendations
- Section 6 - Management and Implementation
- Section 7 - Promotion and Education

The infrastructure recommendations are summarised initially, followed by the proposed strategy to maintain and manage the network. Educational strategies, both for cyclists and other road users, have been developed to ensure that the requirements of cyclists are widely promoted.

5 Infrastructure Recommendations

The infrastructure recommendations form the core of the strategy. The existing conditions review, consultation exercise and site surveys identified a variety of on and off-road bicycle infrastructure issues and opportunities. This section provides strategic guidance and a 5 year implementation plan for developing cycling infrastructure in Ballarat.

This section is structured as follows:

- The Strategic Network as outlined within Section 5.1.
- Infrastructure Prioritisation as outlined within Section 5.2
- 5 Year Implementation Plan as outlined within Section 5.3
- Costing rates as outlined within Section 5.4
- Off-road Recreational Circuits as outlined within Section 5.5
- Bicycle Parking

It should be noted that the proposed future Sebastopol velodrome development works are considered to be beyond the scope of this strategy. It is recommended that a separate investigation be carried out to determine the requirements for this development.

5.1 The Strategic Network

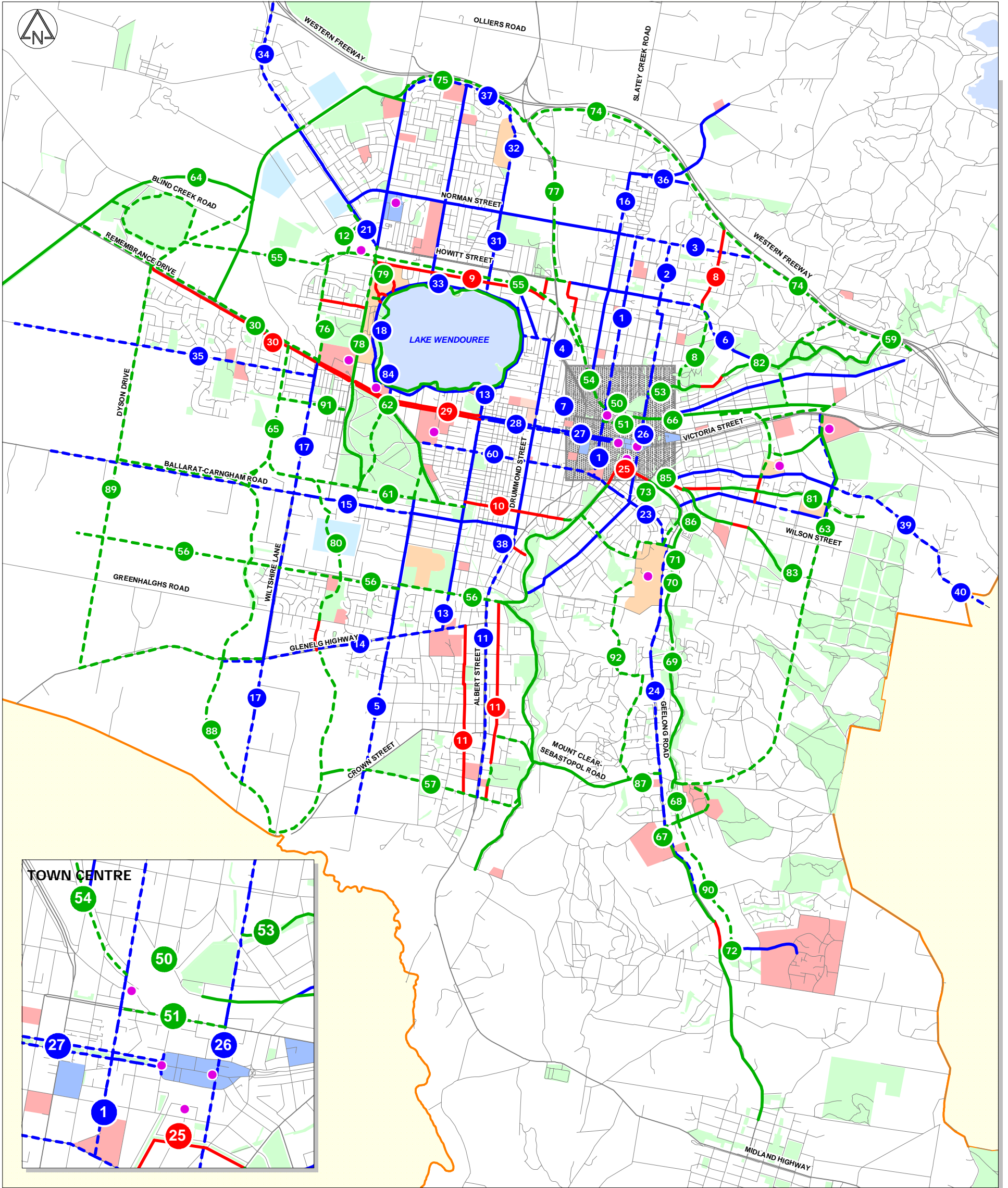
The overall Strategic Network is presented within Figure 1 on the following page. The network provides a structure that ensures long term continuity and connectivity beyond the 5 year context of the strategy. The 5 year implementation plan builds upon existing infrastructure and provides an initial stage to realising the strategic network.

On and off road items are described in detail within the appendix section as follows:

- Appendix G – On Road Infrastructure
- Appendix H – Off Road Infrastructure

In considering the on and off road items outlined, the following should be noted:

- Upgrading and introduction of off-road paths is intended to be of granite sand surfacing, unless otherwise stated
- The recommendations outline strategic links; detailed audits of corridors are beyond the context of the strategy.



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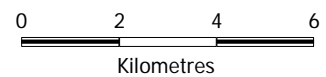
SOURCE: VicRoads Land Information and Survey Group

**Ballarat
City Council**

**Figure 1:
Strategic Bicycle
Network**

LEGEND

- Highways/Main Roads
- Local Roads
- ▭ Ballarat Municipality
- Proposed Quality Bicycle Parking
- ▭ Schools, Colleges & Universities
- ▭ Major Shopping Centres
- ▭ Tourist Attractions
- ▭ Major Employment Centres
- ▭ Open Space/Parks/ Recreational Areas
- Existing:
- On Road Bicycle Path
- On Road Shared Route
- Off Road Bicycle Path
- Proposed:
- - - On Road Bicycle Path
- - - Off Road Bicycle Path



5.2 Infrastructure Prioritisation

Arup understand that Council have a limited provision of resources at their disposal, with respect to both time and finance. Arup has evaluated each recommendation based on a set of key performance metrics, weighted to reflect the value and significance of each metric.

The approach to prioritising each recommendation is two-fold. Firstly, each item was considered with respect to Safety. Any recommendation considered to offer a 'High' level of safety improvement has been fast-tracked onto the five year strategy. Secondly, the potential value of each item was evaluated and weighted with respect to a set of key performance metrics. Further details are outlined within Appendix I.

First Stage - Safety

Irrespective of the wider network connotations of a proposal, improving the level of safety for cyclists using Ballarat's cycling network is at the forefront of the strategy prioritisation. Each recommendation has been evaluated and categorised into three levels of safety impact: 'Low', 'Medium', and 'High'.

The following impacts correspond to a 'High' level of safety impact:

- Addressing a known problem at an existing accident site
- Segregating cyclists from vehicles in a high traffic volume area
- Notable safety improvements on a route adjacent to a school or key activity centre

Second Stage - Impact

The second stage in prioritising the infrastructure recommendations relates to the potential value and scale of impact. Each proposal has been evaluated based on key performance metrics, weighted to reflect the perceived value and bearing of each metric.

Performance Metric	Weighting
Strategic	25%
Connectivity	35%
Anticipated Usage	20%
Consultation	20%
TOTAL	100%

The performance metrics are defined as follows:

Strategic elements relate to the capacity of a recommendation to compliment, develop or expand the overall cycling network, either the PBR network or one of the recreational/tourism circuits.

Recommendations scoring highly for Connectivity will improve or initiate cycling connections to key trip attractors. The attractions primarily considered include schools, employment centres, recreational facilities, the city centre, tourist attractions and rail interchanges.

The Anticipated Usage metric is a measure of the potential catchment of an infrastructure initiative. A recommendation that supports numerous types of cyclist will score well in this category, as will a proposal likely to attract a substantial volume of new cyclists.

A recommendation scoring highly for the Consultation metric will have been either suggested or supported by members of the community, by Council, or by other key stakeholders.

5.3 5 Year Implementation Plan

The completed 5 year Implementation Plan is illustrated within Figure 2 at the end of this section. The suggested timeframes are dependant on political will, planning development or availability of funds. Costs are indicative at this stage and have only been estimated for the building stage. The costs do not include design and audit of infrastructure.

Year 1 – 2008/09

	Location	Stage	Benefit	Cost	Funding
25 26	Peel, Steinfield & Anderson Street	Design	Cross city - All groups	N/A	LAAP (DOI) VicRoads Transit Cities Council
30	Sturt Street – Arch of Victory (VicRoads work)	Design & Build	All groups, Item 30 completed in Year 5	\$50k to \$65k	LAAP (DOI) VicRoads
64	Ballarat Skipton Rail Trail-Gillies St to Smythesdale to Linton (should be completed)	Build	Tourism, Recreation	Fully Committed	Federal Gov Victorian Gov VicRoads Council Adj Councils
71	Canadian Trail, damage to trail from developer	Discussion / liability	All Groups	N/A	Developer Council CHW
67	Canadian Trail - Geelong Road crossing	Design & Build	Students, Recreation (part of school dev)	\$100k	VicRoads Council
18	Tram Tracks, Wendouree Parade	Tram Track	All Groups	\$2K	Council
59	Yarrowee Trail Tunnel at Western Freeway	Design & Build	Recreation Tourist	\$25k to \$60k	Council VicRoads DPCD
79	Off-road link between Gillies Street and lake	Design & Build	Novice, Students, Recreational	\$40k	Council Parks Vic
72	Canadian Trail link with University Drive via verge and splitter island	Design & Build	Students	\$10k to \$15k	VicRoads Council
9	Gregory Street – bypass lanes for bicycles (see also year 2)	Design & Build	All Groups	\$15k to \$20k	Council
53	Yarrowee Trail, steps at Peel Street	Design & Build	Recreation, Tourism, Novice, Commuter	\$30k	Council
4	Macarthur Street	Design & Build	Commuter, Recreation Competitive	\$50k	VicRoads Council
N/A	Bicycle parking and end of trip facilities	Build	All Groups	\$20k	Council

Total Cost = \$342,000 to \$402,000

Year 2 – 2009/10

	Location	Stage	Benefit	Cost	Funding
55	East - West Rail -Trail Macarthur St link to Gregory Street -Gillies St to Ring Rd	Discuss with VicTrack	All Groups	N/A	Council VicTrack
25 26	Peel, Steinfield & Anderson Street	Build	Cross city - All groups	\$600k to \$800k	LAAP (DOI) VicRoads Transit Cities Council
51	Mair Street off-road, connection to station	Design & Build	All Groups	\$15k	Council Transit Cities
27 28 29	Sturt Street – (Pleasant Street to Gilles Street)	Design	All groups	N/A	LAAP (DOI) Transit Cities VicRoads Council
64	Ballarat Skipton Rail Trail – Linton to Skipton	Build	Tourism, Recreation	Fully Comm - itted	Federal Gov Victorian Gov VicRoads Council Adj Councils
9	Gregory Street – Traffic signals at Gillies Street	As Part of New Station	All Groups	N/A	Wendouree Station Development
12	Learmonth Road to Wendouree Station	As Part of New Station	All groups	N/A	Wendouree Station Development
38	Drummond Street, between Latrobe Street and Skipton Street	Build	All groups	\$5k	Council VicRoads
39	Eureka Street, Navigators Road	Build	Link to adjacent townships Competitive cyclists	\$20k	Council
N/A	Bicycle parking and end of trip facilities	Build	All Groups	\$20k	Council

Total Cost = \$660,000 to \$860,000

Year 3 – 2010/11

	Location	Stage	Benefit	Cost	Funding
54	Doveton Crescent & Comb Street	Design & Build	Link to station & city centre	\$80k	LAAP (DOI) Transit Cities Council
628 4	Victoria Park to Lake link and parking	Design & Build	All Groups	\$50k	SRV DPCD VicRoads Council
27	Sturt Street – (Grenville Street to Doveton Street)	Design & Build	All groups	\$80k to \$150k	LAAP (DOI) Transit Cities VicRoads Council
21	Learmonth Road – (between Howitt Street and Norman Street)	Design & Build	Commuters	\$80k	VicRoads Council
76	North/south link west	Design	All Groups, in	\$170k	Developer

	of Gillies Street (link to 65)	& Build	conjunction with Wendouree Station	to \$180k	Council Transit Cities
N/A	Bicycle parking and end of trip facilities	Build	All Groups	\$20k	Council

Total Cost = \$480,000 to \$560,000

Year 4 – 2011/12

	Location	Stage	Benefit	Cost	Funding
85	Canadian Trail link with Warrenheip Gully and Pennyweight Gully trail	Design & Build	All Groups	\$30k to \$40k	Council CHW
69	Canadian Trail - Canadian Lakes	Design & Build	All Groups (Except competitive)	\$100k	Council Developer
28	Sturt Street – (Doveton Street to Pleasant Street)	Design & Build	All groups, post item 27	\$45k	LAAP (DOI) VicRoads Council
29	Sturt Street – (Pleasant Street to Gilles Street)	Design & Build	All groups, post item 27 & 28	\$20k to \$25k	LAAP (DOI) VicRoads Council
78	Gillies Street between Sturt St and Howitt St	Design & Build	All Groups (Except competitive)	\$80k to \$90k	Council DPCD
13	Pleasant Street gaps	Design & Build	All Groups	\$40k	Council
68	Canadian Trail between Olympic & Recreation	Audit and improve	All Groups	N/A	Council DPCD
86	Canadian Crossing - Main Street crossing	Design & Build	All Groups	\$10k	VicRoads Council
1	Lydiard St between Norman St and Grant St – on-road lanes	Design & Build	On-road cyclists, link to station	\$30k to \$35k	Transit Cities Council
73	Canadian Trail adjacent to Barkley Street	Design & Build	All Groups (Except competitive)	\$20k	Council VicRoads
55	East - West Rail Trail - Macarthur St link to Gregory Street via Beaufort Crescent	Design & Build	All Groups	\$30k	Council Fed Funding Transit Cities VicRoads DRD
90	Canadian Trail - Between Olympic Ave and University Drive	Design & Build	Connection to University	\$40k	Council
63	Fussell Street – improve connection to school	Design & Build	Students	\$80k to \$120k	VicRoads Council DOI
N/A	Bicycle parking and end of trip facilities	Build	All Groups	\$20k	Council

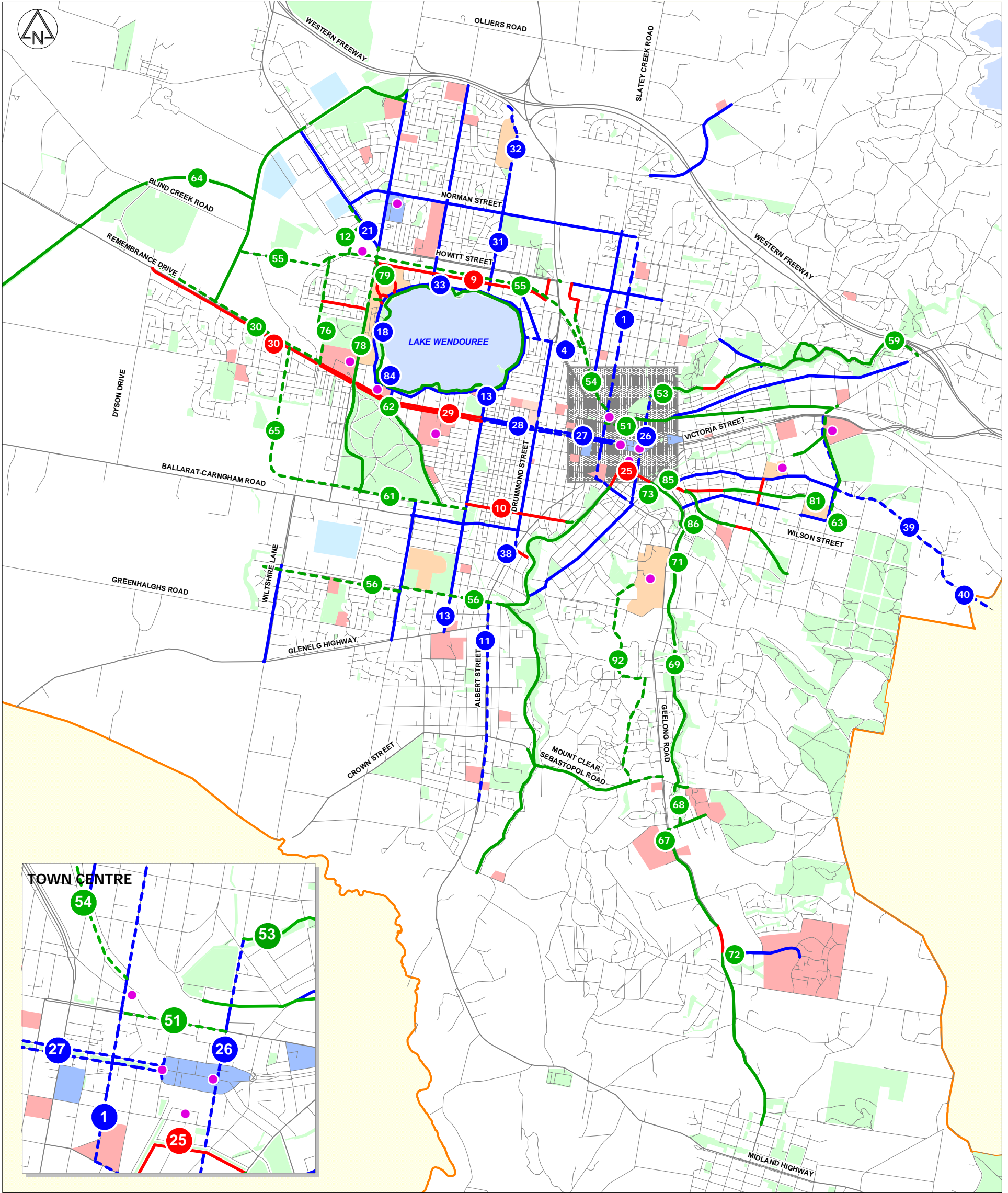
Total Cost = \$545,000 to \$615,000

Year 5 – 2012/13

	Location	Stage	Benefit	Cost	Funding
30	Sturt Street – Complete this item from Year 1	Design & Build	All Groups – Completion of Item 30 linking to Item 29	\$50k to \$65k	LAAP (DOI) VicRoads Council

11	North-South corridor along or near Albert St	Survey & design	Commuter On-road cyclist	\$30k to \$35k	Council VicRoads
56	Whitelaw Avenue and Rubicon Street off-road	Design & Build	Novice, Commuter, Recreational	\$120k	VicRoads Council
10 61	East-west link Winter St & Sebastopol St	Design & Build	Recreation, Tourism, Novice, Commuter	\$85k to \$105k	Developer SRV Parks Vic Council
31	Dowling Street – On – road lanes	Design & Build	Commuters Recreation	\$70k to 100k	Vicroads Council
32	Dowling Street – On-road lanes – includes Giot Drive	Design & Build	Commuter Recreation	\$40k to \$50k	VicRoads Council
92	Tinworth Avenue, and on Britain Street between Whitehorse Road and Sovereign Hill	Design & Build	All Groups	\$40k to \$50k	Council
N/A	Bicycle parking and end of trip facilities	Build	All Groups	\$20k	Council

Total Cost = \$425,000 to \$515,000



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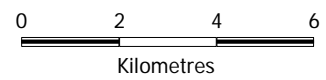
SOURCE: VicRoads Land Information and Survey Group

Ballarat City Council

Figure 2: 5 Year Implementation Plan

LEGEND

- | | |
|--|-------------------------|
| — Highways/Main Roads | <u>Existing:</u> |
| — Local Roads | — On Road Bicycle Path |
| — Ballarat Municipality | — On Road Shared Route |
| ● Proposed Quality Bicycle Parking | — Off Road Bicycle Path |
| ■ Schools, Colleges & Universities | <u>Proposed:</u> |
| ■ Major Shopping Centres | — On Road Bicycle Path |
| ■ Tourist Attractions | — Off Road Bicycle Path |
| ■ Major Employment Centres | |
| ■ Open Space/Parks/ Recreational Areas | |



5.4 Costing

Indicative costs have been developed in consultation with Arup's internal engineering team. The following generic costs provide a foundation for developing costs for recommendations.

Table 2 - Indicative Costing

Item	Use	Unit	Cost per Unit
ON ROAD INFRASTRUCTURE			
Drop kerb (pram kerbing)	Bicycle access from roads	kerb	\$ 210
Clearway bicycle lane installation	On-road formal routes	Lin.km	\$ 8,400
Pavement bicycle symbol	On-road formal routes	No.	\$ 140
Lighting lantern	Road crossings	No.	\$ 800
Zebra crossing	Road crossing	No.	\$ 10,000
Central Refuge for Pedestrians / Cyclists	Road crossing	No.	\$ 10,000
Dropped kerbing at a crossing point to assist Pedestrians and Cyclists	Road crossing	No.	\$ 1,100
Pedestrian / Cycle crossings - signals	Road crossing	No.	\$ 200k
Advance stop lines for cyclists (Head Start Box)	At on-road signalised intersections	No.	\$ 200
Indented parking bays – kerb/channel	Increase road width for new on-road cycle lanes	Lin.m.	\$ 30 - \$ 35
Parking bays –surfacing		Sq.m.	\$ 25
BRIDGES			
Construction – Up to 20m span	Bridge construction	Sq.m.	\$ 1,000
Construction – Greater than 20m span	Bridge construction	Sq.m.	\$ 2,000
OFF-ROAD INFRASTRUCTURE			
Existing shared path widening	Off-road shared paths	Lin.m.	\$ 100
Existing rail/bollard removal	Entry to off-road paths	Lin.m.	\$ 200
Fencing	Off-road paths	Lin.m.	\$ 320
Re-surface/re-edge pathway	Off-road paths	Lin.m.	\$ 130
Shared path construction	New off-road paths	Lin.m.	\$ 250
Granite sand path re-sheet, 50mm depth	Off-road paths	Sq.m.	\$3.00
Granite sand path construction, 100mm	New off-road paths	Sq.m.	\$6.00
ALL ROUTES – WAYFINDING			
Signage - Installation	All formal routes	No.	\$200-\$500
Signage - Removal	All formal routes	No.	\$ 100
Linemarking	All formal routes	Lin.m.	\$ 10
END OF TRIP FACILITIES			
Bicycle rack (3 to 5 bicycles)	Secure bicycle parking	No.	\$ 270

5.5 Off Road Recreational Circuits

Through connecting proposed off-road links outlined under the strategy, it is evident that off-road recreational circuits can be developed throughout the city. These potential off-road recreational circuits are illustrated within Figure 3.

The realisation of these circuits would provide easy accessibility to an off-road recreational opportunity for residents throughout Ballarat and for visitors alike. The circuits would link and enhance Ballarat's key tourism destinations. Individuals can choose to ride small circuits, a combination of circuits or an entire loop around Ballarat. The circuits proposed are illustrated on figure with purely indicative names at this stage. It is also proposed that the circuits are numbered for ease of applying continuity markers (stickers/posts) throughout each circuit.

On completion of the 5 year program of infrastructure recommendations, the following circuits will be near completion:

- Northern Circuit
- Western Circuit
- Southern Circuit

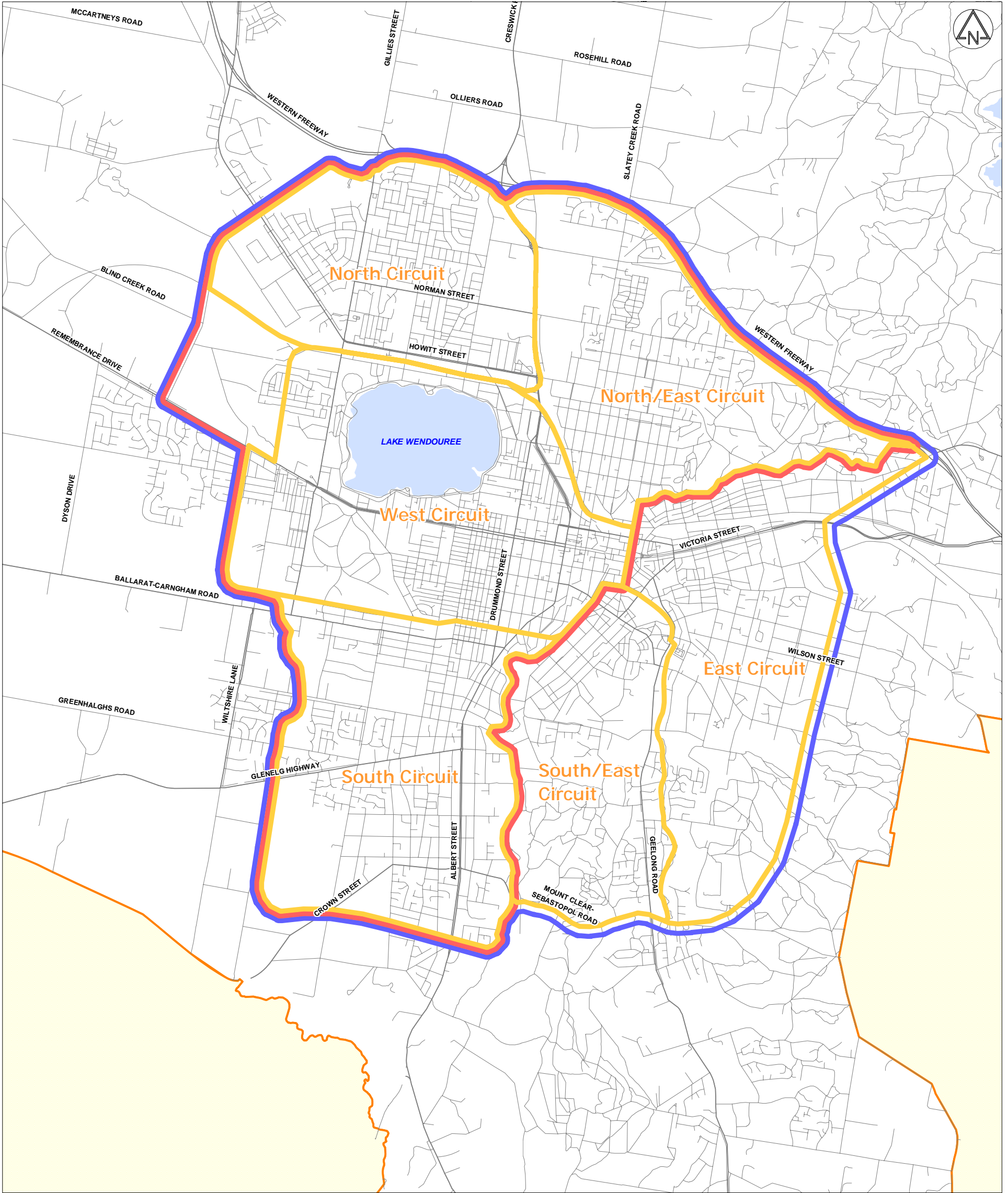
5.6 Bicycle Parking

The lack of secure parking facilities for bicycles is a barrier to potential cyclists and should be addressed at a number of key facilities and amenities. Particular attention should be given to those located adjacent to bicycle routes. It is recommended that as a minimum, the following amenities have secure bicycle parking facilities:

- Schools and universities
- Public transport stations and interchanges
- Recreational facilities (swimming pools, gymnasiums, sporting venues)
- Community facilities (churches, libraries, community halls, venues for social groups)
- Workplaces
- Retail premises.

The degree of provision varies from facility to facility. VicRoads provide initial guidance as outlined within Appendix D, Section D1.2. It is recommended that all locations that have clusters of cycling stands are provided with shelter.

Figure 1 provides a number of locations where sheltered high quality bicycle stands should be accommodated within the 5 year context of the strategy.



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Ballarat
City Council

LEGEND

- Highways/Main Roads
- Local Roads
- Ballarat Municipality

SUGGESTED CIRCUITS:

- Inner Circuits
- "Sovereign" Circuit
- "Eureka" Circuit

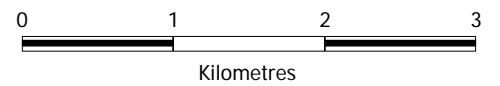


Figure 3:
Recreational/
Tourism Circuits



6 Management and Implementation

6.1 Implementation

In order for Council to successfully progress the Bicycle Strategy, coordination is required between the various Council departments and external Stakeholders such as VicRoads and DPCD.

It is recommended that this process be managed by nominating a lead or coordination department that can accommodate a Cycling Officer or allocate and integrate Cycling coordination duties within an existing Officer's position. This person would be the key City of Ballarat contact for all cycling issues within the municipality. To assist the Cycling Officer, the development of a Bicycle Steering Committee is recommended. The steering committee would include representatives from each of the appropriate Council departments and related external organisations. The steering committee would also include a Councillor, VicRoads and a member of BalBUG. It is envisaged that the Bicycle Steering Committee would meet every three months.

The proposed roles of Cycling Coordination (Cycling Officer) and the Steering Committee are discussed in more detail in the following sections.

6.1.1 Cycling Coordination

It is envisaged that the responsibilities of Cycling coordination be integrated into existing roles with the potential to have a part-time individual appointed as a Cycling Officer in the future. The designated Cycling Officer for the City of Ballarat would provide a key focal person for cycling issues within the municipality. The role of the Cycling Officer would be the implementation of the strategy and the main responsibilities may include but not be exclusive to, subject to the individuals skills and attributes, include:

Major responsibilities:

- Initial key point of contact for any cycling issues
- Coordination of quarterly Bicycle Steering Committee meetings attended by key stakeholders including community bicycle user groups
- Instigation / coordination / leadership of actions to implement a 5 year program of infrastructure development. This may an overseeing role of the actions, and the management of implementation may lie with the Engineering & Open Space maintenance units, respectively
- Identification of funding opportunities and application / acquisition of funds including funding for training, promotion, infrastructure, monitoring and maintenance
- Integrated planning approach and an early means to identify opportunities across different Council departments and key stakeholders
- Promotion and raising awareness of the benefits of cycling and healthy lifestyles
- Promotion of Council / VicRoads achievements (eg. new trails / connections)
- Working relationship with BalBUG and Bicycle Victoria / Liaison with bicycle user groups
- Ensuring that all future developments and retrofitting of existing infrastructure is done in a manner that provides for and encourages bicycle use.

Minor responsibilities:

- Budget preparation, monitoring and reporting (if applicable)
- Ensuring that infrastructure proposals from developers, Council and VicRoads appropriately consider cycling and do not compromise the development of the strategic bicycle network

- Ensuring that new bicycle corridors extend within and beyond new developments and that provisions are to a high standard with direct paths and good continuity and connectivity
- Development and maintenance of information and promotion materials including a Council cycling webpage and updates to cycling maps and brochures
- Responsibilities to partner with other units / agencies
- Implementation of a Council Green Travel Plan including improvements to trip end facilities and advocacy of travel plans to businesses
- Encourage and support the implementation of Green Travel Plans at key employment centres
- Audit and maintenance of cycling infrastructure and management of a routine maintenance budget
- Coordination with adjacent municipalities
- Various walking and public transport coordination and promotion objectives
- Organisation of a monitoring program.

It is important that this officer hold some level of influence within the organisation to coordinate the steering committee and boost the profile of cycling in the City of Ballarat. The creation of a coordination authority / Cycling Officer may also involve redefining responsibilities for an existing Senior Traffic Engineer, Transport Planner, Recreation Development Officer or Parks Planner to include responsibilities for cycling. Assistance from a Junior Engineer / Planner / Officer supporting the Cycling Officer would ensure the most effective use of staff resources. The role may relate directly to or consider job-share with Sustainability Projects or Travel Smart roles.

In order to assist the public promotion of cycling, it is recommended that a Cycling Champion be nominated. The Cycling Champion would be a high profile member of the Ballarat Community. This person would be the 'face' of cycling in the municipality and advocate strongly for cycling at all levels of government and in the private sector.

6.1.2 Bicycle Steering Committee

The development of a Bicycle Steering Committee is recommended, which would comprise of representatives from various council and state government departments and key cycling related organisations including:

- Cycling Departments (Infrastructure, Strategic Planning, Recreation and Open Space, Events and Tourism)
- Victorian Government (DOI, DPCD, DSE)
- VicRoads
- Ballarat Bicycle User Group
- Ballarat and Sebastopol Cycling Club

By closely working with the Steering Committee, it is envisaged that the overall planning and implementation process would be a more integrated and coordinated approach. The Steering Committee has the potential to:

- Provide a discussion forum whereby cycling related issues can be quickly resolved
- Keep Stakeholders up to date with current cycling issues
- Provides an early opportunity to identify new cycling opportunities as part of infrastructure proposals progressed under different Council departments or government authorities which potentially could avoid the need for costly retrofits of infrastructure

- It is recommended that all members of the Steering Committee are provided with a copy of the Bicycle Strategy, are therefore aware of the opportunities and constraints facing cycling in Ballarat, and can consider their role in achieving the strategy's goals.

As indicated above, it is envisaged that the Bicycle Steering Committee would meet once every three months.

6.2 City of Ballarat – A Leader in Cycling

Ballarat City Council has the opportunity to be a leader with regards to cycling. This would provide a positive example to other organisations in the municipality and further raise the profile of cycling. Internal programs and measures that would be introduced within Council include:

- **Green Travel Plan:** A Green Travel Plan should be developed and implemented internally within Council to change the travel behaviour of employees. The Green Travel Plan would identify mechanisms for Council to implement to encourage Council Officers to travel to work using alternatives to single-occupancy car use. Reference should be made to the Department of Infrastructure 'TravelSmart' Programs.
- **End of Trip Facilities:** End of trip facilities are particularly important for encouraging people to ride and particularly to ride to work. Reference should be made to section D1.2 of this report regarding end of trip facilities. While it is acknowledged that it is not a requirement of the Ballarat Planning Scheme, it is recommended that Council retrofit existing Council buildings to satisfy the end of trip facilities requirements of Clause 52.34 of the Ballarat Planning Scheme. This would include changes to the existing bicycle cage at Council Offices to provide secure bicycle parking for Council employees and visitors.
- **Webpage** – A Council webpage that is easy to find serving as a one-stop shop for cycling in Ballarat for residents, schools and employees with links to Bicycle Victoria and VicRoads is recommended providing an important tool for a social marketing program.
- **Internal Bicycle Safety Education and Maintenance:** Safety education and bicycle maintenance programs would reduce the barriers for new cyclists and may encourage employees to cycle to work or recreationally.
- **Ride to Work Breakfast:** In order to encourage employees to cycle to work a monthly ride to work breakfast could be held.
- **Interest Free Loans for Cycling Equipment:** Interest free loans can be established for employees to buy bicycles. Payments are taken from the employees salary each month over a 12 month period. These programs have been implemented at other organisations such as the Darebin City Council and Leichhardt City Council.
- **Salary sacrifice:** It is recommended that the City of Ballarat investigate the potential to provide employees the option of purchasing a bicycle through a salary sacrifice option. Given the complex nature of salary sacrificing, it is also recommended that independent legal advice be sought in this regard.

These measures are critical to further improving Council's reputation when implementing bicycle encouragement and behaviour change programs at organisations throughout the municipality.

6.3 Funding Opportunities

Underpinning the successful implementation of the Cycling Strategy is the ability to secure adequate funding. Although Council is one source of funding, it will have limitations on the amount of capital or operating funding available. It is therefore, very important to ensure that possible funding sources are identified and more importantly that adequate applications are drawn together with clear justification.

A designated Cycling Officer would ensure that the appropriate resource exists to develop funding opportunities and applications.

6.3.1 Funding for Ballarat in 2007/2008

The City of Ballarat has successfully secured funding for bicycle infrastructure projects to the amount of \$100,000 in the 2007/2008 financial year. There is also an allocation of funding for the maintenance of off-roads paths.

6.3.2 Ballarat Skipton Rail Trail

A media release in September 2007 announced the intention of the Federal government and the Councils of Ballarat, Golden Plains and Corangamite to finance the resurfacing and completion of the Ballarat Skipton Rail Trail. The three councils have committed a combined \$200,000 over three years, including \$100,000 from Ballarat City Council. Funding has also been confirmed from the Federal Government (\$250k) and VicRoads (\$300k).

The proposed works will include resurfacing work on the entire trail of 52km in length, providing a high quality gravel surface across its length. Furthermore, the funding will finance upgrade of road crossings, signage installation, and installation of suitable barriers to prevent unauthorised vehicular access. The first stage of works are aimed to be completed during the first half of 2008.

6.3.3 Funding in 2007/2008 and Beyond

A variety of funding sources to assist in the development and expansion of bicycle facilities within Ballarat have been identified. These have been summarised in the following table.

Table 3- Possible Funding Sources (other than Council)

Potential Funding Sources	Additional Information	Amount
Federal Government		
Federal Government & Victorian Government	Bike Lockers at stations throughout Victoria.	\$516k
Victorian Government		
VicRoads	<p><u>PBN Funding: Regional Cities</u></p> <p>VicRoads will consider 100% funding for VicRoads roads, or 50/ 50 with Council on local roads.</p> <p>\$300k confirmed for Ballarat Skipton Rail Trail</p>	<p>\$10 million per year.</p> <p>2007-2008: \$1.41 million regional cities funding (3 projects)</p>

Potential Funding Sources	Additional Information	Amount
Department of Infrastructure (DOI)	<p><u>Local Area Access Program (LAAP)</u> Suitable for projects that provide a link to a Railway Station or a major intersection, or to fund end of trip bicycle storage facilities at Railway Stations, shopping centres, schools etc.</p> <p><u>Connecting Transport Services Program (CTSP)</u> Can be used for installation of bicycle facilities at Railway Stations, such as storage lockers.</p>	LAAP - \$4million per year CTSP – \$20 million per year
DPCD	<p>Transit Cities and Activity Centres fall under DPCD and this includes both Ballarat Station and the proposed Wendouree Train Station.</p> <p>DSE includes Parks Victoria which has funding for Metro Trail Network Paths (not applicable to Ballarat unfortunately)</p>	\$11 million proposed Wendouree station Available funding for access improvements to Ballarat Station
Victorian Government	Provincial Pathways Program (PPP) for Ballarat Skipton Rail Trail projects.	\$8 million (PPP)
Victorian Government - Small Town Development Funding	Match funding for Ballarat Skipton Rail Trail developments. \$250k funding unconfirmed for Ballarat Skipton Rail Trail	Up to 250k
Sports & Recreation Victoria (SRV)	<p>SRV is a government body that aims to increase the involvement of the Victorian community in sport & recreation. A wide variety of projects will be considered for funding (the deadline is normally October) including:-</p> <ul style="list-style-type: none"> - address gaps in facility provision identified through the strategic planning process - are consistent with existing strategic priorities for the area - broaden community access & increase or maintain opportunities for participation - improve access to those groups traditionally disadvantaged in access to sport & recreation facilities - increase the range of users of a facility - are planned in self contained stages <p>Three projects are adopted per municipality per year, (two seeking up to \$60K and one up to \$20K), and would therefore suit a minor project. Further information can be found at:</p>	Council can apply for funding of minor projects with a total value of over \$200,000, with a maximum grant of \$60,000.

Potential Funding Sources	Additional Information	Amount
	http://www.grants.dpcd.vic.gov.au/web18/dvcgrants.nsf/AllDocs/DCC97E81E45D3ADDCA25717D003E344D	
Other		
Private Developers	All new developments should include provision for cyclists. In this way bicycle facilities can be incorporated in the overall development in the initial stages and not added at a later stage on an add-hoc basis. A connection to the outlined Strategic Network should also be pursued. The western growth area in Ballarat presents an ideal opportunity to secure funding for bicycle facilities. Refer to section D1.4.	Unknown
Sporting Organisation Grants	Council supporting grants from major sporting organisations at State or National Association level, e.g. through Bicycle Victoria or elite level sporting groups.	Unknown
Local Amenities Providers/ Operators	There may be scope to obtain some funding from Sports Centres; and for improved bicycle access to their amenities, as this will reduce their need for car parking provision.	Unknown
Universities and Schools for local projects	Cycle parking at schools and university could be jointly funded. Letters addressed to schools, particularly those along cycling corridors, would invite a school to apply for joint funding of cycle parking stands and shelter.	Unknown
Adjacent municipalities Councils	Ballarat Skipton Rail Trail secured: \$50K from Golden Plains Council \$50K from Corangamite Council	NA
Bicycle Victoria	Bicycle Victoria will not provide direct funding for projects, but will assist with promotion of new initiatives, and are a strong and valuable lobbying group.	NA
Other sources for funding and support may include Philanthropic Trusts, Corporate Partners, Community and Service Groups, and the Australian Sports Foundation.		

6.3.4 VicRoads Funding Guidelines

VicRoads has published guidelines on the funding of bicycle facilities on the Principle Bicycle Network (PBN). VicRoads has primary responsibility for managing the development, funding, and implementation of bicycle facilities on the PBN. Council may play an advocacy role to VicRoads to ensure adequate facilities are being provided.

VicRoads will consider providing 100% of the funds to local Councils for constructing on-road bicycle facilities on the PBN and 100% of the funds for off-road bicycle facilities within the road reservation of a freeway, highway, Tourist Road or Main Road on the PBN, subject to the following guidelines:

- Off-road bicycle paths are usually constructed when it is not feasible to provide on-road facilities, and the off-road path will deliver a level of service equal to what would have been provided on-road
- The local council should be actively implementing a strategic bicycle plan

- Council should also be implementing the on-road component of the PBN in a coherent manner
- Proposals that propose extensions to local bicycle paths and on-road bicycle lanes that connect to the PBN
- Incorporation of shared bicycle / pedestrian paths in new suburban developments and whenever major road upgrading or freeway construction works occur.

The funding of bicycle projects other than those meeting the above criteria would be assessed on their merits. However, there is a low expectation that funding would be available for such projects.

6.4 Maintenance

Discussions with Council indicate that there is currently not a specific budget allocated to the maintenance of cycling infrastructure.

The lack of a maintenance program that targets bicycle infrastructure potentially exposes Council to liability issues and claims. Accordingly, it is recommended that the bicycle network maintenance should be considered under the Road Management Plan for Ballarat.

Key maintenance activities include:

- Replacement of signs and surface markings including removal of graffiti
- Removal / relocation of street furniture where this obstructs paths or obscures sight
- Trimming overhanging vegetation
- Clearing pathways and bicycle lanes of loose material
- Adjustment of utility frames and covers in the carriageway and potholes
- Re-surfacing of uneven / broken pavement
- Street-sweeping regimes for on-road bicycle routes
- Weed management adjacent to trails
- Crossover improvements

6.5 Monitoring

An important aspect of the strategy is to monitor cyclist numbers and crashes, particularly following the implementation of new facilities. Monitoring provides a powerful tool that measures the success of cycling infrastructure providing grounds for future funding and further improvements. Forms of monitoring include:

- Census Data (journey to work)
- Crash Statistics
- Household Surveys
- Annual Cycling Counts (Automatic Counts)
- Annual Cycle Parking Counts
- Interviews with cyclists to obtain views and feedback on new facilities/initiatives
- Increase in length of cycle lanes/paths each year.

A number of key indicators supportive of a sustainable future are also outlined under the Ballarat Health and Wellbeing Plan. A number of these indicators relate directly with the development of the bicycle network; these include, number of kilometres of bicycle path, number of kilometres of on-road path, no of trip end facilities and safe routes to schools.

These can all be components of a monitoring program, however, the quality and continuity paths/lanes and facilities also need to be considered.

It is recommended that a monitoring program is developed inclusive of bicycle counts along key corridors including the Ballarat Skipton Rail Trail, Canadian Trail, Yarrowee Trail, Wendouree Parade, Peel Street and Sturt Street. It is recommended that monitoring be undertaken on an annual basis and start before the implementation of the strategy.

7 Promotion and Education

Promoting cycling is integral to raising the community’s awareness of cycling, and of improving the perception of cycling in general. The recommendations have been evaluated based on effectiveness and value, and given a priority. All are long term recommendations.

This section presents a set of recommendations which aim to:

- Educate and increase the understanding of all road users as to the needs and presence of cyclists and as to the likely presence of cyclists and their requirements
- Promote the Ballarat cycle network to the wider community and visitors.

One element of the Cycling coordination (Cycling Officer’s) role is to partner with relevant agencies to initiate, coordinate and foster the promotion and education of cycling activities. Close coordination may be required with a number of groups including Bicycle Victoria and BaBUG.

Table 4 – Promotion and Education Recommendations

Program/ Activity	Target Group	Details	Responsibility	Priority
Awareness and Education Campaigns for Schools				
Safe cycling to schools	Students	<p>Safe Cycling campaigns consist of school wide activities that can be very effective at educating students on safe cycling, and of the workings and maintenance of their bicycles.</p> <p>The Victoria Police can be a valuable resource for promoting cycling safety within schools. Council should aim to develop relationships with appropriate member of the Victoria Police and assist in arranging presentations within schools.</p> <p>VicRoads offer a number of information packages targeted at different age groups that can assist and direct the teaching of safe cycling to students.</p> <p>Refer to http://www.vicroads.vic.gov.au for further details of these programs. Current legislation permits children under the age of 12 to ride on footpaths within the municipality.</p> <p>Road Smart is a traffic safety education program aimed at students aged 5-12 that teaches children to walk, play and travel safely.</p> <p>Bicycle Ed is a bicycle education campaign approved by the government for children aged 9-13, and includes sections covering all aspects of safe cycling; educating children of the components that make up a bicycle, and of how to be a safe road user.</p> <p>Cycle On (now out of print, but some schools may have the booklets) is the follow up package to Bicycle-Ed. It is aimed at Years 7 to 10 and is designed to increase students’ cycling skills, their knowledge of the road rules and their ability to make responsible decisions in the traffic environment.</p> <p>City Rider Guide provides hints and tips on safe cycling</p>	<p>While this is obviously beneficial to students, Council should support the development of the road safety/ bicycle education program through to secondary schools.</p> <p>Council should liaise with VicRoads and schools to implement these programs.</p> <p>Council should also work together with all local schools (all schools can benefit), to work together to promote cycling and to tailor the SRTS program to suit the needs of each individual school that undertakes the program.</p>	High

Program/ Activity	Target Group	Details	Responsibility	Priority
Awareness and Education Campaigns for Schools				
<p>Safe cycling to schools</p>	<p>Students</p>	<p>Safe Routes to Schools (SRTS) is a program that aims to reduce school related pedestrian and cyclist crashes by using a combination of advocacy, education, behavioural change and engineering measures. The aim of SRTS is to provide a safer environment for children on their way to and from school and to encourage children to walk and or cycle to school to decrease traffic congestion surrounding schools during drop off/pick up periods. More information can be found on the following website http://www.travelsmart.gov.au and search for Safe Routes to Schools then follow the links.</p> <p>Council to seek expressions of interest from schools wishing to participate in any educational program.</p> <p>Given that schools have not been receptive to partaking in such programs in the past, the following additional recommendations are proposed. All will require Council to contact the schools and commence discussions:</p> <ul style="list-style-type: none"> • Training Days for school kids to teach safe cycling • Sponsored cycles for schools • More & better bicycle racks/sheds at schools • Encourage parents to ride with the kids • Critical mass: encourage cycling with friends in a group • Encourage bicycle shops to offer discounts to schools, match a shop with a local school, and advertise in a school newsletter. <p>Council should seek to achieve joint funding agreements between Council and Schools for the provision of new facilities at the schools.</p> <p>Ride to School is a targeted travel behaviour change program run by Bicycle Victoria with the intention of 'increasing the number of students riding and walking to school'. The program consists of five components covering a range of measures, including surveys, events, and riding skills education.</p>	<p>Council should liaise with schools and local bicycle shops.</p> <p>Council and Bicycle Victoria to work together to implement the Ride to School program.</p>	<p>High</p>
Awareness and Education Campaigns				

Program/ Activity	Target Group	Details	Responsibility	Priority
<p>Raise awareness of on-road cycling to all road users</p>	<p>Adults</p>	<p>Sharing the Road is an initiative aimed at increasing awareness and observance of key behaviours that will lessen the chances of conflict on the road, and reduce the incidence of common casualty crashes involving cyclists. Sharing the Road has been developed by VicRoads and other members of the Victorian Bicycle Advisory Council, including Victoria Police, RACV, Bicycle Victoria, Cycling Promotion Fund and the Retail Cycle Traders Association.</p> <p>This initiative is aimed at educating both cyclists and vehicles on road rules and ways to share the road with other users safely. Local councils are encouraged and invited to undertake local initiatives to provide Share the Road in their communities, and further information can be found at http://www.vicroads.vic.gov.au, selecting "cyclists" and following the prompts, or from local VicRoads Road Safety Coordinators and www.roadsafe.org.au.</p> <p>Schools that are interested in the schemes should be targeted for localised infrastructure improvements, making safer routes.</p>	<p>Council to liaise with VicRoads.</p>	<p>High</p>
<p>Awareness and Education Campaigns</p>				
<p>Promote an integrated approach to bicycle planning</p>	<p>Engineers / Planners Local Laws Officers</p>	<p>Education also needs to occur at the planning and engineering level at Council. Any new developments which are proposed should incorporate the needs of cyclists. Policies for cyclists should be incorporated into Council documents at the strategic level as well as guidance at the implementation level. Engineers and planners within the Council need to be briefed of the aims of cycling to ensure the requirements are adequately met and incorporated into daily practices.</p> <p>Council needs to work with animal enforcement officers to ensure dog on/off leash requirements are being met by owners on or in close proximity to shared paths, in order to minimise any user conflicts on shared paths. Local Laws Officers at Council to provide ongoing enforcement to ensure that dogs remain under the control of their owners, or on the lead, in designated parks. Consider a 'Dogs-on-leads' campaign/initiative.</p>	<p>Council (Planning & Development; Regulatory Services)</p>	<p>Medium</p>

Program/ Activity	Target Group	Details	Responsibility	Priority
<p>Improving Cycling Safety</p>	<p>All Road Users</p>	<p>The 40kmh zones around schools are effective and increase safety for school children, both walking and cycling to school. There is a draft VicRoads toolkit for Councillors 'How to have a school zone'.</p> <p>It is suggested that Council complete an audit of the roads surrounding the schools in the municipality, with a view to introducing additional school zones if appropriate</p>	<p>Council in conjunction with VicRoads</p>	<p>Medium</p>
<p style="text-align: center;">Awareness and Education Campaigns</p>				
<p>TravelSmart</p>	<p>All</p>	<p>TravelSmart is a Department of Infrastructure led initiative that seeks to encourage sustainable travel by school children, employees and the local community. Green Travel Plans are prepared and these identify methods and proposals to encourage more travel to school/ work in the local area on foot, on bicycle, by public transport or by car sharing. New bicycle infrastructure in Ballarat will be important in assisting the implementation of TravelSmart and to promoting 'green' travel.</p> <p>The current TravelSmart program is undertaking travel behaviour surveys at a number of large organisations. It is recommended that the City of Ballarat continue to promote Travel Smart initiatives, in particular at schools.</p> <p>It is advised that Council regularly review the Green Travel Plan for staff, and ensure that the initiatives are being successfully implemented; Council should strive to set the standard for others in the community.</p>	<p>Council in conjunction with DoI, schools and the local community</p>	<p>High</p>
<p>Driver Awareness</p>	<p>Learner Drivers</p>	<p>Gaining a driving licence in Victoria is currently achieved through obtaining a Car Learner Permit, and then progressing to a Car Licence. A key component of gaining the learner permit involves passing a road law knowledge test, which is based on the Road to Solo Driving handbook.</p> <p>Although the handbook does include elements of cycling safety, a number of community members raised a concern at the limited cycling content present in the test.</p> <p>It is recommended that Council lobby for greater cycle safety content and promotes driver awareness.</p>	<p>Council</p>	<p>Low</p>

Program/ Activity	Target Group	Details	Responsibility	Priority
Promote Cycling as a Mode of Transport				
<p>Social Marketing Program</p>	<p>All</p>	<p>The highest education and promotion recommendation is the establishment of a comprehensive, fully-enveloping social marketing program.</p> <p>This recommendation is primarily aimed at encouraging high school and university (Australian Catholic University) students to cycle, however, the recommendation is also inclusive of major local employers.</p> <p>The program involves the integrated approach of promotion of cycling, Green Travel Plans, safety training (Travel Smart) and awareness programs aligned with trip end facilities and improvements in cycling infrastructure.</p>	<p>Council, in particular the designated Cycling Officer</p>	<p>High</p>
<p>Cycling Events</p>	<p>Recreational and competition cyclists</p>	<p>Ballarat currently has a wealth of bicycle events with particular. Current events include:</p> <ul style="list-style-type: none"> • 10 – 13 January 2008 - Australian Open Road Cycling Championships • 24 February 2008 - Come to Life Cycling Classic • 4 May 2008 - BAD Ride • 20 July 2008 - Melbourne to Ballarat Cycling Classic • 16 – 18 August - 2008 Ballarat Australian Cycling Grand Prix • 29 September 2008 - Gold Ride <p>It is recommended that these events are better coordinated with marketing and education program.</p>	<p>Various</p>	<p>High</p>

Program/ Activity	Target Group	Details	Responsibility	Priority
Webpage – Council webpage as a one stop shop for cycling information	All	<p>The internet offers an opportunity for Council to promote cycling to a wide audience, offers the flexibility to be regularly and easily updated, and can become a valuable resource to the cycling community.</p> <p>The website currently provides a limited amount of information and it is recommended that the City of Ballarat's website be upgraded and expanded to include:</p> <ul style="list-style-type: none"> • Maps illustrating cycle paths and amenities • Safe cycling guidelines • Health benefits of cycling • Rides & Events • Completed projects and proposals • Have your say! • Name & contact details for Council's cycling officer • Links to Bicycle Victoria, BalBUG, etc. • Information relating to cycle lane types and road rules • Safety tips for cyclists. • Photographs of the trails • Location & contact details of bicycle shops in the municipality 	Council	High
Promote Cycling as a Mode of Transport				
Encourage Community to Walk and Cycle more	All	Council should consider sponsoring programs to encourage more people to take up walking and cycling, and more sustainable transport modes in general. Council should work with local community groups and organisations to promote cycling as a mode of transport. Walking programs such as the Walking School Bus should also be implemented more widely	Council in conjunction with community health, neighbourhood houses, service and sporting clubs	High
Promote Cycling Through Partnerships	All	<p>There is an opportunity to work with partners to promote cycling. Promotion of cycling through:</p> <ul style="list-style-type: none"> • Cycling groups/clubs • Competition Organisers • Activity Centres • Social Cycling Activities • Come N' Try days • Engraving of bicycles • Promotion of cycling to the shops etc • Promotion within schools/universities • Public transport providers • Sport facilities and parks 	Council Community health Heart Foundation Neighbourhood Houses Sporting Club Police – Safety Committee Service Clubs Chamber of Commerce	Medium

Program/ Activity	Target Group	Details	Responsibility	Priority
<p>Promote Cycling as a Form of Transport to Work</p>	<p>Employees</p>	<p>A higher proportion of cyclists commuting to work in Ballarat could be achieved through implementation of the following recommendations.</p> <ul style="list-style-type: none"> • Workplaces encouraged to take part in behavioural change programs, • Better and more bicycle parking at workplaces • Encouraging salary sacrificing for bicycles • Better end-of-trip facilities <p>Council to contact major employment workplaces in Ballarat to provide information of all of the above measures, with the intention of 'making it easy' for the workplaces to install new facilities, to educate their employees, and to persuade their employees to commute to work on bicycles. Those organisations that already actively promote cycling and sustainable transport such as Mars and McCain should be recognised and further supported.</p>	<p>Council, in conjunction with significant employers</p>	<p>Medium</p>
<p>Education Campaign Through the Media</p>	<p>All Road Users</p>	<p>The local media could assist in the education campaign by frequently (perhaps monthly) running Council published articles on cycling awareness or cycle promotion. These could also be provided on Council's website.</p> <p>An increase in publicity of safe cycling will educate more people motorists of safe cycling, and will slowly change attitudes towards cyclists on roads. It is recommended to encourage a cycling segment in regular publications such as Royal Auto (RACV magazine), as well as the Ballarat Courier, and other publications. The articles should include tips about how to share the road with cyclists safely, with reminders of road rules.</p>	<p>Council in conjunction with local and regional media</p>	<p>Medium</p>
<p>Promotion of New Facilities</p>				
<p>Promotion of New Cycling Facilities</p>	<p>All</p>	<p>One of the most cost effective ways of promoting cycling is the publicity associated with the provision of new infrastructure. This could include:</p> <ul style="list-style-type: none"> • Public launch of facilities, possibly by a Councillor or State Member of Parliament, as appropriate. • Press release in local newspapers/ Council publications and Council website. • Group bicycle rides linking into Council festivals/ activities. <p>In line with this, regular (e.g. yearly) updated flyers detailing bicycle paths and off-road trails could be provided as a means of promoting the new facilities together with BalBUG maps.</p> <p>Development of a map showing existing and proposed routes, and also linkages with routes in adjoining communities to be put up on website, distributed to households, put on information boards and available at community centres, tourism offices and council offices.</p>	<p>Council in conjunction with local media</p>	<p>High</p>

Program/ Activity	Target Group	Details	Responsibility	Priority
End of Trip Facilities				
End of Trip Facilities	All	<p>More secure bicycle parking facilities will encourage more people to cycle such as bicycle racks, showers and lockers.</p> <p>Council should look to encourage installation of improved end of trip facilities at existing trip attractors (supermarkets, sports centres, large employers), as well as strongly promoting the inclusion of cycling facilities in new developments ensuring that as a minimum new developments adhere to the planning scheme requirements.</p> <p>Initiating the discussions between Council and the developers/business operators would be a suitable role for the Council's cycling officer.</p> <p>It is recommended that Council review the existing level of trip end facilities at existing state facilities and public locations, but also encourage private developers, schools and other major employers to provide and improve their trip end facilities.</p> <p>Figure 1 outlines preliminary locations that would benefit from quality bicycle parking provision.</p>	Council in conjunction with developers and business operators	High

7.1 Summary – Promotion & Education

It is recommended that a Social Marketing Program is developed that complements the Health and Wellbeing Plan. The program would develop an integrated approach to cultural change in travel behaviour.

The program would focus on key segments of the community and tailor events, education and promotion activities to the specific needs of these markets. They integrate fully with development of appropriate infrastructure to suit the audience. This type of program has been shown to be more effective in the long term than some wider ranging promotional campaigns that spread their efforts and moneys more widely and “thinly” and have a lesser and shorter lived impact. Integrated behaviour change programs also provide activities and engagement with potential bike riders throughout the year usually building up to and continuing on from a major event.

Examples of successful behaviour change programs include the Ride to Work Program which runs Australia wide, and the Ride to School Program in Victoria. Both are coordinated by Bicycle Victoria with support from the Victorian government (and by the Federal Government for Ride to Work Day). It is important to tailor these programs to the specific needs of the local area rather than copy the approach adopted in larger urban centres. One way to do this is to run a modified program which integrates with the key dates and events elsewhere – for instance a focus on several workplace ride to work day breakfast events at larger businesses rather than a single central council run breakfast for Ride to Work Day. In this way local areas can maximize the impact of their efforts by “piggy backing” on marketing efforts of a wider program which may support larger and wider ranging media and community engagement campaigns.

The Social Marketing Program would consist of an integrated package of measures for schools/universities, behavioural change program and Green Travel Plans.

Schools should be treated through a combined approach of education (Travel Smart), green travel plans, safe routes to schools, ride to school event and trip end facilities. It is recommended, as a starting point, that those schools that have returned questionnaires be approached and discussions held in terms of developing a package of measures.

It is recommended that Council maximise the impact of their efforts by “piggy backing” on marketing efforts of a wider program which may support larger and wider ranging media and community engagement campaigns. It is recommended that a suite of behavioural change programs are developed based around the following day ride events:

- Ride to Work day (National Day on 17th October)
- Ride to School day (start of school year)
- Ballarat Autumn Day (BAD) (first Sunday of May)
- Time to Ride (BalBUG & Council) (not currently running)
- Bike Path Discovery (BV) – eg Ballarat Skipton Rail Trail Ride

Considering the ageing population and the growing trend of retirees moving to Ballarat, it is recommended that the Time to Ride event is given full support and re-continued. It is also recommended that existing recreational and competitive cycling events are better integrated with promotional and educational opportunities.

It is recommended that Council develop a Green Travel Plan including improvements to trip end facilities and provide encouragement and support to the implementation of Green Travel Plans within key employment centres. Key local employers include hospitals, Mars, McCain’s, Health Services, University & Education Institutions..

Appendix A

Strategic Context

A1 Strategic Context

Arup conducted a documentation review of all relevant strategies at federal, state and local levels. A number of key objectives, recommendations and themes were repeatedly raised and supported by several sources, and are summarised as follows:

- Cycling should be incorporated into all levels of planning, policy and regulation
- Promotion of cycling will assist in the development of sustainable transport opportunities and healthier travel choices
- Cycling safety will be improved through raising the awareness and education of all road users
- The documentation raised several key infrastructure projects considered to be priorities for Ballarat, namely:
 - Completion of the connection from Lake Wendouree to the Ballarat Skipton Rail Trail
 - East-west connection between Lake Wendouree and the city centre
- Cycling infrastructure provision within new development areas
- Cycling promotion, awareness and education initiatives should be implemented to complement the physical infrastructure
- The bicycle network in Ballarat should aim to cater for all groups of cyclist.

A1.1 The National Strategy - Australia Cycling – 1999-2004

The National Strategy provides a framework for the delivery of programs that aim to encourage cycling throughout Australia. The vision is to “Increase cycling for transport and recreation to enhance the well-being of all Australians”. The document complements other national initiatives including the Active Australia and National Greenhouse Strategy.

The document outlines the economic, environmental, social equity, accessibility and health benefits of cycling. The National Strategy outlines six key objectives as follows:

- Objective 1 - Australia Cycling is implemented and reviewed in a coordinated and collaborative manner.
- Objective 2 - Policy and planning integrates cycling as a valued element.
- Objective 3 - Facilities exist that support increased cycling.
- Objective 4 - Safety for cyclists, on and off road, is continuously improved.
- Objective 5 - The benefits of cycling are recognised by decision makers and the Australian community.
- Objective 6 - Cycling is incorporated into all appropriate areas of education, training and professional development.

The strategy document includes a list of strategies aimed at the realisation of each objective. A number of responsibilities fall within the sphere of local government. In brief, these include:

- Policies, planning procedures and regulations that support cycling initiatives
- Create an integrated cycle route network and provision of supporting facilities
- Ensure new developments are integrated including trip end facilities
- Increase multimodal trips
- Safety initiatives and audits
- Awareness and education of all road users and all ages in health and safety
- Provision of reliable information to inform decisions about cycling

It is noted that the timeframe for the strategy has passed, however, the National Strategy remains a strong framework and point of reference that draws together national aspirations.

A1.2 Meeting Our Transport Challenges (MOTC) – Victorian Government

Meeting our Transport Challenges is a transport and liveability statement and was released by the Premier of Victoria in May 2006. It outlines a plan to “*build a world class transport system for Victoria over the next 25 years.*” The document sets out over \$10bn worth of

transport related investment projects over the next ten years. The scope of these extends beyond the metropolitan area and aims to address issues in regional Victoria, such as the need for better access to services and support for economic development, as well as the changing transport demands associated with strong growth in regional centres.

Ballarat was nominated as one of four regional Transit Cities. The Transit Cities program aims to encourage employment and higher residential densities immediately adjacent to "Transport Rich" locations. It is understood that the key design principle of a Transit City is an environment orientated towards providing sustainable transport opportunities/choice and ease of access through mixed use development, variety in the urban fabric and a safe, secure and attractive environment through good design.

MOTC has a series of actions; the following are of particular relevance:

Action 8: Promoting smarter, healthier travel choices. The Government has committed over \$130m to promote greater use of public transport and to encourage people to walk and cycle on shorter, more local trips. A component of this is the behavioural change program TravelSmart aimed at encouraging more sustainable modes of transport.

The Local Area Access Demonstration Program is a MOTC initiative which offers funding for local Councils to develop and implement small-scale 'demonstration projects' that improve access to local facilities with sustainable transport alternatives such as walking and cycling. A demonstration project would typically include minor infrastructure works to overcome local obstacles that may prevent people from using public transport or walking or cycling around their local communities. Examples of potential projects include improving access to railway stations, transport interchanges and community services. Potential works could include better walking and cycling connections, improved signage, lighting and seating, and the provision of information.

Action 9: Creating connected, accessible communities. The Government has committed over \$700 million over ten years in a range of projects to promote better urban planning, improve access to Victoria's transport network, create better community connections and encourage more Victorians to walk and cycle to their destinations.

A1.3 Accessible and Sustainable Travel Grants Package

The Accessible and Sustainable Travel Grants Package outlines funding for two key MOTC initiatives namely the:

- TravelSmart program; and
- Local Area Access Program (LAAP).

TravelSmart is a travel behaviour change program which aims to promote the use of more sustainable forms of travel. By reducing people's dependency on cars, TravelSmart aims to persuade individuals to choose sustainable travel alternatives such as travelling by public transport, cycling and walking. A range of programs are offered, from workplace initiatives, education programs for use within schools and community initiatives for use within households.

The Local Area Access Program is aimed at developing and implementing a range of 'demonstration projects' to improve access to activity centres, public transport or other major destinations within local areas. Through practical initiatives, LAAP aims to overcome local barriers to travel, particularly for pedestrians and cyclists.

Funding has been provided for the program over four years, via MOTC. The first year's grants were awarded in January 2007, with the second years closing date for applications in August 2007 and the announcement of successful projects made in October 2007.

Ballarat has submitted applications for proposals under both the Travel Smart & LAAP Programs. Both applications remain active and Council are awaiting the outcomes.

A1.4 Arrive Alive! Road Safety Strategy 2002 – 2007

The Arrive Alive! road safety strategy for 2002-07 is a State Government co-ordinated by VicRoads. The strategy aims to improve road safety through tackling 17 key issues, including road design, speeding, drink-driving, fatigue and vehicle safety.

Arrive Alive! details several initiatives that aim to reduce the number of crashes involving vehicles, including speed limit reductions; a default 50km/h for roads in built-up areas, school speed zones, and 40km/h through shopping strips.

The strategy determined that head injuries are the common major injury sustained by a cyclist involved in a fatal road crash. Therefore, the Arrive Alive! Strategy has implemented several key initiatives to reduce the risk of bicycle crashes, and to decrease the severity of the victims' injuries:

- Improved Enforcement
Mandatory helmet wearing has been introduced and has already seen a reduction in the number of cyclists killed on Victoria's roads.
- Educate Cyclists
Through implementing the Bike-Ed safety skills program and Cycle On bicycle safety program for primary and secondary schools respectively.
- Improved Road Environment for Cyclists
Ideally through separation of cyclists and vehicle traffic

Statewide activities for the first half of 2007 included:

- Enforcement – Victoria Police
- Publicity – VicRoads/RoadSafe
- Share the Road – Victorian Bicycle Advisory

A1.5 City of Ballarat Bicycle Strategy (1999)

A Bicycle Strategy was developed by the City of Ballarat in 1999 in conjunction with "Parklinks Pty Ltd" and "Peter Moore and Ardam Design Services". The key areas of focus in the strategy include:

- Planning, Education and Knowledge: This section focuses on providing a framework for implementing the strategy. There are a number of recommendations that included establishing a Regional Bicycle Council, developing standards, policies, briefs and providing coordination of Council activities to include the consideration of cyclists.
- Network Development: This section includes the provision of cycling infrastructure along key routes and at major destinations. There are a number of recommendations that relate to the development of an on-road and off-road bicycle network, which includes the provision of event, tourism and sport routes. The provision of end of trip facilities and bicycle network signage system are also considered.
- Activities and Information: This section includes recommendations on the promotion of cycling and the development of maps.

The above recommendations were supported by a ten year bicycle works program at a total of \$2.34 million, including \$2.15 million for trail development. The aim of this strategy was to increase the mode share of cyclist trips to 10% by 2005 (as a percentage of all trips taken, not just work related). However, no monitoring of cycling numbers has taken place.

At the strategy development stage, Arup will undertake a review of the actions recommended within the 1999 Bicycle Strategy to determine the extent to which they have been implemented. If still outstanding, Arup will review the relevance of the proposal with a view to inclusion in the 2007 Bicycle Strategy.

A1.6 Council Plan 2007-2012 / Blueprint Ballarat

The Council Plan outlines the strategic objectives of the Council and complements *Blueprint Ballarat*, the community's plan for the development of the City to 2030.

Blueprint Ballarat recognises Ballarat's excessive car dependency together with the need to improve public transport and walking and cycling infrastructure.

Blueprint Ballarat provides recommendations relating to a set of eight themes and related objectives including the Services and Infrastructure theme, which includes an objective to:

- Demonstrate a major commitment to public transport and walking/cycling as alternative travel modes

The development of this Bicycle Strategy was one of the priorities for the 2007/08 period. The key infrastructure projects to be achieved in 2007/08 include:

- The completion of the missing links in the Lake Wendouree on road circuit.
- Supporting the Ballarat Skipton Rail Trail Management Committee funding bid
- Works on Yarrowee and Canadian Creek trails
- Connection of Lake Wendouree with the Ballarat Skipton Rail Trail, including on going maintenance.

The 2008 / 09 projects include the completion of the Wendouree Parade on road bicycle circuit. If funding is available in 2008/ 09, resealing and the further maintenance of the Ballarat Skipton Rail Trail has been highlighted as a key activity.

A1.7 Ballarat Health and Wellbeing

The Health and Wellbeing plan provides strategic direction to Council identifying the issues and needs for health and wellbeing in the community. The document is an overarching plan to this Bicycle Strategy which recognises cycling as an essential component as an active form of transport.

As part of the plan, six Fact Sheets were developed; Fact Sheet 3 outlines the significance of transport and its impact as follows:

"Transport plays a significant part in most people's everyday lives and can be a major determinant of health both directly and indirectly. There are several links between transport and its impact on health and the environment, such as:

- Motor vehicles contribute to 13.5% of Australia's net greenhouse emissions and are a major source of air, water and noise pollution. It is recognised that these factors have an accumulative effect on our physical and mental health.
- Over-reliance on car use, as well as inadequate attention to the safety of other road users takes its toll each year in Ballarat via preventable deaths, injury and disability (FACT Sheet 2).
- In the last 20 years the proportion of Australian adults who are now overweight, obese or inactive has increased in parallel with our greater reliance on cars
- Walking and cycling are seen as the most accessible forms of physical activity by most of the population regardless of income, age and location.
- Increased car usage has resulted in urban sprawl with more people moving to suburban areas that are dependent on having a car. This has resulted in neighbourhoods that do not encourage social interaction and are planned around large shopping centres rather than community hubs."

Key indicators to support a sustainable future in Ballarat as outlined within Fact Sheet 3 include:

- Reduced speed limits in urban centres
- Length of off-road cycle/walking paths
- Length of on-road bicycle lanes
- Number of end of ride facilities
- Number of safe routes to school.

Appendix B

Existing Conditions

B1 Existing Conditions

This section provides a summary of existing conditions, detailing the key conclusions and aspects of each element considered within Stage Two of the study.

B1.1 Study Area

Ballarat is a major inland regional city. Located 105 kilometres North West of Melbourne, Ballarat is bounded by the adjacent councils of Golden Plains Shire, Hepburn Shire, Pyrenees Shire and Moorabool Shire.



Figure 4 – Ballarat and Surrounding Shires

The City of Ballarat covers an area of 740sq kilometres and is home to 35,000 households, providing residence to 90,000 people.

The population of the municipality is predicted to increase by over 6,000 people before 2021, with the most significant growth areas to be Alfredton, Delacombe, and Miners Rest. A steady but notable increase is also expected in Mount Clear and Sebastopol. The Ballarat West and Canadian Valley development areas are the most prominent residential growth areas.

The centre of Ballarat is served by Ballarat Railway Station, which provides a connection to the suburbs and regional Victoria. It is understood that a second central railway station in Wendouree will improve the railway connectivity. The predicted growth of Ballarat's population is assisted by the increased connectivity with Melbourne and regional Victoria. At present, VicLink operate 17 rail services between Ballarat and Melbourne on weekdays, and 14 weekend services. The journey takes approximately 80minutes, or 64minutes on the peak hour express services.

The road network through Ballarat is extensive; the Midland Highway (A300) runs north to south through the heart of Ballarat, providing a connection to the residential Sebastopol in the south, and north to Wendouree and Mount Rowan. Sturt Street and Victoria Street (C805) provide an east-west connection across Ballarat. .

Ballarat offers a number of significant trip attractors, both centrally located, and in the surrounding suburbs.

The city centre attractors include:

- Central Square Shopping Centre
- Bridge Mall Shopping Centre;
- The University of Ballarat (SMB) campus
- Galleries and theatre, and
- Ballarat Branch Library.

The major suburban trip attractors include:

- Sovereign Hill, Gold Museum and Ballarat Wildlife Park tourist attractions
- Botanical Gardens, Lake Wendouree and the Aquatic Centre
- Wendouree, Stockland, Sebastopol and Mount Clear Shopping Centres
- Eureka Centre
- Victoria Park
- Equestrian centre and a velodrome at Sebastopol
- University of Ballarat - Mt. Helen Campus
- Township of Buninyong, and
- Hollioake Park Sports Complex.

Figure 5 on page 15 presents a plan of the land uses in Ballarat, including major education and employment centres, shopping centres, stations, tourist attractions and sporting facilities.

B1.2 Demographics

The key findings of the demographic analysis are as follows:

- 15,600 school aged children reside within Ballarat. This is a large population that could potentially be attracted to cycling, providing that the cycle routes to their schools are safe, and parking and storage facilities are available at their school.
- 9% of households within Ballarat do not own a car, and 36% own one car. Given that the average number of residents per household is approximately 2.92, an estimated 31,000 of Ballarat residents live in households with one or less private cars.
- 1.2% of Ballarat resident's cycle to work. This is a figure that has potential to be increased, given the size of the Ballarat and the high number of residents that live

within reasonable proximity to their place of employment. All trips of 5-10km are considered local and are achievable on a bicycle with minimal fitness levels.

- The age group of 20 to 59 accounts for 53% of the population. A large proportion of this demographic is potentially able to cycle to their place of work.

B1.3 Existing Cycling Participation

There is currently limited information on the participation rates for cycling in Ballarat. At the present time, the ABS “travel to work” data provides the best indication of bicycle usage for the municipality. However, this data does not include non-commuter bicycle trips, such as recreational riding, travel to school and competitive cycling.

Table 5 below summarises the trends of cycling in Ballarat and provides comparisons to similar regional municipalities; Greater Bendigo, Greater Geelong and Greater Shepparton.

Table 5 – Census Data Mode of Travel to Work

Municipality	Approx Population ¹	1996	2001	Percentage change
Ballarat	88,400	407	397	-2.1%
Greater Bendigo	96,700	447	461	-3.1%
Greater Geelong	205,900	867	844	-2.7%
Greater Shepparton	59,200	479	429	-10.4%

[1] 1 – Source Australian Bureau of Statistics (as at June 2006)

The above table demonstrates that the number of cyclist trips to work in all areas has decreased for the period 1996 to 2001. In comparison to the other regional municipalities, it is noted that Ballarat has only had a minor reduction in the number of bicycle trips.

The 2006 Census data is available in November/December 2007.

Current Bicycle Victoria membership in Ballarat is over 700 individuals. BalBUG releases a regular newsletter to over 100 individuals within Ballarat.

No cycling counts are currently available within Ballarat. Sources pursued included the City of Ballarat, VicRoads, BalBUG and Bicycle Victoria.

B1.4 Crash Data

In the City of Ballarat between 1/1/2001 and 31/12/2005, there was a total of one hundred and three (103) reported casualty crashes involving a cyclist.

Figure 6 on page 16 focuses on crash data across Ballarat, including detail of the high accident locations and the city centre.

Figure 7 on page 17 displays the entire Ballarat municipality, demonstrating the locality of townships and their relationship with Ballarat.

The reported bicycle casualty crashes were identified using the VicRoads CRASHSTATS database, and refer to crashes occurring on roads or pathways that were reported to Victoria Police and resulted in a fatality or injury. It is expected that the actual number of minor crashes and near misses is much higher, given that many crashes are not reported. Anecdotal evidence from Victoria Police suggests that only 1 in 20 (5%) of all bicycle crashes is reported.

The Existing Conditions Report assessed all bicycle crashes in Ballarat within this five year period. The results are summarised in the following sections:

B1.4.1 Crash Types and Patterns

The analysis of all bicycle crashes in Ballarat indicated the following:

- 61% occurred at intersections (38% at cross intersections, 23% at 'T' intersections)
- 36% occurred at mid-block locations.
- 27% of crashes involved primary and secondary school aged children
- 42% of crashes involved cyclists aged 30 to 49
- 86% - involving a collision with a vehicle.

Analysis of the data was undertaken to establish the general characteristics of the crashes involving cyclists. The key results of this analysis indicate that crashes involving a cyclist generally occur:

- 85% - in dry conditions
- 72% - during the day
- 86% - with clear visibility
- 97% - on paved surfaces
- 97% - between Monday and Saturday
- 90% - cyclists injured in crashes are male.

B1.4.2 Crash Hot Spots

The CRASHSTATS data was reviewed to determine crash "hot-spots" for cyclists. There were no locations within the City of Ballarat that exhibited more than two reported casualty crashes. There were four locations where two crashes had occurred for the period 1st January 2001 to 31st December 2005, as follows:

- At Albert Street and Dana Street roundabout
- At Eyre Street and Pleasant Street roundabout
- At Doveton Street and Howitt Street roundabout
- At Hamilton Avenue and Wendouree Parade roundabout.

Due to the low number of crashes at these locations, it is considered that the above intersections do not highlight any particular safety concerns. However, there is a distinct number of crashes, although isolated, surrounding the Mall and Lake Wendouree.

Ballarat cyclists, particularly training cyclists, undertake multiple on-road loops of Lake Wendouree. There have been a significant number of crashes (a total of 14 crashes) along Wendouree Parade. A breakdown of the types of crashes along Wendouree Parade is shown on Table 6.

Table 6 - Types of Bicycle Crashes along Wendouree Parade

DCA	Crash Type	Count	Percentage
174	Out of Control (cyclist)	4	29%
130	Rear End	3	21%
113	Right Near	2	14%
	Other	5	36%

Of the crashes occurring along Wendouree Parade, three were at roundabouts. In June 2005 a number of bypasses were installed at roundabouts to address safety concerns. BalBUG has indicated that this initiative has improved safety for cyclists using Wendouree Parade, and has generally received positive feedback from cyclists. The crash data (2001-2005) analysed does not highlight the benefit of the bypasses at this stage due to their recent introduction.

In July 2007 Council introduced green surfacing at the tramway crossing at Wendouree Parade. This measure intends to clarify the cycle lane alignment across the tram lanes, and to advise of the safety concerns. It is too soon to determine the effectiveness of the treatment.

There are a number of other measures that could be introduced to improve cycling safety surrounding the lake, and this will be reviewed and developed further as part of the strategy. Initial assessment has demonstrated that the following measures may be appropriate:

- The installation of bicycle symbols on the approach and departure sides of all intersections or at a maximum of every 200m to highlight the presence of cyclists.
- Repainting the existing pavement symbols and line marking to highlight the presence of cyclists.
- Prohibition of parking in areas where off road paths reconnect with on-road cycling lanes or at points of conflict with pedestrians. This will improve sight lines for cyclists.

B1.5 Promotion and Education

As part of the existing conditions assessment, Arup reviewed the current cycling information available to the community. A summary of the review is as follows:

- Green Travel Plans have not been introduced at all known major employers in Ballarat, including the City of Ballarat offices.
- The Ballarat Commuter and Touring Map was developed in 2006 by Council in conjunction with BalBUG and VicRoads. This plan provides a good foundation for mapping the cycle routes in Ballarat, and details cycle routes and facilities within the city.
- The Ballarat Bushwalking and Outdoor Club runs the annual Ballarat Autumn Day (BAD) ride between Ballarat and local townships (Creswick in 2006, Buninyong in 2007). The ride is held on the first Sunday of May each year, and besides being popular with touring cyclists, BAD also promotes cycling to the general community.
- BalBUG assisted Bicycle Victoria in running the 'Time to Ride' initiative in Ballarat. The objective of the program is to encourage people over the age of 50 years who have not ridden for a long time to get back in the saddle. Time to Ride adopts a lecture and riding program over a period of ten weeks.

B1.6 Review of Existing 1999 Bicycle Strategy

Arup have completed a review of the recommendations outlined within the 1999 Bicycle Strategy. Each outstanding recommendation was considered for relevance given the demand, condition and requirements of the current bicycle network. Where appropriate, the proposed infrastructure recommendations have been drawn through and detailed as part of this 2007 Bicycle Strategy, and are outlined in Section 5.

The strategy developed a series of recommendations based on 4 major directions:

- Planning, Education and Knowledge

Focusing on the co-ordination and understanding of cycling within Council and throughout the community.

- Network Development

Lays out a set of recommendations to improve the physical cycling network in Ballarat, both on-road and off-road.

- Bicycle Facilities

Considers the need to provide improved end of trip facilities for cyclists at major trip destinations, as well as an integrated and continuous signage system.

- Activities and Information

Includes provision of maps, events, and cycling promotion throughout Ballarat.

The consultation process involved discussions with Ballarat Cycling Clubs, Council departments, adjoining Councils and other key stakeholders. A school questionnaire was also distributed to 45 schools, and received 27 responses (or 60%). The comments and suggestions arising from the consultations were collated and formed a set of issues and associated actions.

The key actions were taken forward and developed into recommendations, and are summarised in this section.

B1.6.1 Planning, Education and Knowledge

- Consideration to be given to cycling issues in all Council strategies.
- Designate a regional Bicycle Co-ordinator to oversee the implementation and co-ordination of bicycle activities.
- Council to undertake a training program for Council staff in bicycle awareness.
- Establishment of a Regional Bicycle Council to provide a high level focus of cycling in Ballarat, with consideration to overseeing the strategic development of the cycling network.
- Council to work with schools, Victoria Police, workplaces and through local community channels to promote and encourage cycling education and associated benefits.

B1.6.2 Network Development

Aside from the outstanding infrastructure recommendations that have been brought forward and are detailed in Section 5 of this strategy, the 1999 strategy included actions to:

- Include additional routes as part of the Victorian bike network, formalised as part of recreational, tourism and competitive routes. Includes adoption of a Ballarat Trail Network to enhance the off-road connectivity for less experienced cyclists, and to consider redundant railway lines as potential routes.
- Identify locations for a footpath cycling network, in conjunction with VicRoads.
- Local Area Traffic Management to recognise the needs of cyclists locally with a view to enhancing safety for cyclists in residential areas.

B1.6.3 Bicycle Facilities

- Support VicRoads to develop on-road bicycle facilities, such as on-road cycle lanes and other VicRoads controlled cycling facilities.
- Improve integration of cycling with other public transport modes, such as provision of bicycle facilities at bus and rail stations.
- Develop maps and signage to promote tourist and recreational routes.
- Survey all major destinations and determine suitable locations for cycling facilities. Includes a review of Council offices, workplaces and schools.

B1.6.4 Activities and Information

- Develop a signage system to inform cyclists of the route and trail networks.
- Produce maps and brochures showing routes and trails within Ballarat.
- Instigate community activities, such as festivals and bike marking.

The strategy provides a work program for all infrastructure recommendations, including indicative costs across a short term (1 to 3 years), medium term (3 to 5 years) and long term (5 to 10+ years) timescale.

The 1999 Bicycle Strategy outlines the Concepts for Bicycle Facilities, an outline of the treatments of intersections, on-road and off-road actions that will set a standard for cycling facilities within Ballarat.

B1.6.5 Monitoring and Review

The 1999 Bicycle Strategy suggested that Council undertakes regular monitoring of cycling in Ballarat to test and gauge the effectiveness of completed measures. Suggested targets for cycling participation, as a percentage of all travel, was:

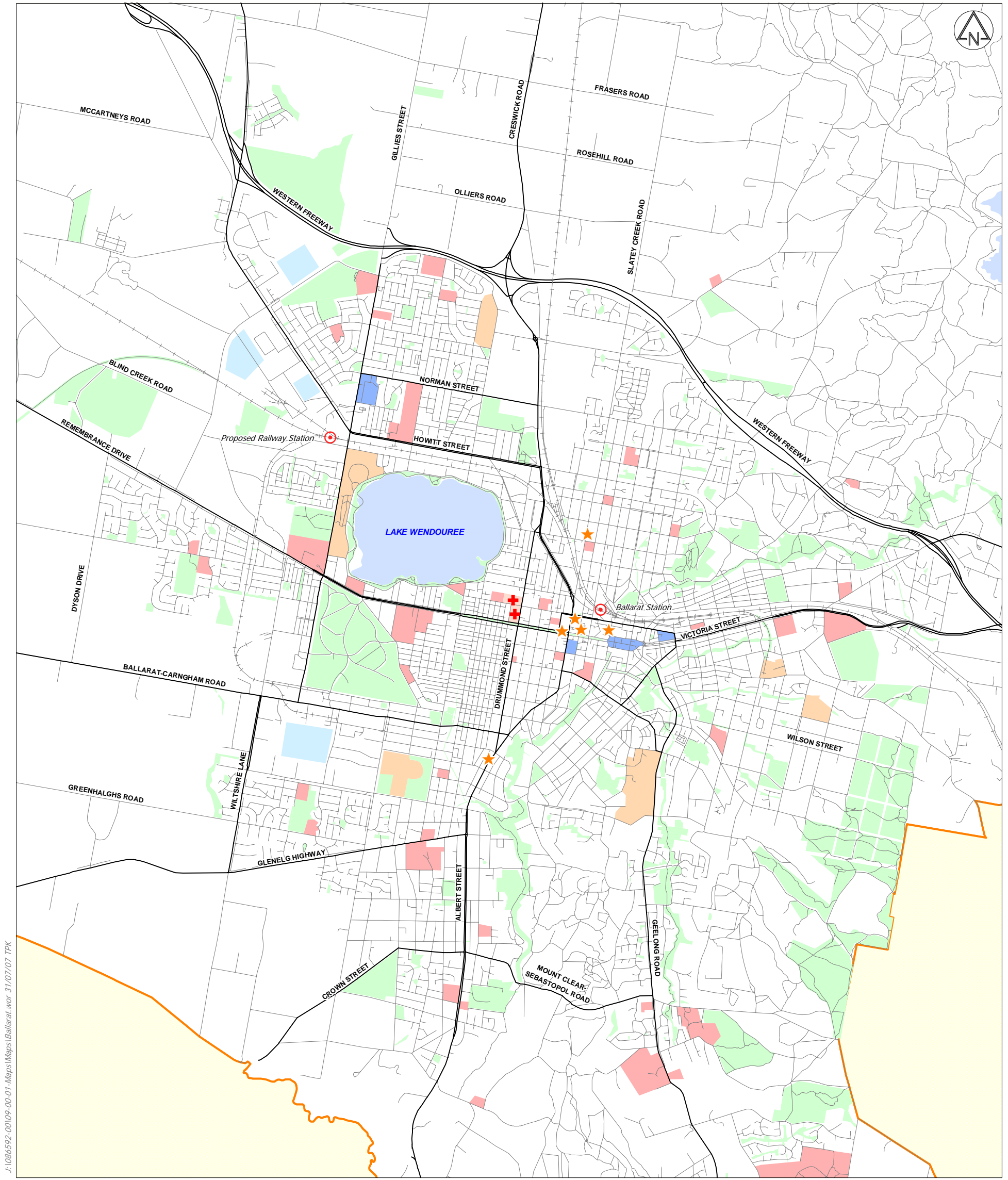
- 3% by 1998
- 5% by 2000
- 10% by 2005

B1.7 Bicycle Network

The existing bicycle network is presented on **Figure 8**.

This plan comprises all on and off road bicycle routes, and includes:

- Routes identified within the VicRoads Principal Bicycle Network (PBN)
- Routes identified on the Ballarat Commuter and Touring Map
- Revisions and updates to the network, based on site visits and discussions with Council and other key stakeholders.

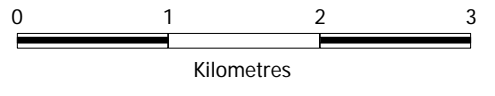


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**Ballarat
City Council**

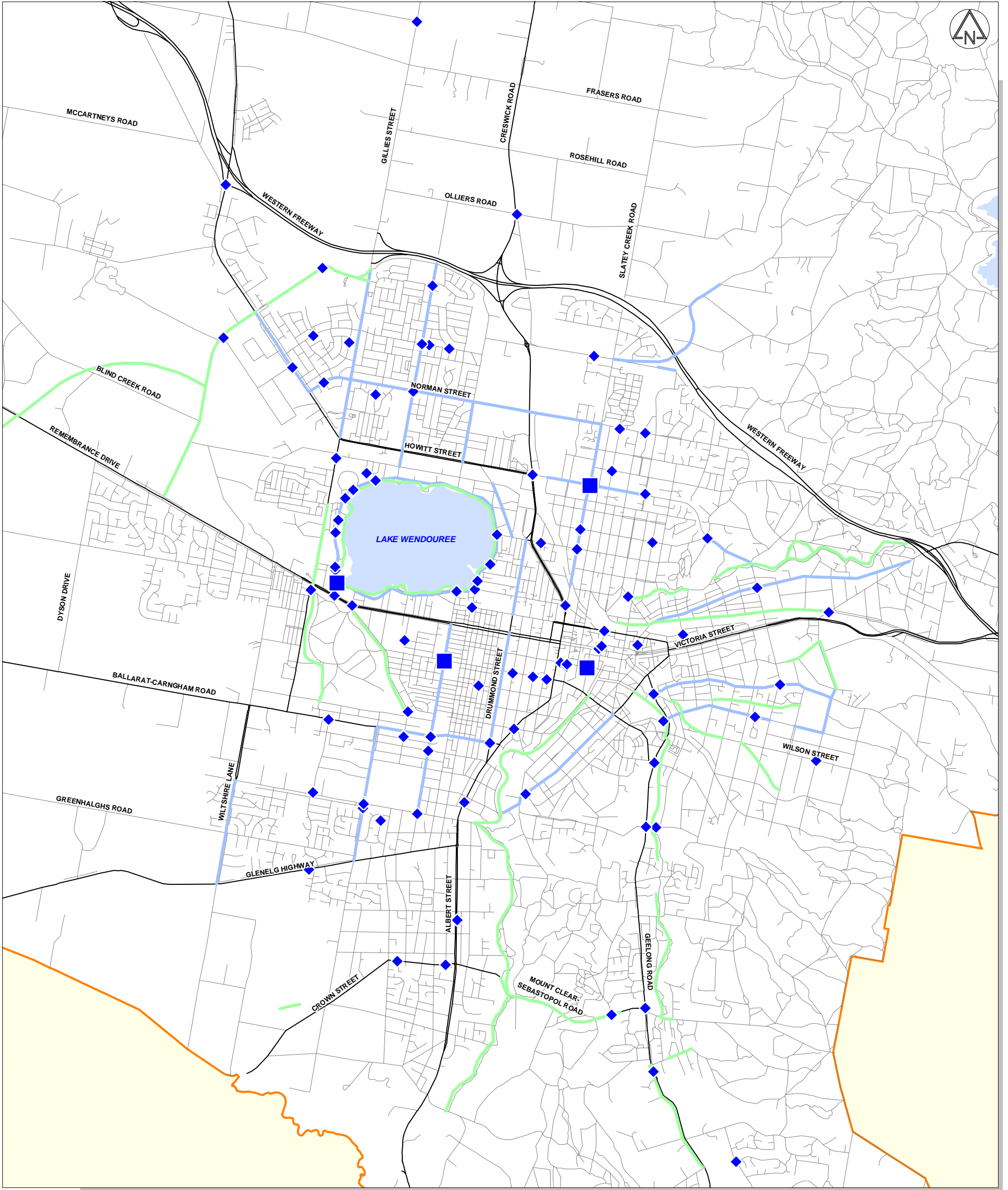
LEGEND

- Highways/Main Roads
- Local Roads
- ▭ Ballarat Municipality
- ▭ Schools, Colleges & Universities
- ▭ Major Shopping Centres
- ▭ Tourist Attraction and Major Sporting Facilities
- ▭ Major Employment Centres
- ▭ Open Space/Parks/Recreational Areas
- ⊕ Hospitals
- ⊙ Railway/Major Bus Stations
- ★ Bike Shops



**Figure 5:
Ballarat Land Use**





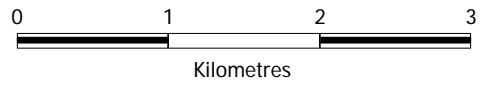
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**Ballarat
City Council**

- LEGEND**
- Highways/Main Roads
 - Local Roads
 - ▭ Ballarat Municipality

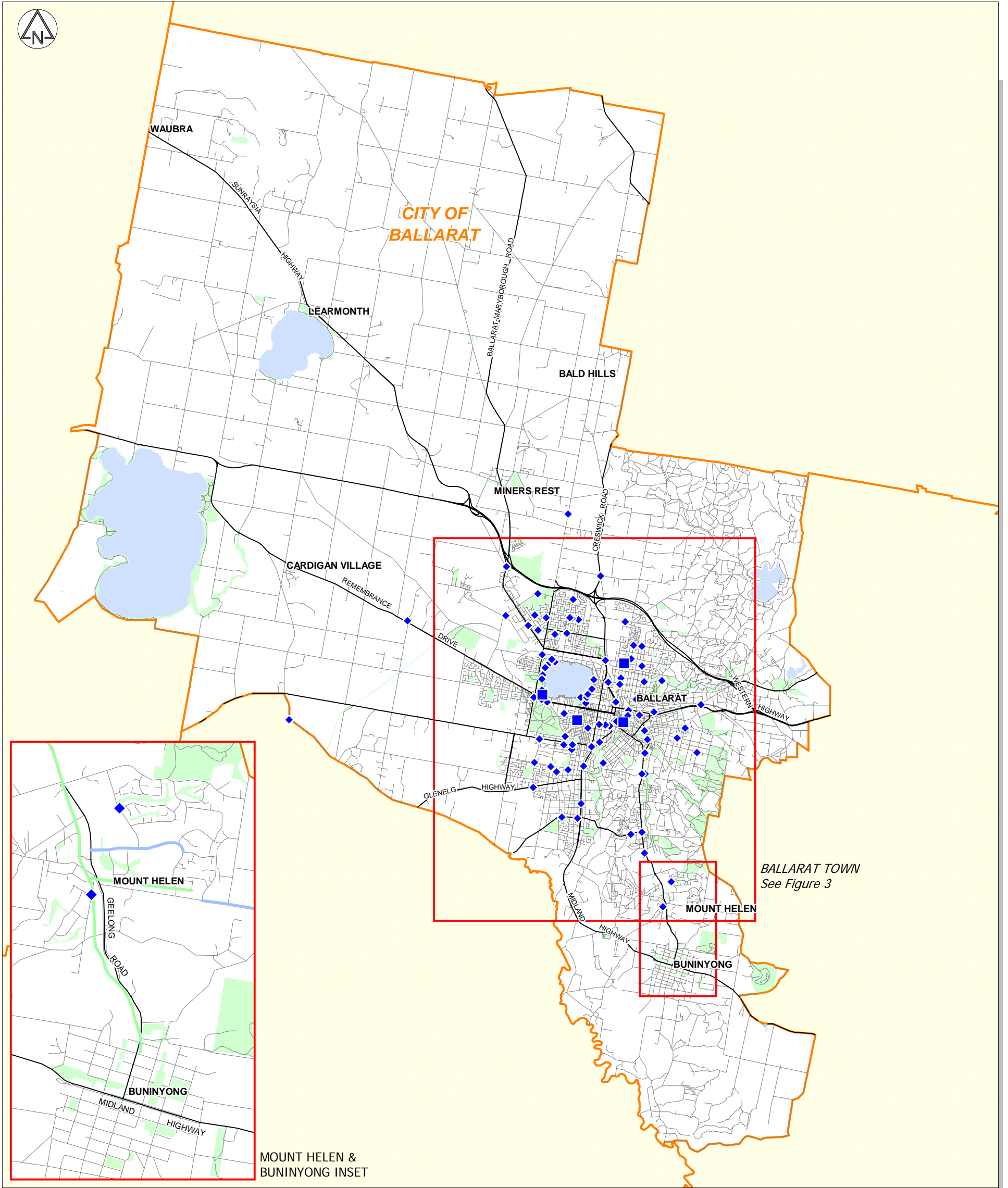
- Bicycle Crashes:**
- ◆ One Crash
 - Two Crashes

- Existing Bicycle Paths:**
- On-Road Path
 - Off-Road Path



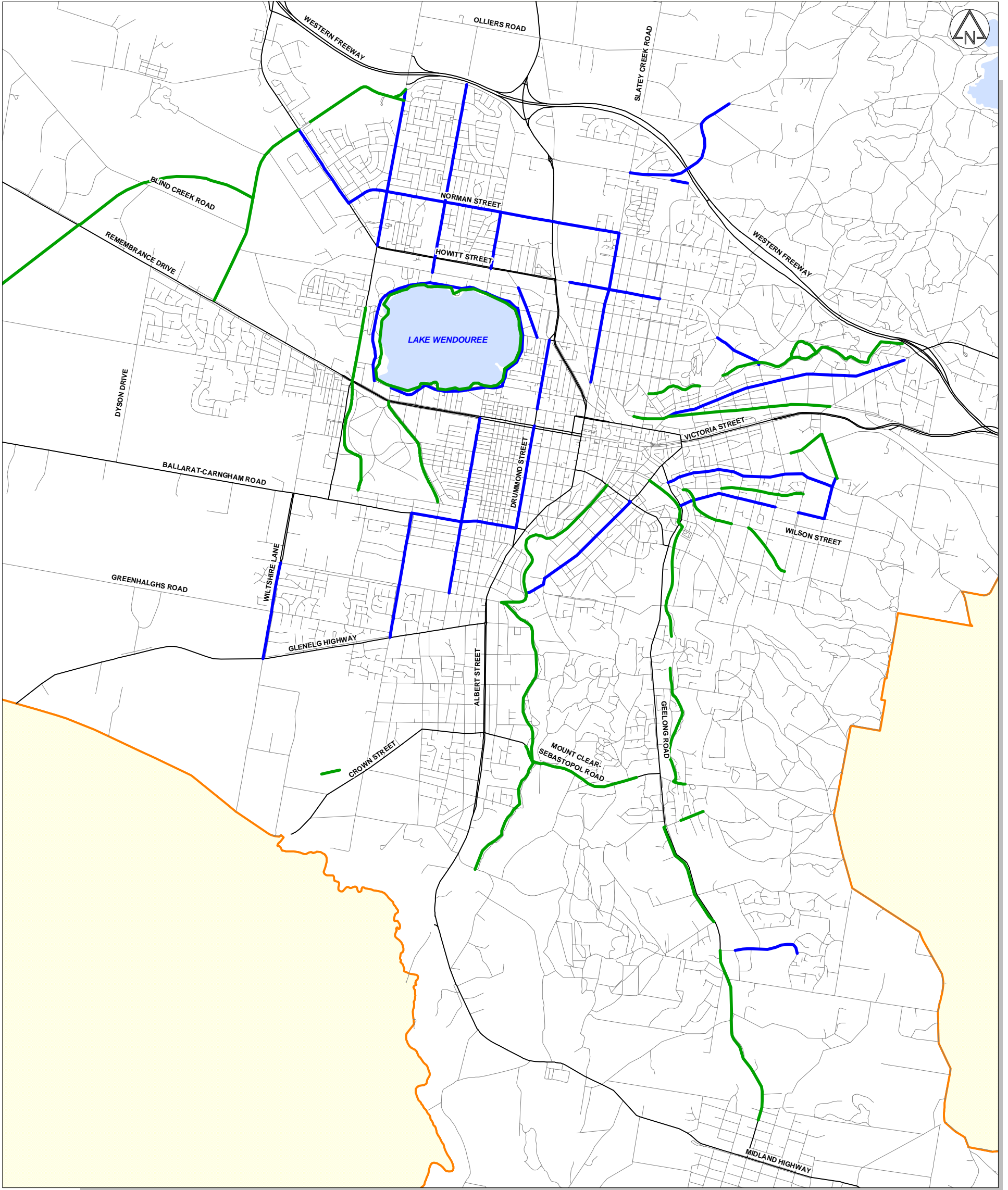
**Figure 6:
Crash Data -
City of Ballarat Town
01/01/01 - 31/12/05**





SOURCE: VicRoads Land Information and Survey Group

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




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SOURCE: VicRoads Land Information and Survey Group

Ballarat
City Council

LEGEND

-  Highways/Main Roads
-  Local Roads
-  Ballarat Municipality

Existing Bicycle Paths:

-  On-Road Path
-  Off-Road Path

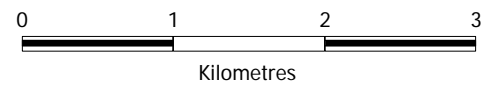


Figure 8:
Principal Bicycle
Network



Appendix C

Consultation

C1 Consultation

The consultation process consisted of a number of integral components, as follows:

- Community Workshop
- Stakeholder Workshop (Stakeholder Site Visit)
- Bicycle Victoria Meeting
- School Questionnaire.

This section provides an overview of each consultation, and a summary of the key issues and findings of all discussions.

C1.1 Community Workshop

A community meeting was held on Thursday 30 August 2007 in the Trench Room at Ballarat Town Hall. The City of Ballarat invited members of BalBUG to the event, and advertised the workshop to the general public via a poster campaign, on the Council newsletter and on noticeboards

A total of 26 local community members attended the meeting. The majority of attendees were active cyclists in Ballarat, including members of BalBUG and competitive cycling clubs. The group included a range of cyclist types; commuters, recreational and competitive. However, novice/learner/non-cyclists were not represented. Those present held informed views on both the existing issues with ideas of the potential to improve conditions for cyclists.

The attendees were divided into four sub-groups for a workshop session. Large-scale existing conditions plans of Ballarat were on hand to facilitate the discussion, which focused around the following topics:

- Quality and provision of the existing cycling network
- Connectivity and wayfinding of the existing cycling network
- Cycling demand (where do people want to cycle?)
- Possible opportunities/ constraints
- Safety Issues
- End of trip facilities – bicycle storage, showers, toilets, drinking fountains
- Education and awareness of cycling.

The community consultation proved to be a valuable source of information as a wide range of issues were discussed. The main issues that were identified are summarised below:

C1.1.1 General Network Comments

- Ballarat has some excellent cycle paths, although a lack of connectivity limits the networks catchment
- Ballarat offers substantial potential for cycling provision
- The primary trip attractors in Ballarat are:
 - Lake Wendouree
 - The CBD
 - Mt Helen – Schools/Colleges/University of Ballarat campus
- Wayfinding is not clear throughout Ballarat, with limited or insufficient signage
- Cycle parking (and end of trip facilities) are generally insufficient throughout Ballarat

- End of trip facilities are not provided at most schools, workplaces and recreational facilities. This may deter some people from cycling.
- Planning and engineering gives poor consideration towards cycling.

C1.1.2 Safety Issues

- Wendouree Parade is dangerous when cars are parked blocking the cycle lane at Loreto College
- Maintenance of on-road shoulders and cycle lanes is currently inadequate – Example given was along Geelong Road
- Roundabouts in general are a problem. Examples given were: Doveton St/Macarthur St, Lydiard St/ Macarthur St
- Safety for students is an issue near schools
- Motorbikes are an issue along the Ballarat Skipton Rail Trail.

C1.1.3 Infrastructure

- Missing link between Lake Wendouree and Victoria Park
- On-road bike lanes should be considered on Sturt Street, Eyre Street and Drummond Street
- A link across the railway lines on Gregory Street would be useful
- Coloured surfacing of cycle lanes should be considered on Main Road, particularly near the intersection with York Street
- There is a dangerous bend on the Yarrowee Trail on route to Magpie near the Dick Fleming Oval
- Stairs at end of Yarrowee Trail adjacent Peel Street - ramped replacement suggested
- Request for on-road bike lanes along Geelong Road
- Safety concern for cyclists at intersection of Grant Street / Barkly Street
- Lighting requested through tunnel under Western Freeway along Yarrowee Trail
- Bicycle route through Hotel grounds along Canadian Trail an issue, wayfinding poor and trail should have been protected when hotel developed
- Bike lane along Learmonth Road an issue between Norman Street and Howitt Street, lanes compromised by left turn lanes
- Call to complete and upgrade Ballarat Skipton Rail Trail.
- Improve link from the Ballarat Skipton Rail Trail to Lake Wendouree
- Bollards are generally dangerous and obstructive
- Provide an improved link to Ballarat Railway station from the town centre
- Gap in provision around lake adjacent Loreto College, parking should be moved
- On road bicycle lanes too narrow and bicycle symbols to carriageway too small at many locations throughout Ballarat
- Crossing of Geelong Road at Olympic Avenue is a problem, proposals for a traffic signal crossing at this location
- Crossing of Main Road along Canadian Trail difficult due to high traffic volumes
- Generally rail crossings are poor quality and extremely uneven
- Improve arterial routes from the suburbs into the city

- Improve link from the CBD to Lake Wendouree

C1.1.4 Maintenance

- Glass is an issue around the on-road Wendouree Lake route, and it was suggested that Council sweep the route on a regular basis

C1.1.5 Opportunities

- Provide pool bicycles for Council employees and perhaps at other major employment centres
- Lake Wendouree and Victoria Park offer a high potential for all types of cycling
- A resident stated that Ballarat per capita has a very high level of bicycle sales, and therefore should have a relatively high number of bicycle trips.

C1.1.6 Social Infrastructure

- Education programs would be effective in encouraging the number of cyclists in Ballarat, and particular focus should be given to schools – where parents and students should be targeted
- Educational programs should target all road users, not just cyclists. This comment particularly relates to road safety and increasing the cycling awareness of motorists
- A “Think Bike” sticker campaign was suggested as per the motorbike campaign a number of years ago.
- An overwhelming majority of the attendees were in agreement that the new Touring and Commuter maps are a significant asset to cycling in Ballarat. However, many were unsure if their circulation is sufficiently widespread to reach novice and tourist cyclists.
- Council should lead by example – e.g. through introducing Travel Smart programs
- Maps and signage en route would be useful, particularly for tourists who are unlikely to be familiar with Ballarat
- Large employers may be persuaded to initiate green travel plans or to participate in promotional programs, and should be encouraged to do so

C1.2 Stakeholder Meeting and Site Visit

A meeting with stakeholders was held at council offices on Thursday 6th September, 10am - 1pm. Following the meeting, attendees were invited to take part in a site visit to key locations where issues had been raised.

The meeting was attended by a range of stakeholders, including representatives from several Council departments, VicRoads, the Ballarat Police and Ballarat Bicycle Users Group.

Arup presented a summary of the existing bicycle network and its associated issues, which was followed by an open workshop discussion session. The discussion focussed around a set of leading questions, including:

- Behavioural Change Programs
- Cycling Promotion and Events
- The role of each Stakeholder group
- Funding opportunities
- Education
- Development/Planning and Policy
- Infrastructure and Implementation

The main comments from the stakeholder meeting and site visit are summarised in the following sections.

C1.2.1 Events

- State Championships are an existing major cycling event in Ballarat – Ride the championship course at Victoria Park
- Ride to Work Day – past central Ride to Work Breakfasts in town were not well attended.
- BAD ride has been very successful with 850 riders of which 40% of riders are from outside Ballarat.
- Ride to School Day has not been run in Ballarat previously.

C1.2.2 Event Issues and proposals

- Litigation issues for Council, events organised by event specialists who take on insurance of big events.
- Suggested that sponsored rides are organised.
- Suggested that events are grouped together in a similar fashion as Walktober.
- Time to Ride ran for 12 weeks by Ballarat BUG with state funding stopped, successfully attracted and encouraged older individuals to cycling
- Opportunity to combine events into the “beginning to ride” season at start of October when National Ride to Work Day, Ride to School Day, Herald Sun Tour and Around the Bay in a Day occur.

C1.2.3 Social Marketing & Wellbeing

- Research and state wide marketing required to encourage more cycling.
- Improve driver education through driving instructors, better educate instructors about responsibilities of motorists towards cyclists – VicRoads Share the Road messages should form basis for any campaign that should target specific behaviours rather than dividing road users against each other (i.e. separating cyclists and motorists).
- Health and Wellbeing plan, integrated approach to cultural change
- Any program needs to recognise the particular attributes of Ballarat (including open road system, relative high road speeds and lack of congestion) and not just try to translate a metropolitan campaign into Ballarat without modification.

C1.2.4 Education

- VicRoads tour schools delivering safety programs
- Police (youth Resource Officer) go to schools to educate children on safety when resources permit and have also conducted rides in groups
- Education for infrastructure designers (including traffic engineers) and planners is available at VicRoads annual course.

C1.2.5 Funding

- Part funding available for arterial road lanes/paths/shoulders from VicRoads
- Link cycling better to land management and health funding schemes
- Develop corridors jointly with storm water and vegetation protection corridors
- Ongoing capital works and maintenance budget required for cycling
- Council needs to drive applications for funding opportunities, particularly those that fall across departments.

C1.2.6 At work

- Greater support for cycling to work from companies (facilities etc). Larger employers may be targeted with more success for Ride to Work Day. For instance Mars has run a successful Ride To Work Day breakfast in previous years.
- Not enough bicycle parking in streets and at work places including undercover parking. Showers and change rooms may also be in short supply and would benefit other user groups (eg walkers, lunchtime sports and exercise) as well. Planning provisions (CI 54 for bike parking and end of trip facilities) should be applied for new developments.
- Council needs to set an example by improving its own trip end facilities and encourage existing companies and new developments to cater for cyclists.
- Retrofit cage in Central Square car park to provide secure bicycle parking for Council. High profile location of cage to publicise facilities and set example

C1.2.7 Development/Planning

- Improved development advice.
- Outline strategic corridors and connections that new developments need to connect with.
- New infrastructure associated with developments should cater for all cyclists with on-road and off-road provision
- Quarterly meetings of bicycle development group, including State Govt, Council and user groups, can be used to improve planning and implementation.
- Agreed strategic bicycle map and list of priorities and routes is needed to guide work of all stakeholders.

C1.2.8 Implementation

- Political will required to push cycling forward
- Key individual required to provide central role in implementing the cycling strategy and coordination of key stakeholders
- Key individual needed to push cycling up the agenda and apply for funding opportunities
- Any central point of contact needs to be backed up by commitment by Council at highest level to implement a program of infrastructure and infrastructure support.
- Central point of contact in Council could be secretary of bicycle development group.
- Quarterly meetings of bicycle development groups could review progress on implementing strategy and projects.
- There was general consensus that regular, strategic consultation (that could come from bicycle development groups meetings) is the best way for them to provide input and stay in touch.

C1.2.9 Infrastructure

- Children find it difficult to negotiate roundabouts, particularly larger roundabouts.
- Need for the strategy to upgrade maps and provide strategic corridors
- "Strategy needs to be strategic" and focus on high value projects that deliver long term benefits and increased ridership, not just easy projects
- Develop central/cross city link via Peel Street.
- Upgrade Ballarat Skipton Rail Trail and provide link with the city – highlighted as key tourism opportunity.

- Sewer line along Canadian trail may require areas of the trail to be reinstated, need to ensure that this corridor is improved
- Granite sand paths are preferred construction material that are good for walkers, runners and cyclists alike and are easily maintained
- Tram lines at Lake Wendouree continue to cause problems following application of coloured surfacing

C1.2.10 Other issues raised

- Police undertake bicycle patrols in groups of 2-4 riders when resources allow

C1.3 Bicycle Victoria Meeting

Arup held a meeting with Bicycle Victoria (BV) on Wednesday 5 September 2007. Jason den Hollander, Facilities Development Manager at BV attended the meeting, and the discussions focussed on the following areas:

- The role of Bicycle Victoria in Ballarat
- Funding opportunities
- Education and Promotion
- Strategic routes and links in Ballarat
- Process of prioritising recommendations.

The following sections summarise the key outcomes and comments from this meeting:

C1.3.1 Bicycle Strategy

BV is a self funded organisation, providing impartial advice to Councils who want to make a positive change. BV have a large members base and are effective at running campaigns, including lobbying for funding.

It was highlighted that an effective bicycle strategy requires a detailed works program enabling Council to turn proposals into reality. This works program should include the action, indicative cost and timescale of each infrastructure proposal.

C1.3.2 Priority Recommendations

With respect to Ballarat, BV have 700 members. Bicycle Victoria are actively pursuing the completion of the Ballarat Skipton Rail Trail, and deem this facility to be of primary importance in the short term development of cycling in Ballarat.

The commuter links between the Ballarat suburbs and the CBD would add significant value to the cycling network, and further routes and linkages should be designed to feed into these primary arterial routes.

C1.3.3 Promotion and Education

Bicycle Victoria summarised the extent of behavioural change programs that are available and have been run in Ballarat.

Ride 2 Schools has been successful, particularly with primary schools.

BV consider the introduction of physical infrastructure to be paramount, and the social infrastructure is supporting and secondary. "Build it and people will cycle."

C1.4 School Questionnaire

In order to understand the current and potential cycling participation, existing programs and infrastructure and to understand the barriers for students cycling to school a survey questionnaire was developed. A copy of the questionnaire is included in Appendix F. The questionnaire survey was distributed to the principals of secondary schools, colleges and universities within the City of Ballarat. A total of twelve questionnaires were distributed.

Six responses to the questionnaire were received which represents a response rate of 50%. The key results of the secondary school and university survey are as follows:

C1.4.1 Secondary Schools

- Secondary schools have between 500 and 1,100 students enrolled and all students are permitted to ride to school
- The proportion of students who live within 5km of the school (and could *potentially* ride to school) varies from 20% to 70% between schools
- The proportion of students who ride to school *on an average school day* is low (varies from 2% to 5%)
- There are very few programs within secondary schools that encourage students to cycle or educate students with regards to cycling safety
- Road safety education is included in the curriculum in two of the five responding schools. St Patrick's College noted that it would be interested to include road safety in the curriculum if it were aware of the programs offered
- All students are educated on the health benefits of regular exercise
- Three of the five secondary schools participate in regional or competitive cycling events
- All five secondary schools have bicycle racks and two also have lockable compounds
- The top five reasons why students don't ride to school, in the opinion of the school respondent were:
 - Adequate school transport exists
 - Students don't want to
 - Parents drive students to school
 - Distance to travel
 - Too dangerous due to heavy vehicles/fast traffic
- All schools felt that an improved bicycle network would be the best way to encourage students to ride to school
- The dangerous locations listed by the schools include Sturt Street (by two separate schools), Barkly Street, Victoria Street, roundabout at Barkly Street and Eastwood Street, Main Road. Safety for cyclists crossing the road and riding along the local roads surrounding Sebastopol College was also identified as an issue
- Two of the responding schools identified that there was no single route that was a priority, as students come from a wide area often over a significant distance. Two of the responding schools indicated that Sturt Street and Hertford Street were priority routes
- It was noted during the survey that there were also comments regarding the social and comfort issues associated with cycling e.g. students would prefer travel to school with friends and riding damages clothing etc.

In summary, while there are only limited numbers of students that currently ride to school, there is significant potential for this to be increased through an improved bicycle network in the vicinity of the school and encouragement. In particular, incentives for students to cycle (e.g. early bell for cyclists, competitions based on the number cycling kilometres per week) may increased the number of secondary school children that cycle to school.

C1.4.2 University

Interestingly, the results from Australian Catholic University indicated that while 95% of students live within 5km of the university, less than 2% of enrolled students currently ride. The main issue identified by the university is that students have the alternative of driving and therefore do not ride. It is considered that there is substantial scope to increase the level of cycling participation through behaviour change programs and partnerships with the university.

Appendix D

Toolkit

D1 Toolkit

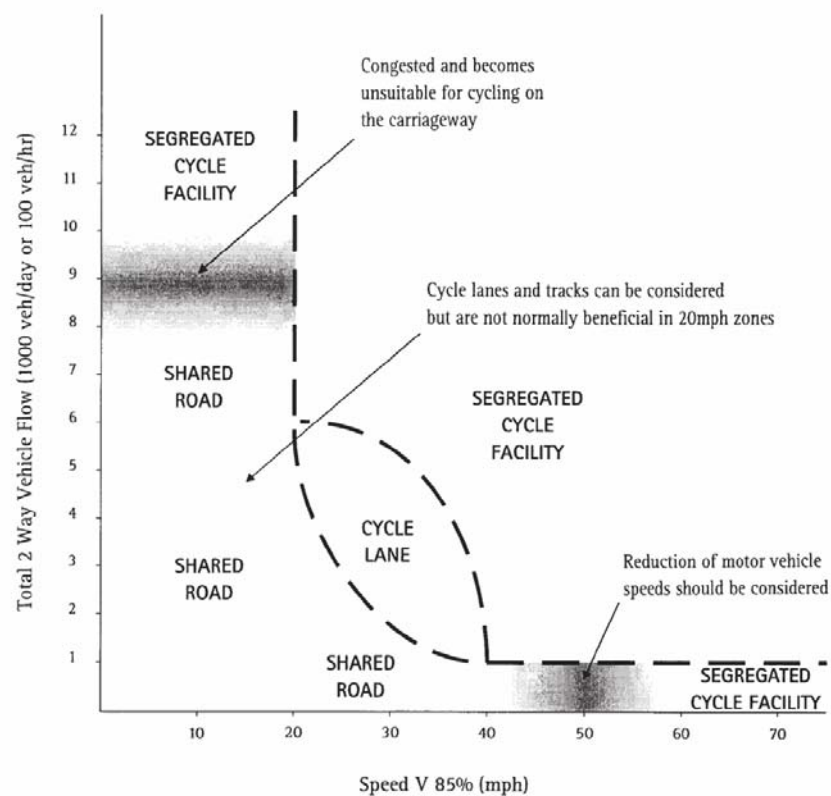
The following guidelines provide examples of best practice and state of the art concepts and bicycle infrastructure design. Practices have been drawn from regionally, nationally and internationally standards and research. It is intended that this information reflects the standards to which the Ballarat cycle network should aim to achieve.

D1.1 Paths, Lanes and Intersections

This section looks at the requirements, performance and suitability of pathway types and lanes, providing a foundation for the quality of cycling network design in Ballarat including:

- Off-Road Shared Paths;
- On-Road Bicycle Lanes;
- On-Road Shared Carriageway;
- Wide Kerbside Lanes; and
- On-road Training Circuits.
- Intersection Treatments

The following diagram has been extracted from UK **Sustrans** (the UK's leading sustainable transport charity) guidelines, and provides an indication of traffic speeds and vehicular flows that are appropriate for particular lane types and road facilities.



If the 85% speeds are above the speed limit, consideration should be given to speed reduction measures

Figure 9 – Bicycle Lane Types

D1.1.1 Off-Road Shared paths

The purpose of a shared path is to offer both cyclists and pedestrians a formal pathway, without the safety risks and atmosphere of sharing the roads with motor vehicles. Off-road

paths should provide a pleasant and continuous route for cyclists and pedestrians, with minimal road crossings and interruptions.

Off-road shared paths are often used for recreational cycling, given that they regularly do not provide the most direct route between locations, and seldom provide connections with city centres (a popular commuter destination).

Given their recreational nature, off-road paths are frequently included as part of trails and strategic routes.

Austroroads - "Guide to Traffic Engineering Practice - Part 14 - Bicycles" is recognised by Victorian authorities as the primary design reference for bicycle paths.

This document states that the desirable widths of (shared) paths should be as follows:

- Local 2.5m
- Commuter 3.0m
- Recreational 3.5m

The risk of conflict on shared paths can be reduced through centre line marking, appropriate design width and signage.

VicRoads Cycle Notes No. 3, July 1999, also provides a set of recommendations for the design of shared paths.

The following recommendations are given:

- Minimum Path Width 2.0m – 4.0m
(Depending on path usage, 2.0m should only be used on paths of very low usage, although 3.0m is desirable)
- Clearance to Obstacles: 0.3m absolute minimum to 'smooth' fences/walls.
- Clearance to dangerous obstacles that may cause an injury to cyclists: 1.0m is required (minimum of 0.5m).
- Minimum Vertical Clearance: 2.4m from cycling surface/pathway

VicRoads Cycle Notes also detail standards with respect to path curvature for given design speeds, and for visibility requirements for cyclists navigating a path.

D1.1.2 On-Road Lanes

On-road cycle lanes are often introduced to roadways with all or a combination of the following properties:

- Sufficient road width, including space for parked cars if required. VicRoads **Cycle Notes No. 7** August 2007: On-Road Arterial Bicycle Routes indicates desirable exclusive bicycle lane widths are as follows:
 - 7.1.10 Road speed of 60km/h: Bicycle lane width 1.5m
 - 7.1.11 Road speed of 80km/h: Bicycle lane width 2.0m
 - 7.1.12 Road speed of 100km/h: Bicycle lane width 2.5m
- Significant cycling demand to create a route where drivers will expect and be aware of cyclists
- Roads are trafficked with above 1,000 vehicles per day, and a shared-carriageway is inappropriate
- Roads with few intersections are ideal, to reduce the potential of collisions

- Shopping strips are best avoided, unless sufficient distance can be achieved between the cycle lanes and opening car doors.

On-road lanes are commonly used to connect residential areas with off-road routes and as commuter routes into city centres. On-road lanes require confidence and experience on behalf of the cyclist, with the majority of cyclists preferring an alternative route given a choice.

Austrroads, "Guide to Traffic Engineering Practice - Part 14 – Bicycles", suggests that introducing a cycle lane can increase safety for cyclists by separating users from motorists. The lanes are commonly defined by a dashed (advisory) or solid (mandatory) white line.

For best practice, on-road lanes should be designed with a smooth alignment and at an adequate width (as defined by Austrroads).

It is equally important that the on-road lanes are connective and continuous and provide space for cyclists at intersections and other points of conflict.



On-road bike lanes with bicycle symbol/logo

A general recommendation of **VicRoads** is that the Austrroads guidelines are adopted. However, VicRoads also recommend design guidelines for cycling infrastructure on topics not covered in the Austrroads guide.

Cycle Notes No. 2, May 1999: Guidelines state that there should be a bicycle pavement logo on both approach and departure sides of a minor intersection, with continuity lane lines across the intersection. The cycle lane width should be between 1.5m-2.0m.



Coloured surfacing, Canning Street Melbourne

Coloured surfacing is heavily used within many European countries. While the use of coloured surfacing is not widespread in Australia, it has become more common in recent years. The application of coloured surfacing is discussed in Austrroads "Guide to Traffic Engineering Practice - Part 14 – Bicycles" and in VicRoads Cycle Notes No. 14, April 2005: Coloured Surface Treatments for Bicycle Lanes

Coloured surfacing can be of value at high conflict locations to reinforce the presence of cyclists, particularly at intersections. An example of such surfacing is on St Kilda Road and Fitzroy Street in St Kilda.

Conflict commonly occurs where left turning vehicles must cross the bicycle lane. While this conflict is minimised by the provision of a separate bicycle lane and vehicle turning lane, the presence of cyclists and priority of cyclists can be highlighted with the use of coloured surfacing.

Coloured surfacing can also be applied to the centre of T-intersections providing cyclists with a clear refuge when turning right (see VicRoads Cycle Notes No. 14).

D1.1.3 On-Road Shared Carriageway

Where roads are lightly trafficked (below 1,000 vpd) and speeds can be maintained below 50 kph, UK guidelines indicate that roads can be safely shared between cyclists and motorists. An opportunity exists to enhance and formalise residential street environments as formal on-road shared routes.

The consultation identified the need to use of local/residential roads, rather than main roads, by cyclists together with the formalisation of these routes.

Measures that can be implemented to foster an on-road shared carriageway include:

- Traffic calming to reduce traffic speeds. These LATM treatments should not create squeeze points for cyclists and should maintain a smooth riding surface.
- Pedestrian/cycling crossing of heavy vehicular routes that intersect with the route
- Wayfinding continuity markers to improve legibility of route
- Signs, bicycle symbol line marking and bicycle lane marking to improve motorists awareness of cyclists.



Bicycle symbols along local road designating a bicycle corridor and shared use with motorists

D1.1.4 On-Road Training Circuits

Ballarat has a number of designated on-road training circuits as illustrated in the Ballarat Commuter and Touring Map. It is highly recommended that improvements are delivered to these circuits under programmed maintenance and resurfacing works. It is recommended that works include the provision of a 1.5-2.0 metre wide shoulder and that farm/gravel tracks are sealed a short distance to minimise debris along into the main carriageway.

These require a low level of treatment due to the experience and confidence of these cyclists but must include a safety focus. While an on-road training route would generally be provided based on the principles discussed in Section D1.1.2 and D1.1.3, other additional considerations include:

- Safety improvements at problematic intersections

- Sealed surfacing the first 15 metres of side roads adjacent to training routes to minimise debris and gravel spread in the path of cyclists
- Signage of training route/distance markers
- Highlight cyclist circuit to other road users using signs and line marking
- Parking prohibitions on these routes to reduce the risk of high speed cyclists hitting doors

D1.1.5 Off-road Recreational and Tourist Circuits

Recreational/tourist cycling is one of the potential areas where the level of cycling in Ballarat can be significantly increased. These cyclists generally tend to have less confidence and ability and may include children, families and tourists that are not familiar with the area. Accordingly, it is important that the bicycle infrastructure and bicycle routes be provided to cater for these different needs.

Recreational/tourism circuits should generally be provided off-road, along shared paths or separate bicycle paths. These paths would be provided based on the principles outlined in Section D1.1.1 and other engineering principles including horizontal and vertical alignments, sight lines etc. Some other additional considerations include:

- Wayfinding information to key destinations (at all decision points)
- Route markers to ensure cyclists can follow the route
- Resting points and connection to parkland areas
- Information boards to provide a theme to tourism routes (Gold Rush route etc)
- Centreline pavement markings to separate the direction of travel
- Selection of a route with high amenity and a quality environment
- Where the path intersects a road, appropriate pedestrian/bicycle facilities
- Delineation of fixed objects adjacent to the path (particularly at night)
- Maintenance program to ensure that these facilities remain at a high standard.

D1.1.6 Major Intersection Treatments

Intersections by their nature involve a number of points of conflicts between all road users and cyclists are particularly vulnerable. Major intersections with high speeds, high volumes and a variety of turning movements can be intimidating to cyclists as their exposure to vehicles is increased. Generally, major intersections will be either signalised intersections or roundabouts. Ballarat has many roundabouts and it is understood that this is a particular issue within the municipality. Accordingly, the treatment of roundabouts is described in detail separately (see section 3.5).

Generally, cyclist safety at a signalised intersection can be significantly improved when on-road bicycle facilities are provided for all elements of the cyclist's path through an intersection. VicRoads **Cycle Notes No. 8**, Feb 2001: Providing for Cyclists at Signalised Intersections identifies six stages of a cyclist's travel through an intersection. These stages include midblock, transition to the intersection, approach, waiting, through and departure.

Based on the above, it is clear that bicycle lanes should be extended up to the intersection stop line, through the intersection and on the departure. While it is acknowledged that the demand for road space along a length of road is often at it's highest at signalised intersections, space for on-road bicycle lanes can often be created by narrowing traffic lanes or indenting turning lanes into the median strip or nature strip.



Advance stop lines (head start boxes) at a traffic signal intersection

Treatments that can improve safety for cyclists during the 'waiting' stage of travel through an intersection include advanced stop line and head start storage boxes (as shown in the adjacent photograph). These treatments are discussed further in VicRoads **Cycle Notes No. 5**, Feb 2000: 'Head Start' Storage Areas at Intersections. Advances stop lines and head start storage boxes are still beneficial to cyclists even where there is no formal bicycle lane along the approaching road, as it allows cyclists store at a location where they are more visible to motorists.

In situations where a shared pathway or bicycle path crosses a signalised intersection, red/green bicycle symbol lanterns should be provided in addition to the red/green man pedestrian lanterns. Bicycle hand rails in close proximity to the pedestrian push button should also be provided to eliminate the need for cyclists to dismount. These treatments are discussed further in Chapter 5 of **VicRoads Traffic Engineering Manual**, Volume 1: Traffic Management.

Consideration should also be given to the phasing of traffic signals along priority bicycle routes. Given that cyclists travel at lower speeds, the intergreen period is generally inadequate for vehicles to safely clear the intersection.

D1.2 End of Trip Facilities

Whilst the provision of a bicycle network is instrumental in encouraging more cycling trips, this needs to be supported with adequate end of trip facilities for cyclists at key destination points. Trip end facilities include the following:

- Bicycle parking – provision and location (see Section D1.2.1)
- Showers and changing facilities – particularly at workplaces
- Lockers/ safe storage
- Water fountains – en-route, often in parks.

D1.2.1 Bicycle Parking

The provision of bicycle facilities for new developments is now prescribed under Clause 52.34 of the Planning Scheme, and includes parking and associated shower and change facilities. Part 3 of the Australian Standard for Bicycle Parking Facilities (AS2890.3 – 1993) prescribes requirements for the layout, design and security of bicycle parking facilities.

The lack of secure parking facilities for bicycles is a barrier to potential cyclists and should be addressed at all key facilities and amenities. Particular attention should be given to those located adjacent to bicycle routes. It is recommended that as a minimum, the following amenities have secure bicycle parking facilities:

- Schools
- Public transport stations and interchanges
- Recreational facilities (swimming pools, gymnasiums, sporting venues)
- Community facilities (churches, libraries, community halls, venues for social groups)

- Workplaces
- Retail premises, see the following VicRoads recommendations.

The **VicRoads** website details recommendations for cycling parking provision, listing the location and recommended type of bicycle parking facilities; as presented below on **Figure 10**.







Type of location	Recommended Parking Facility
<ul style="list-style-type: none"> • Strip shopping centres • Business districts 	<ul style="list-style-type: none"> • Individual and small clusters of bicycle parking rails located 20 to 30 metres apart. 
<ul style="list-style-type: none"> • Shopping complexes • Swimming pools • Libraries • Markets 	<ul style="list-style-type: none"> • Clusters of bicycle parking rails at main entrances. 
<ul style="list-style-type: none"> • Work places • Primary and Secondary Schools 	<ul style="list-style-type: none"> • Groups of bicycle parking rails within an enclosure. 
<ul style="list-style-type: none"> • Universities • TAFE colleges 	<ul style="list-style-type: none"> • Clusters of bicycle parking rails at main entrances and throughout the campus. • Groups of bicycle parking rails within centrally located enclosures. 
<ul style="list-style-type: none"> • Railway stations • Public transport terminals 	<ul style="list-style-type: none"> • Groups of bicycle parking rails within an enclosure. • Individual bicycle lockers. 
<ul style="list-style-type: none"> • Apartment buildings • Residential complexes • University residences 	<ul style="list-style-type: none"> • A group of bicycle parking rails in an area of restricted access such as a car park or within an enclosure. • Individual bicycle lockers. 

Figure 10 – VicRoads Cycle Parking Recommendations

VicRoads has produced the ‘Bicycle Parking Handbook’ – a set of parking guidelines that will help employers and building operators to provide secure and convenient cycling. The handbook can be downloaded electronically from <http://www.vicroads.vic.gov.au/Home/BicyclesPedestrians/DevelopingBicycleNetworks/ParkingAndEndOfTripFacilities.htm>.

It is recommended that the utilisation of bicycle parking be monitored, potentially identifying any growth in cycling and the need to expand facilities, as well as issues of theft and vandalism.

At schools and universities bicycle parking facilities should be under shelter and in a prominent location which allows casual surveillance. Open or see through ends of the stands allows visibility of bicycles from all sides.



Figure 11 – Examples of Bicycle Parking

D1.3 State of the Art and Alternative Concepts

The following concepts are not necessarily recommended in Australian best practice guidelines but outline novel ideas and solutions. These represent recent concepts or established international practice that aim to improve the quality of the bicycle network.

D1.3.1 Volunteer Rangers

In the UK, Sustrans, a non profit pro-cycling organisation, has a fault reporting system using volunteer Rangers. Volunteer Rangers fill in the fault form, send them to the Local Authority and copy them to the local Sustrans Manager. The result is a regular update and maintenance of routes.

Ballarat Bicycle User Group (BaBUG) represent an active group of volunteers that fit this concept and already performs a web based forum.

D1.3.2 Self-adhesive signs

The continuity and legibility of routes is achieved through good design and appropriate signage. Metal signs are usually affixed to poles or lighting columns. Low cost self-adhesive signs have been successfully trialled in Leicester, England and can be fixed to street furniture such as electricity poles, lighting poles, fixed waste bins and traffic signal pedestals. These adhesive markers indicate railway station locations and route markers, particularly where a route passes through a residential area.

D1.3.3 Crossing of Minor Carriageways

Cycle route crossings of minor carriageways where cycling numbers are high and vehicular movements are low have been advantaged through providing table top surfaces for cyclists.

This has also been accompanied with providing cyclists with priority and give way markings applied to the carriageway surface for motorists, or stepping back the give way markings at an intersection allowing cyclists to pass prior to side road vehicles pulling up to the major road and negotiating an intersection (as illustrated in the adjacent photograph).



Concrete Table top crossing within high street environment in Australia. Rear of crossing aligns with shop frontage/back of footpath.

Crossing inclusive of tactile ground surface indicators. The crossing provides a contrast with the surrounding surface.

Paved Table top crossing of side street (UK). This provides greater pedestrian priority as well as a traffic calming measure.

D1.3.4 Contraflow Bicycle Lanes

Located within a one-way road, these cycle lanes operate in the opposite direction to motorised vehicles and improve access options for cyclists.



Contraflow bicycle lanes are widely accepted in Europe and are successfully operating in various locations in Melbourne including in the City of Yarra and City of Melbourne.

D1.3.5 Off-Road Surface Markings

Cyclists and drivers spend much of their time focused on the path surface in front of them. Surface markings have been used to great effect in trials in the UK with particular use through complex junctions and on urban streets. These markings have included route numbers and wayfinding information in addition to the more common directional arrows and bicycle symbols. Surface markings can be used to replace the use of signs particularly where signs are prone to vandalism or to reduce sign clutter.

D1.3.6 Reminders to Motorists

Where left turn incidents frequently occur, as a motorised vehicle crosses the cycle lane to turn left, markings to the carriageway and green surfacing can help to remind motorists to look for cyclists travelling down the cycle lane. Repeater markings on the carriageway in the shape of a bicycle are used in the UK to remind motorists to look out for cyclists.

D1.3.7 Parallel Parking - Door Zone

Where cyclists are regularly struck by opening car doors, a clearance zone adjacent to on-road cycling lane should be provided, carriageway width permitting. **Austroads** Guide to Traffic Engineering Practice, Part 14 – Bicycles indicates that a safety strip of between 0.4m and 1m should be provided in addition to the width of the bicycle lane. However, it should be noted that the distance required due to the open door car width is 0.8m and a lesser clearance will require cyclists to divert around the door in the event of a driver opening the car door in the path of a cyclist. As such, it is generally recommended that a safety strip width of at least 0.8m be adopted.

In combination with the door zone, car parking spaces can also be narrowed encouraging vehicles to park closer to the kerb. Coloured pavement and wider bicycle lanes can make the bicycle lane more visible.

D1.3.8 Angle Parking – Reversing Zone

Motorists sight lines are commonly interrupted when reversing out of angle car parking spaces. Accordingly, it can be difficult for motorists to see an approaching cyclist when reversing from the car space. As such, it is important that adequate protection and separation for cyclists be provided. **Austroads** Guide to Traffic Engineering Practice, Part 14 – Bicycles indicates that a safety strip of between 0.8m and 1.5m should be provided between the rear of the angle car parking spaces and the edge of the bicycle lane. This treatment should only be considered within a speed zone of less than 70km/h (85th percentile speed).

D1.3.9 Physical Segregation

Physical segregation of cyclists from the vehicular carriageway is common practice within urban streets in Europe, as shown on the photograph of a segregated cycle path in Southend, UK.

Segregating cyclists from vehicles reduces the chance of conflict with motorists, enhances the cycling environment, and may encourage more cyclists to use the route.



Segregation in the UK.



Segregation in Melbourne

D1.3.10 Travelsmart

Usage of infrastructure is enhanced by targeted travel behaviour change programs such as Ride to Work Day, Ride2school and Travelsmart.

Ride2school is a cycling initiative of Bicycle Victoria which includes both behaviour and infrastructure components. Some of the key components include a Hands-up Survey (to recognise and encourage students to cycle), improved bicycle skills sessions, bicycle events, facilities and expert advice.

National Ride to Work Day is an event promoted by numerous cycling and transport groups throughout Australia and is aimed at encouraging potential cyclist to try riding to work on one day. It promotes the health, environmental, travel time and productivity benefits of cycling for both individuals and organisations.



Travelsmart

TravelSmart is an initiative of the Victorian Government and aims to reduce people's dependency on cars and persuade them to choose sustainable travel alternatives such as travelling by public transport, cycling and walking. Travelsmart includes tailored behaviour change programs that have been designed for different target groups including education, workplaces, communities and local government.

While the above programs are effective in encouraging more people to cycle more often, the basic cycling infrastructure must be in place for the benefit of such programs to be achieved in full.

D1.4 Planning/Development Considerations

From site observations of new developments, it is clear that greater planning guidance is required to ensure that new developments and subdivisions provide infrastructure which encourages cycling at all levels of ability. Town planning applications provide unique and, in many cases, the only opportunity to provide cycling routes and associated infrastructure. To fail these opportunities can often result in no bicycle links or costly retrofitting by local and regional authorities, which in turn represents a significant cost to the community. Development applications should aim to add and enhance the existing and proposed bicycle network.

It is recommended that a cycling specialist is consulted in relation with the planning and assessment of town planning applications. Continuity, quality, accessibility and security of bicycle infrastructure proposals need to be carefully considered on the basis of encouraging more sustainable development, encouraging healthier lifestyles and reducing the reliance on the private motorised transport. Infrastructure, development, environment and health policies for Ballarat are all supportive of cycling and developers at the outset should be made clear of the importance of this mode of travel to the municipality.

The following key bicycle issues have been identified to assist engineers, planners and other decisions makers involved in the planning and assessment of town planning applications. The consideration of these issues will ensure that new developments and subdivisions contribute to establishing the bicycle network:

D1.4.1 New Developments/Expansions

- Developments/subdivisions should include both on-road and off-road connections within the development with coherent and direct links to the strategic bicycle network and significant land uses.
- Off-road routes through new residential development require good continuity with the minimum of road crossings. Where minor residential roads intersect, cyclists are to be given priority through the introduction of table top crossings (flat top road humps). It is recommended that off-road routes be a minimum of 2.5 metres with a preference of 3 metre wide lanes.
- Collector roads within new residential developments should ideally have a road width of 14-15 metres allowing a central carriageway width of 6-7 metres, 1.5 metre wide cycle lanes to both sides of the carriageway and sufficient space for car parking on both sides of the carriageway.
- Where possible, two-stage crossing opportunities need to be provided where off-road paths intersect with major roads including at key collector roads. It is recommended that a pedestrian/bicycle refuge be at least 2.5 metres wide allowing the entire length of a bicycle to be sheltered within the refuge.
- Shared path bridge crossings of waterways need to be of sufficient width that allow two cyclists to pass. A width of 2.5-3.5 is recommended within Austroads Guide to Traffic Engineering Practice Part 14 - Bicycles.
- Boundary fencing of a new subdivision limits pedestrian and cycling permeability reinforcing a car reliance and reducing social interaction. It is important that gaps in fencing and building line provide intercommunity links and links to amenities, employment and public transport opportunities.
- Provision must be made that allows the bicycle network to expand beyond the boundaries of each individual new development in order that each phase of development connects and contributes to a wider network of bicycle corridors.
- Adequate on-road and off-road directional signage indicating the direction and distance to key destinations and land uses is important for encouraging cycling. Equally, signage that reassures cyclists that they are on the right route is important.

- Adequate lighting should be provided to improve the safety and security along the bicycle network. Bicycle corridors that have a good level of casual/natural surveillance should be encouraged.
- New bicycle facilities should be designed in accordance with Austroads Guide to Traffic Engineering Practice Part 14 - Bicycles.

D1.4.2 Trip end facilities

- Bicycle facility requirements, as outlined in Clause 52.34 of the Ballarat Planning Scheme, should be met for all town planning applications. Bicycle facilities such as bicycle parking, showers and change rooms, are critical to encouraging cycling and should be seen as part of the bicycle network.
- Bicycle parking for employees/residents need to be provided within a fully enclosed, weatherproof, secure compound that allows for storage of a bicycle and bicycle accessories. It is important that access to the compound be controlled with duplicate keys, access cards or similar. Reference should be made to Austroads Guide to Traffic Engineering Practice Part 14 – Bicycles.
- Secure ground floor parking within apartment blocks is often neglected.
- Bicycle parking for visitors/shoppers should allow the bicycle frame and wheels to be locked to a fixed structure without the need to lift the bicycle off the ground. The facilities should have adequate lighting, be vandal proof, provide protection from the weather and be conveniently located in areas with natural surveillance. Careful attention needs to be paid to the design and location of bicycle parking spaces to ensure that access is not obstructed for pedestrians, deliveries or other vehicles.
- It is recommended that the above information be expanded upon and included into a local policy within the Ballarat Planning Scheme. This local policy that is specific to cycling is considered to be an integral part of a strategic framework for encouraging cycling within the municipality and will maximise the opportunity for the provision of bicycle facilities as a part of new applications.

Appendix E

Roundabout Review

E1 Roundabout Review

Ballarat's road network includes a significant number of roundabout intersections. Discussions with Council have indicated that a satisfactory cycling treatment through a roundabout has not been achieved, and that the strategy should consider measures to improve safety for all road users through roundabouts.

Intersections, by their nature, represent points of conflict for all road users. The treatment of signalised intersection and crossing minor roads has been discussed in section D1.1.6 and D1.3.3. Roundabouts are a particular type of intersection treatment that can reduce the number of vehicle conflict points at the intersection, and therefore generally exhibit lower overall crash rates when compared to other intersections.

Cyclists are most vulnerable when travelling through intersections. "Studies have indicated that roundabouts, particularly those which have more than one lane in the circulating roadway, are markedly less safe for cyclists" Austroads 1999³. In New South Wales it was found that 6% of those injured at cross intersections were cyclists compared to 18% at roundabouts⁴.

Research into bicycle crashes at roundabouts has indicated:

- Roundabouts with small central islands with flared entries have crash rates twice that of normal roundabouts (e.g. roundabouts designed for high capacity and allow high speeds through the roundabout), (DOT 1993)⁵;
- A study of crashes at 84 roundabouts in the UK showed that 68% of crashes occurred on the circulating carriageway (Layfield and Maycock, 1986)⁶;
- A study of bicycle crashes at roundabouts highlighted that 74% of crashes occurred between cyclists circulating on a roundabout and motor vehicles entering a roundabout⁷;
- A study in Victoria that examined 391 reported crashes found that 60% of bicycle crashes occurred when motor vehicles entering a roundabout failed to give way to cyclists travelling through the circulatory carriageway (VicRoads)⁸. This figure was 70% under a study conducted in New South Wales (Robinson, 1998) and 50% in the UK (Layfield and Maycock, 1986)
- Where roundabout deflection is minimal and can be improved, safety benefits can be delivered to all road users including cyclists (Layfield and Maycock, 1986);
- DOT 1993 concludes that once a cyclist enters the circulatory carriageway of a roundabout, it is difficult to reduce risk;
- A geographical study of cyclist crashes indicates that most crashes occur at relatively few roundabout sites. (Layfield and Maycock, 1986);
- German⁹ research indicates that marked cycle lanes at the outer side of the circulatory carriageway are not favourable, motorists cutting in front of cyclists and there are problematic conflict zones at entry points. Approaching cycle lanes should end 20-30m prior to the roundabout;
- German research also indicates that cyclists interact well with motorists in small roundabouts (35-40m) where cars and bicycles proceed at almost the same speed and there is no overtaking in the circulatory carriageway;

³ Austroads 1999 Guide to Traffic Engineering Practice Bicycles – Part 14. Sydney

⁴ Robinson, D.L. 1988. Accidents at Roundabouts in New South Wales

⁵ DOT 1993. TD 16/93 – Geometric Design of Roundabouts. UK

⁶ Layfield and Maycock, 1986. Pedal Cyclists at Roundabouts, Traffic Engineering and Control

⁷ Jordan P. 1986. Pedestrians and Cyclists at Roundabouts

⁸ VicRoads. 2005. Cycle Notes No 15 – Providing for Cyclists at Roundabouts

⁹ Brilon and Stuwe, 1992. Roundabouts in Germany.

- A comparison between Dutch, Swedish and Danish research concluded that a small roundabout that encourages low traffic speeds and which has a narrow circulating carriageway preventing motorists from overtaking present no special risks¹⁰.

The research documents outlined above present a foundation and an understanding of the fundamental issues facing cyclists at roundabouts together with factors that may influence safety.

Based on the above, a review was undertaken of the current and state of the art practice in roundabout design with emphasis on bicycle safety. The selected sources for review include VicRoads, Austroads, Sustrans (UK) and other international sources.

E1.1 VicRoads Guidelines

VicRoads **Cycle Notes No 15**, June 2005: Providing for Cyclists at Roundabouts provides some guidance for roundabout design.

E1.1.1 Single Lane - Low Speed and Volume

The guidelines indicate that small single lane roundabouts (i.e. intersections of local roads) can be made safer for cyclists through implementing measures to reduce traffic speeds on the approach and through the roundabout. These measures include minimal flaring on the approaches to the roundabout, minimum lane widths and increased deflection for motorists travelling through the roundabout. However, it is noted that some cyclists perceive roundabouts to be unsafe due to the narrow lanes through the roundabout and on the approach (the very measures that are put in place to reduce speeds and improve safety for cyclists).

Accordingly, Cycle Notes No. 15 recommends that consideration be given to traffic volumes and cyclist volumes at an intersection, and the likelihood that cyclists will be able to “claim” the traffic lane. This should be considered when adopting the constrained roundabout design to improve safety for cyclists.

E1.1.2 Single Lane - Moderate Speed and Volume

VicRoads guidelines indicate that on single lane collector roads or arterial roads with a speed limit of between 50km/h and 70km/h, the typical layout of a roundabout would be as is shown in Figure 12.

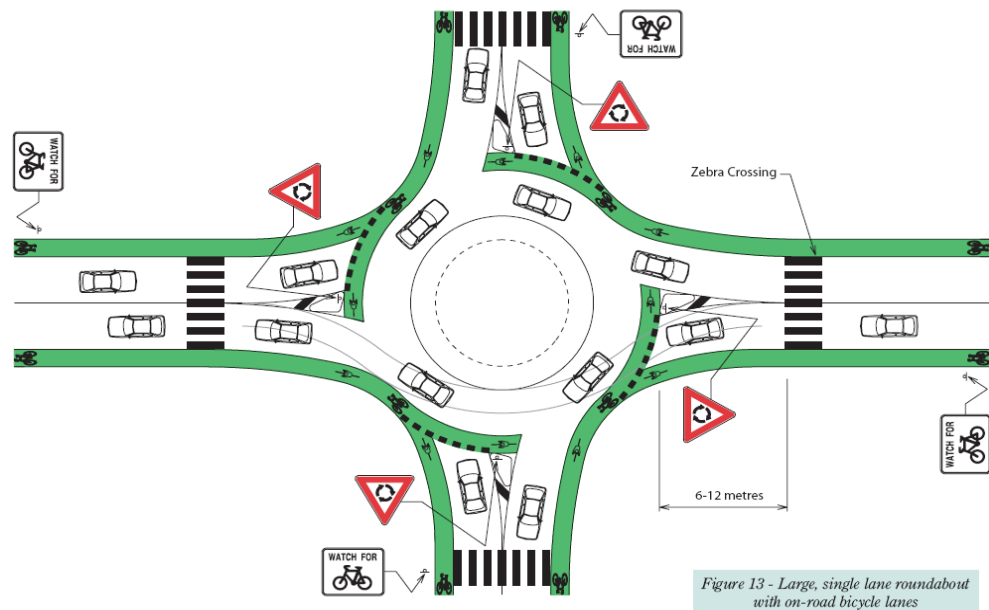


Figure 13 - Large, single lane roundabout with on-road bicycle lanes

Figure 12 – VicRoads Single Lane Roundabout Design

¹⁰ Brudeg & Larsson 1997. The Safety of Cyclists at Roundabouts – a comparison between Swedish, Danish and Dutch results. Swedish National Road and Research Institute

Based on the above, it is clear that VicRoads guidelines encourage the installation of bicycle lanes within the circulating carriageway for larger single lane roundabouts with moderate speeds and traffic volumes.

7.1.13 2 Lane Urban/Single Lane Rural-Moderate Speed & High Volume

VicRoads guidelines indicate that on a two lane urban roundabout or single lane rural roundabout, the typical layout would be as shown in Figure 13. This layout would be applied in situations with higher traffic volumes, speeds and cycling volumes.

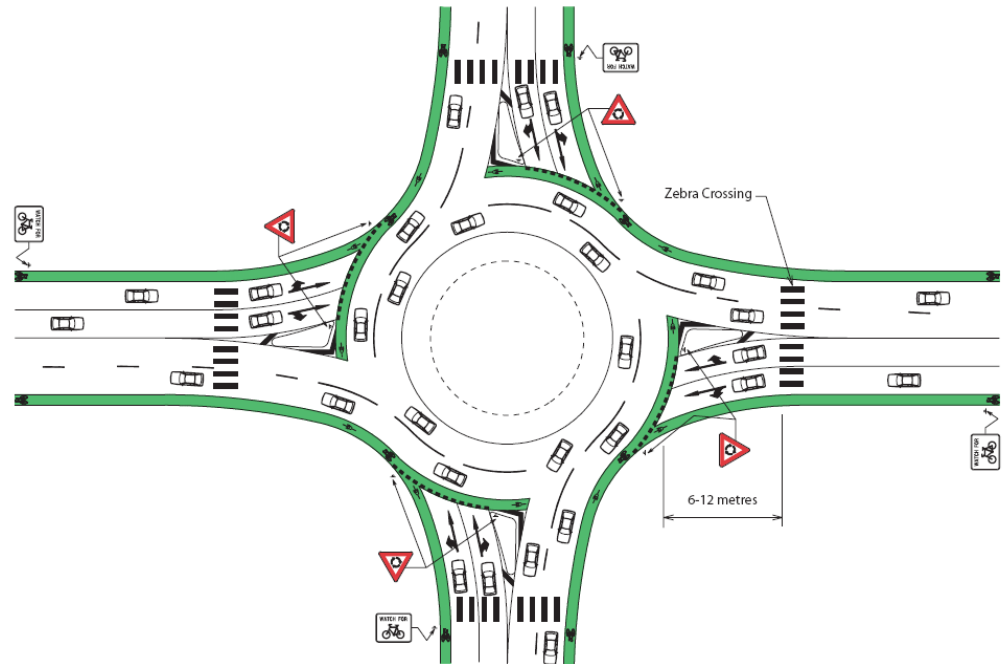
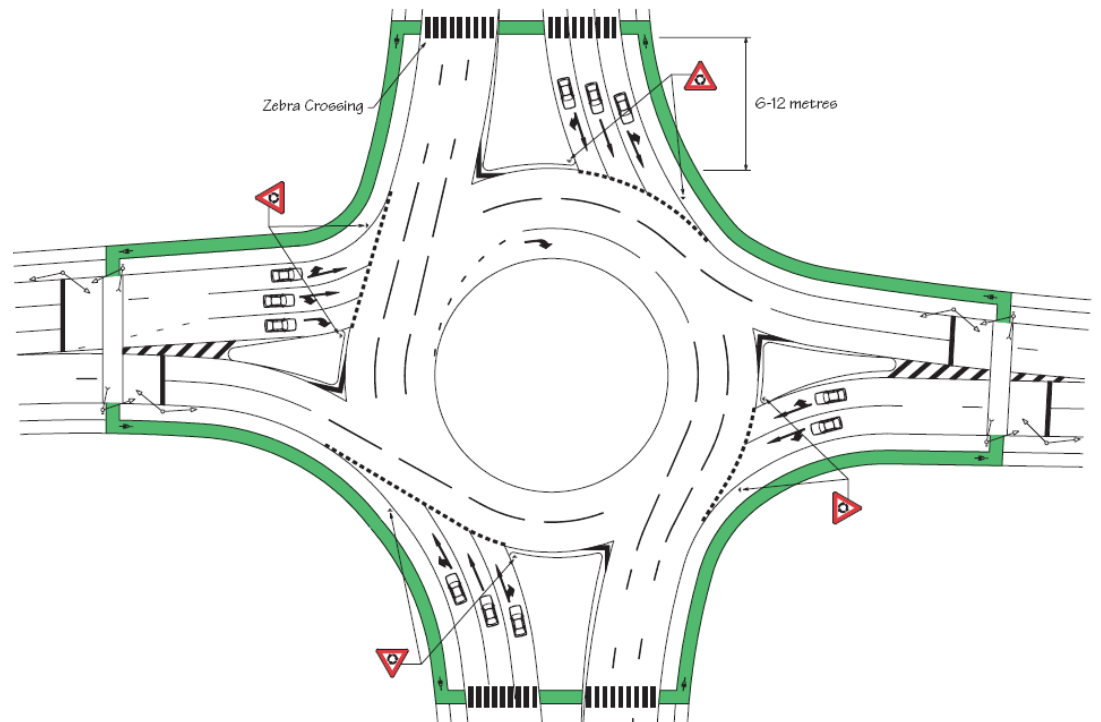


Figure 13 – VicRoads Two Lane Urban and Single Lane Rural Roundabout Design

The general approach for a two lane urban or single lane rural roundabout is similar to that discussed previously for single lane urban roundabouts. The preference is again for the installation of bicycle lanes on the circulating carriageway of the roundabout. However, the guidelines note that consideration should be given to the provision of a separated off-road bicycle path for less experienced cyclists.

7.1.14 Three Lane Urban and Two Lane Rural

VicRoads guidelines indicate that on a three lane urban roundabout or a two lane rural roundabout, the typical layout would be as shown in Figure 14.



Source: VicRoads Cycle Notes No 15, June 2006

Figure 14 – VicRoads Three Lane Urban and Two Lane Rural Roundabout Design

It is noted that the guidelines state that cyclists would find it very difficult and intimidating to travel through a three lane urban roundabout or two lane rural roundabouts. As such, the guidelines recommend that a separated off-road bicycle path and controlled or grade separated crossing points for pedestrians and cyclists should be provided.

E1.2 Austroads Guidelines

Austrroads "Guide to Traffic Engineering Practice - Part 14: Bicycles" also gives advice for providing for cyclists at roundabouts. The Austrroads document provides similar guidance as VicRoads with respect to small single lane roundabouts, where no specific bicycle lane is required.

However, the guidelines indicate that where the intersection traffic volume exceeds 10,000 vehicles per day, the diameter of the roundabout exceeds 25m, multi lane roundabouts occur or where vehicle speeds through the roundabout exceed 50km/h, the design of the roundabout should be as shown in Figure 15.

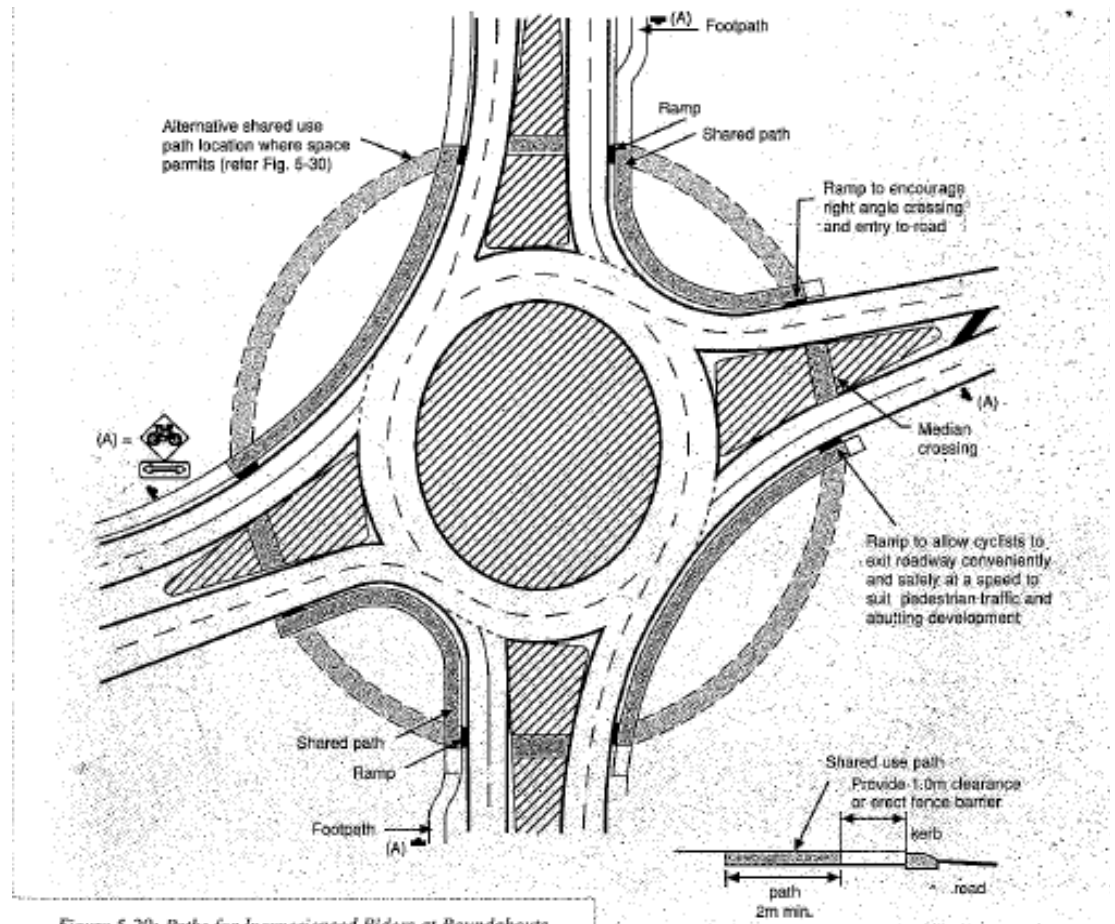


Figure 5-29: Paths for Inexperienced Riders at Roundabouts

Figure 15 – Austroads Roundabout Design with Off-road Bicycle Lanes

As indicated above, a separated shared use path should be provided for the circumstances outlined above. The guidelines indicate in the case of very large roundabouts on busy roads, consideration should be given to providing a controlled crossing on critical approaches or grade separation where cyclist demand is high.

It is noted that the Austroads guidelines also indicate that the separated shared use path has been found to be safer than a bicycle lane within the circulating carriageway. Furthermore, the guidelines also reference that cycle lanes within the circulating carriageway have been withdrawn in some circumstances, as there has been no detectable benefit to cyclists and cyclists are kept on the outer edge 'the most hazardous area of the circulating carriageway'.

The guidelines also indicate the full signalisation of one or all of the arms of the roundabout could be considered, at high crash locations or depending on the predominate paths of cyclists and other traffic.

E1.3 Sustrans (UK) Guidelines

Sustrans (UK) is a sustainable transport organisation at the forefront of developing best practice in the design of bicycle facilities. The guidelines identify that in selecting bicycle routes or constructing new intersections, the benefits to all road users should be assessed with consideration given to alternate bicycle routes or alternate intersection configurations.

Where a roundabout is the preferred intersection treatment, the Sustrans guidelines include two types of roundabout design that should be considered, depending on vehicle volumes and traffic composition. The "continental style" roundabout focuses on reducing

speeds on the approach and through the roundabout. The alternative approach suggested by Sustrans is to provide separated bicycle facilities for travel through the roundabout. A schematic of each of these options is shown in Figure 16.

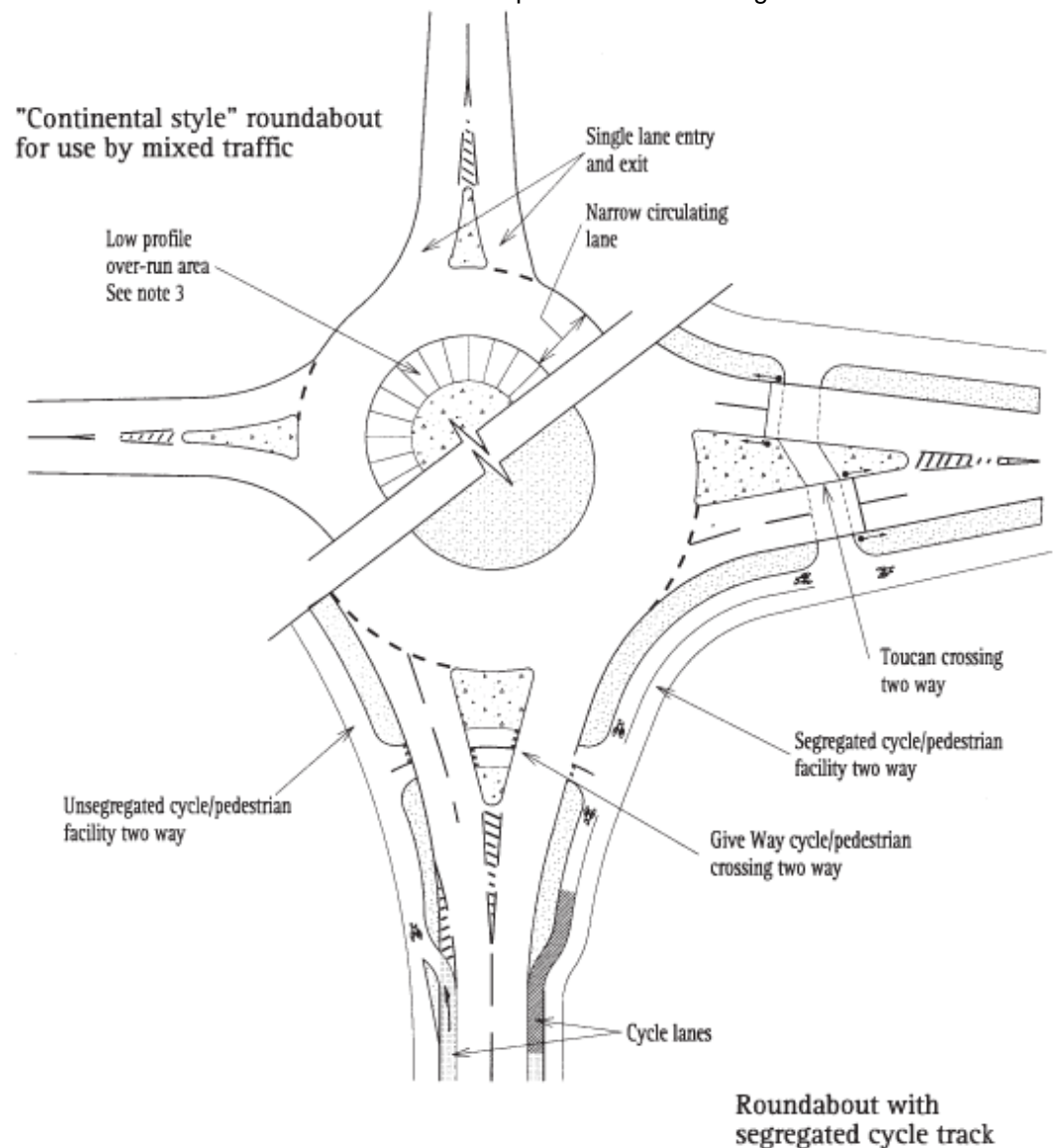


Figure 16 – Sustrans Roundabout Design Options

The dimensions for the continental style roundabout include an outer diameter island of between 28m and 36m, entry and exit widths of 4 to 5m, a circulating carriageway width at between 4m and 6m and perpendicular approach arms.

Generally, the Sustrans guidelines indicate that in situations where the continental style roundabout cannot be accommodated or where traffic volumes exceed 3,000 vehicles per day, a segregated cycle track should be provided.

Sustrans guidelines indicate that at *heavily congested* locations with *high accident rates* involving motorists entering the roundabout and striking cyclists on the circulating carriageway, consideration should be given to the full-time signalisation of the roundabout.

E1.4 Bicycle Victoria Guidelines

Bicycle Victoria have developed a toolbox to assist Councils and developers to design and build a safe, cycle-friendly network of on-road and off-road routes. The toolbox can be accessed from the Bicycle Victoria website, and provides advice as to the advantages and disadvantages of roundabout design.

The guidelines include a set of roundabout examples from locations across the Melbourne area, highlighting the preferred cycling facilities on approach and through roundabouts. As a summary, the Bicycle Victoria guidelines recommend:

- Coloured lane surfacing/markings, which provides significant bicycle awareness and clarity to all road users.
- Avoid inconsistent and unclear lane markings on approach to the roundabout.
- Supports measures that encourage mixing/merging of bicycles and motor vehicles before roundabouts, as oppose to at or in roundabouts.
- Measures are recommended that will encourage cyclists to occupy the centre of the lane on entering the roundabout, therefore increasing the prominence of cyclists to all road users.
- Bicycle cut-through lanes on approach to roundabouts is not recommended, as this may result in the cyclist being insufficiently visible to motorists.

The Bicycle Victoria website also provides a link to the New Zealand document 'The Ins and Outs of Roundabouts', a look at safe cycling design at roundabouts from a safety auditor's perspective. The document states that cyclists are generally poorly catered for at roundabouts, and recommends the following solutions to key safety issues:

- Avoid use of stormwater grate patterns which are parallel to the direction of travel.
- Avoid locating any service covers within the travelled way.
- Provide adequate clearances to heavy vehicle tracking paths in the design phase.
- Provide adequate circulating lane widths to properly accommodate cyclists.

E1.5 Other International Studies

The Transportation Research Board of the National Research Council (USA) conducted an extensive review of roundabout design best practice¹¹. This included reference to almost 60 different research studies and international design guidelines.

The review included a summary of the safety implications for cyclists at roundabouts, where it was noted that safety studies from the Netherlands, Switzerland, Germany, Great Britain and France generally agree on the following points:

- In low-speed, single-lane roundabouts, no negative safety impacts have been observed when bicycles are mixed in the traffic stream. Because of the small speed differential, cyclists are expected to circulate in the traffic lane at more or less the same speed as vehicles. When bike lanes lead to this type of roundabout, it is preferable to discontinue them about 10 to 20 m before reaching the roundabout, rather than continuing the lane through the roundabout. Bike lanes at the outer portion of the roundabout are generally not recommended.

¹¹ Transportation Research Board, 1998. Modern Roundabout Practice in the United States. Washington D.C.

- Bicycle safety tends to deteriorate at high-speed, multilane roundabouts and at flared entries. At these roundabouts, special solutions should be sought when warranted by bicycle volumes. Among the solutions are separate bikeways, possibly mixed pedestrian-bike ways, separate bike routing through other intersections, or grade separation for the vulnerable modes.

These conclusions are generally consistent with the recommendations of the Sustrans and Austroads Guidelines. It is noted again in this study that the installation of cycle lanes on the periphery of the main carriageway is not recommended.

The London Cycle Design Standards¹² provides commentary and recommendations regarding the safety of cyclists at roundabouts. With regards to the circulating carriageway width, these standards indicate that single lane approach and exit widths of between 4.0m and 5.0m, and single lane circulatory carriageways of between 5.0m and 7.0m are desirable. Also, these standards indicate that reduced circulatory speeds can be achieved by introducing over-run strips around the central island of the roundabout, thereby reducing the width of the circulating carriageway.

The Department for Transport UK (DFT) also provides commentary of the recommended geometry. The DFT indicates that "A central island of between 20m and 40m diameter usually provides the best geometry for this (continental) type of roundabout. A diameter less than 20m often gives a sufficiently straight driving path for traffic to maintain higher speeds; very large diameters can also encourage higher speeds."¹³

¹² Transport for London. London Cycling Design Standards – Chapter 5

¹³ Department for Transport, 2007. Cycling Infrastructure Design, Local Transport Note Consultation Draft

Appendix F

School Questionnaire

BALLARAT BICYCLE STRATEGY

SCHOOL QUESTIONNAIRE – TO BE COMPLETED BY THE SCHOOL PRINCIPAL

NAME OF SCHOOL _____

Q1 How many students are enrolled at your school?

Q2 Approximately what proportion of students live within 5 km of school?

Q3 Does the school currently run the '*bike-ed*' course, and/or the '*Ride2School*' program, or something similar?

Yes / No

If Yes, which program? _____

Q4 Is road safety currently part of the school curriculum?

Yes / No

If not, do you have future plans to include road safety?

Yes / No

Q5 Are students educated about the health benefits of regular exercise?

Yes / No

Q6 Could you give an approximation of how many students ride a bicycle?

Q7 Does the school participate in many recreational or competitive cycling events?

Yes / No

If Yes, please give details _____

Q8 Are students permitted to ride bicycles to school?

Yes / No

Q9 Approximately how many students ride their bicycles to school on a typical school day?



Q10 What bicycle facilities do you have at school?

Bicycle Racks

Lock-up Compound

Other (please list) _____

Q11 In order of priority, using 1 as the main reason and 3 as the least influential reason, please indicate the 3 main reasons why, in your opinion, students do not currently ride their bicycle to school.

Not permitted by school

Not permitted by parents

Adequate school transport exists(eg. School bus)

Parents drive students to school

Distance

No/ poor bicycle storage facilities at school

Too dangerous due to heavy vehicle/ fast traffic

Low bicycle ownership rates

Students do not want to

Topography

Other (please state) _____

Q12 In your opinion, how may more students can be encouraged to cycle to school?

Improved bicycle network to the school

Improved road safety course

Improved lock up facilities

Other (please list) _____

Q13 Are there any locations in the vicinity of your school that are dangerous for cyclists?

Q14 In your opinion which route to school should be given the highest priority for the provision of cycling facilities?



Q15 Are there any other comments you would like to make concerning cycling?

If you have any further queries regarding this survey, or you would like to become more involved in the study, please contact Hywel Rowlands on 9668 5414.

Please return the questionnaire in the pre-paid envelope provided, by Friday 7 September 2007, to:

Hywel Rowlands
Arup
Level 17 1 Nicholson Street
Melbourne
VIC 3002

Or fax 9663 1546

Thank-you for your co-operation.

Appendix G

On-Road Infrastructure

Table 5: On-Road Recommendations




Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
1	Lydiard Street	Site Visit Community Workshop	Recreational Commuter Student	Wide carriageway with parking suitable for continuous on-road lanes. Lydiard runs north-south past Ballarat Station and provides an ideal on-road link between residential areas in the north and south, Ballarat University (adjacent Grant Street). The southern end of Lydiard Street is closed to through traffic between Dana Street and Grant Street as this runs through the University precinct.	It is recommended that on-road cycle lanes be provided along the length of Lydiard Street and through the university precinct linking with Grant Street. This section of Lydiard Street crosses a number of intersections and roundabouts. Give way signage to be provided at intersections, with ample signage to inform all road users of the presence of cyclists.		High
2	Peel Street into Havelock Street	Site Visit	All Groups	Wide carriageway that presents an opportunity to extend bicycle lanes to the top of Peel Street and a continuation north along Havelock Street. The topography is very hilly in this area.	Extend on-road bicycle lanes to the top of Peel Street and along Havelock Street.	 <p>Peel Street, at intersection with Chisholm Street</p> <p>Peel Street provides cycle lanes of 0.9metres in width south of the Chisholm Street intersection</p>	Low
3	Norman Street (East)	Site Visit	Commuter Competitive	Wide carriageway that presents an opportunity to extend bicycle lanes to link with the top of Havelock Street and extend to connect with the proposed off-road trail along the Western Freeway as outlined under Item 74. There is a steep climb along the eastern length of Norman Street. There are a number of roundabouts that extend along the length of Norman Street. Aerial pictures clearly illustrated that the wide entries and circulatory carriageway is generally not used by vehicles.	Extend on-road bicycle lanes as far as Havelock Street during the interim, linking with the Havelock/Peel Street corridor.		Low
4	Macarthur Street	Site Visit Community Workshop Stakeholder Workshop	Commuter Recreational Competitive	Macarthur Street provides an on-road link between Peel Street and Lake Wendouree. The route is recognised as a well used corridor to Lake Wendouree by on-road experienced cyclists despite having 5 roundabouts along its length. The corridor is generally favoured over parallel corridors at Mair Street and Webster Street. Road width will not allow bicycle lanes along the entire length of Macarthur Street, however, width would permit a link to be made between Drummond Street, Burnbank Street and Wendouree Parade.	It is recommended that on-road cycle lanes are provided along Macarthur Street between Drummond Street, Burnbank Street and Wendouree Parade. This bridges a gap in the current network and provides a short spur to the lake. Centre lane hatch would need to be removed to provide sufficient width to accommodate bicycle lanes along some of the corridor. It is recommended that roundabouts at Drummond and Burnbank Street are tightened with overrun areas for large vehicles. It is also recommended that advanced stop lines/boxes are included on east/west approaches to Midland Freeway traffic signal intersection.	 <p>Wide circulatory carriageway and approaches at Burnbank Street/Macarthur Street</p>	High
5	Tait Street	Site Visit	Commuter Recreational	Sufficient opportunity exists to extend the on-road bicycle lanes Sutton Street south along Tait Street.	It is recommended that the extension of this corridor should coincide with future developments to the south of the city.		Low
6	Chisholm Street and eastern end of Howitt Street	Site Visit	Novice Recreational Commuter	Carriageway ranges between 10-13 metres in width. Howitt Street length east of Havelock Street is 10 metres in width without shoulder parking. Chisholm Street has a carriageway width of 12-13 metres allowing parallel parking to either side of the carriageway. A very narrow bicycle lane is provided to both sides of the carriageway.	At this stage no recommendations are outlined as this link is seen as a low priority. It may be appropriate to improve this connection beyond the context of the 5 year strategy.	 <p>Sturt/Pleasant Traffic Signal Interchange looking east</p> <p>Service Road adjacent Victoria Park</p>	Low

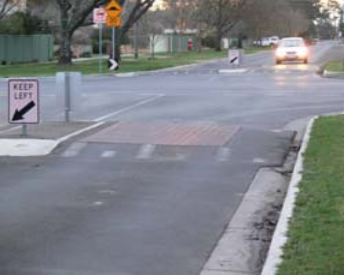







Table 5: On-Road Recommendations							
Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
7	Mair Street and Webster Street	Site Visit		Both Mair Street and Webster Street were investigated as potential links between the city centre and Lake Wendouree. Mair Street is a heavily trafficked corridor with a number of busy roundabouts along its length. Webster provides a suitable connection along much of its length, however, the Doveton/Webster roundabout creates a key barrier for cyclists.	Both these corridors were discounted as an east-west link between the city centre and the lake. Sturt Street was favoured as outlined under items 27, 28 and 29. This was primarily due to the wide nature of the road, signalised intersections, parallel service roads, link directly to the Mall and proposed traffic management changes to the eastern side of Sturt Street.		None
8	Blackhill Reserve and Simpson Street	Site Visit	Novice Recreational Commuter Tourist	This item includes both an on-road and an off-road section. If implemented, it is intended that both sections are developed simultaneously. Parkland through Blackhill Reserve to Maddern Street, wide verge along Howitt Street and thereafter a no through road at Simpson Street for vehicular traffic allowing a low traffic shared on-road environment connecting with the proposed off-road trail along the Western Freeway.	A suitable link for novice and recreational link, however, considered a very low priority under the 5 year context of the strategy.		Low
9	Gregory Street between Gillies Street and Burnbank Street	Site Visit Community Workshop	Recreational Commuter	Gregory Street is an ideal corridor to promote shared use by cyclists and motor vehicles given the traffic calming/speed reduction arrangements in place. Traffic signs indicate a speed of 40 kph to motorists at traffic calming measures. However, recently installed speed humps and road narrowing that slow motor vehicles also affect cyclists, and no provision has been provided for right turning cyclists at the intersections with Dowling and Forest Streets. This could have easily been avoided with the provision of bicycle bypass lanes.	The following measures are recommended: - Retrofit of traffic calming features to provide bicycle bypass. - Apply intermittent bicycle symbol to carriageway, particularly near intersections to inform cyclists and motorists of shared road. - Ensure that future traffic calming measures cater for ease of use by cyclists at all locations not only along the strategic bicycle network. Roads with speed control measures present ideal shared use corridors with motorists. - Signalise the intersection of Gillies Street and Gregory Street. This will provide a valuable on road link to the residential area to the north, Lake Wendouree, major employment centres to the west, and the new Wendouree railway station/	 Road narrowing and road hump along Gregory Street  Road narrowing along Gregory Street	High
10	Sebastopol Street between Pleasant Street and the Yarrowee Trail	Site Visit	Novice Recreational Commuter	Sebastopol Street is a local residential road with low traffic volumes. The corridor represents an opportunity to complete an east-west corridor between new residential growth areas in the west and the Yarrowee Trail.	In order to upgrade this corridor, the following is recommended - provide refuge crossing adjacent Winter Street assisting cyclists linking with Sebastopol St - change priority of intersection at Ascot Street giving east-west priority to cyclists - potential road closure of Sebastopol Street to western side of Drummond Street with bicycle bypass to assist cyclists crossing into the eastern length of Sebastopol Street and reduce through traffic. - apply bicycle symbol road markings to carriageway surface to assist wayfinding and inform drivers of shared use between motorists and cyclists	 Sebastopol Street looking west through Ascot Street  Eastern end of Sebastopol Street, track linking Yarrowee Trail	Medium
11	North-south link along or parallel to Albert Street, between Victoria St/Bridge St intersection and Rubicon St intersection	Site Visit Community Consultation Stakeholder Consultation	Commuter Recreational Students	Cyclists were observed using Albert Street both during the morning and evening peak travel periods despite high traffic volumes and speeds together with large two-lane roundabouts. Corridor is not ideal for cyclists with poor continuity of existing on-road lanes. An attempt has been made to provide continuity of bicycle lanes through lengths which are obstructed by parked vehicles. However, the off-road sections are of poor quality, are subject to continuous grade differences between nature strip and vehicular cross-overs, and are narrow. The paths are not suitable for cyclists and bicycle signage that accompany the path should be removed.	Existing lanes within the nature strip along Albert Street are not adequate for cyclists and signage indicating these lanes together with reference to a cycle route on the Ballarat bicycle map should be removed. A north-south link along Albert Street or immediately adjacent is not easily achieved. It is recommended that a corridor is identified and upgraded. Further understanding of existing bicycle travel patterns is required before Council commits to the up grade of a south-north on-road route. It is recommended that bicycle counts be conducted along Albert Street, Spencer Street, Grant Street and Yarrowee Street to understand the preferred corridor by cyclists. Discussions with cyclists currently using these routes together with students at Sebastopol College would further improve understanding.	 Looking north along Albert Street, no space for cyclists. Cycle track to left of parked vehicle unsuitable for cyclists.  Two-lane roundabouts along Albert Street  Looking north along Albert Street, cycle track along left side of parking lane  Road narrows at crossing points, bicycle lanes end	High

Table 5: On-Road Recommendations



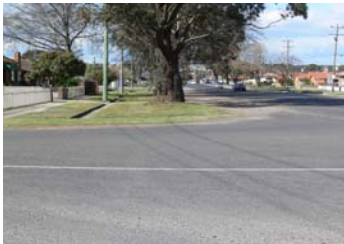



Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
12	Between Learmonth Road and proposed Wendouree Station	Site Visit	All Groups	Industrial/commercial area with significant nature strip areas and ample space. Sufficient space is available to provide a bicycle link from Norman Street through to the proposed Wendouree Station.	Recommend that link is provided as part of the station development.		High
13	Pleasant Street/Alfred Street	Site Visit School Questionnaire	Novice Recreational Students Commuter	Bicycle lanes currently exist along Pleasant Street and Alfred Street between Mair Street and Rubicon Street with the exception of a short length adjacent Lake Wendouree and a short length adjacent Sebastopol College. The corridor represents a north-south link to Lake Wendouree.	Extend carriageway and provide on-road bicycle lanes along Pleasant Street between Mair Street and Wendouree Parade. Introduce parking bays to one side of Pleasant Street between Hertford Street and Rubicon Street. Provide 1.5 metre wide on-street bicycle lanes either side of the carriageway.	 Alfred Street looking north  Alfred Street looking south	High
14	Hertford Street (Glenelg Highway)	School Questionnaire	Students Commuter Recreational	Wide carriageway and shoulder areas with sufficient space for 90° parking. Tree lined nature strips beyond parking. Sebastopol College is located adjacent Alfred Street.	Introduce a 1.5 metre wide carriageway shoulders to support on-road bicycle lanes along Hertford Street (Glenelg Highway) between Wiltshire Lane and with north-south link near Albert as discussed under Item 11. It is recommended that this upgrade be undertaken as part of a future maintenance re-surfacing of the road. This would serve to keep costs low, ensure best value and to provide an even surface between the vehicular carriageway and the bicycle lane.	 Sturt/Pleasant Traffic Signal Interchange looking east  Service Road adjacent Victoria Park	Medium
15	Ballarat-Carnham Road	Site Visit	Recreational	This recommendation relates to the section of Latrobe Street running between Wiltshire Lane and Sutton Street. Beyond Sutton Street, (running east) the road provides a formal on-road cycle lane towards the city centre. However, between Wiltshire Lane and Sutton Street, Latrobe Street is wide, but does not provide an cycle lanes. There is significant width along this section, and car parking running on both sides.	There is sufficient space to provide cycling lanes in both directions, and it is recommended to provide lanes of 1.5-2.0 metres in width. This will provide a useful connection between the existing on-road cycle lanes on Pleasant Street, Gillies Street and Wiltshire Lane.		Low
16	Doveton Street North	Site Visit	Recreational Commuter	The section of Doveton Street North between Normam Street and Seymour Street currently has 90° parking on both sides, and parallel parking on the southern part of the east side. The overall road width is consistently approximately 13 metres, with one lane in either direction, the parking lanes, and a hard shoulder or verge.	It is recommended to provide an on road cycle lane for the duration of this stretch. This will require the removal of parking on one side of the carriageway, but adequate parking provision will remain provision to cater for the parking demand.		Medium
17	Learmonth Street and Wiltshire Lane	Site Visit Correspondence from Community	Recreational Commuter	Lack of sealed shoulder between Leopold Street and La Trobe. Shoulders are dirt with many potholes and edge of surfacing is very rough. Width of existing surfaced carriageway is does not allow much space for cyclists and the corridor is used by a fairly high proportion of heavy vehicles. The corridor has a number of large roundabouts, the corridor is not ideal for cyclists. Lanes can be widened and improved between La Trobe and Whitelaw Avenue.	Although the route is not ideal for on-road cyclists given the number of large roundabouts, there is no alternative on-road corridor. The development of this corridor as a cycling route needs to be developed in conjunction with the proposed adjacent growth area. Depending on the residential nature of this environment under future growth proposals, it is recommended that either separate off-road links are created adjacent the roundabouts or the roundabouts are tightened with over-run areas. It is also recommended that: - a shoulder with bicycle lanes between Leopold Street and La Trobe Street, and - that bicycle lanes are widened to a minimum of 1.5 metres between La Trobe Street and Whitelaw Avenue through the re-application of surface markings.	 Wiltshire Lane looking North near Meadow Court  Wiltshire Lane between Latrobe and Whitelaw	Medium

Table 5: On-Road Recommendations











Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
18	Wendouree Parade near Tramways Museum	Inception Meeting Community Workshop Stakeholder Workshop	Recreational Commuter Novice Tourist	<p>It is understood that there have been a number of loss of control incidents and crashes along Wendouree Parade involving cyclists crossing or cycling adjance to the tram tracks.</p> <p>There are two types of crashes that most frequentlly occur at tramtracks, the first is when the front wheel slides from beneath a cyclist, the second is when a cyclist's wheel is caught in the flange gap of the tram tracks. A review of the VicRoads CrashStats database has indicate that while both type of crashes may be occurring at this location, the crash type whereby a cyclist's wheel slips on the track is more common.</p>	<p>The following treatments have been examined: -Welding on to the surface of the tram tracks. -Scouring and cutting small grooves into the tram track surface. -Build up road surface either side of the tram tracks with additional asphalt. -Treat the surface with a non-slip adhesive or weld non-slip plates over the track.</p> <p>Following a review of advantages and disadvantages of each option together with discussions with rail experts at Arup, it is recommended that welding should be applied to the surface of the tram tracks.</p> <p>Welding to the track has the following advantages: - Improved traction. - No impact to the integrity of the tram track. - Will not affect earthing of trams. - Reasonably easy to maintain and repair.</p> <p>It is recommended that the tram tracks are closely monitored post application of the welding to gauge the effectiveness of the measure.</p>	  <p>Tram track crossing of Wendouree</p> <p>Example of welding applied to a track</p>	High
21	Learmonth Road (C237), between Norman Street and Howitt St intersection	Site Visit Community Workshop	Commuter Recreational (Touring Route)	<p>Left turn lanes for vehicular traffic create gaps in cycle lane provision creating a significant barrier for those wishing to cycle to key employment centres.</p> <p>No advance stop lines at the Howitt/Gilles/Learmonth intersection.</p>	<p>Widen carriageway at left turn lane locations, provide continuous bike lanes 1.5 meters wide between the left turn lane and the through lane. Lanes to be surfaced with a green screed together with prominent bicycle symbol road marking. Green surfacing to start a short distance upstream to improve awareness of approaching drivers who intend to turn left.</p> <p>At the Gillies / Howitt / Learmonth intersection, recommendations include - advance stop lines (head start boxes) from the Learmonth Road (northwest) approach - advance stop lines (head start boxes) for the Gillies Street (northern approach) A link is also required across the traffic signal intersection with the off road path along Gillies Street. Bicycle light symbol is required at pedestrian crossing of Howitt Street and bicycle symbols to footway surface and signage illustrating the connection.</p> <p>An on road connection is required to link to Gregory Street, and this recommendation should therefore be considered alongside Item #78.</p> <p>Care is also required to inform cyclists at the Howitt Street / Gillies Street intersection.</p>	  <p>Cycle lane ends looking south along Learmonth Road</p> <p>Looking south near Howitt/Learmonth intersection</p>	High
23	Grant Street	Site Visit	Commuter Recreational (Touring Route)	<p>Carriageway with sufficient width to provide on-road bicycle link between Eyre Street and Geelong Road which would also connect with Lydiard Street and Peel Street.</p> <p>Route has a number of large roundabouts that are not appropriate along a bicycle route, however, corridor provides a significant link for cyclists.</p>	<p>It is recommended that - on-road bicycle lanes are provided linking Geelong Road and Eyre Street - roundabouts are retrofitted narrowing the approach and circulatory carriageway with over-run areas to allow heavy vehicle movement.</p> <p>It is not recommended that this arrangement would fall within the context of the 5 year strategy.</p>	  <p>Facing north at turning lane at end of bike lane</p> <p>Facing south from Barkly St/Grant St roundabout</p>	Medium
24	Geelong Road	Site Visit Community Workshop Stakeholder Workshop	Recreational Commuter University Students	<p>Geelong Road is a main arterial route into Ballarat, and carries a substantial volume of traffic at speeds of typically 60kph to 70kph.</p> <p>Geelong Road provides a connection to Mount Helen, where several education centres are located - including the University of Ballarat campus.</p> <p>Although the road provides a bike lane in parts, there is a lack of consistency in the route with regard to: - surfacing - pot holes and gravel sections, poor maintenance - width - varies from approximately 1.5m to 0.5, with gaps in the route where no hard shoulder or cycle lanes are provided</p> <p>This route is frequently used by confident and experienced cyclists.</p>	<p>It is highly recommended that improvements are delivered to Geelong Road under future programmed maintenance and resurfacing works. It is recommended that works include the provision of a 1.5 metre (2.0 metres preferred) wide shoulder with bicycle symbols applied.</p>	    <p>No shoulders through cutting near Mount Clear Primary</p> <p>Wide shoulder along northern length of Geelong Road</p> <p>Poor maintenance of shoulder adjacent Tinworth Avenue</p> <p>Shoulder narrow near Mount Clear Primary</p>	Medium

Table 5: On-Road Recommendations

Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
25	Local road link from Yarrowee Trail to Canadian Trail. (development integral to cross city corridor, Item 26)	Site Visit Stakeholder Site Visit Community Workshop	Novice Student Recreational Commuter	No clear connection between Yarrowee Trail and Canadian Trail together with the city centre. Steinfeld Street South and Steinfeld Street North are local roads with relatively low traffic volumes. Anderson Street West attracts little traffic flows although there is significant long term 90 deg parking. Anderson Street East runs into Steinfeld Street South. All these streets present suitable low speed local road connections between trails via Peel Street. Both Anderson Street West and Anderson Street East lead to the supermarkets in the centre of town. Anderson Street East continues through a footbridge.	Provide formal on road bicycle link between Yarrowee Trail and Canadian Trail via Peel Street. This provides continuity between trails. Central islands required along Grant Street adjacent Yarrowee bridge and at Peel Street to assist cyclists to cross the road in 2 stages. This needs to be sufficient to accommodate a bicycle and may include rails to assist cyclists. The RED route can be implemented immediately with bold road markings designating the corridor as a shared carriageway between motorists and cyclist and assisting cyclists with wayfinding. Unfortunately, the route requires two dog leg manoeuvres at bridge crossing. The BLUE route provides improved continuity of route, however, a new bridge would be required from Anderson Street West through to Steinfeld Street North. Provide map signage at key locations including at the end of the Yarrowee Trail, at Peel Street and at the end of the Canadian Trail.		High
26	Peel Street (development integral to cross city corridor, Item 25)	Site Visit Community Workshop Stakeholder Workshop	All Groups	Peel Street represents a north-south continuous corridor through the city centre passing to the east of the central mall and supermarkets, and under the railway line. The corridor comprises of traffic signal intersections with parallel parking either side of the road. There are two zebra crossings between Bridge Mall and Bridge Street. The corridor is often congested due to competing demands between through traffic, pedestrians and parking vehicles. Currently, the corridor has no provision for cyclists although the road is an obvious link between residential areas and bicycle paths, and is a missing link in the Yarrowee Creek Trail.	Peel Street is a much needed north-south link that would provide connectivity between a number of existing bike paths and bike lanes together with future bicycle network corridors. The link would serve intercommunity movements and trips to work and central amenities together with off road recreational paths. Peel Street represents a corridor through the inner activity centres of the city linking northern and southern sides of the Yarrowee Trail together with the Canadian Trail, the Scott Parade Trail together with other shared and on-road routes. This proposal conflicts with the proposed right turn lanes outlined under the Traffic Management and Car Parking Strategy, and would result in the removal of parking spaces and turning lanes. However, it is highly recommended that the available road space be assigned to complete a strategic north-south cycling link encouraging alternative modes of travel rather than encouraging greater traffic volumes. Option A - Provide on-road bike lanes 1.5-2.0metres wide on both sides of the carriageway. Vehicular carriageway to be reduced to between 3.0-3.3metres. Provide links with advanced stop lines. Option B - Introduce Copenhagen style lanes with narrow kerbed segregation between motorists and cyclists. For both options it is recommended that traffic lanes are reduced and width allocated to cyclists.		High
27	Sturt Street (Grenville Street to Doveton Street). To be developed in conjunction with Items 28, 29 and 30)	Site Visit School Questionnaire	Commuter Recreational	Sturt Street is a key activity centre in Ballarat with many retail outlets, cafes and restaurants together with key employment centres including the Council offices adjacent Armstrong Street. Minor works have been undertaken along Sturt Street to discourage through traffic following the completion of the Western Freeway which was designed to take through traffic from Ballarat CBA.	This recommendation is supportive of changes in traffic management along Sturt Street (Grenville to Doveton) to reduce the volume of traffic and vehicular speeds. The reallocation of road space to a bus/bicycle lane and reduction of traffic speeds to 40 kph.		High
28	Sturt Street (Doveton Street to Pleasant Street). To be developed in conjunction with Items 27, 29 and 30.	Site Visit School Questionnaire	Commuter Recreational Students	The existing carriageway generally consists of 2x4metre wide traffic lanes with significant parking widths with shoulders between parked vehicles and the through carriageway. Traffic signals at intersections, however, these do not have advance stop lines for cyclists. Corridor provides an opportunity to link outer western residential areas with central areas including a strong east-west connection to the lake and Victoria Park. A number of schools and colleges are also located along the length of Sturt Street.	It is recommended that through traffic lanes are reduced to 3.5 metres and parking bays are reduced to accommodate 2 metre wide shoulders/bicycle lanes to either side of the carriageway. Introduce advance bicycle stop lines at Doveton, Dawson, Drummond and Pleasant Street intersections with Sturt Street.		High
29	Sturt Street (Pleasant Street to Gilles Street). To be developed in conjunction with Items 27, 28 and 30.	Site Visit School Questionnaire	Commuter Recreational Students	Local service roads run parallel either side of Sturt Street providing a low speed lightly trafficked link suitable for shared use by vehicles and cyclists. Traffic signals at intersections, however, these do not have advance stop lines for cyclists. Corridor provides an opportunity to link outer western residential areas with central areas including a strong east-west connection to the lake and Victoria Park. A number of schools and colleges are also located along the length of Sturt Street.	Provide direct paths and dropped kerbing for cyclists to link with traffic signal crossing at Pleasant Street. Upgrade traffic signals at Sturt Street/Pleasant Street to include bicycle symbols within traffic lights to allow cyclists to ride across the crossing. Place on road bicycle symbols to carriageway surface indicating shared use of side road between motor vehicles and cyclists. Reduction in speed limits to 40 kph would further reinforce a safe environment for novice cyclists. Cyclists travelling eastbound along the two-way service road to the west of the Gilles Street would need to be directed to the northern local service road at the Gilles Street intersection to continue their journey eastbound. Clear surface markings (arrows) and signs would be required to ensure that this is achieved.		High

Table 5: On-Road Recommendations



Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
30	Sturt Street (Gilles Street westbound). To be developed in conjunction with Items 27, 28 and 29.	Site Visit School Questionnaire	Novice Commuter Recreational Students	<p>A local service road run parallel to the southern side of Sturt Street providing a low speed lightly trafficked link suitable for shared use by vehicles and cyclists.</p> <p>Road is not continuous for motorists with short closures along its lengths, this keeps traffic volumes low along much of the length of the road, however, there are some busy sections.</p> <p>Corridor provides an opportunity to link outer western residential areas with central areas including a strong east-west connection to the lake and Victoria Park. A number of schools and colleges are also located along the length of Sturt Street.</p>	<p>An on-road route (Option A) can be developed to the southern side of Sturt Street or an off-road path (Option B) to the northern side of Sturt Street, or both.</p> <p>Option A involves a formal route along a parallel service road with bicycle symbols applied intermittently to the carriageway surface to raise the awareness of the route as a bicycle corridor and as a reminder to motorists of the presence of cyclists. Improved connections across Gilles Street through provision of direct paths linking side roads and the crossing facilities. Upgrade traffic signals at Sturt Street/Gilles Street to include bicycle symbols within traffic lights to allow cyclists to ride across the crossing.</p> <p>Road closure location at disused rail track can be greatly improved to better accommodate bicycle movements through removing signage and barriers that create a bottleneck. Two paths with surface markings indicating direction of flow would improve the route and would continue to ensure that the vehicles do not missuse the link.</p> <p>There is also scope to introduce additional closures along this route that would not greatly hinder traffic and would serve to reduce traffic speeds and keep traffic to the main central road.</p> <p>Option B involves the development of an off-road path to the northern side of Sturt Street. It is noted that VicRoads intend to install a roundabout at the Arch of Victory and provide introduction. It is highly recommended that Council hold further discussions at the earliest with VicRoads.</p> <p>This would extend as far as the Skipton Rail Trail.</p>	 <p>Looking north adjacent Ningana Street</p> <p>Typical local access road running parallel to Sturt St</p>	Low (A) High (B)
31	Dowling Street between Norman Street and Wendouree Parade	Site Visit	Recreational Commuter	<p>Poor connection with the lake via on-road cycle lanes along Dowling Street north of Howitt Street.</p> <p>Howitt Street bicycle lanes are of poor width without bicycle symbols.</p> <p>Opportunity to greatly improve this corridor to the lake together with a link to the proposed rail trail and Gregory Street.</p>	<p>Recommendations include:</p> <ul style="list-style-type: none"> - sealed shoulders to the southern side of the rail line with minimum 1.5 metre wide bicycle lanes - bicycle crossing facilities at the Howitt Street/Dowling Street intersection - improve width of existing on-road facilities along Dowling Street together with bicycle symbols 	 <p>Dowling Street looking north towards rail crossing</p> <p>Existing on-road lanes along Dowling Street north of Howitt</p>	High
32	Dowling Street between Norman Street and Traminer Court	Site Visit	Recreational Commuter	<p>Carriageway and gravel shoulders sufficient to accommodate on-road cycle lanes. The area is an employment area for light industry. A number of cyclists were observed in the area during the early evening period.</p> <p>The proposals provide a link between the lake, bicycle lanes along Norman Street and a potential off-road circuit that would run parallel to the freeway linking with a number of residential areas employment areas and Holloake Park.</p>	<p>Between Norman Street and Walton Street - Widen surfaced carriageway to provide on road cycle lanes with a minimum width of 1.5 metres. Recommend that shoulder is widened by 2 metres to ensure that the cycle lane is not compromised by the edge of the surfacing and to help keep gravel off the cycle lane.</p> <p>Between Walton Street and Traminer Court - provide on-road lanes either side of carriageway. Parking may need to be reorientated from 90deg parking to 45deg parking to establish extra width for bike lanes.</p>	 <p>Dowling Street looking north from Norman Street</p> <p>Dowling Street looking south near Traminer Court</p>	Medium
33	Forest Street to Howitt Street	Site Visit	Recreational Competitive Commuter Students	<p>Relatively narrow carriageway with wide shoulders that can easily accommodate on-road bicycle lanes.</p> <p>Link is a final length of bicycle lane connecting with Wendouree Parade</p>	<p>Provide indented parking to one side of the carriageway and provide 1.5 metre wide bicycle lanes either side of carriageway.</p> <p>Install advanced stop lines for bicycles to the northern and southern approach of the Forest Street/Howitt Street intersection.</p> <p>Provide high standard sheltered bicycle parking at boat house at bottom of Forest Street. A shelter would provide a higher standard of amenity than regular parking facilities and is preferred.</p>	 <p>Looking north along Forest Street</p>	Low
34	Learmonth Road (C237), from Ring Road to Miners Rest	Stakeholder Feedback	Recreational Competitive Commuter	<p>The existing on-road bike lane commences at the intersection with Howitt Street and continues as far as Ring Road.</p> <p>Miners Rest is located approximately 4-5km to the north of Ring Road, and is connected directly by Learmonth Road. Further residential development is proposed at Miners Rest.</p>	<p>Continue the on-road cycle route on Learmonth Road as far as Miners Rest.</p>		Medium

Table 5: On-Road Recommendations

Item No.	Location	Source & Melways Reference	Target Group	Existing Conditions/Opportunity	Description of Recommendation	Photo	Priority
35	Cuthberts Road, from Learmonth Street to Alfredton	Stakeholder Feedback	Recreational Commuter Students	The Commuter and Touring Map indicates on-road cycle lanes along Cuthberts Road between Learmonth Street and Elaine Avenue. No formal bicycle lanes are provided to the west of Elaine Avenue although width permits as far as Robertsons Drive. The carriageway width also allows for on road parking to both sides. West of Robertsons Drive, the road narrows to 10 metres	It is recommended that on-road bicycle lanes be extended along Cuthbert Road as far as Robertsons Drive. Beyond Robertsons Drive the carriageway requires widening to accommodate on-road lanes. It is recommended that future development along Cuthbert Road allow for the widening and inclusion of on-road bicycle facilities.		Medium
36	Heinz Lane, between Doveton Street North and the Western Freeway	Stakeholder Feedback	Recreational Commuter	Heinz lane currently has a short length of on-road cycle lanes. The road reserve would allow for the continuation of this provision as far as residential areas adjacent the Midland Highway.	Introduce an on-road cycle lane to produce a link onto Doveton Street North - which (as detailed on Item 16) will provide a direct commuter route to the town centre		Low
37	Giot Drive, between Gillies Street and Dowling Street	Stakeholder Feedback	Recreational Commuter Students	Giot Drive provides one vehicular lane in either direction with ample width (including naturestrip) for provision of an on-road cycle lane or off-road as discussed within Item 75. Ballarat Secondary College (Wendouree Campus) is located mid section.	Both on-road and off-road facilities can be provided. A preference would be off-road provision given the potential to complete a northern recreational circuit and a safe link to Ballarat Secondary College. However, in the interim, on-road provision would be relatively inexpensive.		Medium
38	Drummond Street, between Latrobe Street and Skipton Street	Draft Strategy Feedback	Recreational Commuter	To the north of this location Drummond Street provides a formal on-road cycle path. However, there is a gap in the on-road path between Latrobe Street and Skipton Street.	Complete the on-road path along Drummond Street through completion of this gap.		High
39	Eureka Street, Navigators Road	Draft Strategy Feedback	Recreational Competitive	This route has been highlighted as a well used cycle route, but lacks a formal cycle path and is unsealed.	It is recommended to improve the road shoulders as follows: - shoulder widening and sealed surfacing - line marking - signage		Medium
40	Beyond Eureka Street and Navigators Road towards Warrenheip and the Western Highway and Buninyong	Draft Strategy Feedback	Recreational Competitive	As per item #39, this route has been highlighted as a well used cycle route, but lacks a formal cycle path and is unsealed.	The long term goal of this recommendation is to achieve an additional recreational/touring circuit the Yarra Flat Road circuit. As per item #39, the following is recommended: - shoulder widening and sealed surfacing - line marking - signage Council will need to develop and co-ordinate the route alongside the Moorabool Shire Council.		Low

Appendix H

Off-Road Infrastructure

Table 6: Off-Road Recommendations








Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
50	Nolan Street between Lydiard Street and Peel Street.	Site Visit	Novice Tourist Commuter Recreational	<p>The route along Nolan Street is indicated as an off-road route. The corridor is not appropriate at present as an off-road bicycle link.</p> <p>Off-road link is narrow (approx 1.2m) with obstructions including vehicles parking on footpath. Visibility and legibility of the off-road route is also poor.</p> <p>Two cyclists can not pass. Cyclists observed using the road rather than the off-road link.</p>	<p>This is an important link to Lydiard Street and an off-road link to the station. It is recommended that:</p> <ul style="list-style-type: none"> - the footway is widened to 3 meters from Peel Street to Lydiard Street through use of nature strip at locations and narrowing of carriageway at other locations. - parking restrictions are required to ensure that this link is not compromised as currently occurs. 	  <p>Nolan Street, looking NW towards Lydiard Street</p> <p>Parking to footway compromising an already narrow path</p>	Low
51	Mair Street connection with Ballarat Station	Community Consultation Site Visit	Novice Tourist Commuter Recreational	<p>No formal bicycle links exists with the railway station.</p> <p>A wide northern footpath along Mair Street presents an opportunity for an off-road connection with Peel Street.</p>	<p>Sufficient width is available to introduce off-road connection to the northern side of Mair Street starting at Peel Street and running west.</p> <p>Bicycle markings to the footpath surface would serve to inform pedestrians and cyclists of shared use.</p> <p>Signage or surface markings would be required at Peel Street to inform cyclists of link to Ballarat Station.</p>	  <p>North side of Mair St - opposite Cattin St, facing west</p> <p>Pedestrian footpath connecting Mair Street to Ballarat Railway Station</p>	High
53	Yarrowee Trail immediately adjacent Peel Street and Rowe Street.	Site Visit Community Consultation Stakeholder Consultation	Novice Tourist Commuter Recreational	<p>Stairs form part of the Yarrowee Trail immediately adjacent Peel Street.</p> <p>Lifting a bike to negotiate the stairs is not a desirable arrangement to using the Yarrowee Trail and can be problematic for younger or older riders.</p> <p>Conspicuity of the start of the off-road trail is poor.</p>	<p>It is recommended that a short ramp is introduced providing a much needed improvement for cyclists.</p> <p>Access to the path can be made far more eye-catching. Bold signage can assist cyclists in identifying the path, advertise the path to all road users and inform motorists of the presence of cyclists.</p> <p>Nature strip immediately in front of path entrance should be removed and surfaced together with the provision of a wide strip of dropped kerbing. Surface markings illustrating a bicycle symbol would further improve the conspicuity of the trail.</p>	  <p>Stairs at end of Yarrowee Trail adjacent Peel Street</p> <p>Entrance to Yarrowee Trail along Peel Street</p>	High
54	Doveton Crescent, Little Clyde Street, Crompton Street and Comb Street.	Site Visit	Novice Tourist Commuter Recreational	<p>At present the Station is not well connected to any cycle lanes or paths. Doveton Crescent and Little Clyde Street represent easy off-road connections towards the north west of the city connecting with proposed off-road trails that can be implemented along the existing rail corridors to the north and west of the station.</p> <p>Wide nature strips to the southern side of Doveton Street are currently used as a park and ride facility for the adjacent station. The parking area is not well controlled with many cars parking well within the nature strip.</p>	<p>It is recommended that this corridor is developed as a safe route to the station for both pedestrians and cyclists and thereafter extended to the north as part of Item 77 and to the west as part of Items 75, 55 and 9.</p> <p>It is recommended that parking is controlled through the introduction of kerbing allowing a 3 metre wide path to be implemented between the rail boundary and parked vehicles.</p> <p>Continue 3 metre path along the eastern side of Little Clyde Street, Crompton Street and Comb Street.</p>	  <p>Doveton Crescent looking east towards station</p> <p>Doveton Crescent looking west towards Little Clyde Street</p>	High
55	East - West Rail	Site Visit	Novice Tourist Commuter Recreational	<p>Wide reserves exist along length of the rail corridor that extends from Ballarat Station to the proposed Wendouree Rail Station.</p>	<p>It is highly recommended that a bicycle corridor is developed between the north-western residential areas and employment centres together with a connection between the Skipton Rail Trail and Ballarat Station/Town Centre.</p> <p>A connection extending the length of the rail line between Ballarat Station and Ring Road would be ideal, however, such a quality link would be difficult in the short term.</p> <p>It is recommended that links are made either side of Gregory Street through utilising segments of the generous rail reserves between Gillies St and Ring Rd. (to be developed in conjunction with item 54 and 9)</p> <p>As suggested in Item #9, it is recommended to signalise the intersection of Gregory Street / Gillies Street. This will complete the east - west connection.</p> <p>In the interim, a connection between Gregory Street West and Blind Creek Road should be implemented. This will compliment the proposed development of the area.</p>	 <p>Looking east along rail reserve from Ring Road</p>	High

Table 6: Off-Road Recommendations












Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
56	Whitelaw Avenue & Rubicon Street	Site Visit	Novice Commuter Recreational	Corridor present an east-west link along wide verges primarily through residential areas linking with the Yarrowee Trail and proposed trail as outlined under Item 80. To the west of Wiltshire Lane, the corridor ends within a new housing development. Road widths do not allow for an on-road corridor.	Recommendations include: - Provide off-road path to northern side of West End, ensure continuity of off-road path through future residential developments. - Provide off-road path along southern side of Whitelaw road, install table top crossings of side streets to assist continuity for cyclists - install off-road path along northern side of Rubicon street - upgrade path between End of Rubicon street and the Yarrowee Trail, it is recommended that this link is a sealed surface due to gradient of path The development of the corridor requires appropriate crossing facilities at major roads and signage indicating the name and number of route and connection with the Yarrowee Trail to the city centre.	   	Medium
57	Morgan Street	Site Visit	Novice Commuter Recreational	East-west corridor through new residential areas with wide verges to the south side of the carriageway. Road widths do not allow for on-road lanes.	A path is recommended either the northern or southern side of Morgan Street with an improved crossing location at Albert Street/Midland Highway and a path linking with the Yarrowee Trail. A southern path is favoured at this stage, however, a more detailed assessment is required to understand the cost and ease of implementation. Extend Yarrowee Trail south along existing walking track.	 	Low
59	Yarrowee Trail tunnel beneath the Western Freeway	Inception Meeting Stakeholder Workshop Community Workshop	Novice Recreational Tourism	The Yarrowee Trail extends north/east bound beyond the Western Freeway via a narrow circular tunnel. Conditions through the tunnel are extremely poor for cyclists exacerbated by the lack of lighting. Approaches to the tunnel are steep and slippery. Entry point to the tunnel are obstructed with bollards. Bollards have been applied with aim to restrict motorbikes.	It is recommended that: - Sealed surfacing is applied along the steep approaches to the tunnel to assist cyclists and improve safety - lighting is introduced through the tunnel It is unclear whether an energy source is available to the edge of the western freeway for lighting. A stand alone solar arrangement may be the most cost effective arrangement if no existing source is available. It is essential that lighting within the tunnel is vandal proof and that any solar array is located to the side of the freeway out of reach from vandals.	 	High
60	Eyre Street, between Russell St linking with Grant Street	Site Visit	Novice Students Commuter	The route provides a parallel east-west on road route. Traffic levels are relatively low Sturt Street providing the main east-west corridor. Eyre Street is a wide two-way two lane local road linking Victoria Park, residential areas and the city centre. The route would be of particular use to students travelling from residential area to St Patricks College, Loreto College and Ballarat High School. A short length of 45' angled car parking spaces adjacent The Queen Elisabeth Centre compromise width. Parking turnover does not seem to be significant, however, turnover may be greater adjacent The Queen Elisabeth Centre. The corridor includes a number of roundabouts.	It is recommended that an on-road route is provided along Eyre Street linking with proposed cycle lanes along Grant Street, the Yarrowee Trail, the city centre and Victoria Park. Cycle lanes would be applied to a minimum width of 1.5 metres but preferably wider providing space for cyclists and opening of car doors. It is recommended that isolated locations of 45' parking is reorientated to provide greater space for cyclists and help cars manoeuvring out of spaces to observe approaching cyclists.	  	Medium

Table 6: Off-Road Recommendations









Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
61	Southern length of Victoria Park along Winter Street nature strip (in conjunction with Item 10)	Site Visit	Novice Student Recreational Commuter	Wide nature strip runs the length of Winter Street from Learmonth Street to Pleasant Street. Dirt path currently exists along the eastern length of the proposed path which is used by both cyclists and pedestrians. Significant 2.3 kilometre corridor would link with proposed rail trail to the west and via Sebastopol Street would link with the Yarwoee trail to the east.	In conjunction with Item 10, develop a key east-west corridor linking with the Yarwoee Trail. It is recommended that this off-road segment is upgraded along its eastern length and extended as new path as far as Learmonth Road. The path would run to the northern side of Winter Street between Pleasant Street and Cedar Drive and to the southern side of Winter Street from Cedar Drive to Learmonth Street.	  <p>Northern side of Winter Street adjacent Victoria Park</p> <p>Looking west across Cedar Drive</p>	Medium
62	Morrison Street between Lake Wendouree and Victoria Park	Community Workshop Stakeholder Workshop Site Visit	Novice Student Recreational Commuter Competitive	A connection between recreational the lake and Victoria Park is highly desired and currently lacking. Sturt Street traffic represents a significant barrier and risk between these two key recreational and training cycling opportunities. Following a number of site visits, Morrison Street provides a unique and desirable opportunity to link these areas. It is understood that a length of parking along Lake Wendouree is to be relocated along Morrison Street. Connection would also link with proposals along Sturt Street (item 27-30)	Introduce a traffic signal intersection at Russel Street and Sturt with a high quality connection for cyclists and pedestrians. To limit delays to motorists it is recommended that the traffic signal timings are aligned with current signalised intersections to the east and west of the proposed crossing. There are a number of options for improving the connection through Morrison Street, however, parking consideration may need to be incorporated into the design. Options include: - Closure of the Sturt St side of Morrison, shared use with motorists - One way arrangement along Morrison providing sufficient width for parking and a bike path/bike lane - Shared use with motorists with left turn only adjacent Sturt Street allowing improved connection between crossing and top of Morrison Street. Shared use would need be reinforced with surface markings. Connection from Lake Wendouree would require clear signage. Provide surface bicycle symbols along Morrison Street in each direction, and a shared pathway on along Sturt Street. Cyclists should be guided to the pedestrian crossing located adjacent to Loreto College.	  <p>Looking north along Morrison Street towards lake</p> <p>Looking south from Morrison Street to Victoria Park</p>	High
63	Fussell Street/Water Street between Scott Parade and York Street	Community Workshop Stakeholder Workshop Site Visit	Novice Students Recreational	Existing off-road section exists between Charlesworth Street and Lalor Street. Path is of high quality. Path is narrow between Scott Parade and Charlesworth Street immediately adjacent to Ballarat Secondary College as illustrated in pictures. Wide verge exists south of Lalor Street along Fussell Street to the eastern side of the street. Unsafe on roads for students at start and end of day due to parents picking up children. Corridor represents an excellent opportunity to improve access to Ballarat Secondary School for those who may wish to cycle. Corridor links with 3 other off-road trails providing a significant residential catchment to the school.	Recommendations are as follows: -widen path beneath eastern side of rail bridge, provide hand railing beneath bridge -upgrade eastern arm of crossing to include holding rails and green bicycle signal -widen footpath to a minimum of 2.5 metres (preferably 3 metres) along Fussell Street immediately adjacent to Ballarat Secondary College and car park (sealed surface) Longer term: -extend path from Eilford Street south to link with proposed off-road path at Spencer Street (granite sand) -protect continuation of path into future development areas	    <p>Rail bridge over Water Street</p> <p>Corner of Fussell St/Victoria St looking south</p> <p>From end of path at Eilford St looking south</p> <p>Path adjacent Ballarat Secondary College</p>	High

Table 6: Off-Road Recommendations



Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
64	Skipton Rail Trail	Community Workshop Stakeholder Workshop School Questionnaires Site Visit	Novice Tourism Recreational	<p>The trail extends from Ballarat to Skipton via Linton and Scarsdale. The trail represent a key tourism and recreational opportunity for residents and visitors alike.</p> <p>The trail consists of a wide gravel/sand trail. Gravel/sand has been indicated as the preferred choice of construction material by Council as it is relatively inexpensive and easily maintained. However, it is evident that gravel/sand trails are not well maintained.</p> <p>Sections of the trail require significant improvent.</p> <p>A connection from Ring Road is lacking.</p>	<p>The Federal Government and Ballarat Council (along with the councils of Golden Plains and Corangamite) have recently accounced the 3-year funding of a combined \$450,000 to upgrade and resurface the route between Ballarat and Skipton. This move is fully supported and commended as the trail is of state significance and has the opportunity to deliver a substantial recreational/tourism opportunity that would aim to deliver economic benefits to communities along its length.</p> <p>It is assumed that a detailed review/assessment, design and upgrade will be undertaken along this corridor to maximise the effectiveness and potential of the proposals.</p> <p>Furthermore, it is recommended that an effective link is achieved between the start of the trail west of Ballarat, and central locations.</p> <p>A direct link with Gillies Street is favoured through the continuation of the trail along the rail reserve connecting with the proposed Wendouree Station, St Johns Wood (Item 76) and the north-south rail reserve (Item 65). A link could also be achieved along Gregory Street West, however, the legibility and continuity of this route would not be ideal. See also Item 55.</p> <p>Discussions would be required with VicRoads to ensure that funding associated with Gregory Street West can be allocated to a trail along the rail reserve.</p>	 <p>Crossing/connection from Ring Road trail to Skipton Rail Trail is poor over a ditch and nature strip</p> <p>Reserve along rail line, looking west towards Gillies Street</p>	High
66	Humffray St / Scott Pde / off-road crossing	Site Visit	Students Commuters Recreational	<p>Poor and unclear crossing point at Humphrey Street North for trail along Scott Parade.</p> <p>There are a significant number of turning vehicles at this location - which is part of a popular rat-run route.</p> <p>No name or number for off-road route along Scott Parade.</p>	<p>Provide clear link and crossing point at Humphrey Street North to both sides of carriageway with dropped kerbing.</p> <p>Provide name or number for the Scott Parade off-road trail.</p> <p>Warn drivers of bicycle trail crossing point and advertise the presence of the trail to passing traffic.</p>	 <p>Looking east across Humphrey Street North</p> <p>Looking west across Humphrey Street North</p>	Low
67	Canadian Trail connects with off-road trail along Geelong Road.	Site Visit Stakeholder Workshop Community Workshop	Students	<p>Cyclists and local school children need to cross the high speed road between the Canadian Trail and Demascus College.</p>	<p>Option 1 - Introduce a central crossing area to allow two stage crossing of highway as the bare minimum.</p> <p>Option 2 - Preferred option is a high profile signalised pedestrian crossing.</p> <p>This will capture the new trips generated by the significant residential Crossing will benefit existing children and cyclists together with the new primary school proposal and residential developments at Mount Helen</p>	 <p>Geelong Road/Olympic Avenue looking south</p> <p>Geelong Road/Olympic Avenue looking north</p>	High
68	Canadian Trail - Between Recreation Road and Olympic Way	Site Visit	Students Commuters Recreational	<p>Path has poor continuity and legibility with gaps and narrow bridges. Path is of low standard along much of its length.</p>	<p>Corridor can easily be improved through developing missing sections, upgrading bridge to a minimum clear width of 3 metres (in line with AustRoads, removing a small area of fencing and the odd continuity marker/post.</p>	 <p>Path adjacent Melvyn Crescent</p> <p>Narrow crossing along trail</p>	Medium

Table 6: Off-Road Recommendations

Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
69	Canadian Lakes	Site Visit	Novice Student Recreational Commuter	New development has created convoluted diversion of cycle route across substandard bridge and footway, and across water area without side rails. Continuity of route has been greatly compromised and legibility of route to follow lost.	Direct path is available and it is highly recommended that this is upgraded and designated as the main trail. Short embankment needs to be negotiated at new bridge structure and the provision of dropped kerbing either side of carriageway.	 <p>At northern edge of development looking south towards new road and bridge</p> <p>New Road to development looking south to point at which the Canadian Trail continues</p>  <p>White line illustrates convoluted sub-standard corridor through new development. Recommended direct corridor for cyclists (Red Line). North=right South=left</p>	High
70	Hotel along Canadian Trail	Site Visit Community Workshop	Novice Student Recreational Commuter	Trail compromised by hotel development.	<p>Recommend additional post markers and symbol markers to carriageway. Clear giveaway marking for cyclists where trail joins with hotel internal road.</p> <p>Fencing and hedging to northern side of hotel development narrows path, approach hotel to realign fencing and maintain hedging.</p> <p>At southern entrance exit, provide clear instruction that parking is not permitted across trail and/or introduce bollards</p>	 <p>Northern edge of hotel, path narrows</p> <p>Exit to south of hotel could be compromised by parked vehicle</p>	Medium
71	Canadian Trail near Lal Lal Street	Site Visit Community Workshop	Novice Student Recreational Commuter	Significant damage to trail from adjacent development	Approach developers to reinstate 50-70 metre length of trail.	 <p>Damaged length of trail near Lal Lal Street</p>	High
72	Canadian Trail - University Drive	Site Visit	Students	No link between off-road trail along Geelong Road across grass verge and roundabout splitter island to link up with on road link to university.	Provide path to splitter island, crossing point utilising splitter islands to north and east of the roundabout and link with dropped kerbs to on road lanes.	 <p>Looking East from down University Drive. No link.</p>	Medium

Table 6: Off-Road Recommendations

Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
73	Canadian Trail adjacent Barkly Street	Site Visit Stakeholder Site Visit	Novice Students Recreational Commuter	Start of Canadian trail poorly defined, lack of dropped kerbing and vehicles park across trail	Provide a clear statement that the trail starts at this point to assist wayfinding for cyclists/walkers whilst advertising the trail to passers by including drivers. Either - build out kerbing to eastern side of carriageway to increase prominence of cyclists crossing over into Steinfeld Street North from Canadian trail, Or - provide a two-stage crossing allowing ease of crossing and that may also improve driver awareness of cyclists crossing and slow vehicular speeds. Install kerbing to restrict car boots and bonnets from hanging over path. Explore opportunities to widen trail at locations where trees confine the corridor.	 Start of Canadian Trail adjacent Barkley Street  Link from Candian Trail into Steinfeld Street North	High
74	Southern side of Western Freeway between Midland Highway and Humffray Street.	Site Visit	Novice Recreational Commuter	Planting reserve to the southern side of the Western Freeway. Opportunity to connect northern suburbs and employment centres together with the provision of a long distance off-road recreational/tourism route.	It is recommended that Council develop an off-road trail to the southern side of the Western Freeway to a width of 2.5-3 metres. The trail would use the planting/nature reserve along a large length of the freeway. The trail would require lengths of new fencing between the trail and freeway. A two stage crossing would be a minimum requirement to cross the Midland Highway to the southern side of the freeway in order to connect with Giot Drive. Warning of cyclists crossing, speed reduction and good visibility would be critical. A signalised crossing may be more appropriate. Consideration should be given to the need of two stage crossings with central refuge at Cochrane Court and Swingers Road depending on traffic volumes and speeds and the resulting ease/difficulty of crossing.	 Looking east to the southern side of the Western Freeway near Old Creswick Road  Looking east to the south-western side of the Western Freeway near Cochrane Court	Low
75	Giot Drive between Midland Highway and Gillies Street.	Site Visit	Novice Students Recreational Commuter	Collector Road that services residential areas, Ballarat Secondary College and light industrial areas. Corridor provides an opportunity to link either an on or off-road trail at Wyndham Reserve and to the proposed off-road trail along the Western Freeway under Item 74. Corridor would link employment, recreational, education and residential areas to the northern side of the city.	It is recommended that this link is developed as an off-road route to complement the off-road link to Wyndham Reserve and the proposed off-road link to the east along the southern edge of the Western Freeway. (also see on-road Item 37) An off-road path can either be introduced to the northern side or the southern side of Giot Drive. There are some obstacles to either side such as road signs and electricity poles, however, these are opportunities to relocate signs and build out short lengths within parking shoulders to negotiate electricity poles. The southern side is favoured at this stage, however, a detailed review and costing would provide the necessary information to make a choice. The northern side provides a better continuous route as side roads are not an issue. A two-stage crossing with central refuge is required across Gillies Street as a minimum crossing provision.	 Eastern end of Giot Drive looking west  Giot Drive near Ulswater Road looking east	Medium
76	St Johns Wood	Site Visit Community Workshop	Novice Students Recreational Commuter	Residential area is fenced and only accessible via road along Gillies Street. Poor connectivity for pedestrian and cyclists to the south (Prince of Wales Reserve and Ballarat High School) and north (proposed station and employment centres). Detours are long and difficult of pedestrians and cyclists alike which results in a car orientated development for trips beyond the fencing.	Highly recommended that this precinct is served with good walking and cycling connections to adjacent employment, transport and educational opportunities. Introduce connection through St Johns Wood and to the south along the edge of the Prince of Wales Reserve and Ballarat High School to connect with Sturt Street and on-road cycle lanes along Learmonth Street (South). Ensure crossing facilities along Sturt Street are installed as part of VicRoads development at the Arch of Victory. Provide connection through boundary fencing to the north with the development of the rail station.	 Reserve along St Johns Wood looking north towards boundary fencing  Looking north along St Johns Wood from southern side of the residential area	High
77	Between rail line and Midland Highway from the Western Freeway to Howitt Street. To be developed post Item 54.	Site Visit	Novice Recreational Commuter	Dirt path runs along this corridor, clear evidence of use by pedestrians. Good continuity of path crossing Heinz Lane, Norman Street and Howitt. Opportunity to provide a north-south link towards Ballarat Station and the city centre. Off-road path would intersect with a number of proposed bicycle corridors together with existing corridors along Norman Street and the eastern length of Howitt Street.	It is recommended that a 2.5-3.0 metre path is developed linking with the city centre and the train station via Doveton Crescent (See Item 54). Two stage crossings are recommended at Norman Street and Howitt Street to assist cyclists to cross the road. It is suggested that the splitter islands for the roundabout at Heinz Lane is used as a crossing.	 Looking north along rail reserve and dirt footpath from Howitt Street	Medium

Table 6: Off-Road Recommendations

Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
78	Gillies Street between Sturt Street and Howitt Street	Site Visit	Novice Students Recreational Commuter	<p>Path links well with Victoria Park and with on-road cycle lanes to the north along Gillies Street and Learmonth Road.</p> <p>Off-road path to the eastern side of Gillies Street. Path is narrow (1.2 metres) towards Howitt Street, good along mid section and full of street furniture along its southern length near Sturt Street.</p> <p>Path is well used by cyclists, clear evidence in tracks along the gravel sections of the path.</p> <p>Path has poor connection with the lake despite only parkland immediately between Gillies Street and Wendouree Parade.</p>	<p>The following is recommended:</p> <ul style="list-style-type: none"> - Upgrade path to eastern path along Gillies Street between traffic signals at Howitt Street and the rail crossing, provide clear link across signalised crossing with bicycle symbol to lights linking on road roads with off-road routes. Apply bicycle symbol road markings to footway to clearly illustrate continuity of the route south. - nature slips cut across the north-south path at the Tram museum entrance from Gillies Street, surface these areas - Review and reduce street clutter to southern side of Gillies Street near Sturt Street, option also exists to build out short length of path into parking bay. 	 <p>Path to eastern side of Gillies Street well used</p> <p>Looking north towards rail crossing</p> <p>Looking south along Gillies Street towards Sturt Street, shared path is cluttered with obstacles.</p>	High
79	Between Gillies Street and Wendouree Parade (develop post Item 78)	Site Visit	Novice Students Recreational	<p>Poor off-road connection between Gillies Street and Wendouree Parade. Path has poor connection with the lake despite only parkland immediately between Gillies Street and Wendouree Parade.</p>	<p>Provide short spurs linking Gillies Street off-road path with Wendouree Parade as illustrated on the strategic network. Spurs can utilise the paved loops that currently exist as illustrated in the photographs.</p>	 <p>Existing paved roads that could be used between lake and Gillies Street</p> <p>Existing paved roads that could be used between lake and Gillies Street</p>	Medium
80	Off-road link between Ballarat Carngham Road and Glenelg Highway	Site Visit	Novice Recreational Commuter	<p>Opportunity to provide an off-road north-south bicycle trail through recreational fields and existing greenfield area to the mid of an industrial area.</p> <p>The trail would link work places with existing and future residential areas.</p>	<p>Protect corridor through greenfield area ensuring future developments allow a clear and direct path for cyclists.</p> <p>Provide north-south trail as industrial/work area is developed and expanded.</p>	 <p>LaTrobe Street looking south along rail reserve</p> <p>Greenfield site marked a major employment centre</p>	Medium
81	Wildlife Park between Fussell Street and Richards Street	Site Visit	Novice Recreational Tourism Students	<p>Warrenheip Trail extends as far as Richards Street to the northern edge of the Wildlife Park.</p>	<p>Connect Warrenheip Trail with the proposed off-road bicycle path extension along Fussell Street (Item 63).</p> <p>It is recommended that an on-road connection is made along Richards Street and along Eureka Street. Consideration needs to given to good safe connections between on and off road corridors enabling good clear connection with Fussell Street and Ballarat Secondary College.</p>		Medium
82	Yarrowee Trail at Chisholm Street	Site Visit	Novice Recreational	<p>Off-road trail crosses carriageway to the bottom of the hill along Chisholm Street. Down hill traffic was observed to be travelling fairly fast towards the bottom of the hill.</p>	<p>A two-stage crossing would greatly improve crossing conditions for novice/young cyclists using the Yarrowee Trail allowing individuals to cross the carriageway one lane at a time.</p> <p>The crossing should be complimented by advance signage. The signage will act as a traffic calming measure, as well as informing and advertising the off-road cycle route. A right turn hatched area to be used as a central crossing island.</p> <p>Traffic calming management measures are required on approach. A detailed assessment is required to consider the safety implications.</p>	 <p>Looking south along Stawell Street from the Yarrowee Trail</p> <p>Looking north up hill. Yarrowee Trail is to other side of bridge</p>	Medium

Table 6: Off-Road Recommendations


Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
83	Sparrow Ground Reserve	Site Visit	Novice Recreational Tourism Students	Off-road road trail ends mid Sparrow Ground Reserve.	Connect trail through to Fussell Street to connect with proposed off-road trail (Item 63)		Medium
84	Lake Wendouree between Hamilton and Morrison	Site Visit Stakeholder Workshop Community Workshop	All users	Gap in on-road bicycle circuit of Lake Wendouree. Carriageway is wide enough to permit parking and running carriageway only.	It is recommended that this gap is completed providing a continuous anti-clockwise loop around the lake. It is recommended that indented parking is provided in nature strip on Loreto College side of the carriageway, running carriageway is shifted towards Loreto College and a bicycle lane is provided outside parking adjacent lakeside. The recommendation should be designed and constructed in conjunction with Item 62.	 	High
85	Between Canadian Trail and Callow Street to north side of drainage channel	Stakeholder Site Visit	Novice Commuter Recreational Tourism	There is currently a poor connection between the Canadian Trail, Pennyweight Gully and Specimen Vale Trails. A direct link can easily be provided along the side of a drainage channel between the Canadian Trail and Callow Street.	It is recommended that a granite/sand path is extended along the northern edge of the channel together with pedestrian guardrailing. Due to the central location of this connection it is recommended that this path is installed 3 metres in width. It is recommended that a direct link is provided along the drainage channel between the Canadian Trail and Callow Street. Clear signage is required on Main Road to indicate the trail to all road users.	 	High
86	Main Road crossing of Canadian Trail	Site Visit Stakeholder Site Visit	Novice Tourism Recreational Commuter	Main Road represents a heavily trafficked crossing of the Canadian Creek Trail	It is recommended that refuge providing a two-stage crossing of Main Road is introduced allowing cyclists and pedestrians to cross the road one side at a time. Care should be taken to ensure that the refuge does not result in narrowings that cause difficulty to cyclists travelling along Main Road. It is necessary to discourage parking along a short length of Main Road.	 	High
87	Bicycle trail to southern side of Whitehouse Road		Novice Recreational Tourism	The off-road section of the bicycle path along Mount Clear-Sebastopol Road between Bridge Street and Tinworth Avenue is of ample width. However, the eastern end of the route (connecting to Geelong Road) is narrow and substandard.	Widen the eastern part of the off-road cycle path between Tamworth Avenue and Geelong Road. It is recommended that a cycle lane of 3.0 width is achieved. Shared path facilities will need to integrate with vehicular driveways. A link to Mount Clear College was not identified on site, and a detailed investigation is required.		Medium

Table 6: Off-Road Recommendations

Item No.	Location	Source	Target Group	Existing Conditions	Description of Recommendation	Photos	Priority
88	Latrobe Street and Ross Creek Road	Stakeholder Feedback	Novice Recreational Tourism	The proposed route would follow a creek through the proposed western growth area.	Introduce off-road north-south path as part of development proposals.		Medium
89	Heinz Lane, between Sturt Street and the Glenelg Highway	Stakeholder Feedback	Novice Recreational Tourism	This site is located within the western growth area. The corridor would run parallel to a proposed north-south arterial road	Introduce an off-road cycle lane from Sturt Street to Latrobe Street. As the development area expands, the route should be continued southwards connecting to the Glenelg Highway. Coordinate with developers to encourage cycle planning in their proposals.		Medium
90	Canadian Trail - Between Olympic Ave and University Drive	Stakeholder Feedback	Novice Recreational Tourism Students	The existing Canadian Trail runs off-road runs as far south as Mount Clear College. An off-road gap exists between Olympic Avenue and Greenhill Road. As such, students of the University of Ballarat are required to reach the university via a detour to Geelong Road.	It is recommended to complete the off-road link between Olympic Avenue and Greenhill Road - This route is intended to run alongside the Canadian Creek and form part of the existing trail.		Medium
91	Learmonth Street to Victoria Park	Stakeholder Feedback Site Visit	Novice Recreational Tourism	Leopold Street is largely residential and has been recognised as an informal cycle route by the Commuter and Touring Map. This links into an informal track that extends to Lawrie Drive.	It is recommended that an off-road cycle connection is formed along Leopold Street and accross to Lawrie Drive.		Medium
92	Tinworth Avenue, and on Britain Street between Whitehorse Road and Sovereign Hill	Draft Strategy Feedback	Novice Recreational Tourism Students	Existing off-road shared bicycle and footpath along Timworth Avenue, and Britain Street between Whitehorse Road to Sovereign Hill.	Works to include rehabilitation of existing paths and construction of some small sections of new path.		Medium

Appendix I

**Infrastructure
Prioritisation**

HIGH

Item #	Location	5 Year Programme					Beyond
		1	2	3	4	5	
1	Lydiard Street				•		
9	Gregory Street between Gillies Street and Burnbank Street	•	•				
11	North-south link along or parallel to Albert Street, between Victoria St/Bridge St intersection and Rubicon St intersection					•	
12	Between Leamonth Road and proposed Wendouree Station		•				
13	Pleasant Street/Alfred Street				•		
18	Wendouree Parade near Tramways Museum	•					
21	Leamonth Road (C237), between Norman Street and Howitt St intersection			•			
25	Local road link from Yarrowee Trail to Canadian Trail. (development integral to cross city corridor, Item 26)	•	•				
26	Peel Street (development integral to cross city corridor, Item 25)	•	•				
27	Sturt Street (Grenville Street to Doveton Street). To be developed in conjunction with Items 28, 29 and 30)		•	•			
28	Sturt Street (Doveton Street to Pleasant Street). To be developed in conjunction with Items 27, 29 and 30.		•		•		
29	Sturt Street (Pleasant Street to Gilles Street). To be developed in conjunction with Items 27, 28 and 30.		•		•		
38	Drummond Street, between Latrobe Street and Skipton Street		•				
51	Mair Street connection with Ballarat Station		•				
53	Yarrowee Trail immediately adjacent Peel Street and Rowe Street.	•					
54	Doveton Crescent, Little Clyde Street, Crompton Street and Comb Street.			•			
55	East - West Rail		•	•			
59	Yarrowee Trail tunnel beneath the Western Freeway	•					
62	Morrison Street between Lake Wendouree and Victoria Park			•	•		
63	Fussell Street/Water Street between Scott Parade and York Street				•		
64	Skipton Rail Trail	•	•				
67	Canadian Trail connects with off-road trail along Geelong Road.	•					
69	Canadian Lakes				•		
71	Canadian Trail near Lal Lal Street	•					
72	Canadian Trail - University Drive	•					
73	Canadian Trail adjacent Barkly Street				•		
76	St Johns Wood			•			
78	Gillies Street between Sturt Street and Howitt Street				•		
84	Lake Wendouree between Hamilton and Morrison			•	•		
85	Between Canadian Trail and Callow Street to north side of drainage channel				•		
86	Main Road crossing of Canadian Trail				•		

MEDIUM

Item #	Location	5 Year Programme					Beyond
		1	2	3	4	5	
3	Norman Street (East)						
4	Macarthur Street	•					
7	Mair Street and Webster Street						•
10	Sebastopol Street between Pleasant Street and the Yarrowee Trail					•	
14	Hertford Street (Glenelg Highway)						•
17	Leamonth Street and Wiltshire Lane						•
23	Grant Street						•
24	Geelong Road						•
30	Sturt Street (Gilles Street westbound). To be developed in conjunction with Items 27, 28 and 29.	•				•	
31	Dowling Street between Norman Street and Wendouree Parade					•	
32	Dowling Street between Norman Street and Traminer Court					•	
34	Leamonth Road (C237), from Ring Road to Miners Rest						•
35	Cuthberts Road, from Leamonth Street to Alfredton						•
37	Giot Drive, between Gillies Street and Dowling Street						•
39	Eureka Street, Navigators Road		•	•			
50	Nolan Street between Lydiard Street and Peel Street.						
56	Whitelaw Avenue & Rubicon Street					•	
60	Eyre Street, between Russell St linking with Grant Street						•
61	Southern length of Victoria Park along Winter Street nature strip (in conjunction with Item 10)					•	
66	Humffray St / Scott Pde / off-road crossing						•
68	Canadian Trail - Between Recreation Road and Olympic Way				•		
70	Hotel along Canadian Trail						•
75	Giot Drive between Midland Highway and Gillies Street.						•
77	Between rail line and Midland Highway from the Western Freeway to Howitt Street. To be developed post Item 54.						•
79	Between Gillies Street and Wendouree Parade (develop post Item 78)	•					
80	Off-road link between Ballarat Carngham Road and Glenelg Highway						•
81	Wildlife Park between Fussell Street and Richards Street						•
82	Yarrowee Trail at Chisholm Street						•
83	Sparrow Ground Reserve						•
87	Bicycle trail to southern side of Whitehouse Road						•
88	Latrobe Street and Ross Creek Road						•
89	Heinz Lane, between Sturt Street and the Glenelg Highway						•
90	Canadian Trail - Between Olympic Ave and University Drive				•		
91	Leamonth Street to Victoria Park						•
92	Tinworth Avenue, and on Britain Street between Whitehouse Road and Sovereign Hill					•	

LOW

Item #	Location	5 Year Programme					Beyond
		1	2	3	4	5	
2	Peel Street into Havelock Street						•
5	Tait Street						•
6	Chisholm Street and eastern end of Howitt Street						•
8	Blackhill Reserve and Simpson Street						•
15	Ballarat-Carngham Road						•
33	Forest Street to Howitt Street						•
36	Heinz Lane, between Doveton Street North and the Western Freeway						•
40	Beyond Eureka Street and Navigators Road towards Warrenheip and the Western Highway and Buninyong						•
57	Morgan Street						•
74	Southern side of Western Freeway between Midland Highway and Humffray Street.						•