City of Bayswater

Local Bike Plan

CEP02267

Prepared for City of Bayswater

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Executive Summary

Cardno was commissioned by the City of Bayswater (CoB) to develop a Local Bike Plan for the Bayswater Local Government Area (LGA). The Bike Plan aims to improve the existing cycle network at a local level and promote, encourage and facilitate the greater use of cycling as a mode of transport. The Plan sets out a programme through which to develop a comprehensive and interconnected cycling network, providing a comfortable and enjoyable cycling experience for cyclists of all types and confidence levels.

The Bike Plan is a broad document with a variety of components including networking planning, infrastructure improvement, maintenance works, education and promotional programs.

The development of the Bike Plan was a collaborative process which involved many stages:

- > Establishing a vision for the network and its users
- > Completing a desktop review of the existing cycling infrastructure within the City
- > Undertaking a saddle survey to assess the cycling network from the perspective of a cyclist
- > Identifying user groups
- > Carrying out community consultations
- > Network planning
- > Infrastructure assessment
- > Works recommendation, costing and prioritisation
- > Educational and promotional development

Through the consultation, site analysis and network planning, a number of primary issues within the existing cycling network were identified. Of these, the following were considered to represent the most problematic issues for the safety and success of cycling in Bayswater:

- > Morley City Centre
- > Guildford Road, particularly at Garratt Road and King William Street intersections
- > Bayswater Station

Additional issues identified include:

- > Disjointed sections of path along the riverside shared path and the Midland Rail Line PSP
- > Discontinuity for north-south trips within Bayswater
- > Maintenance issues
- > Lack of suitable signage to facilitate way-finding

Bayswater has the foundations of a legible and interconnected cycling network, with the Midland Rail Line PSP and the riverside shared path providing the main arterial routes for the City. Additionally, the Perth Bicycle Network (PBN) routes complement the main arterial routes for Bayswater. However, further significant investment is required to create a comprehensive network which is safe, friendly and convenient for cyclists of all confidence levels. This Bike Plan aims to ensure that the needs of different cycling user groups are taken into account, through a range of proposals designed to create an interconnected and accessible cycling network for all cyclists.

The existing PBN network throughout the LGA facilitates wayfinding for cyclists and provides accesss to numerous locations. While these routes provide a reasonable distribution throughout the City, there is the potential for these routes to be enhanced through the development of new cycling infrastructure. Accordingly, this Bike Plan aims to build upon the PBN network, acting as an extension from the existing PBN routes.

This Bike Plan presents a series of recommendations to rectify the issues identified through analysis and consultation. Based on Cardno's assessment of the network and the needs of the Bayswater cycling community, an order of priority for the most significant works is proposed, as follows:

1. **Coode Street / King William Street**: Convert kerbside lanes into buffered cycle lanes from Haddrill Street to Broun Avenue.

On-street cycle lanes are also recommended along Rudloc Road to provide a connection into the Morley City Centre

Reallocate road space at the Broun Avenue intersection to provide cycle lanes. Convert Coode Street approaches to a shared through/left lane and right turn configuration.

2. **Riverside RSP & Riverside Gardens**: Realign path across Milne Street intersection, including two raised crossings with pedestrian/cycle priority.

Resurface section of concrete path on both approaches to bridge over drain to delineate the main route.

Realign new section of path at boat ramp car park and improve continuity with existing path extension.

Install bicycle direction signs along new route to assist in wayfinding and remove old signage.

Install signs and pavement markings along other paths in Riverside Gardens to indicate a slow speed, shared environment. Signage should reference appropriate behaviour, not speed.

Fence or otherwise delineate off-leash area within Bird Sanctuary to minimise conflicts between cyclists and dogs.

Construct shared path along foreshore to complete the final link of the Riverside RSP within Bayswater LGA.

- 3. **Collier Road**: Construct shared path along northern side of Collier Road to provide a continuous link between Bassendean and the Morley City Centre
- 4. **Beechboro Road**: Construct shared path along eastern side of Beechboro Road.

Improve the termination of Beechboro Road South into Coode Street

5. **Crimea Street**: Install cycle lanterns at Crimea Street/Walter Road West intersection

Improve intersection geometry at Rodda Street, Frimley Way, Wonga Road, Horlsey Way.

Install pedestrian/bicycle symbols on the pavement through the Crimea Park car park and install parking signage recommending vehicles to be parked rear to kerb.

Install median cut throughs and kerb ramp crossings across Crimea Street at Fitzgerald Road, Kennington Road, Fedders Street, Farnham Way, Walmsley Drive, Corderoy Way, and Cardwell Avenue.

6. **Coode Street / King William Street**: Provide 1.5m wide cycle lanes in both directions from Broun Avenue to Walter Road. Narrow median islands as required.

Install bicycle symbols in the centre of the lane between Whatley Crescent and Hill Street.

Install cycle lanes in both directions between Hill Street and Guildford Road, including changes to lane arrangements at Guildford Road.

Install bicycle symbols in the centre of the lane south of Guildford Road through to Riverside Gardens.

- 7. **Wellington Road**: Widen existing path to a minimum 2.5m. Extend current reasonable quality path from Smith Street to Morley Drive, connecting to Camboon Road, Morley Drive and Wellington Road (North) cycling routes. Particularly important as Wellington Road cannot be improved to provide cycle lanes.
- 8. **East Street / Eighth Avenue**: Construct a shared path along East Street between the Riverside Recrational Shared Path and Eighth Avenue to provide connection to the Maylands Town Centre.

In addition to these primary recommendations, a schedule of infrastructure and maintenance works has been determined for ongoing works by the City in partnership with State Government agencies. The ultimate goal of this work is to guide the City towards a comprehensive, legible network to a high standard of design and safety.

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1 Introduction and Background

1.1 Introduction

Cardno was commissioned by the City of Bayswater (the City) to develop a bicycle plan for the Bayswater Local Government Area (LGA). The City has not previously implemented a formal bicycle plan and the adoption of this plan will provide strategic direction for cycling infrastructure works in the future.

The plan encompasses a range of interdependent initiatives which prioritise the optimisation of cycling throughout the City. The proposed changes to the cycling network were formed through stakeholder engagements, comprehensive research and an analysis of cycling opportunities. These changes seek to create a comprehensive and attractive network of routes coupled with behaviour change initiatives in order to encourage an uptake of cycling by providing for safer and more convenient travel by bicycle in the community.

1.2 Study Area

The City of Bayswater LGA is located in the Perth Metropolitan Region in Western Australia, approximately 8km north-east from the central business district (CBD) of Perth, as shown in **Figure 1-1**. The LGA covers an area of approximately 33km², with the majority of this land consisting of urban zone. The City contains a wide range of land uses and trip generators including shopping centres, recreational parks and commercial/industrial land uses. The City borders the Swan River to the south, with a large stretch of foreshore proving to be a popular attraction for tourists and residents alike. The City has an estimated population of 65,342 (2011 Census), affirming it as one of the larger LGAs in the Perth Metropolitan Region.



Figure 1-1 Bayswater and neighbouring Local Government Authorities

Cycling is a relatively underutilised form of transportation in the City, with only 0.9% of residents using bicycles as their main form of transport (ABS 2011). Nonetheless, cycling is still popular for commuter and recreational cyclists in the City, with access to the Midland railway line Principal Shared Path (PSP) and the Riverside Recreational Shared Path being the most popular routes for these two rider groups. The proximity of the City to the Perth CBD contributes to the rising popularity of cycling amongst residents, particularly for those commuting to work.

1.3 Vision and Objectives

The vision for the City is to *"develop a comprehensive and interconnected cycling network which enables the City to become a cycle friendly LGA."* The vision is supported by the following strategies:

- 1. Provide a co-ordinated approach to implement a high-quality and connected bicycle network.
- 2. Plan for maintaining and safeguarding the existing and future bicycle network.
- 3. Integrate cycling network development with other developments and projects.
- 4. Prepare a Bike Plan to guide professionals implementing bicycle network projects.
- 5. Encourage and promote cycling as a legitimate transport mode.

1.4 Methodology

The methodology for the bike plan is outlined in the following sections:

1.4.1 Existing Network Review

A review of the existing cycle and planning background information was undertaken as detailed in **Section** 2. A desktop review of the current cycle network was undertaken and subsequently confirmed through site inspections spanning over 2 days. During these site inspections, a 'saddle survey' was carried out to determine the existing conditions of road and path infrastructure by considering the needs to mainly casual and recreational cyclists whilst also giving due consideration to commuter cyclists. The opportunities and limitations found within the street layout were assessed in addition to evaluating the path design. Staff from the City accompanied Cardno during the site visits to provide input into issues that had arisen through community feedback and personal experience and gave general observations about the existing network. This vital anecdotal information provided the context for a more comprehensive assessment of the network.

1.4.2 <u>Community and Stakeholder Consultation</u>

Stakeholder consultation was a major component of the bike plan, allowing cycling organisations and members of the public to provide input to the design and implementation of the final plan. The results of the community consultation are presented in **Section 4**.

A range of consultative methods were utilised to enable visitors, residents and other stakeholders to voice their concerns, put forward ideas and provide information on their personal experiences of cycling throughout the City.

The consultation exercise completed for this project included:

- Public Surveys Public consultation was conducted by distributing online and hard copy surveys for members of the public to answer the purpose of their cycling trips, as well as the frequency of their journeys. An open-ended section was included to:
 - Allow participants to state what they enjoy about cycling in the City;
 - Determine which areas they experienced discomfort or avoided; and
 - Encourage participants to suggest ways in which the network could be improved.
- School Surveys School surveys were sent to all schools within the City to ascertain the manner in which students typically cycle to school. Students were asked how often they cycle, whom they cycle with, and what they enjoy about cycling. School students were also asked if they cycle, and, if not, why they opt to travel by another mode of transport. Similarly to the public surveys, the school surveys asked what they dislike about the cycling infrastructure and how their concerns could be improved or fixed.

A copy of the surveys instruments can be found in **Appendix A** and **Appendix B** for the public and school surveys respectively.

1.4.3 <u>Network Planning</u>

An ultimate network plan has been developed to describe a complete cycling network for the City within the next 15-20 years. This plan has been formulated as an integrated network of four route types, with accompanying pictures to differentiate the respective routes shown below.

Details regarding the standard for construction and design of these facilities are included in **Section 3** of this Bike Plan.

Off-street Principal Shared Paths (PSP) - PSPs are the main arterial routes for cycling in Perth (example shown in **Figure 1-2**), offering a comfortable ride to cyclists from all levels of experience. These pathways are usually surfaced with red asphalt and are a minimum width of 3m, often extending to a width of 3.5m. They are primarily frequented by commuting cyclists due to the direct nature of the routes but are available for all cyclists and pedestrians.

Figure 1-2 Off-street Principal Shared Path example



Off-street minor (shared path) - These provide path infrastructure for pedestrians and cyclists and are suitable for slower speed cycling (example shown in **Figure 1-3**). Off-street minor routes are most commonly used by casual and recreational cyclists as well as school children, with commuting cyclists often preferring to cycle on street.

The formal definition of a shared path is as follows:

"Regulation 242 (2) of the proposed Australian Road Rules states that "A shared path is an area open to the public (except a separated footpath) that is designated for, or has as one of its main uses, use by both riders of bicycles and pedestrians, and includes a length of path for use by both bicycles and pedestrians beginning at a shared path sign and ending at the nearest of the following:

- a) An end shared path sign.
- b) A no bicycles sign or no bicycles road marking.
- c) A bicycle path sign.
- d) A road (except a road related area).
- e) The end of the path".

It is considered standard practice to denote a shared path by linemarking instead of shared path signage, for the following reasons:

- > Linemarking is more durable than signage
- > Linemarking is more economical to install and maintain
- > Signage is prone to vandalism, damage and theft resulting in an illegible network

For the purpose of designating a shared path, linemarking is considered to satisfy the intent of the Australian Road Rules while maintaining the best outcomes for cyclists and the Local Government.



Figure 1-3 Off-street minor (shared path) example

Off-street footpath - These provide path infrastructure for pedestrians and cyclists under the age of 12 and are considered suitable for this purpose. In Western Australia, adults supervising children are not permitted to ride on footpaths under the Australian Road Rules.

However, it may be considered unsafe or impractical for adults to ride on the road while supervising children. (e.g paths provided only on the right-hand side of the road). In this case it is good practice to ride alongside children along the footpath.

On-street cycle lanes – On-street facilities describe any infrastructure that accommodates for, or encourages, cyclists to use the road (example shown in **Figure 1-4**). Dedicated on-street cycling infrastructure is primarily provided in the form of a cycle lane, in which a sealed shoulder and edgeline is installed to separate cycling and vehicular traffic. In these circumstances, bicycle symbols are marked to indicate the purpose of the lanes.



A cycle lane denoted by a bicycle lane sign is provided for the exclusive use of cyclists and drivers may not drive, stop or park within that lane. An on-street facility without such signage is a sealed shoulder and there are no restrictions on driving, stopping or parking within that shoulder, beyond the limitations placed by other appropriate signage (e.g. 'no standing, 'no parking' etc.)

Figure 1-4 On-street facility example



On-street mixed - On-street mixed routes are riding environments that are used by more experienced, higher-speed cyclists that are comfortable without the presence of cycling facilities on the road (example

shown in **Figure 1-5**). Mixed traffic environments also include low traffic, low speed streets suitable for riders of a wide range of confidence levels.

Figure 1-5 On-street mixed (High traffic)



Figure 1-6 On-street mixed (Quiet)



1.4.4 Infrastructure Assessment and Prioritisation

In order to achieve the gradual implementation of the ultimate network plan, a schedule of infrastructure improvements for the cycling network has been completed and can be found in **Appendix D**. The schedule outlines the priorities for infrastructure based on their classification, scale, location and potential costs, with consideration given to the constraints which may necessitate further investigation, detailed design or assessment.

Deficiencies in the existing bicycle network have been identified, and a schedule of remedial actions has been proposed to improve practicality and operational safety for cycling infrastructure in the LGA. Ongoing maintenance works have also been identified, with suggestions for alterations to the current maintenance schedules included to alleviate issues such as encroaching vegetation on pathways.

The proposed infrastructure improvements will be prioritised through a five year horizon for gradual implementation. Projects that require future infrastructure have been noted, and the particular concepts behind these long-terms visions have been conveyed in a straightforward and clear manner.

1.5 Structure of the Plan

The Plan is set out as follows:

- > A review of relevant policy and the context of the Plan
- > A summary of the community consultation process
- > A summary of design guidance relevant to facilities in Bayswater
- > An analysis of the existing and future cycling network

- > A series of recommendations
- > An ultimate network plan and an outline of strategies to encourage cycling

2 Policy Context

2.1 National Policies

2.1.1 National Urban Policy: Our Cities, Our Future (2011)

Our Cities, Our Future is the guiding national framework for shaping the future of our cities, focusing on improving their productivity, sustainability and liveability. The report identifies that although nearly 40% of Australians commute less than 10km to work or study, less than 1.6% cycle (p. 55). The absence of safe and convenient cycling routes is a major contributor to this low mode share. The report also notes that the infrastructure must meet the needs of its target users (p. 63), a key component of the network design philosophy for this Bike Plan.

2.1.2 <u>Moving Australia 2030 (2013)</u>

Moving Australia 2030 – A *Transport Plan for a Productive and Active Australia* was produced in 2013 by the Moving People 2030 Taskforce. The report outlines a whole-of-system approach to how we fund transport infrastructure, how we move people, how we move goods, and how we better integrate our spatial planning systems with effective transport networks.

Cycling is addressed within the report mainly in the context of a healthy and active Australia. The key relevant recommendation for this Bike Plan is to "Provide sustainable infrastructure funding that supports active travel". This Bike Plan supports this recommendation by identifying the highest priorities for allocating funding to cycling and a clear message that funding needs to be provided in all future years.

2.1.3 National Cycling Strategy (2010)

The Australian National Cycling Strategy 2011-2016 (NCS) was prepared by Austroads and the Australian Bicycle Council in September 2010. The purpose of this strategy is to double the existing rates of cycling in a holistic manner by supporting its myriad of benefits through promotion, infrastructure provision, integrated planning and safety improvements.

Benefits identified in the NCS (pp. 8-11) include:

- > Societal Benefits reduced traffic congestion as a result of commuters shifting to cycling modes, as well as increasing the land area available for urban activity
- > Environmental Benefits reduced carbon footprint as a result of a transition to active, zero-carbon transport
- > Health Benefits increased fitness has both a social and economic benefit to the community by encouraging interaction, improving quality of life and reducing health care costs arising from a sedentary lifestyle
- > Equity Benefits a comprehensive cycling network reduces the proportion of household income necessary to provide mobility. This is particularly beneficial for low income families and households located near the urban fringe, where public transport may be lacking
- > Convenience where cycling infrastructure provides a safe, comprehensive network for access to education, employment and entertainment precincts, cycling presents an efficient travel mode. Short trips are most affected by good cycling facilities.

A series of actions have been identified (pp. 27-29) to achieve the goal of doubling cycling mode share. This implementation framework focuses on the following priorities and objectives:

- > Cycling Promotion Promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity
- > Infrastructure and Facilities Create a comprehensive network of safe and attractive routes to cycle and end-of-trip facilities
- Integrated Planning Consider and address cycling needs in all relevant transport and land use planning activities
- > Safety Enable people to cycle safely

- > Monitoring and Evaluation Improve monitoring and evaluation of cycling programs and develop a national decision-making process for investment in cycling
- > Guidance and Best Practice Develop nationally consistent technical guidance for stakeholders to use and share best practice across jurisdictions.

This Bike Plan incorporates all the key actions listed above. In addition, the Bike Plan aligns with the NCS objective of "creating a comprehensive network of safe and attractive routes to cycle and end of trip facilities" (p. 22).

2.1.4 <u>Walking, Riding and Access to Public Transport (2013)</u>

This document is a Ministerial Statement from the Australian Government, setting out how the Government will increase the proportion of people walking and riding for short trips, and accessing public transport, in our communities. The document provides a summary of the benefits of greater use of active transport and guidelines for the coordination of land use and transport planning and development to achieve high quality outcomes.

There are no direct actions involving Local Government, however this Bike Plan is generally consistent with the aims and objectives of the document.

2.2 State Policies

2.2.1 Western Australian Bicycle Network (WABN) Plan 2014-31

The Western Australian Bicycle Network (WABN) Plan was released by the Department of Transport in 2014. This plan replaces the Perth Bicycle Network (PBN) and provides a framework for infrastructure improvements across Western Australia including Metropolitan and Regional areas.

The WABN Plan focuses on network improvements as a way of creating attractive and safe cycling corridors. The key aspects of this plan are as follows:

- > Implementation Coordination between Government and non-Government Groups to ensure that the proposed infrastructure is delivered in an effective manner and to identify opportunities to integrate delivery across jurisdictions
- > Principal Shared Path Network Expansion The Principal Shared Path network forms the backbone of the cycle network through Perth. The WABN focuses on funding improvements within 15km of the CBD to create safe and efficient links along major cycling routes to maximise the benefit of infrastructure funding
- > Perth and Regional Bicycle Network Grants Additional funding to LGAs to plan and provide cycling infrastructure within their jurisdictions. This includes funding of Local Bike Plans, path infrastructure, signage and line marking
- > Connecting Schools Grant Program Specific funding to LGAs for projects that improve bicycle access and end of trip facilities for schools, as well as providing behaviour change initiatives to promote cycling.
- > Network Focus Improvements to the network will be prioritised to promote strategic connections to schools, major rail/bus stations and activity centres. To assist this process, Department of Transport is undertaking studies in consultation with Local Government to identify gaps and potential route alignments which would tend to attract funding
- > Review of Traffic Management on Local Roads- Local Government has a role in undertaking road works to reduce vehicle volumes and speeds through built-up areas. Some of the measures implemented through these programs have resulted in a reduction of on-road cyclist safety and an increase in conflict. The review will include a mix of what is seen as best practice and situations of reduced cycling safety, and consider safety aspects for all roads users, in keeping with the state road safety strategy 'Towards Zero'.

Significant increases in Local Government Regional Bicycle Network Grants funding for bicycle facilities were recommended in the WABN and committed to by the State Government. Many of the projects recommended as part of this Bike Plan will be eligible for grant funding and the City should apply for grants each year.

2.2.2 Perth Metropolitan Transport Strategy 1995-2029

The Metropolitan Transport Strategy (MTS) is a strategic transport plan for the Perth Metropolitan Region for the years 1995 to 2029, published by the Department of Transport and others. The MTS recognises that Perth is, and will continue to be, a car-dominated city. However, the MTS is clear that current trends in car use, as opposed to other modes of transport, are either not sustainable or would incur great costs to the community if this were to continue unrestrained. The main elements of the MTS recognise that:

- > increased co-ordination of the development and use of the transport system as a whole;
- > greater integration and mutual support between the transport system and land uses and;
- > improved efficiency in the use of transport infrastructure and services.

The main elements provide a strong basis for the direction of transport management within Perth by ensuring that future development will be more efficient and integrated. The strategy also recommends an objective and target that is applicable to the Bike Plan.

Objective	Target
Promote walking and cycling	Incorporate walking and cycling guidelines in all metropolitan local authority town planning and transport planning schemes by 2000.

A further objective of the MTS is to more than double the non-commercial mode share of cycling trips to 11.5% of non-commercial trips by 2029. Current trends indicate that if no action is taken, cycling mode share will not reach this target.

2.2.3 <u>Western Australia Planning Commission Development Control Policy 1.5 – Bicycle</u> <u>Planning (1998)</u>

This policy describes the planning considerations which should be taken into account in order to improve the safety and convenience of cycling. Both State and Local Government agencies have been encouraged to promote cycling as a mode of transport because of:

- > recognition of the adverse environmental effects of motor vehicles, particularly the private car
- > moves towards the development of low-energy lifestyles, initially as a response to the "energy crisis" of the mid-1970s
- > the need to make more efficient use of transport infrastructure
- > increasing awareness that cycling reduces congestion and the need for car parks.

The policy sets out a requirement to ensure cycling is considered in all aspects of land use and transport planning. In particular, the policy recommends (pp. 5-6) that a cycling network should be developed for urban areas by:

- > improving the existing road network and new subdivisional roads to meet the needs of cyclists more effectively
- > providing off-road facilities of adequate standard where there is a strong demand (such as near schools) and where the opportunity exists
- > providing information to enable cyclists to make the most effective use of the network
- > ensuring that the needs of cyclists are adequately catered for in the planning, design and construction of extensions to the existing road network.

This Bike Plan has been prepared in accordance with these principles. The Bike Plan contains proposals to improve the existing road network, provide off-road facilities, provide information (by way of pavement markings and signs) to enable cyclists to use the network and ensure that cyclists are adequately catered for in future infrastructure projects.

The policy also supports the provision of appropriate end of trip facilities through the imposition of development conditions dealing with such matters as the type, number and location of bicycle parking facilities, and the installation of showers and change rooms with an emphasis on locations including:

- > shopping centres
- > factories
- > offices
- > educational establishments
- > sport, leisure and entertainment centres
- > health centres and hospitals
- > libraries and other public
- > buildings
- > rail and bus stations
- > major places of employment
- > parks
- > beaches and recreation venues
- > tourist attractions

Recommendations for the location of future end-of-trip facilities have been included in this Bike Plan.

2.2.4 <u>Bike Ahead: Bicycle Strategy for the 21st Century</u>

The Bike Ahead plan recognises the significance of cycling to minimise the reliance people have towards using their cars as a sole mode of transport. According to the plan, an interconnected cycling networking has the capacity to vastly enhance accessibility, which is an increasingly salient facet given the displacement of the growing population to the urban fringe. The Bike Ahead strategy emphasises a network of cycle facilities which:

- > is convenient, accessible and safe;
- > is comprehensive, providing access to most destinations for most cyclists;
- > establishes connectivity; and
- > has regional coverage.

The Perth Bike plan approach strategies are also covered within this document, with a broad array of information relating to cycling behaviour outlined.

> Cycling is primarily a transport mode, serving major trip attractors and generators, rather than purely a recreational activity.

> It is neither practical nor necessary to provide segregated cycling facilities on each and every street, or even on the majority of streets.

> The majority of cycling is, and will continue to be, on the road/street system, and cycling must be actively incorporated into the planning and design of roads and streets.

> The majority of cyclists have never been taught to ride a bicycle as a vehicle.

> The majority of non-cyclists have never been taught to regard the cyclist as a legitimate road user nor how to share the road with cyclists.

> The majority of bicycle/motor vehicle accidents have, as one contributory factor, poor cyclist behaviour or, in the case of adult cyclists' accidents, poor motorist behaviour.

> Bicycle/motor vehicle accidents represent only 1 in 5 serious injury accidents and only 1 in 30 injury accidents for cyclists.

The Bike Ahead strategy builds on 12 key objectives of the MTS and adds three further objectives. In 1996, these objectives were written as follows:

- 1. Bikewest to continue to be an advocate for cycling facilities and services and to co-ordinate cycling programs.
- 2. Review legislative basis for cycling and cycling facilities as a recognised transport mode.
- 3. Establish more effective links with road safety programs.
- 4. Introduce safe cycling programs target at motor vehicle users and pedestrians.

- 5. Identify, develop and signpost safe routes to defined local destinations including schools and commuter routes.
- 6. Encourage bicycle-friendly local area traffic management.
- 7. Provide appropriate on-road and published information and traffic signing.
- 8. Integrate bicycle use with public transport.
- 9. Promote design standards which encourage cycling without the need for totally separate facilities.
- 10. Define, establish and maintain continuous local cycling routes.
- 11. Define, protect and implement a regional cycle network.
- 12. Incorporate cycle requirements in local government planning schemes and policies.
- 13. Educate cyclists and other road users about rights, needs and responsibilities of cyclists.
- 14. Ensure bicycle facilities serve the needs of all cycle users.
- 15. Continue to implement the Perth Bikeplan of 1985.

The Perth Bicycle Network Plan (PBNP), which was produced as a supplementary document to Bike Ahead, expands upon the Perth Bikeplan by setting out the proposed cycle network for the Perth Metropolitan Region, to serve regional and, wherever possible, local cycle trips. Additional strategies are also covered throughout the Perth Bikeplan, and these include;

> public transport integration is primarily addressed in Bike Ahead, but the PBNP will ensure good cyclist access to train stations and other major public transport interchanges;

> local area traffic management is a key issue in the specific design of on-road bicycle routes, but needs to be addressed on the broader basis that 'every street is a bicycle street'.

In addition to maintaining the approach that every street is a bicycle street, opportunities for the development of the Perth Bicycle Network include;

> On-Road Bicycle Routes- linked local streets with special provision for and priority to cyclists;

> Principal Transport Routes- high standard bicycle facilities along the alignments of suburban railways and freeways; and

> Regional Recreational Paths- combined recreational and commuter cycle facilities following linear areas of public open space, such as river and coastal foreshores.

2.2.5 Liveable Neighbourhoods (2009)

Liveable Neighbourhoods was produced to implement the objectives of the previous State Planning Strategy which guides the sustainable development of Western Australia to 2029. Its primary function is as a guide to more sustainable structure planning and subdivision, applicable to new urban areas and large urban infill sites.

The key element of Liveable Neighbourhoods relevant to, and consistent with, this Bike Plan is Element 2, Objective 9:

> To provide a safe, convenient and legible bike movement network to meet the needs of both experience and less experienced cyclists, including on-street and off-street routes.

2.2.6 Main Roads WA (MRWA) Policy for Cycling Infrastructure (2000)

This document sets out MRWA's policies for the provision of cycling infrastructure on its network. All new road works and upgrades involving road widening will meet the requirements of these guidelines. Existing roads and cycling facilities that do not meet the above requirements will be progressively upgraded. The timing of retrofit work will be determined by the availability of funds and priorities.

Key elements of this policy relevant to the City of Bayswater include:

On-Street Facilities

- New urban roads will be constructed with an edge line separated sealed shoulder in accordance with the desirable standards within Austroads' Guide to Traffic Engineering Practice "Bicycles" Part 14 (1999). Where this cannot be achieved, a shared path will be constructed adjacent to the road.
- > On existing highways and main roads, the facility described above for new roads, will only be provided in conjunction with any upgrades involving widening the road where land is available within the existing road reserve or, if land is being resumed for other purposes, the cost of acquiring the additional land is not proportionately higher than that for the other purpose.
- > Sections of rural main roads that are regularly used by more than 25 cyclists per day will comply with urban area guidelines indicated above. Roads not used regularly by cyclists will comply with MRWA Technical Standards for the provision of shoulders.

Off-Street Facilities

- > Main Roads will provide shared paths adjacent to highways and main roads which are not considered appropriate for cyclists or where the lane widths required by these guidelines cannot be achieved.
- > Path widths and layouts will generally be in accordance with Austroads Part 14 (1999), with the use of red oxide coloured asphalt for the path surface.

2.2.7 Activity Centres for Perth and Peel

The State Planning Policy 4.2- Activity Centres for Perth and Peel made under part 3 of the Planning and Development Act 2005 describes the Perth and Peel regional planning framework. The policy provides an overview of the requirements for the planning and development of new activity centres and the redevelopment and renewal of existing centres in Perth and Peel. It is mainly concerned with the distribution, function, broad land use and urban design criteria of activity centres, and with coordinating their land use and infrastructure planning.

Section 5.3.2: Traffic and parking: General requirements (2) states that the planning of activity centres should:

- > take account of the need for access and parking priority accorded to different users and modes including public transport, freight/delivery, people with a disability, bicycles, pedestrians and private cars, and balance competing user needs such as workers and visitors; and
- > identify necessary improvements to public transport, walking and cycling infrastructure and capital and recurrent service funding needs.

Appendix 2: Model Centre Framework within the policy engenders a framework that incorporates planning considerations and activity centre structure plan requirements in the development phase of works. Section 3.4 within Appendix 2 covers the cycling guidelines for activity centres and outlines planning considerations. The planning considerations include:

Network Provision	To promote cycling as a viable mode of transport provision should be made for a comprehensive network that connects the Centre safely and conveniently to other local destinations. This includes dedicated or shared paths and the reallocation of road space to provide more space for cyclists, such as cycle lanes or bus lanes where cyclists are permitted.
End of trip facilities	Facilities should be provided to cater for and promote cycling within commercial and community developments such as showers, change rooms and lockers.
Cycle Parking	Standards to ensure the supply of adequate cycle parking for public and private use should be adopted and mandated as part of the development control process.

2.3 Local Policies

2.3.1 City of Bayswater District Town Planning Scheme No.24

The Town Planning Scheme No.24 (TPS No.24) for the City of Bayswater acts an instrument to control, regulate and co-ordinate public and private development, the use of land and buildings and other activities to improve the amenity, convenience, economy and attractiveness of the environment within the municipality. The document provides direction for the implementation of future infrastructural works, encompassing a broad scope of development which includes buildings, roads and paths.

Many Town Planning Schemes provide guidelines and/or requirements for the provision of bicycle parking and end of trip facilities, including the quantum, location, type and quality. This enables the gradual improvement of bicycle facilities within private land as development occurs; which is essentially the only effective way of developing adequate end of trip facilities in private development destinations. TPS No.24, however, does not make any reference to bicycle parking or end of trip facilities. This is a key gap identified in this policy. In addition, guidelines for bicycle infrastructure works and maintenance programs, such as path management plans, are not outlined within TPS No.24.

Town Planning Scheme No.23 (TPS No.23) Morley City Centre Scheme also does not stipulate any requirements for bicycle facilities during the development and maintenance phases. The lack of information relating to bicycle infrastructure demonstrates a gap in the overarching policy framework within the two respective Town Planning Schemes for Bayswater.

2.3.2 Strategic Community Plan 2013-2023

The City of Bayswater Strategic Community Plan 2013-2023 outlines the overriding direction and framework to inform the Corporate Business Plan of the deliverables that will be met by the City. The Plan comprises strategic guidance for the City, in which the themes of Community, Natural Environment, Built Environment, Local Economy, and Leadership and Governance are highlighted. Key objectives within the Strategic Plan and how they relate to the Bike Plan are outlined below.

Theme	Objectives
Key Area 1: Our Community	C1- Facilities that offer a sense of community, that cater for a range of affordable services and social amenity.
	C1.3 Increase participation in leisure and recreation activities within the City.
Key Area 2: Natural Environment	N2- A community which lives in a sustainable way.
	N2.3 Encourage the community to have sustainable lifestyles.
	N3- Reduce the City's carbon footprint.
	N3.2 Provide leadership in the delivery of sustainability initiatives.
Key Area 3: Built Environment	B1- Streetscapes which allow for community interaction in an urban environment.
	B1.1 Develop high quality streetscapes, which are well maintained and allow for safe pedestrian and vehicle movement.
	B2- A connected community with sustainable transport options.
	B2.2 Provide bicycle and pedestrian connections.

2.3.3 Corporate Business Plan 2013-2017

The Corporate Business Plan 2013-2017 for the City outlines the deliverables that the City aims to meet. In particular, the Natural Environment theme covers the objective of developing and implementing a bicycle plan for the City.

Theme	Objectives
	B2- A connected community with sustainable transport options.
Built Environment	B2.2- Provide safe bicycle and pedestrian connections.
	B2.2.1- Formulate and implement a Local Bicycle Plan.

2.3.4 Asset Management- Infrastructure Assets (Engineering Services Policies)

The Asset Management Policy contains a summation of the current objectives of the engineering services maintenance and prioritisation programs. The Policy notes that roads and footpaths are components of the overall Asset Management Plan, although it does not detail any specific policies pertaining to the maintenance of pathways.

The Policy sets out key principles used to guide asset management of existing and future infrastructure. The City considers the predicted longevity of a particular asset during the implementation process, highlighting the requirement for high quality infrastructure to reduce future maintenance costs. The demand and need for a particular facility is also taken into account, with the opportunities for multiple usage of an asset given precedence over singular use facilities.

2.3.5 Car Parking in the Town Planning Scheme No. 24 Area

The City of Bayswater has implemented a Car Parking Strategy which guides the quantum and location of parking within the LGA. Objective 3 of the document states that the policy aims to balance the provision of sufficient on-site car parking with the need to encourage pedestrians and promote alternative transport methods. While the policy outlines the importance of providing sufficient car parking to cater for demand, it does not mention the provision of facilities that are suitable for parking bicycles. At the same time, the policy does recognise the need to encourage pedestrian access and alternative transport methods, such as bicycles, to reduce the amount of onsite car parking bays. Allocating bicycle parking infrastructure is crucial to encourage more people to take up cycling, and the lack of information on the provision of bicycle parking is a noticeable policy gap.

2.3.6 Morley Activity Centre Structure Plan: Movement Network Report 2013

Section 5 of the Movement Network Report previously conducted by Cardno covers the strategic cycling objectives for the City of Bayswater within the Morley Activity Centre. The Report stresses the importance of an interconnected surrounding cycling network to support movement along major routes through the Morley area. The movement can additionally be supported by traffic calming measures, on-street parking and other horizontal and vertical friction effects to reduce speeds down to the desired 30km/hr. The introduction of bus priority infrastructure described in the *Russell Street Transport Priority Measures* would create an opportunity for an improved cycling connection to be formed along this street, and, in turn, this change in streetscape could be followed along other streets.

Section 5.2 provides an overview of the end of trip facilities recommended for the Morley Activity Centre. According to the Report, large-scale multi-level buildings with some proportion of undercroft or basement parking should have bicycle parking in secure areas adjacent to vehicular parking, along with shower and locker facilities sufficient to cater for the projected level of demand. For smaller precincts, end of trip facilities are not necessarily suitable as they generally do not have the private infrastructure to enable businesses to provide secure commuter parking, let alone showers. To offset this inability for many businesses to develop end of trip facilities, a large-scale cycle parking facility is recommended within the Activity Centre, ideally situated near the core.

It is recommended that the requirements for cycling infrastructure be mandated through Design Guidelines and Town Planning Schemes for both public facilities and private development. It should be noted that TPS No. 23 and TPS No. 24 do not provide information for the requirements for cycling infrastructure. Austroads recommendations and Green Star ratings provide reasonable industry benchmarks for cycling provision and could be used as target provision rates for Morley and the entirety of the City of Bayswater area.

2.3.7 Eastern Metropolitan Regional Council (EMRC) Regional Cycle Network Masterplan

The EMRC Regional Cycle Network Masterplan was developed in 2011 as an outcome of the Regional Integrated Transport Strategy 2010-2013 which recognised the need for increasing accessibility for walking and cycling.

The Masterplan takes a higher-level, regional view of the cycle network and, from the perspective of Bayswater, focuses mainly on the following areas:

- > Cross-boundary linkages between LGAs, particularly where bridges over the Swan River are required
- > Joining up the present disconnected lengths of path along both banks of the Swan River to create a single, easily navigable recreational route catering for many trip lengths.

The projects recommended in the Masterplan include:

- > Extend cycle facilities on Wellington Road between Morley Drive and Smith Street to improve connectivity to Morley Centre
- > Extend shared paths (both sides of road) along Garratt Road between Whatley Crescent and Guildford Road
- > Complete PSP at Bayswater Station
- Install cycle facilities (pedestrians/cyclists traffic lights and bicycle lanes) at intersection of Tonkin Highway and Reid Highway
- > Install bicycle lanes at Tonkin Highway-Collier Road intersection and provide access for cyclists to enter the kerb waiting areas of the traffic lights
- > Construct cycle facilities on Garratt Road Bridge and connect shared paths along Grandstand Road and Garratt Road
- > Construct shared path along Walter Road West between Grand Promenade and Wood Street
- > Extend shared paths (both sides of road) along Grand Promenade between Walter Road west and Alexander Drive to improve connectivity from Dianella to Mirrabooka
- > Complete Swan River foreshore path at Ashfield
- > Improve railway crossing connectivity around Meltham Station
- > Construct cycle facilities on Midland Railway crossing of Seventh Avenue (Maylands) and connect PSP to crossing
- > Construct two additional cycle bridges, inclusive of cycle paths, between Belmont-Maylands-Belmont Park
- > Construct PSP along Tonkin Highway (between Collier Road and Reid Highway)

The Masterplan provides a prioritised 20-year program for each LGA but does not provide an indication of the cost of the projects. The projects proposed in the Masterplan have been used to inform the allocation of routes in this Bike Plan. More ambitious projects, such as a cycle bridge from Maylands to Belmont, have been taken into consideration in the formulation of this Bike Plan, with a long term vision to improve connectivity over the Swan River.

3 Planning and Designing for Cyclists

There are a number of guidelines available to refer to when planning and designing facilities for cyclists. The key reference documents are listed below.

- > Cycling Aspects of Austroads Guides (Austroads, 2014)
- > Guide to Road Design Part 6A: Pedestrian and Cyclist Paths (Austroads, 2009)
- > Guidelines for Traffic Engineering Practice: Part 14 Cycling (1999)

Austroads' Guide has been adopted as fundamental design criteria for the provision of on and off-street paths, signage, grab rails and other bicycle infrastructure. Through this document, an acceptable minimum standard can be maintained, to ensure safe operation for cyclists, pedestrians and vehicular traffic. This chapter is designed as an overview of key design considerations and not as a substitute for referring to guidance documents.

3.1 On-Street Facilities

Table 3-1 provides a summary of key design considerations when planning typical on-street facilities, excluding bicycle boulevard facilities. It is recognised that due to the constraints of a built-up environment some of the objectives may be impossible to achieve in certain locations, and a slightly lower quality facility may be suitable. The designer will need to consider whether the proposed lower standard facility actually achieves an improvement in safety or riding conditions for the cyclists, or whether it is safer to omit the facility altogether if the appropriate standard cannot be reached.

Issue	Considerations
	Traffic speeds are based on 85 th percentile speeds for existing roads, and for the posted speed limit of new roads.
	Less than 50km/hr – sealed shoulders or cycle lanes may be desirable, depending on road layout (e.g. if continuous median islands are used) and traffic volumes, however these are generally not required. On-street cyclists can be expected to ride in mixed traffic when prevailing traffic speeds are less than 40km/h.
Traffic speed	50km/h – sealed shoulders or cycle lanes may be desirable, depending on the volume of cyclists, volume of vehicles and whether vehicles can overtake easily. On quiet streets with low traffic volumes or undivided carriageways wider than 7m are generally not required.
	60km/h-70km/h – sealed shoulders or cycle lanes should be provided with a minimum width of 1.5m.
	80km/h+ - sealed shoulders or cycle lanes should be provided with a minimum width of 2.0m. This provides an additional buffer for cyclists alongside fast and heavy traffic.
	When considering the traffic speed, it should be noted that the 85 th percentile rule applies to nominated traffic speeds. That is, the speed at or below which 85% of all vehicles are observed to travel under free-flowing conditions, therefore accounting for the majority of motorists (AS1742.4).
Continuous median islands	Wherever continuous median islands are used to separate traffic flows, 1.5m wide sealed shoulders should be provided to ensure that cyclists are not squeezed by vehicles. If barrier kerbs are used for median delineation, an offset of at least 0.3m (0.6m preferable) should be provided. Where these are introduced irregularly along streets the offset from the edge of travelled way should be a consistent minimum of 0.6m. This minimum may be used to match local authority standards on roads with design speed of 70km/h or less.
	Austroads recommends an absolute minimum kerb-to-median width of 4.2m, increasing to 4.7m at 80km/hr.
Single-lane roundabouts	Single lane roundabouts should be designed to reduce, as far as possible, the approach speed of vehicles on all legs. Sealed shoulders or cycle lanes should be ended on approach to the intersection, with clearly defined merge areas, to encourage cyclists to 'claim the lane' through the intersection. Cycle lanes should not be painted at the edge of the circulating roadway.

Table 3-1 Design considerations for on-street cycling facilities

Issue	Considerations
Multi-lane roundabouts	Multi-lane roundabouts should be avoided on on-street cycle routes wherever possible. If a roundabout is required, cyclists should be given the option of 'claiming the lane' through the intersection or exiting onto the path network. Cycle lanes should not be painted at the edge of the circulating roadway.
Priority-control intersections	Sealed shoulders or cycle lanes should be provided on the through route. Deceleration lanes should be separate to cycle lanes, as per Main Roads WA standard design. If a slip lane is provided for left turning traffic on the terminating leg, a cycle lane should be provided adjacent to the right turn lane to assist cyclists in turning right.
	On cycle routes with sealed shoulders or cycle lanes these should be continued through the traffic calming device, e.g. by providing a bypass around a slow point. The bypass can be either at road level or path level. If the bypass is at path level, care needs to be taken to ensure suitable vertical transitions at either end.
Traffic calming devices	On cycle routes where cyclists are expected to ride with mixed traffic, it is expected that cyclists would 'claim the lane' through any traffic calming devices and therefore bypasses are not required. If bypasses are provided, e.g. around a single-lane slow point, the design needs to be aware of potential conflicts where cyclists will merge with vehicles after passing through the device.
Local Area Traffic Management	Use of cul-de-sacs to prevent 'rat running' traffic has the potential to provide low volume, low speed corridors for cycling. However, many of these end-of-street treatments do not appear to appropriately accommodate cyclists. Any future creation of cul-de-sacs or one-way road sections must include provision for cyclists to easily travel both ways, retaining network permeability.
Sealed shoulders or cycle lanes	Sealed shoulders are generally adequate in most locations as Western Australian drivers do not tend to park on the carriageway. Formal cycle lanes, signposted with regulatory signage as required under the <i>Road Traffic Code 2000</i> , should be used where it is likely that vehicles will park in the sealed shoulders and create an unsafe conflict between cyclists and vehicles.
	For urban streets, it is desirable to use red asphalt as the surface treatment for sealed shoulders and cycle lanes. This treatment provides a high quality surface for cyclists, as well as clearly delineating the presence of the lane and visually narrowing the street which reduces traffic speeds. This should include roads on the rural/urban fringe which are used by high volumes of cyclists (
Surface treatments for cycle lanes or sealed shoulders	For rural roads, black asphalt or hot mix is acceptable for sealed shoulders and cycle lanes. As cyclists, particularly road cyclists, are sensitive to rough or uneven road surfaces, the quality of pavement is critical.
	'Green Lane' treatments should be used on cycle lanes at intersections where there is likely to be a significant conflict between cyclists and motorists – e.g. at the start of a left turn slip lane or at a location where significant volumes of traffic are likely to turn left across a cycle lane. 'Green Lane' treatments should, however, be used sparingly across the network to maintain their effectiveness as a warning device.
Parking	Where angled parking is located adjacent to on-street facilities there is the potential for conflict between drivers reversing into the traffic lane and cyclists. The risk is significantly reduced when vehicles are parking rear-to-kerb, where oncoming cyclists are more clearly visible.
	Therefore, it is good practice to recommend rear-to-kerb parking where high-turnover perpendicular on-street parking is provided. This must be considered in the context of the adjacent roadway, and it is advised that rear-to-kerb parking is not introduced where traffic volumes are high or roadway speeds are >50km/hr.
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3.2 Off-Street Facilities

Table 3-2 provides a summary of key considerations when planning typical off-street facilities, i.e. shared paths.

Table 3-2 Design considerations for off-street cycling facilities

Issue	Considerations		
Footpath or Shared Path	All new footpaths should be constructed as shared paths. Regulation 242 (2) of the Australian Road Rules states that 'A shared path is an area open to the public that is designated for, or has as one of its main uses, use by both riders of bicycle and pedestrians, and includes a length of path for use by both bicycles and pedestrians beginning at a shared path sign and ending at the nearest of the following:		
	a) An end shared path sign.		
	b) A no bicycles sign or no bicycle road marking.		
	c) A bicycle path sign.		
	d) A road.		
	e) The end of the path'.		
	These are referred to as Shared Use Paths in Austroads Part 14.		
	The only exception to not constructing shared paths is in locations with extraordinary safety issues where pedestrians and cyclists would be unable to safely co-exist on a path. In these occasions, a safe alternative for cyclists of low confidence levels should be provided.		
Path Location	Shared paths within road reserves should be located as far from the property boundary as possible to maximise the sight distance at driveway crossings. A 0.5m buffer should be provided between the road carriageway and the dual use path where feasible.		
Road Crossings	Road crossings should be located along the cycling desire line wherever possible. Path deviations to minimise crossing distance are appropriate for pedestrians, but require cyclists to undertake direction changes while looking over their shoulder and are considered to create an additional safety risk.		
	Where refuge islands are installed, these should be a minimum of 2.0m wide. Grab rails should be installed only where traffic volumes or speeds at the crossing point are high, and should always be located on the left side of the path for path users approaching the crossing point.		
	Consideration should be given to providing road crossings where pedestrians and cyclists have priority along key corridors.		
Path Width	All new shared paths constructed in the City should be designed to a 2.5m width. However, this width may be reduced to 2.0m path where constraints in the urban environment occur and the 2.5m width cannot be achieved. Additional width should be provided where the volume of pedestrian and cyclist traffic is likely to result in a greater frequency of passing manoeuvres, using Austroads as a guide.		
Signage	Part C: Technical Guideline- Bicycle Directional Signs from Main Roads WA sets out the requirements for bicycle signage along paths and roads. Section 2.8 states that pavement arrows and destinations may be used to supplement bicycle directional signs where the continuation of the PSP in unclear at the intersections with roads or other paths. At important junctions on key routes, bicycle direction signage should be provided in accordance with Main Roads WA standard drawings. A signage strategy should be prepared to ensure that adequate follow up signage, or passive delineation, is provided along the routes. To complement the directional signage, 'shared path' symbolic stencils should be used, where possible, as a reminder to pedestrians to be aware that they are sharing		
	the path with cyclists. Stencils should be placed in conformity with Austroads guidelines. The formal definition of a shared path under Australian Road Rules requires the erection of shared path signage, however it is considered standard practice to denote a shared path by linemarking instead of shared path signage to mitigate the cost, legibility and maintenance requirements for signage.		
	It should be noted that the Road Traffic Code (2000) confirms that the use of paths that are not designated as shared paths through signage is an offence for riders over the age of 12. This regulation is not consistent with standard practice (or best-practice).		
	In addition, bicycle lanterns should be installed at intersections that receive high		

Issue	Considerations		
	volumes of cyclists. An example of a bicycle lantern is shown in Figure 3-1.		
Linemarking	Centre linemarking should be used on paths wider than 2.5m if the volume of cyclist and pedestrian traffic is significant or if there is a history of conflicts.		
Speed or access control devices	These should be avoided as far as possible. If there is a definite need to prevent unauthorised vehicle access to the paths, a single bollard placed in the middle of the path is recommended, with the path widened to 3.0m. Bollard visibility should be enhanced by use of retro-reflective material and supported by a widened centre line on the approaches, to ensure adequate visibility at night.		
	Where a definite need exists to reduce cyclist speeds approaching a road crossing, due to poor cyclist behaviour and safety considerations, gates (grab rails) should be used. Gates should be separated by a minimum of 3.0m to allow a cyclist to weave through them at approximately walking pace. In a town centre environment, well-placed street furniture is preferred to achieve the same aims. Bollards should not be used to reduce cyclist speeds.		
Grab Rails	Grab rails should be placed according to Austroads Guidelines and used sparingly along cycle routes where there are high vehicle crossing volumes or speeds. Grab rails can be used as a passive wayfinding technique to delineate the route of local bicycle routes. Grab rails should always be located on the left side of the path approaching a road crossing and never in the centre of the path.		
Passive Wayfinding	Passive wayfinding should be incorporated into the design of shared path networks. Strategic placement of grab rails, linemarking and coloured asphalt can illustrate the route of the main shared path without the need for signs.		
Connectivity	All new shared paths should be implemented with maximum connectivity, including kerb ramps and crossings to facilitate movement between paths. Ensure that new developments do not introduce missing links in their path networks.		
Controlled Access Point (CAP) Roads/Service Roads	CAP roads/Service roads should not be used as substitute for shared paths.		

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Figure	3-1	Bicycle Lanterns



3.3 Bicycle Boulevards

A bicycle boulevard is the name given to a range of treatments to quiet suburban streets in order to create a safe, low speed and low vehicular traffic environment for on-street cycling. The concept is used extensively in The Netherlands as well as Portland, USA. As a number of bicycle boulevards are proposed as part of this Local Bike Plan, the following section is designed to provide an overview of their purpose and key features, in order to inform detailed design considerations.

The main purpose of a bicycle boulevard is to create a safe, low speed and low vehicular traffic environment that encourages on-street cycling among cyclists of all confidence levels. With a safer, friendly environment for cyclists, it is expected that bicycle boulevards will encourage greater take up and utilisation of cycling as a transport mode for students, commuters and discretionary travel.

The key features of a bicycle boulevard include:

- > Road closures and traffic calming devices to reduce traffic volumes and speeds
- > High quality shared paths between road sections to create seamless linkages along a route

> Pavement marking, such as bicycle symbols, which guide cyclists on their positioning and remind motorists of the presence of cyclists

- > Reversal of priorities at minor intersection to give the boulevard priority
- > Improved crossings at busy roads where the boulevard cannot be given priority

Bicycle boulevards tend to create attractive on-street cycle routes, designed preferentially for cycling connectivity.

3.4 End of Trip Facilities

End of trip facilities are a critical, but often forgotten, component of the cycling network. The presence and/or quality of end of trip facilities can often make or break the decision to cycle for many trips.

Different trip purposes will have different needs when it comes to end of trip facilities. For example:

- > A commuter may want a secure place to park their bicycle inside their workplace, along with showers, lockers and ironing facilities to enable them to freshen up before commencing work for the day
- > A commuter may instead want a secure long term place to park their bicycle at the train station or bus interchange, allowing them to complete a portion of the trip via bicycle
- > A shopper may only want a secure short term place to park their bicycle, conveniently located to their destination (e.g. close to the entrance of a shopping centre, or on the footpath in a 'main street' environment) which is ideally protected from wet weather
- > A recreational rider generally has end of trip facilities at their own home but may require a secure place to park their bicycle at an intermediate destination, such as a cafe or a park

Long term end of trip facilities for commuters should generally be provided by the employer. Council's involvement in the provision of end of trip facilities should be in the form of:

- > Requiring, through its Town Planning Scheme, new developments to provide a certain standard of end of trip facilities for both employees and visitors; and
- > Providing suitable end of trip facilities for employees and visitors at its offices, depots, library etc.

Short term end of trip facilities should generally be in the form of simple u-rails or other design which facilitates the secure parking of a bicycle. In accordance with Austroads guidelines, these should be located approximately every 30 metres along 'main street' type shopping strips and in small clusters at the entrances to shopping centres and other significant destinations.

There are several train stations in the City of Bayswater (Mount Lawley, Maylands, Meltham and Bayswater). The purpose of providing EOT facilities at train stations is that it should make it easier for a person to access the station from a greater distance than by walking. People living within a comfortable 800m of their station (equivalent of a 10 minute walk) are not likely to use a bike to get to the station once they factor in the extra time taken to prepare for riding (appropriate clothing, securing luggage, helmet, lights if it is dark, getting the bicycle out of storage/garage) and once they reach the station, locking the bicycle.

The NSW Bicycle Guidelines considers that riding a bicycle over 5 minutes to the station involves less physical effort than walking. In other words, the decision to ride to the station is only viable if the advantage of travelling the extra distance for less physical effort outweighs the other factors of using a bicycle. As it is not possible to control the preparation factors in riding, it is important that the ride or route to the station coupled with the end of trip facilities is as comfortable and convenient as possible.

At the stations commuters require secure long term place to park their bicycle thus allowing them to complete a portion of their trip via bicycle.

Specific considerations relating to the provision and location of end of trip facilities at train stations

- > Storage areas need to be open and attractive and in easily supervised areas that have good active and passive public surveillance
- > Bicycle parking should be as close as possible to station platform entrances with a maximum walking distance of 100m
- > Bicycle parking u-rails should be located under cover and out of the weather
- > Bicycle parking facilities need to be easy to find, well signed and marked
- > Bicycle riders need to be able to access the parking facilities easily and quickly from the local routes

Source: Bicycle Guidelines from RTA NSW

End of trip facilities at train stations are the responsibility of the PTA. With future growth in cycling, it is expected that demand for these facilities will increase. It is recommended that Council monitor the situation and liaise with the PTA to ensure that supply exceeds demand.

3.4.1 Bicycle Parking at Schools

Bicycle parking at school is important to encourage students to ride to/from school. All schools within the City of Bayswater presently have some form of bicycle parking facility, ranging from simple u-rails to secure cages. The key considerations for bicycle parking at schools include:

- > Convenience the parking should be located close to the classrooms and not at the far end of the playing fields. Easy access from the approach routes is also important;
- > Security the student, and their parents, need to be confident that their bicycle will not be vandalised or stolen at school and therefore the parking needs to be secure with passive surveillance. The ultimate solution to this is a lockable bicycle cage, controlled by staff.

Bicycle security is one of the key factors that discourages cycling to school, as identified through surveys of school children. Parents note that there are theft concerns where bicycle racks are visible from the road. With after school activities being variable throughout the week, students may need to leave bicycles parked at school overnight and this increases the theft risk if the facility is not sufficiently secure.

When planning for end of trip facilities at schools, the different needs of students must be considered, including:

- > Parking is almost always long stay (> 4 hours) and arrival / departure times are very strict. Therefore a lockable bicycle cage is appropriate, with a responsible person from the school controlling access to the facility.
- Most bicycle parking guidelines advocate the placement of bicycle parking facilities in areas visible to and accessible by the public. However, schools are different to other public facilities or workplaces. Placement of the facility near the school boundary can be a great symbol of the school's support for sustainable transport and develop awareness among the school population; however exposure to passing traffic does bring with it a theft or vandalism risk. If the facility is to be located in view of the public then it needs to be fully secure to cater for bicycles left overnight or on weekends, and be vandalism proof.
- > Weather protection in the form of a roof to protect from rain and sun is very desirable to reduce exposure to the elements. This is particularly desirable on very wet or very hot days where the bicycles may become unrideable due to wetness or heat exposure.

Whichever location and type of facility is selected, the need for future capacity expansion should be considered to match the anticipated growth in cycling to schools. Current Austroads guidelines recommend a provision of 1 bike bay per 5 students over year 4.

It is recommended that schools be encouraged to install secure bicycle cages for their students. The City may wish to contribute financially, and/or assist the school by applying for 'Connecting Schools' grants from the Department of Transport.

Whilst parking at schools is primarily the responsibility of the school itself, the LGA should encourage schools to get involved in improving their cycling facilities.

Any proposals by the City to upgrade bicycle parking at schools should be coordinated with the further development of the cycle network in the area.

It is important to note that the Department of Transport's (DoT) Connecting Schools Grant Program offers funding on a dollar for dollar basis (50% matched funding basis) for end of trip facilities or other projects which aim to improve bicycle access.

3.5 Cycle Lane/Sealed Shoulder termination treatments

Intersections are critical points on the bicycle network and, if the level of conflict or perception of danger is too high, will often become an almost invisible barrier to use of a cycle route.

3.5.1 Signalised Intersections

For signalised intersections where the approach flares into two or more traffic lanes, the treatment is very simple and examples of appropriate treatments are shown in **Figure 3-2**. The most important aspect is to, wherever possible; avoid the situation where a vehicle in a dedicated left turn lane must turn across the cycle lane at the stop line as this is the most dangerous conflict point.

Where the left lane is a shared through/left lane, the through bicycle lane may be omitted, provided that the conflict point at the commencement lane is clearly marked.

However, the termination of the cycle lane/sealed shoulder needs to be clearly marked in order to indicate to both cyclists and motorists that cyclists will be merging at this point. This treatment should also be used on approach to multi-lane roundabouts.

The most important aspects of this treatment are that:

- > The termination of the cycle lane/sealed shoulder occurs well before the give way line at the roundabout
- > The merge area is clearly marked with visual cues so that both cyclists and drivers are aware of the merge
- > A kerb ramp leading to a shared path around the outside of the roundabout is provided at a gentle angle, to allow cyclists who are not confident enough to ride in mixed traffic to use the path network instead



Figure 3-2 Example of Cycle Lane/Sealed Shoulder Termination Treatment where road widens on approach to a signalised intersection

3.5.2 <u>Roundabouts</u>

At single lane roundabouts, current practice in the City is to terminate the shoulder or cycle lane before reaching the give way line. This is good practice, as it requires cyclists to either ride in primary position in the traffic lane where they are most visible to other users, or to use the off-street paths if they are not confident enough to use the road.

However, the termination of the cycle lane/sealed shoulder needs to be clearly marked in order to indicate to both cyclists and motorists that cyclists will be merging at this point. This has not been well covered in existing Australian Standards or state guidelines so an indicative concept sketch has been provided in **Figure 3-3**.

The most important aspects of this treatment are that:

- > The termination of the cycle lane/sealed shoulder occurs well before the give way line at the roundabout
- > The merge area is clearly marked with visual cues so that both cyclists and drivers are aware of the merge
- > A kerb ramp leading to a shared path around the outside of the roundabout is provided at a gentle angle, to allow cyclists who are not confident enough to ride in mixed traffic to use the path network instead

The proposed treatment is similar to the recommendations contained within a new Austroads document, released in May 2014: Assessment of the Effectiveness of On-road Bicycle Lanes at Roundabouts in Australia and New Zealand.

Figure 3-3 Example of cycle lane / sealed shoulder termination treatment at single-lane roundabout



4 Consultation

The stakeholder consultation guided the development of the bicycle plan and provided considerable insight into the issues throughout the network. During the consultation process, two forms of surveys were conducted, and these included public and school surveys.

In total, 83 public surveys were completed, in a combination of online and hardcopy forms. In addition, 152 students provided a response to the school survey across two schools, Bayswater Primary School and Camboon Primary School.

4.1 Public Surveys

Respondent demographics are summarised in a series of graphs below.



Age of Respondents



It can be seen that 60% of respondents ride at least 3 times per week, indicating that the vast majority of those participating in the surveys are highly familiar with the intricacies of the network. This is also much higher than the expected average for the population in general, confirming that there is a significant self-selection bias among public respondents.



More than one third of respondents answered they are confident riders, showing that a high number of the responses from participants reflect answers from experienced riders.



How frequently do you cycle on

How frequently do you cycle on local roads?



It can be observed that half of the respondents either rarely use major roads or never frequent them. This highlights the factors, such as high volumes of traffic and busy intersections, that influence the routes which

cyclists are more inclined to take. Local roads are considerably more popular than major roads, with 42% of respondents often using these particular roads.



PBN routes are relatively popular, with 65% of respondents stating that they use PBN routes at least sometimes. It is important to note that recognition of the PBN, even among cyclists is often relatively poor. The high response rate may be attributed to the consistent investment and maintenance of these routes by the City over time. However, the use of a route may be incidental in that PBN routes are often the only appropriate option from a particular area and may not imply that the use of the PBN is intrinsic in routeplanning.

The river foreshore path is generally not that popular among respondents, with almost one third answering that they rarely use the path. This is likely due to proximity, as respondents who live north of Broun Avenue are less likely to employ this route to access their trip destinations.



Almost half of the respondents use shared footpaths often, and only 3% answered that they never use shared paths. As expected, footpaths do not receive the same level of use. However, it is important to note that the use of footpaths is illegal for cyclists aged over 12 under Western Australian legislation. In addition, children cycling along pathways may be accompanied by a parent if they are under 12 years of age. This may account for some of the participants answering that they use footpaths to cycle, despite it being illegal under the Australian Road Rules. The use of footpaths may therefore reflect a general level of cycling confidence and a lack of alternative off-street facilities along chosen routes.

July 2014


Almost half of respondents indicated that they use the Midland-line PSP almost always, representing the primacy of this PSP route and its use for a variety of trip purposes, most notably commuting.

There was also a high level of interest in cycling workshops provided by the City. This aligns with the promotional and educational aspects of the Bike Plan, described in **Section 7.2**.

4.2 School Surveys

School surveys were identified as a priority to obtain a greater understanding of the cycling patterns of school students within the LGA. Routes for school students should provide a high level of safety and convenience to ensure that students feel comfortable riding to school.

Initially, schools contained within the City were identified, as well as schools in neighbouring LGAs. The surveys were established around the objective of evaluating the factors that influence the decision to ride to school. The survey was structured in order to determine if students own a bicycle, how often students cycle, whom they cycle with, what they perceive the benefits of cycling are, and what the current issues are in the cycling network. Upon finalisation of the surveys, schools were contacted to inform them of the surveys and to organise an approach for completing the surveys. Unfortunately, due to conflicting class schedules, there was a relatively low response rate from schools. The schools that completed the surveys were Bayswater Primary School and Camboon Primary School. A summation of the responses received is presented below:



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The majority of respondents were in the 9-11 years, and just beginning to ride to school without their parents. In general, children are not riding to school alone, with only 16% of respondents making the trip solo. This is a positive sign as it creates a family or social experience out of the journey.



If you ride to school; how often?

Why do you normally ride?



The majority of respondents answered they rarely cycle to school. However, out of the students who cycle to school, almost half of the 40% cycle to school on most days, accounting for 17% of all respondents.



Do you own a bicycle?

Note that almost all of the students have access to a bicycle, with only 9% answering they do not own a bicycle. Out of those who own a bike, 30% ride their bicycle most days, but 34% ride their bicycle rarely, if at all.

5 Site Analysis

5.1 Land Use and Attractors

The main land use and attractors within the City are shown in **Figure 5-1**. These have been used to determine the route destinations for cycling trips within the City.

Figure 5-1 Land Use and Attractors



The City of Bayswater is predominantly a low density residential area, with R-Codes usually consisting of R20 to R25, and some industrial and commercial areas. The streets form a grid network with the Midland train line running east west through the LGA. Medium density housing can be found within close walking distance of the train stations.

The suburbs of Bayswater, Bedford, Dianella, Embleton, Maylands, Morley, Noranda and Mount Lawley are all found in the City of Bayswater.

5.1.2 Morley City Centre

The main commercial centre is in Morley. Currently, Morley City Centre offers a diverse range of commercial options, with Centro Galleria as the main focal point of the precinct for retail opportunities. Morley is defined as a Strategic Metropolitan Centre by the WAPC's Directions 2031 located west of Midland and east of Stirling, the two closest strategic metropolitan centres. Due to this spatial distribution, Morley acts as a major attractor to nearby residents and has a large catchment for employment and destination retail.

The Morley City Centre Masterplan (2010) proposes a range of options to improve the variety of land uses as well as enhance accessibility to the area. Some of the key principles of the plan are:

- > Emphasising high quality development;
- > Promoting a mix of land uses to deliver a lively and prosperous centre;
- > Providing for a range of housing choices;
- > Encouraging the propagation of cafes, restaurants, and social and recreational facilities;
- > Upgrading streetscapes and public spaces;
- > Planning for a greener city centre; and
- > Prioritising pedestrians and 'streets for the people' rather than 'roads for cars'.

This report prioritises cycling links to the Morley City Centre, particularly in the longer term, recognising the importance of Morley as a generator of major employment and retail activity in the City.

5.1.3 Key Attractors in the City of Bayswater

Other Key Attractors in the City include:

5.1.3.1 Maylands Activity Centre

The Maylands Activity Centre is an example of mixed use and medium density housing with good transport access. Recreational Shared Paths are provided along the Swan River Foreshore in Maylands.

The Maylands Train Station Precinct has a variety of retail and dining land uses, which resultantly attract substantial pedestrian and cyclist activity. The main street precinct along Whatley Crescent and Eighth Avenue is a focal point for the area, with the majority of services located along this strip.

The RISE (Recreation, Information, Socialising and Entertainment) building located further along Eighth Avenue is a multipurpose facility incorporating a gymnasium, library, café, crèche and function rooms, thus acting as a major trip generator to the area. Guildford Road also receives activity due to commercial land uses, although this is at a lesser extent than Eighth Avenue as the high volumes of traffic along this road deter pedestrian movement.

5.1.3.2 Bayswater Industrial Precinct

Ashfield is an industrial area in a strategic location, east of Morley and west of Midland as well as proximal to Tonkin Highway. Ashfield has been identified by the Eastern Metropolitan Regional Council (EMRC) and the City of Bayswater as an area with a significant proportion of underutilised and vacant land (see **Figure 5-2**). The precinct has been identified as a priority and is set to expand and develop in the future.

Currently, industrial uses are the main use in the area, with activity generated by employees. As indicated in Directions 2031, Ashfield, adjacent to the Bayswater Industrial Precinct has the potential to be a secondary activity centre, therefore enhancing the existing industrial uses as well as contributing towards improving the distribution of mixed uses such as residential and some retail. This would present an opportunity for a portion of land adjacent to the Bayswater Industrial Precinct to become a transit oriented development by encompassing an array of land uses given its close proximity to the Ashfield Train Station.



Figure 5-2 Vacant Land in Bayswater Industrial Precinct

5.1.3.3 Swan River Foreshore

The 10km stretch of parkland and paths along the foreshore generates significant usage as it accommodates for a vast range of recreational activities.

Key attractors on the Swan River Foreshore include

- > Maylands Peninsula Public Golf Course
- > Tranby House, Maylands
- > Eric Singleton Bird Sanctuary, Bayswater
- > Halliday House, Bayswater
- > Maylands Waterland
- > Riverside Gardens, Bayswater

5.1.3.4 Bayswater Town Centre

The Bayswater Town Centre is located near the Bayswater Station, with King William Street as the main street in the precinct (see **Figure 5-3**). There is a lot of activity in this area due to its close proximity to the station as well as the number of schools located nearby.

The Frank Drago reserve to the west of the area is another major trip generator as a number of sporting events take place in this reserve.

Figure 5-3 Bayswater Town Centre Precinct



5.1.3.5 Noranda Shopping Precinct and Sporting Complex (Benara Road)

Located in the north-west quadrant of the City of Bayswater, this area is defined by the WAPC's Directions 2031 as a District Centre. The Sporting Complex has a lawn bowls club, soccer pitch as well as netball courts. The Shopping precinct has major retailers (including Coles and Woolworths) as well as a medical centre and cafes and restaurants which generate activity in the area. It is also located opposite the Robert Thompson Reserve which has high recreational use.

5.1.3.6 Schools

Major schools in the City include Morley Primary and Senior High School, Chisholm Catholic College, Bayswater Primary School, and Hampton Primary and Senior High School. A more extensive analysis of the schools with the City is outlined in **Section 5.6**.

5.1.4 Key Attractors outside the City of Bayswater

Attractors outside the City of Bayswater should also be taken into consideration as these attractors will also generate trips and have an impact on the City. These include, but are not limited to, the following:

- Perth CBD The CBD is a major attractor due to the high number of services it provides within a close proximity Bayswater in addition to the significant number of commuters travelling to the area due the CBD being the main centre of employment.
- > *Beaufort Street in Mount Lawley* This strip just north of the Perth CBD offers an array of cafes and restaurants as well as a number of retail stores.
- > *Malaga* To the north of Bayswater, Malaga contains a comprehensive variety of retail, office, and, primarily, light industrial land uses.
- Midland The Midland Gate Shopping Centre has a number of retail shops and cafes as well as some restaurants located nearby. Midland also contains recreational facilities and numerous schools such as Governor Stirling High School and Guilford Grammar School to the west.
- > Perth Airport Located south-east of Bayswater, the Perth Airport is a key facility which is a significant trip generator. Infrastructure upgrades to the site will also increase trips in the coming years.
- > Crown Precinct (Burswood) The range of facilities and the construction of the new stadium to the north of the site will continue to attract visitors to the area. The casino, restaurants, bars and hotels are substantial trip generators.
- > Edith Cowan University (Mount Lawley Campus) ECU attracts students on a daily basis and the location of nearby facilities such as the Alexander Park tennis club, WAAPA, Mount Lawley Senior High School, and nearby parks further the number of trips to the site.

5.2 Strategic Regional Cycling Links

The existing strategic regional cycling links are presented in **Figure 5-4** below. Note that this does not include the proposed Tonkin Highway PSP, which will form a major north-south connection in the future.





5.2.2 Perth to Midland

The strategic links from Perth to Midland run along Guildford Road and the PSP adjacent to the Midland train line. While the PSP affords a safer cycling environment, Guilford Road is also utilised for access to facilities such as the RISE in addition to serving as a link between the foreshore path and the PSP. However, the hostile riding environment of Guildford Road deters frequent usage, and consequently the PSP is deemed to be a more conducive cycling environment for both commuting and recreational cyclists. The only minor deficiency along the PSP is the interrupted section of pathway at Bayswater Station. Cyclists using the PSP currently have to navigate through car parking at Bayswater Station, therefore presenting a minor encumbrance and potential safety hazard to cyclists.

5.2.3 Swan River Foreshore

The Swan River foreshore link is a highly popular riding route, particularly for recreational riders. The pathway generally offers a comfortable and safe cycling environment, however, certain sections of the path are discontinuous. The section of path east of Tonkin Highway towards Bassendean is disjointed and forces cyclists to ride on road at particular areas on Ashfield Parade. Another minor discrepancy is located on the east segment of the Maylands Peninsula as there is a deviation from the shared path to a narrower path on Swan View Terrace.

5.2.4 Inglewood to Bassendean

This link serves as an important access route to Morley City Centre and to the Bayswater Industrial Precinct. The link follows along Walter Road East to Broun Avenue and converges onto Beaufort Street from Coode Street, passing by five different schools along the route. It is noted that local bicycle route NE8 runs parallel to Broun Avenue and Beaufort Street for the majority of the link; although, due to the poor way-finding associated with the NE8 route, it was not classified as part of the strategic link.

5.2.5 <u>Morley Drive</u>

Morley Drive connects Tonkin Highway through to Mitchell Freeway, passing by other major routes such as Alexander Drive, Wanneroo Road and Cedric Street. It is considered an arterial route for the City of Bayswater due to the linkages that it provides. The existing shared path facility is sporadic, with poor legibility.

5.2.6 Garratt Road and Tonkin Highway

These routes enable direct access to Belmont towards the south via bridges. The bridges provide crucial access as the other nearest bridges are located at Guildford Road in Bassendean and Graham Farmer Freeway to the south-west.

5.2.7 <u>Beechboro Road North</u>

This strategic link provides access from Walter Road East along to Reid Highway. The route passes three schools as well as the Beechboro Shopping Centre.

5.3 Connecting links

The connecting links to nearby and adjacent LGAs are key routes that should be prioritised and maintained to support increased usage. The Midland line PSP provides an important link from the CBD to Bassendean and ultimately Midland. The Midland line PSP also enables access to surrounding suburbs from Railway Parade in a south-westerly direction. Central Avenue, located in the south-west quadrant of the LGA, links the PSP to Beaufort Street, ECU and Alexander Drive, therefore acting as a major connecting route. Grand Promenade, which also links with the PSP, is another significant route as it passes Our Lady's Assumption Primary School and Centro Dianella.

Morley Drive is one of the more noteworthy connecting routes in the City as it links Tonkin Highway with Mitchell Freeway to the west. In addition, it also enables a route to Reid Highway and an eventual link to the proposed MAX light rail through Alexander Drive.

Broun Avenue and Collier Road are also integral to linking Bayswater with Mount Lawley and Bassendean respectively. Broun Avenue changes into Beaufort Street which traverses through Inglewood and Highgate

and eventually Northbridge. Collier Road links Walter Road West through to Guildford Street, passing through the Bayswater Industrial Precinct along its path.

The Strand from Surrey Street to Walter Road West will have bicycle lanes added as part of a planned road upgrade by the City of Stirling. This will encourage riders along Walter Road West to enter Dianella to access nearby parks and Dianella Centro. Further along Walter Road West, the Grand Promenade intersection is set to undergo an upgrade in the near future which will be more accommodating for cyclists, hence improving connectivity between the City of Bayswater and City of Stirling.

The PBN routes also provide a degree of connectivity within the City, with the most significant routes being NE8, NE26, NE18 and NW7. A map identifying these routes can be found in **Appendix A**.

5.4 Existing Cycling Infrastructure

Figure 5-5 Existing Cycling Infrastructure



5.4.2 <u>Main Routes</u>

The existing cycling network accommodates cycling along a variety of routes, with the Recreational Shared Paths (RSP) located on the Swan River foreshore and the Midland train-line PSP being the primary pathways in the City of Bayswater. Generally, the quality and uniformity of these shared paths is satisfactory, with some occasional deviations on to local roads. It is noted that access alongside the foreshore is

precluded by properties in some areas, particularly north from the Bath Street Reserve adjacent to Swan View Terrace.

The linkages between these major routes are also important to improve connectivity in the cycling network. Access to King William Street from the Swan River Foreshore path to the Midland line PSP and Bayswater station is a crucial link in the network. This particular route also merges into Coode Street, providing an eventual link via Broun Avenue to Morley City Centre to the north. The provision of adequate infrastructure along King William Street is therefore integral to interlinking two of the main strategic routes in the cycling network.

Following on from Coode Street via King William Street, Broun Avenue is another main route as it provides a connection to Russell Street into the Morley City Centre. It also allows for access through to Beaufort Street and to the Ashfield Industrial Precinct, thereby increasing its importance to the network with the gradual expansion of Ashfield in the near future.

Guildford Road also bears an importance to the cycling network as it is an integral intermediary from the Swan River foreshore path and the Midland PSP. In addition, it offers access to Garratt Road and Eighth Avenue, with both of these links providing a connection to nearby train stations.

In the northern section of the LGA, Morley Drive is deemed to be a main route as it allows for connection to Tonkin Highway towards the east and eventual connection to Stirling in the West. Morley Drive also bypasses Wellington Road, which links to Walter Road West and Russell Street.

5.4.3 <u>Network Deficiencies</u>

The local network deficiencies identified through the saddle survey and desktop analysis are presented in **Figure 5-6** below, with the pathways indicating missing gaps and the red circles representing issues disrupting the continuity and convenience of cycling journeys.





Particular segments of the cycling network present smooth riding surfaces and level grades; however, there are many instances where suitable cycling infrastructure is lacking or inadequate. Such instances include:

 Bayswater Station PSP- The deviation from the Midland line PSP into the car park should include way-finding assistance through linemarking, indicating the direction which cyclists should take. Bicycle symbols will help improve way-finding to reduce the likelihood of cyclists missing the link for the continuation of the PSP and to promote appropriate cycling behaviour while in the mixed-traffic car park zone.



Figure 5-7 Termination of PSP at Bayswater Station

- 2. Coode Street Cycle Lane- Cycle lane signage terminates at the Haddrill Street intersection. The transitions at each of the Coode Street cycle lanes can be improved by installing signage from Walter Road West to the King William Street convergence to establish continuity.
- 3. Collier Road- There is currently inadequate cycling infrastructure along this road, particularly for a link to Broun Avenue and through the Bayswater Industrial Precinct to Ashfield. Progressive widening of this road to construct cycle lanes in both directions is recommended.
- 4. Katanning Street to Ashfield Parade- The discontinuation of the shared path along the foreshore is a key discrepancy along this route. To rectify this, the pathway should be adjoined to improve connectivity.

Figure 5-8 Katanning Street Configuration



5. Walter Road West- There is an opportunity for Walter Road West to connect from Tonkin Highway towards Morley City Centre. At present, there is no cycling infrastructure along this route.

5.5 Crash Analysis

5.5.1 Crash Data

Safety is a very important factor in building a successful Bike Plan. The availability and quality of existing cycle facilities is a good way of determining the level of safety and performance within an area. Main Roads Western Australia (MRWA) crash data was utilised to identify the level of safety for the existing facilities within the City of Bayswater.

Over the past five year period from 1 January 2009 to 31 December 2013, a total of approximately 6000 crashes have occurred within the City of Bayswater, with 1.42% of them involving cyclists. The number and severity of crashes involving cyclists per year is shown in **Figure 5-9**.





In summary:

- > A total of 94 crashes involved bicycles;
- > 52.1% resulted in major and minor property damage;
- > 29.8% resulted in medical treatment; and
- > 18.1% resulted in hospital treatment.

It is worth noting that almost half of the total bicycle crashes resulted in medical and hospital treatments. As the crash data only contains records of reported crashes, it is very likely that crashes that involve only minor property damage would be unreported. The number of crashes over the sample period has fluctuated, however the general trend has been a reduction in the number of cycling accidents.

There are a number of different explanations for this decline. For example:

- > Cycling or driving could have decreased
- > Cycling or driving behaviour may have improved
- > Improvements in infrastructure have improved safety of existing routes
- > Improvements in infrastructure have relocated cyclists to alternative, safer routes

There is insufficient data to suggest a particular cause of the decline shown, but it is likely to be a combination of factors. Cycling across Perth has increased over this period and driving rates are down, while infrastructure provision including PSP construction has improved the quality and safety of the cycling environment.

5.5.2 Crash Locations

According to crash data provided by MRWA, more than 56% of bicycle crashes occurred at intersections, with 59% of the intersection crashes occurring at T-junctions. The location of these crashes is listed in **Table 5-1**, though it is noted that some of the cycling accidents are not geo-referenced. The highest numbers of crashes occurred along Walter Road West and Beechboro Road, though the number of crashes is not statistically significant.

This location mapping highlights the fact that cyclists are using routes to commute irrespective of the high traffic volumes and an increased probability of conflict. There is a particular risk along these corridors, particularly at intersections where cyclists have limited priority.

Notable statistics include:

- > 71.4% of all bicycle crashes occurred during the day time
- > 21.9% of the crashes happened at night time
- > 93.6% of these crashes occurred in dry conditions
- > 4.3% of these crashes occurred in wet conditions

Crash Location	Number of crashes	Crash Location	Number of crashes
Walter Rd West	5	Ninth Av	1
Beechboro Rd South	3	Bottlerush Rd	1
Beechboro Rd North	3	Caledonian Av	1
Railway Pde	3	East St	1
Wellington Rd	3	Maxwell Ave	1
Guildford Rd	2	Seventh Av	1
Walter Rd East	2	Benara Rd	1
Grand Prom	2	Broun Av	1
McGilvray Av	2	Ewell St	1
Drake St	2	Kathleen Ave	1
Beaufort St	1	Kenmure Av	1
Collier Rd	1	Morley Rd	1
Whatley Cr	1	Peninsula Rd	1
Wolseley Rd	1	Widgee Rd	1
Camboon Rd	1		

Table 5-1 Bicycle crash location listed by level of occurrence

When assessing locations that result in high incidences of crashes, the causes of the crashes must first be identified before any engineering treatments can be implemented. A step by step process for identifying causes is provided in *Austroads Guide to Road Safety: Part 8 - Treatment of Crash Locations*. The document also provides information on the factors that contribute towards a safe riding environment, as well as the facets that influence the risk of a serious injury resulting from a motor accident. The following information in relation to speed is pertinent in assessing crash locations:

- > Speed in urban areas greater than 5km/h above average doubles the risk of an injury crash.
- > Reductions as little as 1 to 2% in average speed result in substantially greater reductions in fatalities and serious injuries.
- > Chances of surviving a crash decrease markedly above certain speeds, depending on the type of crash i.e.:
 - > pedestrian struck by vehicle: 20 to 30 km/h
 - > motorcyclist struck by vehicle (or falling off): 20 to 30km/h
 - > side impact vehicle striking a pole or tree: 30 to 40km/h
 - > side impact vehicle to vehicle crash: 50km/h
 - > head-on vehicle to vehicle (equal mass) crash: 70km/h

Source: Australian Transport Council (2006)

It should be noted that the majority of cycling crashes are not vehicle-bicycle crashes, but are instead a result of a variety of other factors. Surveys conducted internationally suggest that the most common sources of injury for cyclists are:

- 1. Car crash: 29%
- 2. Falling from bicycle: 17%
- 3. Poor path quality: 13%
- 4. Rider error: 13%
- 5. Collision with stationary object: 7%
- 6. Crash while avoiding an animal: 4%

These statistics show that while interactions between vehicles and cyclists is important, other factors including infrastructure quality and education are also important when considering how to reduce the risks of cycling.

5.6 School Analysis

An analysis of the cycling facilities surrounding and within schools has been conducted as students cycling to and from school require facilities of a high standard and safety. School students are, generally speaking, not as experienced with cycling compared to adult cyclists, although the level of confidence gradually increases as children become older and more capable of cycling independently. Based on the survey results outlined in **Section 4.2**, a high number of school students own a bicycle (91%) and almost one third (30%) cycle most days. While it is recognised that these survey results do not account for bicycle ownership and cycling frequency within the entirety of the City, they do, however, provide an indication of the popularity of cycling among school students. Therefore, there is potential for more school students to start cycling to school on a regular basis.

This analysis is comprised of two components, covering an analysis of the surrounding infrastructure pertaining to cycling as well as identifying the cycling facilities located within the schools themselves.

5.6.1 <u>Surrounding infrastructure</u>

This section looks into the availability, accessibility and condition of pedestrian walkways for 16 schools within the City. The study zone for each school is strictly limited to a circular area, centered at the target school, with a radius of 300m.

The surrounding land usage for each school is characterised as residential, commercial or recreational. The footpaths or walkways along the roads proximal to the selected school are checked for availability. Path widths have also been noted, although the majority of paths are mandated to a similar width by the City. Additionally, the accessibility of the pedestrian walkways leading to nearby bus stops is analysed. Following this, intersection facilities such as grade-separated / on-grade crossing and pedestrian crossing (zebra) have been documented.

Lastly, the condition of pedestrian paths is rated according to the following criteria:

- > Good: Readily available with high accessibility. Surface condition is optimum.
- > Moderate: Acceptable provision with good accessibility. Surface condition is satisfactory.
- > Poor: Poor availability with low connectivity. Surface condition is unfavourable.

Figure 5-10 Bayswater Primary School



- > Surrounded by residential area.
- > No separated bicycle paths.
- > No visible pedestrian crossings in the vicinity.
- > Bayswater train station is 300m north-east, accessible by pedestrian walkway.
- > Available pedestrian walkway to nearby bus stop on King William St (Route 48, 99).
- > Leake Street is recognised as one of the safer streets in the area due to its low traffic volumes in comparison with King William Street.
- > Overall condition of paths: Good

Camboon Primary School Benar 300.00 m Pedestrian access ,743.34 m² to bus stop on Camboon Road Pedestrian walkway consists (Route 65) of council paving. No visible pedestrian crossing. No seperated bicycle tracks.

Figure 5-11 Camboon Primary School

- > Surrounded by residential area.
- > No separated bicycle paths.
- > No visible pedestrian crossings in the area.
- > Available pedestrian walkway to bus stop on Camboon Road (Route 65).
- > The pathway from Benara Road to Forder Road provides a high level of safety for students travelling from a northerly direction.
- > Overall condition of paths: Good



Figure 5-12 Chisholm Catholic College

- > Surrounded by residential area.
- > No separated bicycle paths.
- > No visible pedestrian crossings in the area.
- > Available pick up/drop off buffer lane for bus stop along Beaufort Street (Route 67, 950).
- > Available pedestrian access to bus stop on Coode Street (Route 98, 99).
- > Overall condition of paths: Good



Figure 5-13 Durham Road School

- > Surrounded by residential and commercial area.
- > No separated bicycle paths.
- > No visible pedestrian crossings in the area.
- > No bus routes available in the region.
- > Overall condition of paths: Good



Figure 5-14 Embleton Primary School

- > Surrounded by residential area.
- > Absence of pedestrian walkway along Wade Street and Towning Street.
- > No separated bicycle paths.
- > No visible pedestrian crossings in the area.
- > Overall condition of paths: Moderate



Figure 5-15 Hampton Park Primary School

- > Surrounded by residential area and alongside Tonkin Highway.
- > No separated bicycle lanes.
- > No visible pedestrian crossings in the area.
- > Grade-separated pedestrian footpath under Tonkin Highway, with a raising crossing following onto Alfred Avenue.
- > Available pedestrian walkway access to bus stop along Morley Drive (Route 52, 343).
- > Overall condition of paths: Good



Figure 5-16 Hampton Senior High School

- > Surrounded by residential area.
- > No separated bicycle lanes.
- > No visible pedestrian crossings in the vicinity.
- > Available pedestrian walkway access to bus stop along Beechboro Road North (Route 345).
- > Peterborough Crescent has no pathway and a section of pathway terminates towards the southern end of Maidstone Way. This is a significant impediment to school students cycling, particularly those travelling from a south-easterly direction.
- > Overall condition of paths: Good



Figure 5-17 Hillcrest Primary School

- > Surrounded by residential area.
- > No visible pedestrian crossings in the area.
- > Available access pedestrian walkway to bus stop along Coode Street (Route 98, 99).
- > Bike lanes along Coode Street terminate north of Haddrill Street.
- > Drake Street access provides a safe route to the school grounds, with a designated path leading into the car park.
- > Overall condition of paths: Good



Figure 5-18 John Forrest Secondary College

- > Surrounded by residential and commercial area.
- > The Broun Avenue (5 way) McGregor Street intersection is unsignalised with on grade crossing.
- > No separated bicycle lanes or visible pedestrian crossings.
- > Available pedestrian footpath access to bus stops along Drake Street (Route 68, 342), Broun Avenue (Route 342, 950) and Russell Street (Route 345, 611...).
- > Catherine Street provides a relatively safe route for those travelling from the west; however the width of the path along this road is insufficiently wide in certain sections.
- > There is a public right of way from Coode Street to Drake Way which provides a path with a higher width than standard pathways in the area, yet the lack of a pathway along Drake Way does not complement this facility. Although, given the level of traffic on this road, it is currently suitable for on-street riding. High school students, in particular, are generally more experienced cyclists than primary school students, and therefore would be more capable of on-street riding along a quiet street.
- > Overall condition of paths: Moderate



Figure 5-19 Maylands Peninsula Primary School

- > Surrounded by residential area.
- > No separated bicycle lanes.
- > Access to Maylands Peninsula Primary School (MPPS) is currently afforded via Kelvin Street; however, the existing path infrastructure is of generally poor quality and is not considered to be of a suitable standard for school students.
- > Pedestrian crossing in front of school entrance along Kelvin Street, with a raised crossing further south.
- > Available pedestrian walkway access to bus stop along Caledonian Avenue (Route 41).
- > Overall condition of paths: Moderate





- > Surrounded by residential area.
- > No separated bicycle lanes.
- > No visible pedestrian crossings around the area.
- > Footpath available connecting to bus stops along Wellington Road (Route 17, 20, 371).
- > Public right of way from Halvorson Road to Vera Street provides safety to cyclists. However, west of Halvorson Road and along Steven Street there is no pathway.
- > Overall condition of paths: Good



Figure 5-21 Morley Senior High School

- > Surrounded by residential area.
- > Absence of pedestrian walkway along most roads in the adjacent residential area.
- > No separated bicycle lanes.
- > No visible pedestrian crossings in the area.
- > There is a pathway located east of the school boundary which spans from Bramwell Road to Widgee Road. Also, an expansive public right of way with a footpath traversing from Bunya Street into the school boundary provides a high degree of safety for those travelling from a westerly direction.
- > Bus stop conveniently situated in front of school, along Widgee Road with slip lane (Route 65).
- > Overall condition of paths: Moderate





- > Surrounded by residential area.
- > No separated bicycle lanes.
- > No visible pedestrian crossings in the area.
- > Available pedestrian pathway access to bus stops along Benara Road (Route 58) and Crimea Street (Route 344).
- > There is a separated pathway from Deschamp Road heading in a northerly direction towards the school boundary, thereby improving the level of safety for cyclists.
- > Overall condition of paths: Good



Figure 5-23 Saint Columba's Primary School

- > Surrounded by residential area.
- > No separated bicycle lanes.
- > No visible pedestrian crossing in the area.
- > No bus services in the vicinity.
- > A public right of way from Leake Street to Roberts Street provides a high degree of safety for cyclists.
- > Overall condition of paths: Good

Figure 5-24 St. Peter's Primary School



- > Surrounded by residential area.
- > No separated bicycle lanes.
- > No visible pedestrian crossing in the vicinity.
- > Available bus stop outside of school along Wood Street (Route 16).
- > Overall condition of paths: Good

Weld Square Primary School Pedestrian walkway consists of council paving. No visible pedestrian crossing. No separated bicycle tracks. Radius: 300.00 m rea: 282,743.34 m² No pedestrian walkway

Figure 5-25 Weld Square Primary School

- > Surrounded by residential area.
- > Absence of pedestrian footpath along Weld Square West.
- > No separated bicycle lanes.
- > No visible pedestrian crossing in the area.
- > No bus services in the region.
- > Overall condition of paths: Good

5.6.2 School Cycling Facilities

The cycling facilities of the various schools in the City were determined through consultation. Information collected included the presence of bike racks, the number of bikes that the racks could hold, as well as if the racks were secured (bike locker).

For future funding of pathway implementation and upgrades, the following facilities in **Table 5-2** should be considered. Schools with facilities at an unsuitable standard may receive funding for improvements through the Department of Transport's Connecting Schools Grant Program. All schools appear to be eligible for additional cycle parking, based on the general guidance from Austroads.

School	Bike Racks	Number of bikes capable of being stored (approximate)	Secured
Bayswater Primary School	Yes	30	No
Camboon Primary School	Yes	24	No
Chisholm Catholic College	Yes	unknown	No
Durham Road School	Yes	unknown	No
Embleton Primary School	Yes	unknown	No
Hampton Park Primary School	Yes	unknown	No
Hampton Senior High School	Yes	unknown	Yes
Hillcrest Primary School	Yes	24	No
John Forrest Secondary College	Yes	36	No
Maylands Peninsula Primary School	Yes	36	No
Morley Primary School	Yes	12	No
Morley Senior High School	Yes	60	Yes
Noranda Primary School	Yes	48	Yes
Saint Columba's Primary School	Yes	24	No
Saint Peter's Primary School	Yes	40	No
Weld Square Primary School	Yes	24	No

Table 5-2	Cycling Facilities at Schools in Bayswater

6 Network Analysis

6.1 Precinct Designation

For the purposes of this report, the City of Bayswater has been divided into eight individual precincts to classify proposed works based on their location, as shown in **Figure 6-1**. This allows projects within a suitable distance, to be carried out in conjunction with other proposals, enabling a more holistic 'suite' of works to be completed, rather than carrying out separate works incrementally.

Figure 6-1 Precincts within the City of Bayswater



The network analysis outlines the deficiencies identified in the network and proposes works to improve the cycling experience in the City. The analysis is composed of on-street and off-street corridors, with both sections covering the eight precincts outlined in **Figure 6-1**.

Each proposed improvement also has a priority designated from 1-8, with 1 being high priority and 8 being low priority. While projects with a priority of 1 are deemed to be important to the network or representing 'quick wins', lower priority projects are envisioned as long term strategic works, and will likely form crucial linkages in the cycling network in the future. These priorities correspond to the schedule of works priorities, and the number listed in the schedule is also provided in order to refer to anticipated cost and funding. The number and priority is displayed as follows - (Number:Priority).

6.2 On-Street Corridors

6.2.1 Precinct 1

6.2.1.1 East Street and Eighth Avenue (68:6)

East Street has an east-west alignment and provides residents access to Eighth Avenue, where the majority of services are situated, as well as a direct link to Maylands Station. The report recommends providing a shared path on East Street in Maylands from the RSP to the intersection of East Street and Eighth Avenue (see **Figure 6-2**).

Figure 6-2 Proposed projects on East Street and Eighth Avenue in Maylands



A shared path is not proposed along Eighth Avenue from Guildford Road to Whatley Crescent due to space constraints and the conflict between cyclists and pedestrians within the activated 'main street' precinct. However, a bicycle boulevard treatment should be applied to this section with 'share the road signs' erected to encourage motorists to share the road with cyclists. The posted speed limit is currently 40km/h, with traffic speeds generally less than this limit. It is considered worthwhile to lower the speed limit to 30km/h in order to increase the safety of cyclists and pedestrians in the area, in a similar way to the works along several main streets throughout Perth (including Oxford Street in Leederville and the Fremantle CBD on South Terrace between Market Street and Norfolk Street).

The proposed shared path links to the existing RSP on the Swan River provides residents a more direct route to the Station. This addition of the shared path caters to commuters who choose to cycle to the station and use the PTA's lock 'n' ride shelters and then continue their commute into Perth or Midland.

East Street has a steep incline which may not be favoured by some cyclists, although due to the winding road layout of Maylands, there are few suitable alternatives. This project is an important link in Maylands and will provide cyclists with access to the main street precinct and access to the station.

Main Roads WA is currently rebuilding the Seventh Avenue Bridge and completion is expected in early 2015. As most of the local activity destinations and the Maylands Station are accessed via Eighth Avenue it is recommended that cyclists utilise the mixed traffic environment on Eighth Avenue to cycle to the station.

For destinations beyond the train line, it is recommended that cyclists use the rebuilt Seventh Avenue Bridge. Prior to reconstruction, the underpass at Maylands Station is still the better option to cross over to Railway Parade.

6.2.1.2 Central Avenue (43:4)

Central Avenue provides a direct link to key locations such as ECU, WAAPA and Mount Lawley Senior High School and it should be recognised as a strategic route with the implementation of cycling infrastructure. The current provision of dual-use paths along this road is not adequate to meet the demands of the cyclist user group. The paths run particularly close to the setback walls on property fronts which presents a risk to those cycling in certain sections. Rather than having high-speed cyclists use these paths while attempting to negotiate pedestrians, it is proposed that cycle lanes be installed on both sides of the roads from Railway Parade to the municipal boundary along Carrington Street. The proposed cycle lanes would be a minimum of 1.5m in width and the current road width on Central Avenue is deemed to be relatively accommodating to the implementation of such bike lanes.

6.2.1.3 Riverside RSP (1:1)

The Riverside RSP is a major route for cyclists with both recreational and commuter riders using this facility on a consistent basis. As such, the maintenance and improvement of this route is essential to retain and enhance connectivity within the LGA. The Maylands Peninsula circuit of the RSP is an enjoyable and scenic route for recreation cyclists; however, it is a relatively lengthy and time-consuming detour for commuting cyclists. To reduce the journey length among commuting cyclists to navigate this peninsula, it is recommended that bicycle symbols and directional signage be installed along a convenient parallel route to bypass the RSP. This proposed route would travel through Fogerthorpe Crescent and Richard Street (see **Figure 6-3**). A refuge island should be included as part of the 'quiet street' improvements to provide an alternative crossing for cyclists not sufficiently confident to cross Peninsula Road in one stage. The directional signage along the alternative Swan Bank Road through to Peninsula Road and Wall Street route should be removed to guide cyclists along the more direct route through Fogerthorpe Crescent and Richard Street.
Figure 6-3 Richard Street Bypass



6.2.1.4 Caledonian Avenue (23:3)

This road provides an important connection from the RSP to Guildford Road and through to the Midland-line PSP. This route is generally adequate for cycling in mixed traffic notwithstanding the right angle bends and poor path condition at the Guildford Road crossing. The northern approach to this crossing should be realigned to provide a direct connection across the road and bicycle symbols installed along the full length of the route to assist with way-finding and driver behaviour.

6.2.1.5 Guildford Road (57:6)

Guildford Road has consistently high traffic volumes coupled with the narrow paths along this road. This has the potential to deter cyclists from using this route on a frequent basis. However, as Guildford Road acts as a barrier between the Midland-line PSP and Riverside RSP, changes to intersections are recommended to facilitate movement in a north-south direction across Guildford Road, as well as along it. To enable this, cycle lanterns are recommended for the King William Street and Garratt Road (shown in **Figure 6-4**) intersections, with the Garratt Road intersection improvements also encompassing the installation of kerb ramps and upgrades to traffic islands. The western approach to the Tonkin Highway intersection should also be realigned to eliminate the right angle bend.



Figure 6-4 Guildford Road/Garratt Road Intersection

- 6.2.2 Precinct 2
- 6.2.2.1 Leake Street

6.2.2.2 (58:6)

Similarly to Caledonian Avenue, Leake Street provides access from the two major shared paths in the City. The route is fragmented near Bayswater Primary School, as shown in **Figure 6-5**, and there is an opportunity to improve connectivity along this segment.

Figure 6-5 Leake Street Missing Link



A link is proposed between the two disconnected sections of Leake Street in the form of a shared path in the centre of the carriageway. Throughout the length of the street, on-street infrastructure in the form of a bicycle boulevard is recommended to support the significance of this route and its connection to the Midland Train Line PSP.

Bicycle boulevards, or greenways (described in **Section 3.3**) are low-volume, low-speed streets that have been optimised for bicycle travel through traffic calming installations, and by improving way-finding through

the implementation of cycling symbols. However, to attract cyclists, the boulevard must first and foremost offer utility, as Leake Street does.

Following on from Leake Street in a northerly direction, Lawrence Street would also be a suitable street for the continuation of a bicycle boulevard. Upon Hester Street, the boulevard would use May Street as a bypass to navigate around Chisholm Catholic College. The route would continue along Lawrence Street, eventually terminating at Walter Road West.

6.2.2.3 Railway Parade (34:4)

Railway Parade is a critical distributor route along the northern side of the rail lines, connecting the north and south routes with the rail crossing and PSP access points. Cyclists currently using this route have minimal cycling infrastructure to allow for a safe and comfortable ride. Accordingly, cycle lanes are recommended between Third Avenue and Grand Promenade to a minimum width of 1.5m. Cycle Lanes will encourage commuter cyclists to access this route, particularly for those using the PSP.

An improvement to the Railway Parade and Hotham Street intersection is also recommended, as shown in **Figure 6-6**. A potential approach would include the construction of an entry point for westbound cyclists from Railway Parade to reach the westbound lane, as well as a kerb ramp to allow eastbound cyclists to connect to the existing path. It is understood that bollards may be required to restrain other vehicles from using this path. In addition, vegetation through this thoroughfare should be maintained to ensure that cyclists have sufficient visibility when travelling through this segment of path.



Figure 6-6 Hotham Street and Railway Road Crossing

6.2.2.4 Coode Street/King William Street (26:3)

This route allows for a linkage from the riverside RSP, passing Bayswater Station and the Midland-line PSP, through to Walter Road and ultimately Morley Drive. It is considered to be a route of high strategic importance and enhancements to the existing facilities are recommended to ensure that cyclists are comfortable using this route. The current cycle lanes from Haddrill Street to the Railway Parade are at a reasonable standard of quality, with some minor pinch-points along the road (as shown in **Figure 6-7**).



Figure 6-7 Existing Coode Street cycling environment

Improvement works include extension of the existing cycle lanes to improve continuity for cyclists, from Haddrill Street to Walter Road West. The kerbside lanes would be converted in to buffered cycle lanes, with coloured asphalt used for the resurfacing. Buffered cycle lanes involve a barrier or some form of protection for cyclists from the road, with extra distance from the road often forming part of this protection. The southbound cycle lane alongside Hillcrest Park parking area could be widened to install a 'green lane' treatment, thus improving the appeal of the journey to cyclists. It is understood that this treatment involves a theoretical reduction in capacity for Coode Street. However, the transition from a 2-lane to a 1-lane form to the south of the proposed cycle lane extension suggests that this should not have a significant impact on traffic. An impact assessment is recommended to identify and mitigate any issues arising from these proposed works.

The current configuration at the Bayswater subway crossing is hazardous to cyclists due to the minimal width at this pinch point combined with poor sight lines to oncoming cyclists. The subway is a critical crossing point in a highly trafficked part of the network and is a critical part of the network requiring long-term consideration. It is understood that the PTA are investigating the possibility of improvements to the subway as part of the Bayswater Train Station works. At this time it is recommended that the subway be widened to provide 2.5-3m shared paths on both sides alongside cycle lanes in both directions. Cycle lanterns should also be installed at the Whatley Crescent and King William Street signalised intersections.

The existing configuration of King William Street, between Guildford Road and Hill Street, is considered suitable for the installation of cycle lanes in both directions. North of Hill Street the pavement width is not considered sufficient to permit this treatment, and it is recommended that bicycle symbols be painted in the centre of the lane through to Whatley Crescent. This area generally consists of shop-front retail and other activated pedestrian-scale land uses which benefit from slow-speed traffic and could support mixed traffic cycling. In the quiet-street section of King William Street, on the south side of Guildford Road, mixed traffic cycling is also recommended to provide a connection through to the RSP, via the bird sanctuary.

A summary of these works is shown in **Figure 6-8**.



Figure 6-8 King William Street Works

6.2.3 Precinct 3

6.2.3.1 Beechboro Road South (38:4)

This road provides a link from Railway Parade through to Collier Road and ultimately to Beechboro. With the anticipated increase and diversification of activity in the Bayswater Industrial Precinct and in Ashfield beyond, access to this location is likely to become pivotal in the coming years. The current cycle lane infrastructure on Railway Parade and Beechboro Road South is not currently of sufficient width (as shown in **Figure 6-9**), and it is proposed that the cycle lanes be widened to a minimum of 1.5m alongside the southbound traffic lane.



Figure 6-9 Existing on-road bicycle lane on Beechboro Road South

Bicycle symbols should be marked in the centre of the northbound traffic lane from Coode Street to the beginning of the cycle lane at Foyle Road, as shown in **Figure 6-10**. In order to achieve safe over taking of cyclists, the section of median strip between Coode Street and Rose Avenue would be removed to allow cars to safely pass on-road cyclists. However, this treatment would have a potentially significant effect on pedestrian safety. It is recommended a specific review of the impacts on pedestrians, and any potential mitigation measures be investigated prior to the modification of the existing median treatment.

Figure 6-10 Railway Parade and Beechboro Road South works



6.2.4 Precinct 4

6.2.4.1 Russell Street (44:4)

Bisecting the Morley Centre City, Russell Street provides access to the Morley Bus Station and passes by a myriad of retail stores, restaurants and offices. The current provision of paths along this street is generally poor and should be rectified through the construction of on-street cycling infrastructure in both directions. Accessibility for cyclists would be substantially improved through such an upgrade as the area is currently dominated by car usage.

This treatment may ultimately form part of bus lane works described through the Morley City Centre Structure Plan. It is expected that the gradual change in land uses associated with Activity Centre growth will create the nexus for improvements along Russell Street.

6.2.4.2 Rudloc Road (16:2)

Rudloc Road affords a linkage from Coode Street through to Russell Street and ultimately to the Morley City Centre (see **Figure 6-11**). The existing form of Rudloc Road is a wide, 2-lane road with a central median along a portion of its length. To facilitate a smooth transition from the proposed Coode Street cycle lanes previously mentioned in **Section 6.2.2.4**, and to enable safe access to the City Centre, it is recommended that 1.5m cycle lanes be installed in both directions, within the existing pavement.

This treatment will generally require only line-marking within the existing wide lanes. However, the approach works to the Russell Street intersection will require additional consideration to ensure safe operation within a restricted roadway width.

Figure 6-11 Rudloc Road



6.2.4.3 Catherine Street (73:7)

Catherine Street is a key link from Bedford and Inglewood into the Morley Activity Centre, avoiding Beaufort Street and Walter Road, as well as serving John Forrest Secondary College. Catherine Street has many sections where cyclists are segregated from the main traffic flow through the use of pedestrian and cycling public rights-of-way. Due to the relatively safe riding environment that Catherine Street currently affords, it is proposed that any treatments made build upon the existing infrastructure.

A bicycle boulevard treatment along Catherine Street is suggested to create an attractive and relaxing riding environment for cyclists of all confidence levels. The route chosen would continue onto Clifton Crescent in the City of Stirling, creating a continuous link between Morley and Mount Lawley.

Figure 6-12 Catherine Street Right of Way



6.2.4.4 Drake Street (72:7)

Drake Street does not currently carry significant traffic volumes as it runs parallel to Coode Street and generally provides only local access to schools, parks, residential and recreational uses. This corridor has been recommended as a key long term route serving Morley and Bayswater through the Morley City Centre Structure Plan, eventually superseding Coode Street.

The land uses accessed from this street suggest the implementation of a treatment to the road environment that caters for cyclists with varying levels of experience. To cater for the expected demand a bicycle boulevard treatment is recommended from Railway Parade to Walter Road. This entails the provision of uphill cycle lanes on steep sections, selected road closures, improved crossing facilities at Broun Avenue and Walter Road and a connection via View Street across Morley Drive into Camboon Road.

It should be noted that these proposed treatments are not location specific and they should be implemented at the discretion of the City in circumstances where it is deemed appropriate.

The requirements for a bicycle boulevard on Drake Street will be determined as the Morley City Centre grows and an increased residential and retail density emerges. It is not recommended that works to modify the existing street environment be implemented immediately, but that this route should form an integral part of the future planning of the Morley City Centre growth plan.

6.2.5 <u>Precinct 5</u>

6.2.5.1 Bath Road/Emberson Road (79:7)

These two roads connect Broun Avenue intersecting Morley Drive through to Benara Road, passing by recreational facilities and businesses. Currently, the paths along Bath and Emberson Road are narrow and of a poor quality as shown in **Figure 6-13**.

Figure 6-13 Poor quality path along Bath Road



As Bath Road is a primary link into Morley for the area east of Crimea Street, it is proposed that cycle lanes be installed from Morley Drive to Walter Road West along this road. Additional works include:

- > Cycle lanes marked on existing pavements, and alterations to median islands and slow point bypasses provided in appropriate circumstances.
- > Improved delineation at the junction with Walter Road West, with a crossing facility into Bath Road south.
- > Emberson Road to connect through to Bath Road via the crossing infrastructure outlined in Section 6.3.7.1.

6.2.6 Precinct 6

6.2.6.1 Camboon Road (65:6)

Camboon Road caters for a high volume of traffic, providing an efficient link between Benara Road and Morley Drive. The path running on the western side of this road is not considered suitable for shared use, and cyclists would generally be more inclined to cycle on-road due to conflicts with pedestrians on the narrow footpath.

To mitigate this situation, cycle lanes should be installed between Morley Drive and Reid Highway. The following works are recommended along Camboon Road:

- > Remove the existing line-marking north of Widgee Road and replace with 1.5m cycle lanes
- > Widen the carriageway to provide 1.5m cycle lanes from Widgee Road to Morley Drive, including on the immediate approach to the Morley Drive intersection
- > Install appropriate merge treatments at roundabouts (see Figure 3-3)

6.2.6.2 Wellington Road (11:1)

This route from Morley Drive into Walter Road West receives substantial traffic due to a range of adjacent facilities, including the YMCA Morley Sport and Recreation Centre, as well as providing access to Morley City Centre. The existing path along this street is of a reasonable standard and it is recognised that there is little room to cater for on-street cycling lanes (see **Figure 6-14**).

Due to these constraints, bicycle symbols are recommended, especially at pinch points, to direct cyclists and to inform car users that cyclists may use the road. The existing off-street path should also be widened to a

minimum of 2.5m from Morley Drive to Smith Street. It must be noted that this may involve extending the path to the verge of the road in some sections.

These changes will improve access to key attractors in the Morley City Centre (Centro Galleria and Coventry Markets).

Figure 6-14 Existing road form of Wellington Road



6.2.7 <u>Precinct 7</u>

6.2.7.1 McGilvray Avenue (50:5)

Serving a similar purpose to Emberson Road, McGilvray Avenue links Benara Road to Morley Drive, albeit terminating at Morley Drive rather than continuing through to Walter Road West. However, access to Walter Road West is provided via Ballarat Road, Halvorson Road and Wellington Road. At present, this route to Walter Road West is not defined, and cyclists generally choose Morley Drive to access Wellington Street.

To establish the alternate quiet-streets route, pedestrian and bicycle symbols should be installed to guide southbound cyclists travelling from McGilvray Avenue into Ballarat Street. Bicycle symbols would continue on along Ballarat Street and Halvorson Road west to Wellington Road.

Cycling infrastructure along McGilvray Avenue is already at a relatively high standard, offering both cycle lanes and an off-street path. The standard of the cycle lanes can be further improved by introducing a southbound green lane treatment from Benara Road to the stop sign at Morley Drive and adjacent to the seagull island for the right turn. Green lane treatments highlight the presence of a bicycle lane and improve the visibility of a bicycle operating space to reduce the potential conflict between bicycles and other vehicles.

Currently, the cycle lane ends at Widgee Road. As part of this Bike Plan, the following works are proposed:

- Install pavement markings to indicate that cyclists will be 'claiming the lane' on the southern approach to the roundabout at the McGilvray Avenue and Widgee Road intersection (shown in Figure 6-15)
- > Install a transition path connection from the northern departure leg of roundabout to the shared path
- > Provide a transition degree path connection for southbound cyclists from the shared path to the southbound lane
- > Mark bicycle symbols through the roundabout until the start of the cycle lane



Figure 6-15 McGilvray Avenue/Widgee Road Intersection

6.2.8 Precinct 8

No specific on-street treatments are recommended for Precinct 8.

6.3 Off-Street Infrastructure

School students are an important user group as they represent a long-term investment in sustainable transport demand. However, they are the most vulnerable of all road users and therefore require well maintained and easily accessible routes with a minimum of (safe) traffic crossings to sustain consistent use. Safety is the most important determining factor to influence parents to allow their children to ride to school.

6.3.1 Precinct 1

6.3.1.1 Maylands Peninsula Primary School (MPPS) (83:8)

Encroaching vegetation along Kelvin Street needs to be cleared as it obstructs visibility and sightlines at numerous sections along the pathway. A shared path on Mephan Street is proposed to facilitate use of Kelvin Street and connections through to MPPS. This shared path would continue along Mephan Street from the Kelvin Street to Ferguson Street.

Application for the DoT's Connecting Schools Grant Program would be appropriate as these changes aim to improve bicycle access for students and encourage them to cycle to school.

6.3.1.2 Guildford Road South (69:6)

The environment along Guildford Road is a section of pathway that is considered generally insufficient to support cycling. Cycling to and from intersections to various destinations, such as the respective town centres, should be as accessible and convenient as possible. The accessibility and safety of such routes determines the willingness of people to cycle along Guildford Road.

Therefore, it is proposed that the pathways be upgraded from Darby Road to Riverslea Avenue along the southern section of Guildford Road. This would improve the connectivity for those travelling in a northerly direction from Eighth Avenue, Peninsula Road and Caledonian Avenue.

6.3.2 <u>Precinct 2</u>

6.3.2.1 Riverside RSP (21:2, 12:2, 2:1)

There are a few segments along the path that require remedial works to improve the use and function of the Riverside RSP, particularly with respect to improvements in wayfinding and continuity. The Riverside Garden section of the path from Garratt Road Bridge to Tonkin Highway currently creates conflict between pedestrians, dog walkers and cyclists. It is recommended that the existing path crossing at the Milne Street intersection be realigned, with a raised crossing indicating cyclist priority, as shown in **Figure 6-16**. Both approaches to the bridge should be resurfaced in an asphalt material to delineate the main route.

Figure 6-16 Milne Street Intersection Works



The segment of path to the east of Tonkin Highway currently terminates at Katanning Street. In order to improve continuity, the shared path should be extended along the foreshore to enable a connection to Ashfield Parade. Alterations to the car park adjacent to Claughton Reserve and Tonkin Highway are also recommended in order to allow for a smoother transition of the RSP through to Ashfield Parade.

There are significant conflicts within the Eric Singleton Bird Sanctuary and Bayswater Riverside Gardens. The following provides a graphical representation of the recommended works in this location.





These recommended works leverage the existing infrastructure, but provides alternative, dedicated routes for cyclists which predominantly use on-road infrastructure, shared with slow-speed vehicles.

Only the path sections adjacent to the Milne Street car park, across the drain bridge and at the end of Leake Street are shared between pedestrians and cyclists. These shared zones should be clearly labelled with signage and linemarking and differentiated by pavement surface.

To achieve separation between cyclists and pedestrians, a short section of segregated cycle path is proposed at the southern end of Bayswater Riverside Gardens. The need for this section of path should be determined by the Council based on the prevalence of interaction in this location.

It is acknowledged that a strong desireline remains from the drain bridge to Leake Street via the existing pedestrian path. This location is generally not conducive to a segregated cycle path, as it bisects the two park areas and is likely to have poor compliance from dogs and pedestrians.

Pedestrian paths as shown in the diagram above are not assumed to be used solely by pedestrians. That is, they are not designed to completely exclude cyclists. Instead, they support only slow-speed cycling which can safely interact with pedestrians (e.g. families, recreational riding etc.). Pedestrian paths should be differentiated from cycling paths through signage and colouration, and potentially through surface applications that introduce a texture or roughness that discourages speed (similar to the effect of compacted limestone). In contrast, cycle paths should be constructed in smooth asphalt, with optimum transition to the on-road alignment and high quality legibility through wayfinding signage, linemarking and other means.

Additional realignments and installations to the path include:

> The section of path from Johnson Road to Tranby House realignment as shown in Figure 6-18 as well as a raised crossing and widening of a consistent 3.0m width.

Widen path Widen path Shared zone Shared zone Browe path and Remove path and Browe path and

Figure 6-18 Tranby House Works

- > The car park at Bath Street and alongside Swan View Terrace is bisected by the RSP, and there is a need to realign the pathway to improve wayfinding. Access to and across the car park should be provided along Wall Street and Swan View Terrace, with the existing right-angled bend removed. The 'End Shared Path' sign should also be removed to make it clear to riders that the RSP does not terminate at this particular point.
- > The intersection at Swan Bank Road and Mary Street can be improved by installing direction signage and linemarking to clarify the route of the RPS.

6.3.2.2 Perth to Midland PSP (14:2)

This particular path is an arterial route for the City of Bayswater. It is generally of a uniform high quality and provides a comfortable ride for a variety of users, and particularly commuters. There are, however, some inconsistencies along the path that require remediation to improve the overall experience for cyclists. Access through Bayswater Station is problematic for cyclists, with the path terminating in front of the Station. Riders currently have to navigate through the car park, including riding the opposite way to existing one-way linemarking. This is confusing for unfamiliar cyclists and comprises a potential risk of conflict during peak commuting times.

In order to ensure that cyclists can continue along the PSP, the following works are proposed:

- 1. Bicycle symbols to be installed through the Station car park to assist in wayfinding between the disjointed sections of the PSP as shown in Figure 6-19.
- 2. Appropriate signage to be installed in conjunction with bicycle symbols to legalise eastbound cycling through the car park.
- 3. Linemarking at the eastern end of the car park to be altered to clearly delineate the preferred route.

Figure 6-19 Bayswater Station Works



The rail crossing at the eastern section of the southern car park is narrow and does not allow cyclists to easily transition between the southern and northern car parks in a timely manner. The resulting conflicts between pedestrians and cyclists due to this layout also contribute to a lengthy crossing time. A wider, straight crossing at a minimum of 4m in width would minimise conflicts and improve access across the rail line to and from the PSP. This alteration would remove the existing maze and require the installation of automatic gates. The resulting configuration would support appropriate connection from the south side of the train line to Beechboro Road and the Midland PSP.

6.3.2.3 Garratt Road Extension (55:5)

The cycling facilities along Garratt Road are, at present, of a relatively poor standard, with the off-street paths intermittently varying in width and a poor intersection crossing at Guildford Road. In order to achieve a more continuous link from Belmont into Bayswater, it is recommended that off-street cycle paths be implemented from Guildford Road to Whatley Crescent. This would involve extending or, where necessary, replacing paths with new infrastructure along both sides of the road. Improving this link will allow cyclists direct access to the Midland-line PSP, as well Meltham Station to the west. The implementation of bicycle lanterns at the intersection of Garratt Road and Guildford Road, as recommended in **Section 6.2.1.5**, would complement the proposed paths on both sides of the road.

6.3.3 Precinct 3

6.3.3.1 Collier Road (22:2, 86:8)

Collier Road is a strategic link bisecting the Bayswater Industrial Precinct and linking Guildford Road to Walter Road West. In addition to providing a linkage between Bassendean and Bayswater, the road also crosses Tonkin Highway, otherwise a significant barrier for cyclists.

Collier Road currently provides some off-street cycling infrastructure on the western side of the road. However, there are existing gaps in the provision of suitable cycling facilities, particularly from Wright Street to Grey Street (see Figure 6-20). These are expected to be rectified as part of the Tonkin Highway upgrade works, which will include high-quality PSP infrastructure and grade-separation.



Figure 6-20 Current cycling environment along part of Collier Road

To ensure continuity in the cycling network, this report recommends that a shared path be constructed from Grey Street to Beechboro Road. In order to compensate for the narrow off-street path between Beechboro Road and Broun Avenue, it is recommended that on-street cycle lanes be installed on Collier Road from Broun Avenue through to Grey Street (east of Tonkin Highway), providing an alternative route for confident cyclists.

6.3.4 Precinct 4

6.3.4.1 Beaufort Street/Broun Avenue (71:7)

Beaufort Street/Broun Avenue is a major link through the City, providing a connection from Bassendean through to Inglewood and beyond to the Perth CBD. At present, there are a series of minor off-street paths along this road, with cyclists having to negotiate with pedestrians on a relatively narrow path for shared use.

It is noted that the long-term plan for Broun Avenue includes an extension of the bus lanes from Beaufort Street through to Russell Street, providing priority access for trunk services through to the Morley Bus Station. While it is inevitable that these lanes will be used by confident cyclists, the high speed and frequency of buses, along with the relatively narrow kerb-side lanes, suggests that alternative routes and/or infrastructure should be provided to fulfil this desireline. Alternative routes that are supported in this Bike Plan include Catherine Street to Clifton Crescent, Walter Road West and Guildford Road (following the planned upgrade).

It is also recommended that the vegetation that is obstructing the shared path on the north side of Broun Avenue be cleared (encroachment shown in Figure 6-21). Long-term, off-street cycling can be assisted by maintaining a wide shared path along at least one side, to the standards described in Appendix C. The

existing servicing requirements and street furniture, including electrical poles and bus stops, significantly reduces the effective width of the path. Until the power infrastructure is relocated underground, little can be improved within the verge, particularly on the northern side.



Figure 6-21 Vegetation obscuring the Shared Path on Broun Avenue

6.3.4.2 Walter Road West (47:5, 60:6)

Walter Road West currently has no cycling facilities either off-street or on-street, discouraging riders from using this strategic corridor. Given the provision of an east-west link across the northern portion of the City and linking the Morley City Centre through to Tonkin Highway, this road has been identified as an important corridor. Accordingly, cycle lanes are recommended along Walter Road West between Crimea Street and Embleton Avenue. This will assist to alleviate access issues and provide a link from Tonkin Highway through to Broun Avenue (via Collier Road) and to the Morley City Centre.

To enable casual cyclists to use this link, a series of shared paths should be installed on the northern side of the road. It is noted that there is significant vehicular activity due to the distribution of businesses on this road. Cyclist and car conflict can be reduced through preventative action such as ensuring compliance with set-backs and truncated fences on corner blocks, in line with the advice set out in **Appendix C**. In addition, vegetation should be maintained or removed to ensure the full width of path is available. One example of existing encroachment issues is shown in **Figure 6-22**.



Figure 6-22 Vegetation blocking the shared path on Walter Road West

6.3.5 <u>Precinct 5</u>

6.3.5.1 Walter Road East (61:6)

Walter Road East forms a continuation of Broun Avenue from Bayswater through to Bassendean. This road carries a high volume of traffic and is characterised by an unattractive road-riding environment. An existing shared path runs along the majority of the road, catering for casual cyclists. A path deviation at the Broun Avenue / Embleton Avenue intersection prevents cyclists from crossing at the desireline, forcing them to use a short section Broun Avenue. While a minor encumbrance, it has the potential to deter cyclists from using this route and creates a demand for unsafe crossing outside of the crossing infrastructure provided.

Therefore, in conjunction with the proposed shared path works along Walter Road West (as discussed in **Section 6.3.4.2**), it is recommended that a shared path be extended along Walter Road East, with ramps connecting to Broun Avenue and ultimately the Tonkin Highway PSP, as discussed further in **Section 6.3.7.2**. The installation of eastbound cycle lanes on Broun Avenue from Tonkin Highway Bridge to Beechboro Road is also a potential improvement to enhance the road-riding environment along this corridor.

6.3.6 Precinct 6

There are no off-street infrastructure improvements proposed for Precinct 6.

6.3.7 <u>Precinct 7</u>

6.3.7.1 Morley Drive (30:3, 8:1)

The current cycling infrastructure along Morley Drive caters for casual riders, although the path along this road is not consistent or legible, being of various width and quality along the corridor. Numerous detours and minor road crossings create wayfinding issues and discourage commuter use of Morley Drive

Westbound cyclists following Morley Drive on the southern side are directed to cross west of Bath Road to join the shared path at Emberson Road. While this route follows the apparent desireline, a more direct path exists alongside Fitzgerald Road and crossing Morley Drive at Byfleet Street. Similarly, the eastbound path along Morley Drive connects to a legible shared path adjacent to Hamersley Place. Thus the poor legibility and misleading passive wayfinding disguises the existing connectivity in the area.

To moderate this effect, wayfinding signage and minor crossing improvements can support the use of the existing infrastructure, prior to an upgrade of the cycling environment within the Morley Drive road reserve. In this instance, the crossing near Bath Road should be improved to allow for a smooth transition across Morley Drive; achieved by constructing a kerb ramp across Bath Road to connect the two sections, as shown in **Figure 6-23**.

It is also recommended that bicycle symbols and direction signage be installed to assist way-finding along Clandon Way, which may be used as part of the Morley Drive cycle route. A refuge island crossing on Emberson Road will assist with a minor path realignment to form a direct line with Hamersley Place. To improve passive wayfinding, and following from the recommended improvements above, the existing superfluous kerb ramp at Emberson Road should be removed.



Figure 6-23 Morley Drive Works

6.3.7.2 Tonkin Highway (62:6)

As per the proposed works to be undertaken as part of the 'North Link WA' project by Main Roads, Tonkin Highway is set to be grade separated at the Collier Road and Morley Drive intersections, in addition to general road upgrades. It is understood that Main Roads are exploring the possibility of extending a Tonkin Highway PSP to connect through to Reid Highway. The PSP should also connect to the proposed loop ramp on Walter Road West outlined in **Section 6.3.5.1** in addition to Morley Drive, Benara Road, Collier Road, Midland Line PSP and the Riverside RSP.

It is understood that these works are outside of the control of the City; however it is important that the City is involved in lobbying for and advising on critical links to land uses and road connections along Tonkin Highway.

6.3.7.3 Benara Road (82:7)

Benara Road acts as a connecting link to numerous facilities in the northern part of the City. A pathway runs in a fairly consistent manner on the southern side of the road west of Bottlebrush Drive, with a reduced standard of continuing path further to the east. The northern side of the road has an interrupted series of paths suitable for cycling, terminating just to the east of Tonkin Highway.

The existing paths are generally only adequate for low levels of cycling and pedestrian use and it is recommended that cycle lanes be constructed for the entirety of Benara Road in the long term. This will assist in providing an alternative direct east-west connection, prior to the ultimate completion of the Reid Highway PSP. Benara Road will ultimately form a complementary route running parallel to Reid Highway and appropriate for access through to Guildford, Malaga as well as a number of schools and other attractors.

It should be noted that the Reid Highway alignment is suitable only for regional trips, and is not expected to provide good connectivity to local land uses. In the medium term, realignment of the existing shared path is recommended between Weir Place and Tonkin Highway so that it follows the road carriageway on Benara Road, rather than diverting through the bushland. In addition, the construction of a shared path along the northern side of Benara Road, between Mahogany Road and Maxwell Avenue is a necessary contribution to the cycling network (see **Figure 6-24**).



Figure 6-24 Terminus of the northern shared path on Benara Road

6.3.7.4 Crimea Street (32:3)

Serving as an important link from Walter Road West to Benara Road, Crimea Street connects Morley City Centre to Noranda, as well as intersecting Morley Drive. Crimea Street has a cycling environment that, when considering the narrow road reserve, is generally at a reasonable standard for off-street cyclists. A few minor improvements are recommended to enhance the riding experience, and they are as follows:

- > The crossing at the Crimea Street/Walter Road West intersection currently has a narrow median strip and it is proposed that cycle lanterns are installed to reduce the likelihood of accidents. Extended and designated crossing time is particularly imperative for inexperienced cyclists that, due to high traffic speeds or busy intersections, feel uncomfortable at such crossings.
- > Another discrepancy is the wide intersection throat at Rodda Street that allows vehicles to turn into this street at a speed that puts pedestrians and cyclists at risk. It is recommended that the throat at the entrance to this street be narrowed.
- > The wide throat at Frimley way should also be narrowed to reduce the speed of turning vehicles and the crossing distance. The crossover should be relocated closer to Crimea Street so that it is aligned with the northern approach path.

6.3.8 Precinct 8

6.3.8.1 Beechboro Road North (81:7)

Running alongside Tonkin Highway and connecting to Reid Highway in the north, Beechboro Road is an important distributor road as well as allowing access to adjacent facilities such as the Beechboro Shopping Centre. The off-street cycling infrastructure on this road offers a narrow path that has the potential to generate conflict between cyclists and pedestrians. Given the high usage of this path and the importance of the road in relation to nearby highways, it is considered a high priority to construct a wide shared path on the eastern side of Beechboro Road North, between Morley Drive East and Benara Road.

7 Implementation

7.1 Network Plan

Figure 7-1 shows the proposed changes to the cycling network in the City of Bayswater. Cycle lanes, mixed traffic and bicycle boulevards have been included. In addition, the numbers displayed in the map correspond to the proposed works contained in the schedule of works. The numbers shown represent the respective priorities for each proposed work. The schedule of works can be found in **Appendix D.** It must be noted that not all project numbers are displayed on the proposed changes map.



Figure 7-1 Proposed Infrastructure Changes

The network analysis, in conjunction with consultation and site visits, led to the development of the network plan, provided in **Figure 7-2** below. The network plan attempts to fill gaps in the cycling network and proposes cycling infrastructure based on factors such as topography, traffic conditions, location and the quality of the existing infrastructure.



Figure 7-2 Ultimate Cycling Infrastructure Map

The network plan is intended to represent an ideal scenario for planning bicycle infrastructure works over the next 10-15 years. It is acknowledged that many of the proposals in the plan will not be undertaken for a number of years. Nonetheless, the main purpose of the network plan is to provide strategic direction to enable the City of Bayswater to capitalise on potential changes to the LGA in the near future, such as road

upgrades (Tonkin Highway Grade Separation, Guildford Road and Bayswater Station upgrades), redevelopment and urban infill. Such changes may present opportunities to implement what may be deemed as otherwise unattainable projects.

7.2 Encouraging Behaviour Change

While constructing new infrastructure is crucial to the promotion of cycling in the City, it is imperative to engender usage of new infrastructure through encouraging behaviour change. The following sections outline a variety of factors that influence cycling behaviour. In addition, methods to stimulate cycling change by encouraging those who do not currently cycle to take up cycling, as well as ensuring that existing cyclists will continue to ride throughout the City, will be outlined.

7.2.1 <u>Method of Travel</u>

The methods of travel for Bayswater residents are displayed in **Table 7-1** below. It is interesting to note that the number of those travelling by car as driver grew by an almost identical number to the total population of Bayswater while the number of those travelling via bicycle has remained stagnant. The City of Bayswater has therefore not seen the growth in cycling that the Greater Perth area has, with cycling mode share actually declining since 2006.

Main method of travel	2006			2011			Change
	Number	%	Greater Perth %	Number of	%	Greater Perth %	2006- 2011
Train	255	1.7	4.9	351	2.2	3.7	96
Bus	495	3.3	4.9	466	3.0	4.0	-29
Ferry	0	0	0	0	0	0.0	0
Tram	0	0	0.2	0	0.1	0.0	0
Taxi	35	0.2	0.2	47	0.3	0.2	12
Car, as driver	11958	81.4	75.8	12545	82.1	78.8	587
Car, as passenger	1114	7.5	6.9	1024	6.7	6.4	-90
Truck	167	1.13	1.2	150	0.9	0.7	-17
Motorbike/Scooter	75	0.5	0.7	88	0.5	0.7	13
Bicycle	148	1.0	1.2	143	0.9	1.4	-5
Other	70	0.4	1.3	82	0.5	0.7	12
Walked only	381	2.5	2.4	374	2.4	2.7	-7
Total	14688	100	100	15273	100	100	585

Table 7-1 Bayswater Mode of Travel

Source: ABS 2011

7.2.2 <u>Target Audience</u>

To achieve Bayswater's strategic target to increase cycling activity within the LGA, segments of the population should be identified that may be more likely to cycle, cycle more often or to take up cycling for specific trips (to work, school or for recreation). When reviewing information regarding the City of Bayswater's mode choices by residents and visitors, consideration should be made of those:

- > travelling distances or journeys that could be made by bike;
- > that own a bicycle (or have access to one); and
- > that have a willingness to cycle.

The National Cycling Participation Survey suggests that approximately two thirds of households in Western Australia have access to a bicycle. In 2011, this equates to approximately 9,000 bicycles within the City.

Given that a large number of residents have access to a bicycle, it is the provision of high quality cycling infrastructure that has the potential to encourage those to take up cycling on a more frequent basis.

7.2.3 Cycling Segmentation

Roger Geller's cycling segmentation (as illustrated in **Figure 7-3** below with the segments described in **Table 7-2**) is a best practice model for identifying the type and needs of existing and potential cyclists. Geller proposed this cycling segmentation during his work with the City of Portland in Oregon, which has since been supported through surveys and adopted as a schematic model for the purposes of cycling development.





Source: <http://web.pdx.edu/~jdill/Dill_VeloCity_Types_of_Cyclists.pdf>

Table 7-2 Geller's Cycling Segmentation – Descriptions

Туре	Approximate Proportion	Description
Strong and Fearless	1%	Will ride anywhere and in any weather conditions.
Enthused and Confident	6%	Relatively comfortable on busy roads with bike lanes
Interested but Concerned	60%	Uncomfortable around traffic, feel unsafe.
No way, no how	33%	Not interested in cycling for transport

From the ABS 2011 data (shown in **Table 7-1**), it is likely that the majority of those cycling regularly or for transport (such as to work) in the City of Bayswater at present fall into the 'Strong and Fearless' or 'Enthused and Confident' categories.

As it is recognised that the 'Strong and Fearless' group will likely cycle with or without specific behaviour change activities or infrastructure, and represent only a small proportion of the population of the City of Bayswater, an emphasis for activities has therefore been placed on encouraging the remaining portion of the population that may cycle occasionally or for recreation. Cycling participation survey results estimate that approximately 77% of the population cycle at least occasionally for recreation. This proportion is likely to make up the Interested but Concerned segment and even some of those who would never consider themselves "cyclists".

This segment will require the implementation of cycling infrastructure to start cycling, but holds the most potential for increasing cycling mode share. The purpose of behaviour change activities for this group is

therefore to encourage the development of an appreciation of the benefits, provision of the tools and culture of support for cycling while the network develops.

This research and methodology has informed the proposed approach and activities for Bayswater.

7.2.4 Recommended Behaviour Change Approach and Activities

There are many models for using promotion to encourage behaviour change. **Table 7-3** provides an overview of the considerations based on Prochaska's model of the Stages of Change. This model is considered appropriate for the City of Bayswater, and provides a clear framework for identifying suitable promotional activities in order to increase the uptake of cycling for transport purposes. Specifically for the 'Enthused and Confident' and 'Interested but Concerned' segments it provides focus on activities that promote 'everyday' cycling in a positive manner and focuses on tools to overcome identified barriers to cycling.

Stage of Change	Individuals Perception	Potential Activities and Interventions
Pre-contemplation	Not considering bike riding	Raising the awareness of cycling Introduce messages that portray riding as an activity that individuals associate with in a positive manner.
Contemplation	Aware of bike riding, the benefits and interested in finding out more	Ensure that tools and resources are available to support potential riders seeking <i>information</i> .
Preparing	Would like to give riding a go	To be able to ride appropriately, have access to a bicycle, to know how to ride it and have the relevant resources and facilities provided.
Action	Riding for the first time	Ensure infrastructure and supporting facilities are well maintained, safe, legible and convenient so that the new rider has a positive initial experience.
Maintaining	Riding again	Positive reinforcement – or the rider may not choose to ride again and relapse into their old behaviour (non-bike riding).
Relapse	Stopping riding	The rider may re-enter the stages of change at any of the above steps.

Table 7-3 Behaviour Change Approach

Source: Gatersleben and Appleton 2007, Contemplating cycling to work: Attitudes and perceptions in different stages of change, Transportation Research Part A: Policy and Practice, Vol.41, No.4, pp.302-312.

7.2.5 Raising the awareness of cycling

These activities ensure that positive messages regarding cycling are included wherever possible in order to raise awareness of cycling throughout the community. Particularly for the City of Bayswater, celebrating the introduction of new infrastructure should provide an important opportunity to raise awareness of cycling and encourage the wider public to give the new infrastructure a go.

Examples: Information regarding cycling related activities being included on the Council website, newsletters and community events. Opportunities to capture and promote feedback from riders regarding why they enjoy riding in the City of Bayswater could also be included within this material. Positive imagery of cycling, and local infrastructure where possible, should be included in Council publications, plans and reports whenever appropriate.

7.2.6 <u>Tools and Resources</u>

In order to support those who may be considering cycling, knowledge of the provision of infrastructure through route maps, visible bicycle parking in convenient locations, guidance on cycling etiquette, road rules and cycling safely is recommended to help encourage and equip them to take action.

Examples: Relevant information could be supplied electronically in downloadable format from the Council's website, made available in printed format from the Library and Community Centre. As the Council will be looking to introduce new types of cycling and road user infrastructure, it is recommended that additional

education and promotion is associated with these changes to ensure all users are informed and advised of appropriate use of the new facilities.

7.2.7 <u>To be able to ride appropriately</u>

In order to ride a bike, you must have access to a bike to ride, and know how to ride it appropriately. Several councils within Western Australia work to address this barrier through providing cycle training courses, in order to introduce new riders or increase confidence for the inexperienced rider. This could be an option for the Bayswater community.

Some councils also provide cycling training specifically for women. These initiatives have been proven successful in getting the 'interested and concerned' group back into cycling.

Examples: Cycling education courses and lead rides could be provided.

7.2.8 Infrastructure and supporting facilities

This Bike Plan provides a detailed list of recommendations regarding potential cycling infrastructure requirements, supporting facilities (such as bike racks) and the importance of maintenance. Cycling and other community events could be associated with the opening of specific bicycle routes and facilities as completion of the recommended infrastructure programs occurs, alongside ensuring appropriate promotion and education regarding the new facilities. Other supporting infrastructure could include signage and wayfinding tools, bicycle maintenance facilities such as air pumps and so on.

7.2.9 <u>Positive Reinforcement</u>

To encourage those who start riding, to continue riding, infrastructure must continue to meet users' needs and provide for a positive experience. To further reinforce this behaviour, opportunities to recognise and/or reward bike riders should be considered.

Examples: Cycling surveys and counts to demonstrate and promote improvements to the wider public, alongside using community events to recognise bike riders. Several authorities also participate in Super Tuesdays, which is a national annual bike count event. Others use Bike Week to provide an opportunity to both promote cycling and recognise existing riders, often through cycling breakfasts.

7.3 Targeted Driver Education

Driver education, when targeted properly, can be an effective tool in encouraging better road user behaviour. Safety focused industries, such as mining, focus significant training resources on driver education in order to protect the safety of employees, contractors and the community, forming a key component of their obligations under Occupational Health and Safety legislation. As a major employer, the City of Bayswater has a responsibility to ensure that staff who are required to drive or cycle as part of their employment, are educated in appropriate road user behaviour, including sharing the road with cyclists.

One of the most significant areas of concern for cyclists is the intersection of Garratt Road/Guildford Road where cyclists must ride in mixed traffic, sharing the road with heavy vehicles.

7.4 School Programs

School children are a critically important component of the cycling community; they are the next generation of cyclists. The early exposure of children to cycling as an enjoyable way to spend their leisure time and to get to/from school has been proven to contribute significantly to children continuing to cycle into adulthood.

The major opportunities for encouraging school children to ride bicycles include:

- > Cycling to/from school the majority of children live within 5km of their school which is a comfortable cycling distance
- > Cycling lessons at school teaching children the basics of riding a bicycle and safety on and around the roads
- > Organised cycling sport, either at school or on weekends, ranging from simple leisurely rides, to road riding and mountain biking

The City of Bayswater, in conjunction with State Government agencies and community groups, could undertake programs to encourage school students to take up cycling. These initiatives should be continued at least once every two years, with different schemes targeting different age groups. A key focus should be children in the 10-14 age bracket, who are reaching the age where they may consider and are permitted by their parents to cycle to school.

7.5 Connecting Facilities

Facilities that enable cyclists to continue their journey via public transport are important to promote and encourage the use of sustainable modes of transport. The main transport nodes in the City of Bayswater and the corresponding facilities they provide are as follows:

- > Morley Bus Station- 4 bicycle lockers;
- > Ashfield Station- 4 bicycle lockers, 16 U-Rails;
- > Bayswater Station- 8 bicycle lockers, 12 U-Rails;
- > Maylands- 8 bicycle lockers;
- > Meltham Station- 4 bicycle lockers, 16 U-Rails; and
- > Mount Lawley Station- 4 bicycle lockers, 8 U-Rails

Figure 7-4 Bayswater Station cycle parking



Compared to similar stations across metropolitan Perth, the provision of bicycle lockers and U-Rails at the stations in the City of Bayswater is generally satisfactory. Nevertheless, there is an opportunity for many of these stations to include bicycle shelters on site in conjunction with the pre-existing bicycle lockers.

Other factors that should be considered include:

- > Storage areas need to be open and attractive and in easily supervised areas that have good active and passive public surveillance;
- Bicycle parking should be as close as possible to station platform entrances with a maximum walking distance of 100m;
- > Bicycle parking u-rails should be located under cover and out of the weather;
- > Bicycle parking facilities need to be easy to find, well signed and marked; and
- > Bicycle riders need to be able to access the parking facilities easily and quickly from the local routes.

Cyclists should also be aware of train etiquette when using public transport and while it is primarily the responsibility of the PTA, signage should be implemented to inform those using the facilities of the restrictions. These restrictions include:

- > Bikes are not permitted on Transperth train services during peak periods. Between 7.00am and 9.00am, Monday to Friday, bikes are not permitted on train services travelling to Perth City. Between 4.30pm and 6.30pm, Monday to Friday, bikes are not permitted on train services travelling away from Perth city.
- > Bikes cannot depart or pass through Perth, Perth Underground or Esplanade stations in any direction during the aforementioned peak periods.
- > Do not block entrances with your bike or leave it unattended where it can fall over.
- > Standard bicycles are not permitted on any Transperth bus service including train replacement buses.

7.6 Maintenance

Regular maintenance is required to keep cycling facilities in a reasonable condition. Cyclists are particularly vulnerable to punctures and crashes caused by broken glass, loose gravel and vegetation. Regular maintenance activities should include the following:

- > Regular sweeping of paths to remove gravel, sand/earth, broken glass and vegetation;
- > Targeted sweeping of known problem areas e.g. paths through parks after a Saturday night;
- > Prompt clean up from storms, fires and other one-off events which cause damage to paths;
- > Regular pruning of vegetation to ensure the full path width is available; and
- > A regular, documented system of visual path inspections to identify surface or structural defects. An allocation should be made in each financial year for preventative or remedial maintenance to address this type of issue.

7.7 End of Trip Facilities

7.7.1 Background

End of trip facilities are a critical, but often forgotten, component of the cycling network. The presence and/or quality of end of trip facilities can often make or break the decision to cycle for many trips.

Different trip purposes will have different needs when it comes to end of trip facilities. For example:

- > A commuter may want a secure place to park their bicycle inside their workplace, along with showers, lockers and ironing facilities to enable them to freshen up before commencing work for the day
- > A shopper may only want a secure short stay place to park their bicycle, conveniently located to their destination (e.g. close to the entrance of a shopping centre, or on the footpath in a 'main street' environment) which is ideally protected from wet weather;
- > A recreational rider generally has end of trip facilities at their own home but may require a secure place to park their bicycle at an intermediate destination, such as a cafe or a park.

Long stay end of trip facilities for commuters should generally be provided by the employer. Council's involvement in the provision of end of trip facilities should be in the form of:

- > Requiring, through its Town Planning Scheme, new developments to provide a certain standard of end of trip facilities for both employees and visitors; and
- > Providing suitable end of trip facilities for employees and visitors at its offices, depots, library etc.

Short stay end of trip facilities should generally be in the form of simple u-rails or other design which facilitates the secure parking of a bicycle. In accordance with Austroads guidelines, these should be located approximately every 30 metres along 'main street' type shopping strips and in small clusters at the entrances to shopping centres and other significant destinations

7.7.2 Locations

The council is responsible for providing bicycle parking on public land such as road reserves, parks, recreational facilities and Council buildings. U-rails, with capacity for a minimum of 10 bicycles, should be provided at all major recreational facilities and Council buildings. End of trip facilities, such as showers, lockers, secure parking and washing/drying/ironing facilities should also be provided at Council workplaces

for use by staff. Public bicycle parking in the form of u-rails should also be progressively installed in front of shops, businesses, cafes etc. across the urban area.

Bicycle parking adjacent to land uses should consider both the type of destination and the adjacent cycling infrastructure. Where cyclists are encouraged to ride in mixed traffic or within cycle lanes, on-street bike parking is particularly important. This can be provided in attractive 'bike corrals' which provide a high volume of bike parking within a small space, often a single car parking bay. This type of bike parking is ideally suited to main street environments. An example of this type of bike parking is shown in **Figure 7-5**.



Figure 7-5 Bike corral in Newcastle Street, Vincent

Schools should be encouraged to provide secure bicycle parking for their students where it does not currently exist. The schools that have unsecured bicycle parking are referred to in **Section 5.6.2**. The City of Bayswater is eligible to apply for the Department of Transport's Connecting Schools Grant Program which provides funding on a dollar for dollar basis for bike shelters and improvements to End of Trip facilities for both private and public schools.

End of trip facilities, both short and long stay, should also be focused in the Morley City Centre area to ensure that workers and visitors feel comfortable cycling to this site. Such a proposal is in accordance with the *Morley Activity Centre Structure Plan: Movement Network Report 2013* and described in brief in **Section 2.3.6**.

7.7.3 <u>Development Provisions</u>

TPS No. 24 does not include any requirements for end of trip facilities. The following requirements for new commercial buildings should be included;

- > Showers
- > Lockers
- > Secure and/or undercover bicycle parking
- > Washing/drying/ironing facilities

Whilst simple bicycle parking may be sufficient for short-stay cycling trips, these facilities are critical to encouraging long-stay (i.e. commuter) cycling trips to private developments.

In many cases, workplaces, particularly in the hospitality industry, showers and lockers are already provided for staff therefore meeting these requirements for many developments is not considered to be particularly onerous.

These requirements can be scaled back depending on the type and scale of the development to ensure that provision is at the appropriate levels and consistent with the likely patronage and usage profile of such developments. The Green Building Council of Australia's Green Star ratings for End of Trip facilities are an appropriate benchmark.

It is recommended that TPS. No.24 is amended to include requirements for end of trip facilities.

7.7.4 <u>Procurement</u>

Due to the volume of parking which is required, parking at many locations will need to be progressively provided over multiple years. In order to assist in determining priorities, it is recommended that the City set up a scheme where local businesses can apply for 50% matched funding for the installation of u-rails (shown in **Figure 7-6**). Such a scheme would encourage businesses to provide parking and thus reaping the benefits that cycling provides. If such a scheme included the City Centre precinct, it would also assist the City in determining the precise locations for u-rails.

Figure 7-6 U-rails at Esplanade Station in Perth



U-rails are more than just utilities for parking bicycles; they can also enhance the streetscape if designed cleverly and can contribute to the image of the City of Bayswater becoming a cycle friendly community. **Figure 7-7** shows bicycle parking installed in the City of Fremantle also functioning as public art in order to promote the image and increase the prominence of cycling.



Figure 7-7 Bicycle Parking in the City of Fremantle

It is recommended that the City, perhaps in conjunction with the Department of Culture and the Arts, Propel Youth Arts WA and local artists, arrange for a public art competition to develop unique and innovative designs for simple on-street bicycle parking. The designs should, first and foremost, be suitable for locking up a variety of bicycles, but the design possibilities are endless. Potential themes could include cycling culture and Bayswater's history and heritage. As well as providing tangible benefits to cyclists, the public art competition would continue to encourage more sectors of the community to engage in cycling.

8 Conclusion

The Local Bike Plan for the City of Bayswater aims to promote, encourage and facilitate the greater use of cycling as a mode of transport. The Plan sets out a variety of ways in which to achieve the goal of enabling the City to become a cycle friendly LGA. The proposed changes to the cycling network were formed through stakeholder engagements, comprehensive research and an analysis of cycling opportunities.

Bayswater has the foundations of a legible and interconnected cycling network, with the Midland-line PSP and the Riverside RSP the main arterial routes for the City. However, further investment is required to enable the LGA to develop a network which is safe, friendly and convenient for cyclists of all confidence levels. In particular, forming connections between the two arterial routes, as well as other routes in the LGA, is imperative. The continuity and connectivity of a cycling network often determines the frequency of use.

Changes to off-street paths have been suggested to complement and enhance the existing off-street network. While off-street paths are desirable in most locations to maximise potential use, they are not always feasible, and, accordingly, on-street routes have been allocated throughout the plan. These on-street changes often comprise cycle lanes, with bicycle boulevard treatments selected for locations that are strategically located by providing substantial utility. Additional works to intersections and existing pathways are suggested, with the intersections of Guildford Road/Garratt Road, Whatley Crescent/King-William Street and Broun Avenue/Embleton Avenue deemed to be a high priority.

North-south connectivity, from the RSP, through the train-line, and passing Morley Drive, is a significant issue for cyclists in Bayswater. The extension of cycle lanes on Coode Street, running from King William, through to Morley Drive, and additional off and on street paths spanning across this route, will help to ameliorate issues travelling from the Midland train-line through to Morley City Centre. Improved cycling infrastructure through Russell Street, Collier Road, Crimea Street and Camboon Road is also proposed in order to facilitate a smooth transition from south to north in the LGA.

The RSP along the foreshore in the City is a major asset to the cycling network. This pathway provides a comfortable, scenic route, while also allowing commuters to travel in a relatively direct manner. It is suggested to build upon this existing route by rectifying some discrepancies along the pathway. The missing link from Katanning Street to Ashfield Parade should be remedied by joining these sections of the pathway. In addition, reconfigurations of pathways near Tranby House and the Milne Street intersection are recommended to improve the experience for cyclists.

A range of behaviour change strategies have also been recommended to complement the significant infrastructural investment required. As part of these strategies, promotional events engaging the community in cycling have been proposed to encourage more people to take up cycling in the City.

Local Bike Plan







Section 1 (About You)	Section 3 (You and Cycling) What is the principal purpose of your bicycle trip(s)?	
Male Female Age:	(Check one or more) \Box Recreational/Leisure \Box Commuting	A map of the City has been Please take this opportuni
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Competition Social Social	home to work, home to sci
Do you live in the City of Bayswater? □ Yes □ No	Other	What do you like about you
If you are a resident, please mark your approximate location on the attached map.	 (Check one only) A confident rider who is comfortable riding in most traffic situations [In mixed traffic on road] 	
How many bikes are in your household?	 A rider who is somewhat comfortable riding in <i>some</i> traffic situations [In mixed traffic, on road] 	What do you dislike about
How often do you cycle? Rarely/Never (Go to Section 2)	 A rider who prefers designated on road bike lanes A rider who prefers to stick to off road dual use footpath-bike paths Don't ride 	
 Occasionally Less than once a month A few times a month 	Are you aware of the signed Perth Bicycle Network (PBN) Routes within the City of Bayswater (see attached map)?	How do you plan your bike
(Go to Section 3)	What types of routes do you cycle on within the City of Bayswater, and how frequently? (Check one or more)	
Section 2 (Non Cyclist) How long has it been since you last rode a bike?	Major Roads	What improvements could
 Less than 5 years More than 5 years 	Local Roads Vever Rarely Sometimes Often Almost Always	
I have never ridden a bike What are the main reasons you do not ride a bike?	Signed PBN Routes Sometimes Shared Paths Sometimes Shared Paths Sometimes	Do you have any other cor
	Image: Contracting and the second state of the secon	
What might help you to start cycling in the future?	Often Almost Always River Foreshore Paths Never Rarely Sometimes	
	Principal Shared Path Never Rarely Sometimes (alongside the train line) Often Almost Always Would you like Council to provide cycling workshops? Yes No	Completed surveys can be local Public Library, sent v jacob.martin@cardno.com Alternatively, an electronic
	If they were available would you or one of your family attend? Yes I No	Bayswater website: http://engage.bayswater.w

een included in this survey. Inity to describe your **primary** cycling route(s) *(eg. school, recreational riding route etc)*

your chosen route(s)?

ut your chosen route(s)?

ike route?

Ild be made to make your cycling trip better?

comments or suggestions concerning bicycle of Bayswater?

be deposited at the City of Bayswater offices or your t via fax to 9486 8664 or by email to or on or before Monday April 7. hic survey may be completed from the City of

.wa.gov.au/local-bike-plan



Please mark your **primary** cycling route(s) on the map provided.

You may wish to **circle** road crossing points or put an **X** at the location of existing issues.

Feel free to label the map in any way you wish with road names, comments or ideas.

This information will assist us in improving service along your preferred route.

If your primary cycling route extends beyond the boundaries shown, please feel free to describe your route further through arrows and/or text.


APPENDIX B SCHOOL SURVEY INSTRUMENT



City of Bayswater Bike Plan

What Suburb do you live in?

If you live within the area shown on the maps, please mark where you live on the map with a red circle.

How old are you?

□ 5-8 years □ 9 - 11 years □ 12 - 15 years □ 16 - 18 years

Do you own a bicycle?

🗆 Yes 🗖 No

Do you feel confident riding a bicycle?

🗆 Yes 🗖 No

How often do you ride your bicycle?

Rarely Once a fortnight Once a week 2-3 days per week Most days

Why do you normally ride? Fun School Work Shops Exercise Who do you ride with? Alone Parents Brother/Sister Friends

If you ride to school; how often? □ Rarely □ Once a fortnight □ Once a week □ 2-3 days per week □ Most days

Why do you ride to school?

If you don't ride to school; why not?

What do you think about the routes you ride on?

How can we make them better?



City of Bayswater Local Bike Plan

Please mark your **primary** cycling route(s) on the map provided.

You may wish to **circle** road crossing points or put an **X** at the location of existing issues.

Feel free to label the map in any way you wish with road names, comments or ideas.

This information will assist us in improving service along your preferred route.

If your primary cycling route extends beyond the boundaries shown, please feel free to describe your route further through arrows and/or text.



APPENDIX C CROSSOVER DESIGN RECOMMENDATIONS





Technical Memorandum

Title Bayswater Bike Plan

Driveway Crossover and Path Advice

Client	City of Bayswater	Project No	CEP02267
Date	23 April 2014	Status	Version 1
Author	Yohanes Tadesse	Discipline	Traffic and Transport
Reviewer	Jacob Martin	Office	Perth

1 Introduction

Cardno have been requested to provide technical engineering design advice with respect to:

- 1. The position of shared path infrastructure within the verge area;
- 2. Sightline truncations and fencing details; and
- 3. Crossover detail

2 Path Position

Footpaths (paths intended for pedestrians and cyclists only under the age of 12) and shared paths (paths specifically intended for use by pedestrians and all cyclists) may occupy a variety of positions within the verge area to accommodate the requirements of utilities (street lights, power poles etc.), trees and street furniture. However, when considering the safety aspects of shared paths, and the connectivity and legibility of pedestrian and cycling facilities, path infrastructure should ideally be positioned at the back of kerb.

Austroads' *Guide to Road Design - Part 6A: Pedestrian and Cyclist Paths* recommend that shared paths (i.e. paths intended to be used by both cyclists and pedestrians) be an absolute minimum of 2.0m and a desirable minimum of 2.5m in width. They should be located 500mm from any significant obstruction or hazard, including the roadway, to provide sufficient separation and safety.

It is understood that a narrow gap between the kerb and path represents a significant maintenance issue and it is therefore recommended that paths, where feasible, be constructed at the back of kerb, with an edgeline 500mm from the roadway and a minimum 2.0m width from this point to the far edge. This corresponds to a constructed path width of 2.2-2.35m, depending on kerb width.

In addition, the Austroads' design requirements for footpath drainage and the corresponding crossfall are not generally consistent with those for crossovers. Design advice reconciling these differing requirements is provided in the following section.

Where obstructions require a path to be located centrally within the verge area, or against the property line, these represent preferable options to forgoing path infrastructure altogether, but require additional consideration with respect to sightlines and connectivity.

3 Crossover Design

A driveway crossover is the extension of a driveway; commencing at the property boundary and concluding at the carriageway (including any kerb, channel and footpath contained within).

Crossovers represent a singular issue in the design of a quality cycling network as the geometric requirements of a crossover are a result of traffic safety, convenience and drainage considerations. The following advice is intended to satisfy the requirements of all of the above, in addition to minimising the impact of grade changes on the shared path network.

Main Roads WA identifies the following basic structure of a crossover (Figure 1).



Figure 1Representative driveway crossover configuration.(Source: Main Roads, D12#5713).

4 Design Considerations for Crossovers

Storage Length

Main Roads requires that sufficient storage length be provided (crossover length) for a vehicle to stand clear of the carriageway. The set back from any gate to the edge of the carriageway will vary with the type of vehicle likely to use the driveway in accordance with **Figure 2** below (i.e. residential driveways use minimum crossover length of 6m).

Type of Vehicle	Minimum Length
Light vehicles	6m
Single unit trucks	15m
Semi-trailers and wide farm machinery	21m
Long Vehicles & Road Trains	Length of Vehicle + 3m

 Figure 2
 Minimum crossovers lengths required set against corresponding design vehicles.

 (Source: Main Roads, Driveways D12#57413).

Width and Splay

Sufficient width and an adequate splay configuration must be provided for the safe turning movement of vehicles both from and onto the carriageway.

Advice regarding appropriate dimensions is provided by Main Roads WA and Australian Standards AS2890.1, as shown below, **Figure 3** and **Figure 4**.



Figure 3 Main Roads WA minimum crossover width and driveway radii

(Source: Main Roads, https://www.mainroads.wa.gov.au/Documents/200431-0198-1.RCN-D13%5E23514191.PDF).

TABLE 3.2 ACCESS DRIVEWAY WIDTHS

			metres
Category	Entry width	Exit width	Separation of driveways
1	3.0 to 5.5	(Combined) (see Note)	N/A
2	6.0 to 9.0	(Combined) (see Note)	N/A
3	6.0	4.0 to 6.0	1 to 3
4	6.0 to 8.0	6.0 to 8.0	1 to 3
5	To be provided Clause 3.1.1.	as an intersection, not an	access driveway, see

NOTE: Driveways are normally combined, but if separate, both entry and exit widths should be 3.0 m min.

Figure 4Australian Standards for minimum and maximum access driveway widths(Source: AS-NZS 2890.1-2004, Table 3.2).

NB: Category 1 represents low volume traffic volume access driveways.

These statutory requirements therefore suggest a crossover width of between 4.5m and 8.0m, with a minimum 1.5m radius (increased as required to facilitate design vehicle movement).



The City of Bayswater currently provides advice regarding crossover widths that fits within the requirements of AS2890.1, as shown in **Figure 5**.

Figure 5City of Bayswater required access driveway configuration(Source: City of Bayswater, Crossover Application Booklet, 2013).

Sight Distance and Truncation

Adequate sight distances at the frontage footpath and at the carriageway must be provided. This is accomplished by keeping driveway/property boundary and driveway/carriageway interfaces clear of obstructions.

The interface between the crossover and the road is defined by Australian Standards AS2890.1:2004 and is described in **Figure 6** below.



	Dista	nce (Y) along	frontage road
Frontage road speed		m	
(Note 4) km/h	Access driv than domes	eways other stic (Note 5)	Domestic property
	Desirable 5 s gap	Minimum SSD	access (Note 6)
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	the second
100	139	160	Use values from 2
110	153	190	

Figure 6 Minimum sight lines for vehicle safety.

(Source: AS-NZS 2890.1-2004, Figure 3.2).

With respect to the interface between driveway and pedestrians/cyclists on adjacent shared paths, Australian Standards AS2890.1 provides the following guidance, refer **Figure 7**.

"Visual truncations are required on each side of the driveway at the driveway/property boundary interface. Local councils impose height and configuration requirements for front fences."

It should be noted that the AS-NZS 2890:1-2004 takes the driver's eye height and the height of the object to be 1.15m above the road surface.





Visual Permeability

The above visual truncations are considered appropriate for minimising pedestrian conflict. However, cyclists travel significantly faster than pedestrians and there is an inherent risk of vehicle/cycling crashes where the footpath abuts the property line. To alleviate this risk, fencing regulations attempt to extend the sightlines for reversing vehicles so that drivers can properly assess the potential risk of conflict.

The City of Bayswater currently provides advice regarding fencing and visual permeability by precinct. While there are significant differences in the advice provided to residents, the guidelines for the Maylands Precinct provide a benchmark for these regulations, as follows:

"The front (primary street frontage including and corner truncation) fence must not be any higher than 1.2m of which the upper 0.6m (or 50%) must be visually permeable (i.e. through the use of picket or wrought iron sections). Galvanised mesh or powder coated metal pool type fencing is not appropriate)."

Current City of Bayswater fence guidance is that front fences over 1.2m in height require planning approval within the Maylands Precinct.



Figure 8 City of Bayswater fence specifications

(Source: City of Bayswater, http://www.bayswater.wa.gov.au/cproot/264/2/TP-P4.10%20Peninsula%20Road%20%E2%80%9CThe%20Pointe%E2%80%9D%20Residential%20Estate,%20Maylands.pdf).

This regulation generally exceeds the requirement of Australian Standards and the majority of other Local Government regulations in that it mandates a much greater degree of visual permeability. In general, fencing requirements recommend visually permeable materials only over 1.2m in height, roughly corresponding to the driver's eye height.

Of the equivalent Local Government regulations reviewed, the City of Canning's appears to be representative of Australian Standards, specifying a solid wall height of no more than 1.2m and a visually permeable section up to 1.8m in height.

With respect to the visually permeable materials employed, guidelines are generally unclear. However, an effective benchmark would be a maximum of 50% solid material. By preference solid inserts would constitute horizontal slats rather than the vertical inserts shown in the existing regulations, to maximise the range of visibility to the path.

Truncation and visual permeability should be considered for all crossovers that address a path, whether this interaction occurs at the front or side boundary. This may require modification of existing design guidelines which often limit permeability requirements explicitly to the front boundary.

Elevation and Crossfall

The grade of a driveway is determined by a number of factors; drainage, accessibility for people with disabilities, traffic safety considerations and consistent path crossfall requirements.

Because of these different needs, a standard elevation design has been established by Main Roads WA to provide a baseline for future applications. The following advice for crossover elevation assumes a path located in the most desirable position; at the back of kerb.

While a number of grades changes may be necessary, Australian Standards AS2890.1 recommends a maximum of 12.5% change in grade over a driveway. If the grade change is larger than this value the transition should be effected in two or more stages, as vehicles underside may scrape the driveway if there is too large grade change.

With this in mind, the following design considerations have been included:

- > Path construction guidelines dictate a maximum crossfall of 1:40
 - (Source: Austroads Guide to Road Design 6A, Clause 7.6.1).
- > For disability accessibility the maximum gradient of the associated access driveway across a footpath and a property line of a building alignment shall be 1:20 (5%)."

(Source: AS-NZS 2890.1:2004, Clause 3.3a).

- > The grade and level of a crossover needs to take into account stormwater drainage. Driveways must be constructed such that road drainage runoff cannot flow onto the crossover and into private property.
 - Main Roads advises that at a point 1500mm into the driveway there should be a vertical distance of at least 100mm from the invert of the kerb (gutter) (**Figure 9**).



Figure 9 Main Roads WA design for elevation view of driveway crossover.

(Source: Main Roads, Driveways D12#57413)

> The Institute of Public Works Engineering (IPWEA) advises that there should be a vertical distance of 250mm from the invert of the kerb to a point 3850mm into driveway (**Figure 10**).



Figure 10 IPWEA design for elevation view of driveway crossover

(Source: Institution of Public Works Engineering, http://www.moretonbay.qld.gov.au/uploadedFiles/common/forms/roads-traffic-and-transport/A-guide-to-self-assessable-development-of-a-driveway-crossover.pdf)

The grade and level of a crossover needs to take into account existing footpath levels. There are effectively two different techniques to tie footpaths into driveway crossovers as shown in **Figure 11** and **Figure 12**.

Perpendicular

All of the grade transition takes place within the kerb. The footpath remains at grade throughout the width of the driveway. This is considered to be the ideal arrangement for cyclists and pedestrians as the current footpath grade profile is maintained.



 Figure 11
 Perpendicular footpath crossover with footpath tie-in at back of kerb

 (Source: New Zealand Transport Agency, http://www.nzta.govt.nz/resources/pedestrian-planning-guide/docs/chapter-14.pdf).

Note that this arrangement infers a continuation of the path across the driveway crossover.

Combination

Grade transition is spread throughout length of footpath and crossover. Bicycle riders would experience grade change whilst traveling path.



 Figure 12
 Combination footpath crossover with footpath tie-in at back of kerb

 (Source: New Zealand Transport Agency, http://www.nzta.govt.nz/resources/pedestrian-planning-guide/docs/chapter-14.pdf)

The design of a combination crossover is similar to the standard kerb ramp design, as shown in **Figure 13** below.



 Figure 13
 Main Roads WA standard design for a combination ramp

 (Source: Main Roads, Ramp and Grab Rail details)

Kerb Profile

The design of the kerb must be carefully considered. This is because the kerb can significantly assist in providing the crossover with a suitable vertical clearance. According to Main Roads (Design of Kerbing, Main Roads), a mountable kerb shall be used in the following circumstances:

- > On pedestrian and cycle paths
- > On lightly travelled residential streets, as it does not require modification at driveway entrances.

A standard mountable kerb cross-section is provided below (Figure 14), for reference.



Figure 14 Typical mountable kerb

(Source: City of Bayswater, Crossover Guidelines)

5 Reference Design Recommendation

To assist the City in formulating a Policy for crossover and path geometry, Cardno has prepared the following best-practice reference design.

The driveway considered is a perpendicular footpath crossover with the footpath located at the back of kerb (**Figure 11**). The majority of the grade transition required occurs in the mountable kerb; in addition to the area between the edge of the footpath and the property boundary.

The following design acts in accordance with Main Roads WA and IPWEA guidelines. Local council best practice has also influenced the final design.

Path Position

The path should ideally be positioned at the back of kerb. A shared path should be constructed to a minimum width of 2.5m, measured from the road pavement to the path edge. An edgeline should be painted at 500mm from the road pavement.

Additional width and linemarking should be provided wherever there is an obstruction in the path.

Kerbing

Any existing form of kerbing is appropriate for abutting the path edge. However, to achieve the desired crossover characteristics, a specific kerb detail will be required at driveway crossovers.

The driveway crossover should be built into the back edge of the kerb. The final design requires an extension of a standard mountable kerb section of kerb in order to provide the crossover with an adequate vertical clearance as shown below, **Figure 15**.

It is noted that this design may be modified for commercial premises or other high-volume crossovers where ongoing maintenance may be an issue.



Figure 15 Modified mountable kerb

Crossover Dimensions

The recommended crossover detail adheres to all the aforementioned requirements, resulting in the compliant crossover design as shown below, **Figure 16**. This design satisfies IPWEA and Main Roads WA requirements for stormwater management and Austroads requirements for radius and width, while providing a consistent surface for cyclists and pedestrians. This is supported by contining the path across the driveway crossover.







APPENDIX D WORKS SCHEDULE



No.	Priority	Funding (Budget Allocation)	Corridor	Suburb/Precinct	Key User Group	Project Name	Start	End	Length (m)	Width	Surface	Type (on/off)	Representative Image	Description of Work	Comments/Issues	Order of Cost Estimate
1	1	Capital	Riverside RSP	Maylands	Commuter	Fogerthorpe Cres/Richard St quiet street route	Woodhouse Road/Fogerthorpe Crescent	Swan View Terrace/Richard Street	800	-	-	On		Install bicycle symbols and direction signage to promote quie street route for commuters. Install refuge island crossing of Peninsula Road on northern side of intersection to provide alternative crossing for cyclists not confident enough to cross Peninsula Road in one stage. Remove direction signage along alternative Swan Bank Road/Peninsula Road/Wall Street route.	Short cut' route for commuters avoiding the lengthy detour via Tranby House and the tip of Maylands Peninsula. Avoids using Peninsula Road.	\$ 20,000
2	1	Capital	Riverside RSP	Maylands	Recreation (Off- Street)		Swanbank Road/Mary Street		-	-		Off		Install direction signage and linemarking to clarify the route o the RSP.		\$ 7,000
3	1	Capital	Riverside RSP	Bayswater	Recreation (Off- Street)	Tonkin Highway crossing wayfinding	Tonkin Highway west path	Tonkin Highway east path						 Widen throat of junction with Tonkin Hwy west path to ease curve from W to S Install bicycle direction signs and pavement markings to improve wayfinding along the route 		\$ 10,000
4	1	Capital	Guildford Road	Bayswater	Commuter (Path)	Tonkin Highway crossing upgrade	Tonkin Highway/Guildford Road interchange							 Realign the western approach to the eastern intersection to eliminate right angle bend. 		\$ 12,000
5	1	Capital	Beechboro Road Sout	n Bayswater	Commuter (Path)	Foyle Road	Beechboro Road/Foyle Road intersection							Remove grab rail, relocate sign posts and widen path on approach to crossing.		\$ 6,000
6	1	Capital	Morley Drive	Morley	School Students	Barnes Way crossing	Morley Drive East/Barnes Way							Install kerb ramp crossing across Morley Drive on the westerr side of the intersection.	5	\$ 11,000
7	1	Capital	Morley Drive	Morley	School Students	Beechboro Court crossing	Morley Drive East/Beechboro Court intersection							Install kerb ramps to facilitate use of existing path crossing.		\$ 2,000
8	1	Capital	Morley Drive	Morley	Commuter (Path)	Clandon Way missing link	Tonkin Highway	Bath Road	180				bele	Install bicycle symbols and direction signage to assist wayfinding along section of Clandon Way which is used as part of the shared path.		\$ 2,000
9	1	Maintenance	Hampton Park Primary School	r Morley	School Students	Hamersley Avenue underpass improvements	Tonkin Highway/Hamersley Avenue underpass							Remove obstacles on path and replace with bollards to prevent vehicle access.	Obstacles create conflicts between cyclists and pedestrians and are a significant danger in shadow/night time.	\$ 6,000
10	1	Capital	North Morley Primary School	Norandra	School Students	Wellington Road/Noranda Avenue crossing improvement	Wellington Road/Noranda Avenue intersection							Realign path on northern approach to crossing to provide gentle curve and perpendicular crossing. Construct cut through left turn island.		\$ 8,000
11	1	Capital	Wellington Road North	Morley/Dianella	Commuter (Road)	Wellington Road cycling street improvements	Noranda Avenue	Morley Drive	950					Install bicycle symbols along route, especially at pinch points.		\$ 6,000

No.	Priority	Funding (Budget Allocation)	Corridor	Suburb/Precinct	Key User Group	Project Name	Start	End	Length (m)	Width	Surface	Type (on/off)	Representative Image	Description of Work	Comments/Issues	Order of Cost Estimate
12	2	Capital	Riverside RSP	Maylands	Recreation (Off- Street)	Tranby House Improvements	Hardey Road/Johnson Road	d Tranby House	200	2.5	Asphalt	Off		Improvements as shown on sketch. Includes: Path realignment, raised crossing and widening to a consistent 2.5m.	Existing path is narrow with tight corners, restricted visibility and conflicts with vehicles during busy periods.	\$ 20,000
13	2	Capital	Riverside RSP	Maylands	Recreation (Off- Street)	Wall Street/Swan View Terrace upgrade			-	-	Asphalt	Off		 Realign right-angle bend in RSP at Swan View Terrace/Wall Street intersection. Realign northern side of crossing across Bath Street and remove "END SHARED PATH" sign. 	Right-angle bend is located at the bottom of a hill and is subject to derbis from pine trees, making it slippery. Realigned curve will improve safety and remove blind spot. Existing high quality asphalt path ends at Bath Street and kerb ramp on northerm side is not correctly aligned. 'END SHARED PATH'sign is incorrect and misleading as the shared path continues in concrete along Swan View Terrace.	\$ 19,000
15	2	Capital	Coode Street/King William Street	Bayswater / Morley	Commuter (Road)	Coode Street cycle lane extension	Haddrill Street	Walter Road	2000		Asphalt	On		Convert kerbside lanes into buffered cycle lanes - Haddrill Street to Broun Avenue. Reallocate road space at Broun Avenue intersection to provide 2x cycle lanes, 2x shared through/left lanes and 1x right turn lane in each direction on Coode Street. S. Provide 1.5m wide cycle lanes in both directions - Broun Avenue to Walter Road. Narrow median islands as required.	Coode Street forms part of a north-south route linking Malaga/Mirrabooka, Morley, Bayswater and the Garratt Road and Redcliffe Bridges.	\$ 750,000
16	2	Capital	Morley Activity Centre	Morley	Commuter (Road)	Rudioc Road cycle lanes	Coode Street	Russell Street	600	1.5	Asphalt	On		Mark 1.5m wide cycle lanes in both directions.	Link from Coode Street into Morley Activity Centre	\$ 19,000
17	2	Capital	Beechboro Road South	n Bayswater	Commuter (Road)	Beechboro Road southern end improvements	Coode Street/Railway Parade	Beechboro Road/Foyle Road	200					Widen southbound cycle lane along Railway Parade to minimum 1.5m Amage to the northbound traffi lane from Coode Street to beginning of cycle lane at Foyle Road. Remove section of median island between Coode Street and Rose Avenue to allow safe overtaking of cyclists Alter solid painted median island between Winifred Road and Poyle Road to broken lines to permit safe overtaking of cyclists	c Significant pinch point on approach to Bayswater station. Widening of the carriageway to provide full width cycle lanes is difficult, therefore the following measures are recommended to manage the conflicts between cyclists and vehicles, particularly in the northbound (uphill) direction.	\$ 40,000
18	2	Maintenance	Coode Street/King William Street	Bayswater	Recreation (Off- Street)	Riverside Gardens gate replacement								Remove gate and replace with removable bollards.	Gate obstructs access to paths within Riverside Gardens and forces cyclists to conflict with pedestrians.	\$ 1,000
19	2	Capital	Riverside RSP	Bayswater	Recreation (Off- Street)	Riverside Gardens realignment	Garratt Road bridge	Tonkin Highway	2300		Asphalt	Off		Realign path across Milne Street intersection, including twi raised crossings with pedestrian/cycle priority. Surface path section of concrete path on both approaches to bridge over drain to delineate the main route. Realign new section of path at boat ramp car park to continue into new section. Install bicycle direction signs along new route to assist in wayfinding and remove old signage which has not been updated.	o Ongoing conflicts between pedestrians, dog walkers and cyclists, particularly on paths adjacent to the river. Need to separate higher speed cyclists by delineating a primary route through the park.	\$ 300,000
														5. Install signs and pavement markings along other paths in Riverside Gardens to indicate a slow speed, shared environment. Do not include speed limits. 6. Fence off-leash area to minimise conflicts between cyclists and dogs. 7. Construct 270m segregated cycling path between bridge and Memorial Drive 8. Investigate surface treatments to discourage high-speed cycling	3	
20	2	Capital	Riverside RSP	Bayswater	Recreation (Off- Street)	Claughton Reserve missing link	Tonkin Highway	Katanning Street	180		Asphalt	Off		Construct direct path link across the northern side of the car park, linking to a future direct continuation to Ashfield Parade.		\$ 65,000
21	2	Capital	Riverside RSP	Bayswater	Recreation (Off- Street)	Katanning Street to Ashfield Parade link	Katanning Street	Ashfield Parade	250		Asphalt	Off		Construct shared path along foreshore to complete the final link in the Riverside RSP within Bayswater LGA.		\$ 45,000

No.	Priority	Funding (Budget Allocation)	Corridor	Suburb/Precinct	Key User Group	Project Name	Start	End	Length (m)	Width	Surface	Type (on/off)	Representative Image	Description of Work	Comments/Issues	Order of Cost Estimate
22	2	Capital	Collier Road	Bayswater	Commuter (Path)	Collier Road shared path extension	Beechboro Road South	Grey Street	1000					Construct shared path along northern verge of Collier Road	Potential to construct as part of Tonkin Highway/Collier Road grade separation project	\$ 170,000
23	3	Capital	Caledonian Avenue	Maylands	Commuter (Road)	Caledonian Avenue improvements	Swan View Terrace	Railway Parade	1800	1.5	Asphalt	On		 Install bicycle symbols along the full length of the route to assist with wayfinding and driver behaviour. Realign the northern approach to the Guildford Road crossing to remove right-angle bends and narrow path in poo condition. 	Quiet street route providing access to Maylands town centre and across rail line. Route is generally OK for cycling in mixed traffic.	\$ 12,000
24	3	Capital	Coode Street/King William Street	Bayswater	Commuter (Path)	Coode Street shared path pinch point	Coode Street/Railway Parade intersection		20		Concrete	Off		Remove tree and widen shared path to 3m to remove pinch point.	Current path is restricted to approx 1.5m wide with fast traffic on one side and a retaining wall on the other side. Key route for commuters to Bayswater train station, town centre and PSP.	\$ 7,000
25	3	Capital	Coode Street/King William Street	Bayswater	Commuter (Road)	Coode Street cycle lane improvements	Railway Parade	Haddrill Street	950				670	I. Install cycle lane signage. Z. Improve the transitions at each end of Coode Street cycle lanes. Widen southbound cycle lane alongside Hillcrest Park parking area by narrowing vehicle lane and install green lane treatment.	Existing sealed shoulders end abruptly with poor transitions that leave cyclists in 'no mans land'. Parked vehicles alongside Hillcrest Park block shoulders.	\$ 25,000
26	3	Capital	Coode Street/King William Street	Bayswater	Commuter (Road)	King William Street improvements	Whatley Crescent	south of Sutherland Street	1200					I. Install bicycle symbols in the centre of the lane between Whatley Crescent and Hill Street. I. Install cycle lanes in both directions between Hill Street and Guildford Road, including changes to lane arrangements at Guildford Road. Install bicycle symbols in the centre of the lane south of Guildford road and into the Riverside Gardens.	Key commuter route. Due to on-street parking and narrow road reserve through town centre, cycle lanes are not achieveable, so cyclists should be encouraged to ride in primary position. South of Hill Street, cycle lanes should be provided. South of Guildford Road, street is very quiet and cyclists can ride in mixed traffic.	\$ 110,000
27	3	Capital	Collier Road	Embleton	Commuter (Road)	Collier Road/McGregor Street/Priestly Street crossing	Collier Road/McGregor Street/Priestly Street intersection							Construct median gap to facilitate direct crossing between McGregor Street and Priestly Street.		\$ 9,000
28	3	Capital	Beechboro Road North	Morley	Commuter (Path)	Beechboro Road North shared path	Morley Drive East	Benara Road	2900		Concrete	Off		Construct shared path along eastern side of Beechboro Road		\$ 490,000
29	3	Maintenance	Morley Drive	Morley	Commuter (Path)	Bruce Road crossing upgrade	Morley Drive							Clear vegetation to improve visibility for pedestrians and cyclists exiting crossing onto Clandon Way and install direction signage to assist in wayfinding.		\$ 1,000
30	3	Capital	Morley Drive	Morley	Commuter (Path)	Bath Road crossing upgrade	Morley Drive/Bath Road							Construct kerb ramp crossing across Bath Road to connect two sections of the Morley Drive south side shared path.	Existing deviation contains right angle bends and unnecessary grades.	\$ 12,000
31	3	Capital	Morley Drive	Morley	Commuter (Road)	Emberson Road crossing upgrade	Emberson Road							 Remove kerb ramp and path to nowhere on eastern side and improve the curve north into Emberson Road. Construct a refuge island crossing of Emberson Road with minor path realignment in a direct line with Hamersley Place. Extend traffic island to provide 3m wide storage area. 	Existing crossing is not aligned and requires pedestrians and cyclists to cross a wide road in a single stage. Key access route to Hampton Park Primary School.	\$ 10,000

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32	3	Capital	Crimea Street	Morley/Noranda	Commuter (Path)	Crimea Street shared path upgrade	Walter Road West	City of Swan Boundary	2600					I. Install cycle lanterns at Crimea Street/Walter Road West intersection Install cycle lanterns at Crimea Street/Walter Road West intersection Install cycle street to reduce speed of turning vehicles & crossing distance Install perform a thread to the street of the street and realign northern approach path. Install pedestrian/bicycle symbols on the pavement throug the Crimea Park car park and install parking signage requiring vehicles to be parked rear to kerb. So Narrow throat at Wonga Road to reduce speed of turning vehicles & crossing distance. Alternatively, install median refuge island. Install median cut throughs and kerb ramp crossings across Crimea Street at Fitzgerald Road, Kennington Road, Fedders Street, Famham Way, Walmsley Drive, Corderoy Way, and Cardwell Avenue.	h Package of improvements to upgrade existing shared path and provide adequate connections. No real room in road reserve to provide cycle lanes or widen shared path.	\$ 190,000
33	3	Capital	Wellington Road	Morley/Dianella	Commuter (Path)	Wellington Road western path upgrade	Morley Drive	Smith Street	400					Widen path to minimum 2.5m - in some sections this may involve paving the entire verge.	Extends current reasonable quality path from Smith Street to Morley Drive, connecting to Camboon Road, Morley Drive and Wellington Road (North) cycling routes. Particularly important as Wellington Road cannot be improved to provide cycle lanes.	\$ 85,000
34	4	Capital	Railway Parade	Meltham	Commuter (Road)	Railway Parade/Hotham Street connection	Railway Parade/Hotham Street intersection				Concrete	Off		Improve connection between the two sections of Railway Parade by constructing an entry point for westbound cyclists from Railway Parade (east) to reach the westbound lane of Railway Parade (west) and a kerb ramp to allow eastbound cyclists to connect to existing path.		\$ 16,000
35	4	Maintenance	Bayswater Primary School	Bayswater	School Students	Leake Street - Roberts Street link	Leake Street	Roberts Street	100					Remove obstacles at eastern end of shared path linking Leake and Robert Streets.		\$ 2,000
38	4	Capital	Beechboro Road South	ı Bayswater	Commuter (Road)	Beechboro Road cycle lanes extension	Collier Road	Broun Avenue	850					Widen roadway to provide northbound and southbound cycle lanes from the end of the existing cycle lane to Embleton Avenue. Construct 'G Turn' for northbound cyclists to turn right into Beechboro Road South (dead end section). Install bicycle symbols along dead-end section of Beechboro Road South dead-end section of Beechboro Road South dead-end section of Beechboro Road South dead-end section of tood, along Tonkin Hichway reserve to Bronu Avenue.		\$ 410,000
39	4	Maintenance	Lockridge Senior High School	Morley	School Students	Milligan Avenue shared path improvement	Milligan Avenue cul- de-sac							Remove obstacles which block shared path and replace with bollard if necessary to prevent vehicle access. Consider realigning path straight through for more effective vehicle access prevention.		\$ 2,000
41	4	Capital	Benara Road	Morley/Noranda	Commuter (Path)	Benara Road shared path (northern side)	Mahogany Road	Maxwell Avenue	1200					Construct shared path along northern verge of Benara Road	Could be implemented as part of Tonkin Highway grade separation.	\$ 160,000
42	4	Maintenance	McGilvray Avenue	Noranda	Commuter (Path)	McGilvray Avenue shared path obstacle removal	McGilvray Avenue/Weatherill Way intersection							Relocate telephone box which is located in the centre of the path. Alternatively, install linemarking to Australian Standard and install reflective material on obstacle.	Telephone box is a significant hazard, located in a shady area in the centre of the path.	\$ 2,000
43	4	Capital	Central Avenue	Inglewood	Commuter (Road)	Central Avenue Bike Lanes	Railway Road	Carrington Street	400	1.5	Asphalt	On		Bike lanes from Railway Parade to Carrington Street	Improves connectivity along this primary corridor	\$ 10,000

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44	4	Capital	Russell Street	Morley	Commuter (Road)	Russell Street Bike Lanes	Walter Road West	Broun Avenue	1100	1.5		On		Develop on-street cycling infrastructure on both sides of the troad for the entirety of Russell Street.	Improve connectivity through the Morley City Centre	\$	8,000
45	5	Maintenance	Maylands Peninsula Primary School	Maylands	School Students	Kelvin Street shared path maintenance			-	-	-	Off		Clear vegetation which obstructs the shared path in various locations, particularly outside 88 Kelvin Street.		\$	1,000
46	5	Maintenance	Collier Road	Embleton	Commuter (Road)	Collier Road shared path maintenance	Broun Avenue	Beechboro Road South						Remove vegetation to ensure full width of path is available, particularly in front of 155 Collier Road.		\$	2,000
47	5	Capital	Walter Road East	Morley	Commuter (Road)	Walter Road West cycle lanes	Embleton Avenue	Crimea Street	1100		Asphalt	On		Install cycle lanes on existing pavement.	Key link from Bassendean/Midland and suburbs east of Tonkin Highway to Morley Acitivity Centre.	\$	50,000
48	5	Capital	Walter Road East	Bayswater/Morley	Commuter (Road)	Walter Road East cycle lanes	Beechboro Road North	Rugby Street	850					Convert kerbside lane in either direction into high quality cycle lane. Consider also installing a median island to facilitate crossing Walter Road and protected right turn lanes	Bassendean LBP proposes similar treatment for the remainder of Walter Road.	\$	55,000
49	5	Maintenance	Noranda Primary School	Noranda	School Students	Noranda Primary School improvements	Walmsley Drive/Watt Road intersection							Remove 'END Shared Path' signage. Improve delineation of route for cyclists to enter the school.		\$	4,000
50	5	Capital	McGilvray Avenue	Morley/Noranda	Commuter (Road)	McGilvray Avenue to Morley connection	Morley Drive	Walter Road West/Russell Street intersection	800					Thistail sourneound cycle fane winn green rane treatment or McGivray Avenue to the stop line, and adjacent to seagull island for the right turn. Summark and bicycle symbols to guide northbound and cyclists travelling from McGilvray Avenue into Ballarat Street. Install bicycle symbols along Ballarat Street and Halvorson Road, west to Wellington Road. Aconstruct improved path connections between Halvorson Road & Wellington Road, and improved crossing to/from Smith Street.	Links McGilvray Avenue cycle lanes into Morley Activity Centre, mainly aimed at medium confidence level cyclists or road cyclists wishing to avoid Morley Drive. Allows access to Weilington Road, Russell Street, Light Street/Drake Street and Coode Street cycling routes.	S	55,000
51	5	Capital	Benara Road	Noranda	Commuter (Road)	Benara Road/McGilvray Avenue intersection improvement	Benara Road/McGilvray Avenue intersection							1. Construct 45deg path connections from cycle lanes to paths on each leg 2. install pavement markings to indicate that cyclists will be claiming the lane' on each approach 3. Narrow the carriageway of the approaches and roundabou to reduce the potential for dangerous overtaking manouevre in roundabout	t .	\$	60,000
52	5	Capital	McGilvray Avenue	Noranda	Commuter (Road)	McGilvray Avenue cycle lane northern end improvements	McGilvray Avenue/Widgee Road intersection							Install pavement markings to indicate that cyclists will be claiming the lane' on the southern approach to the roundabout Install a 45deg path connection on northern departure leg of roundabout to allow a transition to the shared path S. Provide a 45 deg path connection for southbound cyclists on the shared path entering the median island and then the southbound lane. Mark bicycle symbols through the roundabout until the start of the cycle lane.		\$	8,000
53	5	Maintenance	Morley Senior High School	Noranda	School Students	Bunya Reserve path improvement								Remove 'gates' from path at Bunya Street		\$	2,000
54	5	Maintenance	Wellington Road	Morley	Commuter (Path)	Wellington Road/Thomton Stree	t Wellington Road/Thornton Street intersection							Remove grab rail from centre of path and relocate it to the east side of the path.		\$	1,000

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55	5	Capital	Garratt Road	Bayswater	Commuter (Path)	Garratt Road Extension	Whatley Crescent	Guildford Rd	700	2.5	Concrete	Off		Extend the link from Guildford Road to Whatley Crescent		\$ 120,000
56	6	Capital	Railway Parade	Maylands	Commuter (Road)	Railway Parade cycle lanes	Third Avenue	Grand Promenade	1900	1.5	Asphalt	On		Install sealed shoulders along Railway Parade.	Important distributor route along the northern side of the rail line, connecting N-S routes with the rail crossings and PSP access points.	\$ 540,000
58	6	Capital	Leake Street	Bayswater	School Students	Leake Street bicycle boulevard	Whatley Crescent	Bellevue Street	1600		Asphalt	On		Implement bicycle boulevard, including improved crossing of Guildford Road.	Good candidate for bicycle boulevard treatment for cater for school students and utility cyclists. Leake Street is a key feeder to the PSP and linsk with pedestrian subway to cross rail line, as well as the Riverside RSP at its southern end.	. \$ 40,000
59	6	Capital	Leake Street	Bayswater	Commuter (Road)	Leake Street missing link	Outside Bayswater Primary School		90		Concrete	Off		Construct path connection between the two disconnected sections of Leake Street in the centre of the carriageway.	Currently cyclists are required to navigate low quality paths with right-angle bends. Leake Street is a key feeder to the PSP and links with pedestrian subway to cross rail line.	\$ 15,000
60	6	Maintenance	Walter Road West	Bedford	Commuter (Path)	Walter Road West shared path maintenance	Salisbury Street	Russell Street	2400					Remove vegetation to ensure full width of path is available, particularly in front of 188 Walter Road West.	Poor quality path with many obstacles but limited options for improvement.	\$ 2,000
63	6	Maintenance	McGilvray Avenue	Noranda	Commuter (Path)	McGilvray Avenue/Widgee Road obstacle removal	McGilvray Avenue/Widgee Road intersection							Remove bollard in centre of path	Significant hazard due to curve and downhill slope	\$ 8,000
64	6	Capital	Widgee Road	Noranda	Commuter (Road)	Widgee Road cycle lanes	Camboon Road	Alexander Drive	1100					Widen carriageway to construct cycle lanes in missing link between Coulsen Close and Luderman Road.	Missing link in otherwise continuous cycle lanes.	\$ 30,000
65	6	Capital	Camboon Road	Morley/Noranda	Commuter (Road)	Camboon Road cycle lanes	Morley Drive	Reid Highway	2200					1. Remove existing linemarking north of Widgee Road and replace with 1.5m cycle lanes 2. Widen carriageway to provide 1.5m wide cycle lanes from Widgee Road to Morley Drive, including on the immediate approach to Morley Drive intersection. 3. Install appropriate merge treatments at roundabouts		\$ 920,000
66	6	Capital	Camboon Road	Morley/Noranda	Commuter (Road)	Morley Drive/Camboon Road/Wellington Road intersection upgrade	Morley Drive/Camboon Road/Wellington Road intersection upgrade							1 Construct cycle lane on Camboon Road as far as stop line and install bicycle storage box across all lanes. 2. Construct 45 degree path connection on the SW corner of intersection to allow cyclists from Camboon Road to access View Street 3. Continue cycle lane into Wellington Road (by way of road widening) and then construct path transition and appropriate lane termination.		\$ 140,000
67	6	Capital	Bath Road/Emberson Road	Embleton	Commuter (Path)	Irwin Road extension	Broun Avenue	Broadway	250					4. Install cycle lanterns on all crossings Construct shared path along reserve connecting Bath Road/Broun Avenue to Broadway/Irwin Road.	Simple link to improve permeability in Embletown. Can also be considered as part of Bath Road link to Beechboro Road (via either Broadway or Collier).	\$ 40,000
68	6	Capital	East Street & Eighth Ave	Maylands/Bayswater	Commuter (Path)	Shared path on East Street and Eighth Ave	East Street	End of East Street (near River)	Guildford Rd	980	2.5	On		Widen shared path along east street and Eighth Ave till Guildford Road to 2.5m.	Important distributor route provide direct route to the train station	\$ 190,000

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69	6	Capital	Guildford Road	Maylands	Commuter (Path)	Guildford Road (south) works	Darby Road	Riverslea Avenue	1700	2.5	Concrete	Off		Provide a continuous path on the southern section of Guildford Road from Darby Road to Riverslea Avenue	Improves the functionality of Guildford Road for cyclists.	s	250,000
71	7	Maintenance	Beaufort Street/Broun Avenue	Morley	School Students	Broun Avenue shared path maintenance	Coode Street	Drake Street	240					Clear vegetation which is obstructing the shared path on the north side of Broun Avenue, particularly outside 41 Broun Avenue.	vegetation obstructs already narrow shared path	\$	1,000
72	7	Capital	Drake Street	Bayswater / Morley	Commuter (Road)	I Drake Street bicycle boulevard	Railway Parade	Walter Road (continues to end of View Street in City of Stirling)	3300					Implement bicycle boulevard treatment. Includes: uphill cycle lanes on steep sections, selected foad closures, improved crossing of Broun Avenue, improved crossing of Walter Road connections from View Street across Morley Drive into Camboon Road.	Key long term NW-SE route serving Morley and Bayswater, superseding Coode Street. Designed to attract cyclists of all confidence levels.	\$	90,000
73	7	Capital	Catherine Street	Bedford	Commuter (Road)	Catherine Street bicycle boulevard	Wood Street	Russell Street	2600					Implement bicycle boulevard treatment.	Key link from Bedford, Inglewood and Mt Lawley into Morley Activity Centre, avoiding Beaufort Street and Walter Road, as well as serving high and primary schools. Should be continue along Clifton Crescent into City of Stirling.	\$	55,000
78	7	Maintenance	Morley Drive	Morley	Commuter (Path)	Morley Drive East path maintenance	Morley Drive East, adjacent to 41 Morley Drive East				Concrete	Off		Replace section of path which has been deformed due to tre roots.	e	s	1,000
79	7	Capital	Bath Road/Emberson Road	Morley	Commuter (Road)	Bath Road cycle lanes	Morley Drive	Walter Road West	700					Mark cycle lanes on existing pavement and provide alterations to median islands and slow point bypasses as required. Include improved delineation at the junction with Waiter Road West and improved crossing facility into Bath Road south.	Main link into Morley for area east of Crimea Street.	\$	16,000
80	7	Capital	Bath Road/Emberson Road	Morley/Noranda	Commuter (Road)	Emberson Road cycle lanes	Benara Road	Morley Drive	1400					Mark cycle lanes on existing pavement and provide alterations to median islands and slow point bypasses as required.	Main link into Morley for area east of Crimea Street.	\$	40,000
82	7	Capital	Benara Road	Morley/Noranda	Commuter (Road)	Benara Road cycle lanes	City of Swan Boundary	Camboon Road	4100					Progressively install cycle lanes along full length of Benara Road.	East of Crimea Street, the kerbside lanes in both directions can be reallocated as cycle lanes once the Tonkin Highway connection is removed. West of Crimea Street, the existing pavement can generally be marked for cycle lanes, with alterations to median islands as necessary.	Ş	320,000
83	8	Capital	Maylands Peninsula Primary School	Maylands	School Students	Mephan Street shared path	Kelvin Street/Mephan Street	Ferguson Street/Mephan Street	110	3	Concrete	Off		Construct shared path along southern verge of Mephan Street.	Pending advice from school as to demand for this link.	s	35,000
84	8	Capital	Lawrence Street	Bayswater	Commuter (Road)	Lawrence Street bicycle boulevard	Railway Parade	Walter Road	3100						Consider extension of bicycle boulevard along Lawrence Street (with detour via May Street to get around Chisholm College). Connects with Leake Street via rail subway to make continuous north-south route.	\$	60,000
85	8	Capital	Durham Road School	Bayswater	School Students	Clavering Road shared path extension	Raleigh Road	Clavering Road	450					Construct shared path from Raleigh Road south to school entrance.		\$	50,000

N	o. Prior	ty Funding (Budget Allocation)	Corridor	Suburb/Precinct	Key User Group	Project Name		End	Length (m)	Width	Type (on/off)	Representative Image Description of Work	Comments/Issues	Order of Cost Estimate
:	6 8	Capital	Collier Road	Embleton/Bayswater	Commuter (Road)	Collier Road cycle lanes	Walter Road West	Grey Street	3100			Progressively widen Collier Road to provide cycle lanes in both directions.	Highest priority section is from Beechboro Road South to Grey Street, which could be implemented when Collier Road is widened to four lanes as part of Tonkin Highway grade separation project.	\$ 270,000
;	7 8	Maintenance	Benara Road	Noranda	Commuter (Path)	Burges Street link improvement	Benara Road/Burges Street					Remove obstacles from shared path		\$ 2,000

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14	2	External	Perth to Midland PSP	Bayswater	Commuter (Path)	Bayswater Train Station interim improvements	King William Street	Slade Street	50					 Install bicycle symbols through station car park to assist in wayfinding between the two sections of PSI Install appropriate signage (e.g. 'Bicycles Excepted' plates) to legalise eastbound cycling through the car park Alter the transition at the eastern end of the car park to clearly delineate the preferred route. 	Significant missing link in the PSP. Moor improvements are dependant upon the redevelopment of Bayswater Train Station which currently has no timeframe. For unfamiliar cyclists, the area is very confusing. Cyclists generally use the current car park in both directions despite 'No Entry' signage.	\$ 16,000
36	4	External	Tonkin Highway	Bayswater	Commuter (Path)	River Road path transition	River Road				Asphalt	Off		Realign path transition from Tonkin Highway into Rive Road (north).	r Existing transition is a sharp bend with bollards at the bottom of a steep grade. Significant safety hazard.	\$ 10,000
37	4	External	Beechboro Road South	h Bayswater	Commuter (Path)	Bayswater rail crossing improvements	Railway Parade	southern car park						Construct new railway level crossing for pedestrians & cyclists, minimum 4m wide. Include automatic gate but no maze, and provide appropriate connections to Beechboro Road and the Perth-Midland PSP.	Existing crossing is narrow and has right-angle bends, creating significant conflicts between pedestrians and cyclists. A wider, straight crossing would minimise conflicts and improve access across the rail line to/from the PSP.	\$ 35,000
40	4	External	Benara Road	Morley	Commuter (Path)	Benara Road shared path realignment	Weir Place	Tonkin Highway	230					Realign shared path so that it follows road carriageway.	existing path diverts through bushland	\$ 80,000
57	6	External	Guildford Road	Bayswater	Commuter (Path)	Guildford Road/Garratt Road intersection upgrade	Guildford Road/Garratt Road intersection					Off		Upgrade traffic islands, kerb ramps and install bicycle lanterns.		\$ 55,000
61	6	External	Walter Road East	Morley	Commuter (Path)	Tonkin Highway/Broun Avenue/Walter Road connectivity upgrade	Walter Road West/Embleton Avenue	Walter Road East/Beechboro Road North	250					I. Construct PSP on Torkin Highway from Beechbor Road South to Walter Road West (portion of larger project). Construct PSP link to Walter Road West. Construct loop ramps from both Broun Avenue paths onto PSP. Construct eastbound cycle lane on Broun Avenue	Significant crossing of Tonkin Highway, acting as central distribution point for cyclist traffic on a number of routes. Costly to improve on-road facilities in this area to improved off-road facilities to PSP standard are required. Potential to get this partially funded as part of Tonkin Highway grade-separation works.	\$ 130,000
62	6	External	Tonkin Highway	Bayswater/Morley	Commuter (Path)	Tonkin Highway PSP	Dunstone Road	City of Swan Boundary	8200		Asphalt	Off		Construct grade-separated PSP along the western side of Tonkin Highway with appropriate connections to roads including Dunstone Road, Guildford Road, Perth-Midland PSP, Railway Parade, Bassendean Road, Colifer Road, Beechboro Road South, Broun Avenue, Walter Road West, Robinson Road, Morley Drive, Alfreda Avenue, Benara Road.	MRWA project, lobby to have this constructed as part of Tonkin Highway grade-separation projects. Mqor north-south route through Bayswater LGA.	\$ 5,300,000
70	7	External	Coode Street/King William Street	Bayswater	Commuter (Road)	Bayswater Subway widening	Whatley Crescent	Mills Ave						Widen subway to provide (a) 3m wide shared paths on both sides and (b) cycle lanes in both directions. Install cycle lanterns at signals.	Significant choke point for cyclists using Coode/King William Streets and Beechboro Road. It is understood that PTA are investigating the possibility of alterations at this location as part of Bayswater Train Station Upgrade and these improvements should be incorporated.	\$ 25,000
74	7	External	Guildford Road	Bayswater	Commuter (Path)	Guildford Road/King William Street intersection upgrade	Guildford Road/King William Street intersection							Install bicycle lanterns on all crossings.		\$ 75,000
75	7	External	Beechboro Road South	h Bayswater	Commuter (Path)	Collier Road/Beechboro Road South intersection upgrade (path)	Collier Road/Beechboro Road South intersection							Install cycle lanterns		\$ 75,000
76	7	External	Broun Avenue	Embleton	Commuter (Path)	Broun Avenue/Embleton Avenue intersection upgrade	Broun Avenue/Embleton Avenue intersection							Install cycle lanterns		\$ 75,000

77	7	External	Morley Drive	Morley	Commuter (Path)	Morley Drive East/Beechboro Road North intersection upgrade	Morley Drive East/Beechboro Road North intersection		Install cycle lanterns	\$	75,000
88	8	External	Benara Road	Noranda	Commuter (Path)	Benara Road/Crimea Street intersection upgrade	Benara Road/Crimea Street intersection		Install cycle lanterns	\$	75,000

















About Cardno

Cardno is an ASX200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company, listed on the Australian Securities Exchange [ASX: CDD].

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