Town of Cambridge

TOWN OF CAMBRIDGE BICYCLE PLAN 2018 - 2022

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BACKGROUND REPORT

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Document Information

Prepared for	Town of Cambridge
Project Name	Bicycle Plan 2018 Background Study
Site Name	Town of Cambridge LGA
Client Reference	CAMB0003
Project No.	CW963500
Document Title	Town of Cambridge
Discipline Code	Traffic & Transport
Document Type	Report
Document Sequence	002
Date	28 June 2018
Revision Number	D

Approved By: 
Jacob Martin
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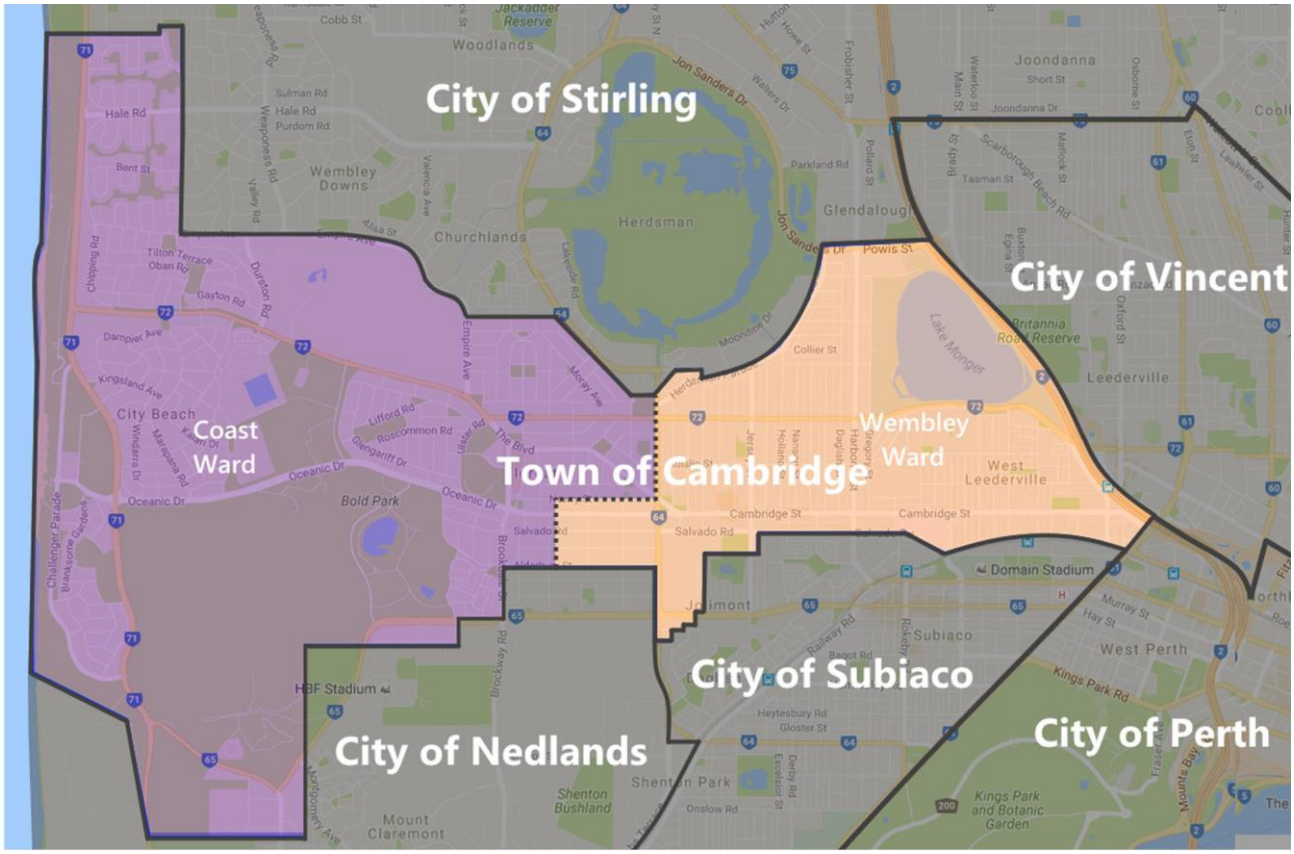
1 Introduction

1.1 Background Context

Cardno has been commissioned by the Town of Cambridge (the Town) to develop a bicycle plan for the Cambridge Local Government Area (LGA). The Plan sets the direction for investment in cycling infrastructure over the next 5 years, informing Council's forward works and budgeting processes.

The Town of Cambridge LGA is located in the Perth Metropolitan Region in Western Australia, approximately 5km north-west from the central business district (CBD) of Perth. **Figure 1-1** shows the Town's location and wards. The Town borders City of Stirling to the north, City of Vincent to the east, City of Perth to the southeast, City of Subiaco and City of Nedlands to the south, and the Indian Ocean to the west.

Figure 1-1 Town of Cambridge – Location



1.2 Objectives

This report mainly focuses on review of the Town's cycling network to gain understanding of existing deficiencies and identify opportunities for network expansion. As part of the study, saddle survey, desktop analysis, community consultation, and stakeholder engagement was undertaken to inform the planning of the Town's cycling network.

This document will serve as the basis for the Bike Plan, where further details regarding the Town's future network will be presented.

2 Policy Review

As part of the Bike Plan, existing local, state, and federal policies related to cycling was undertaken in order to formulate a bike plan that is consistent with initiatives and directions set out by these policies. A list of relevant policies and planning documents that were reviewed is detailed in **Table 2-1** and described further below.

Table 2-1 Policies Relevant to the Bicycle Plan

Policy	Federal	State	Local
National Urban Policy: Our Cities, Our Future (2011)	✓		
Moving Australia 2030 (2013)	✓		
National Cycling Strategy (2010)	✓		
Walking, Riding and Access to Public Transport (2013	✓		
Western Australian Bicycle Network (W ABN) Plan 2014-2031		✓	
West Australian Planning Commission Development Control Policy 1.5 – Bicycle Planning (1998)		✓	
Liveable Neighbourhoods (2009)		✓	
Main Roads WA Policy for Cycling Infrastructure (2000)		✓	
Activity Centres for Perth and Peel		✓	
Perth and Peel @ 3.5 Million		✓	
Our Bike Path 2014-2020		✓	
Perth Transport Plan for 3.5 Million People and Beyond		✓	
Town Planning Scheme			✓
Town of Cambridge Parking Policy (Policy 5.1)			✓
Town of Cambridge Strategic Community Plan 2013-2023			✓
West Leederville Activity Centre Plan			✓

2.2 National Policies

2.2.1 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.

2.2.2 Moving Australia 2030 (2013)

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.

2.2.3 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).

2.2.4 Walking, Riding and Access to Public Transport (2013)

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.

2.3 State Policies

2.3.1 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.

2.3.2 Western Australia Planning Commission Development Control Policy 1.5 – Bicycle Planning (1998)

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.

2.3.3 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.

2.3.4 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 Town of Cambridge 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.

Note that the previous Austroads Guide to Traffic Engineering Practice Part 14 - Bicycles has now been integrated throughout the new Austroads series of guides.

2.3.5 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.

2.3.6 Perth and Peel @3.5 Million

This document provides guidance to government agencies and local governments on land use, land development, environmental protection, infrastructure investment and the delivery of physical and social infrastructure.

This document envisaged Perth and Peel to be a connected city a network of connected activity centres which deliver employment, entertainment and higher-density lifestyle choices. These centres will be designed to be attractive, accessible, compact, vibrant, pedestrian and cycling-friendly environments that have high-quality public transport and road linkages;

2.3.7 Our Bike Path 2014-2020

This document is published by WestCycle and provide a strategic framework to guide the future and growth of cycling in Western Australia. The document envisaged Western Australia as a state that embraces all forms of cycling with safe cycling environment and strong cycling culture with targets set out below:

Category	Description
Participation	Over 1 million Western Australians regularly riding by 2020.
Transport	5% transport mode share for cycling.
Female Participation	Reduce disparity between men's and women's participation in cycling.
Children's Participation	Increasing the percentage of kids riding to school closer to 1970 levels (84% of children walked, cycle or used public transport in 1970).
Safety	Reduce the number of serious bicycle injuries every year.
Image	Dramatically improve community perceptions of cycling as a safe and enjoyable activity.
Sporting Success	Increase the number of Western Australian cyclists winning gold at national championships.
Infrastructure	increase the number of cycling infrastructure facilities in metropolitan and regional WA (includes cycle paths, mountain bike trails and cycle sport facilities) every year

To achieve its vision, the document focuses on 5 key actions that are described below:

Action	Description
Grow a cycling culture	Creating a place where riding is encouraged, supported, and celebrated by creating an
Create a bike friendly communities	environment where cycling is free from negative association and embraced as a normal activity. Transform the streets, roads, and local communities into a place where cycling is safe for adult and children
Build the capability of our community	Support and build the capacity and capability of cycling groups and organisations to effectively deliver cycling initiatives in communities
Strengthen our sporting pathway	Develop pathway structure that enables all Western Australian to achieve their full potential
Develop a cycling economy	Maximise the economic benefits of cycling in Western Australia.

2.3.8 Perth Transport Plan for 3.5 Million People and Beyond

The Perth Transport Plan provides long term vision for Perth's transport network as its population grow to 3.5 million people published by the Department of Transport. The plan covers 4 major transport network: Public Transport, Road, Active Transport, and Freight.

The plan recognised that Perth has the attributes for a great cycling city and cycling will be a big part in reducing congestion, air pollution, and encourage more people to live a healthy and active lifestyle.

The emphasis of the plan for cycling in Perth is to provide high quality, safe, and comfortable cycling infrastructure, especially around activity centre, as well as high quality end-of-trip facilities with a broad objective of increasing cycling trips from 100,000 per day (2011 Census Data) to 500,000 and to extend the off-road cycle network from 172km to 850km when the population of Perth reached 3.5 Million in 2050. On-road cycling routes will be assessed on a case-by-case basis and developed as appropriate to the local road environment, e.g. bike boulevards for older suburbs with grid-like road network.

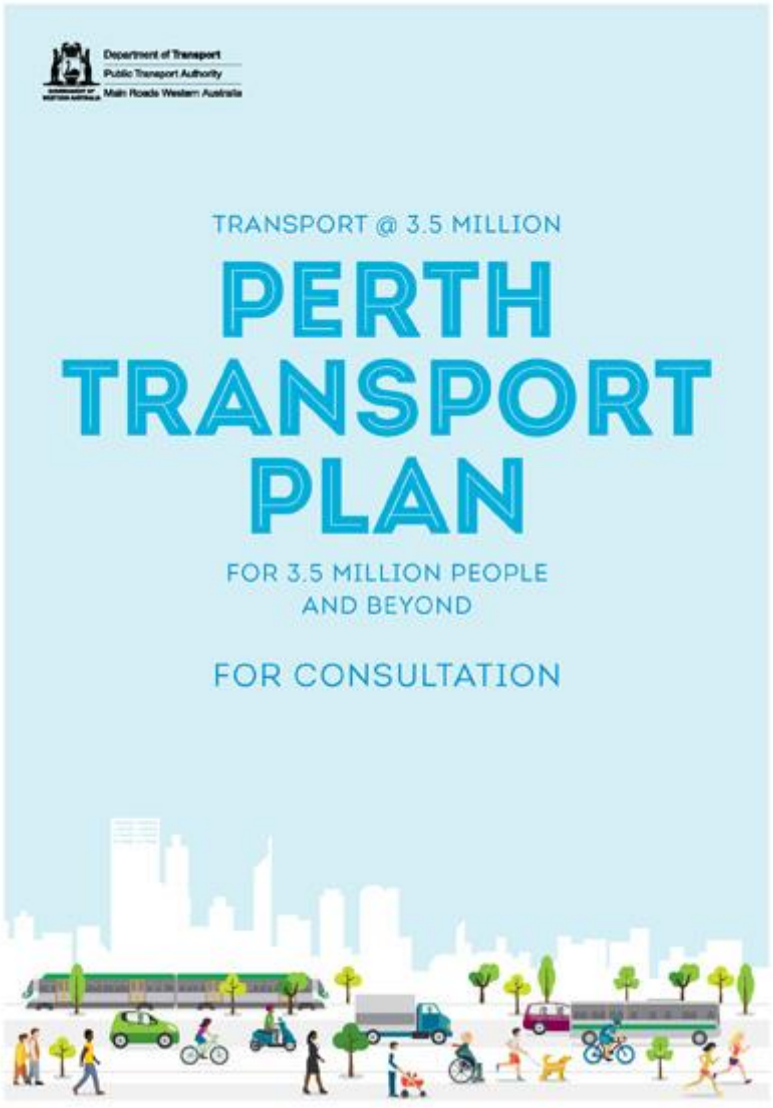
Objective from the plan that can be applied directly to the bike plan include:

> Gaps in the current off-road cycle network will be filled

> End-of-trip facilities will be available at all major centres

> Complete the ocean beachfront off-road cycling network from Two Rocks to Wannanup

> Strengthen on-road strategic network



2.4 Local Policies

2.4.1 Town of Cambridge Town Planning Scheme

The Town Planning Scheme No.1 (TPS No.1) for the Town of Cambridge 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.

2.4.2 Town of Cambridge Parking Policy (Policy 5.1)

Policy 5.1 sets out the access and parking requirements for non-residential developments within the Town. Of relevance to the Bike Plan, one of the aims of the policy is to encourage greater use of and promote other transport modes including cycling to reduce the reliance on the car. Accordingly, the policy presents bicycle parking requirements for short-stay and long-stay for non-residential use. The policy also sets out end-of-trip requirements for land uses which are required to provide long-stay bicycle parking.

2.4.3 Town of Cambridge Strategic Community Plan 2013-2023

The Town of Cambridge Strategic Community Plan 2013-2023 outlines the overriding direction and framework for the town. The Plan comprises strategic guidance for the Town, in which priority areas of Our Community Life, Our Natural Environment, Our Planned Neighbourhoods, and Our Council are highlighted. Key actions within the Strategic Plan and how they relate to the Bike Plan are outlined below:

Priority Area	Goal	Strategy	Key Actions
Our Community Life	Goal 3: An active, safe and inclusive community	Strategy 3.3: Encourage activity that meets the needs of people of all ages, cultures and abilities	Provide connected paths and trails for pedestrians and cyclists
Our Planned Neighbourhoods	Goal 6: Efficient transport networks	Strategy 6.2: Reduce car dependency	Encourage people to use alternatives to cars by providing and improving safe bicycle and pedestrian links and facilities.

2.4.4 West Leederville Activity Centre Plan

The Plan focuses on the West Leederville area between the Leederville and West Leederville Strain Station. The plan lay out a plan to develop West Leederville into a Transit Oriented Development area due to its excellent access to public transport and proximity to the Perth, Subiaco and Leederville Town Centre. A key feature of the plan is the proposed bridge over Mitchell Freeway passing the Leederville Station connection West Leederville and Leederville. The bridge is envisaged to be a ‘transit plaza’ and would accommodate public transport (bus or light rail), pedestrian, and bicycle.

Key elements that arises out of the plan are:

> Opportunities for increased commercial and residential developments, creating a mixed use area that takes advantage of its inner-city location and access to public transport.

> Creating comfortable, interesting and safe routes for pedestrians and cyclists.

> Making public transport infrastructure more appealing and a convenient alternative to private motor vehicles.

> A lively, ‘main street’ character for Cambridge Street, creating a focal point for local retail and services.

> Encouraging a gradual ‘stepping up’ of built form and maintaining a human scale to buildings along street frontages and around public spaces.

> Enhancing the quality, identity, comfort, accessibility and usability of public areas: street, parks and civic areas.

> Improving pedestrian and public transit connections between West Leederville, Leederville train station and the Leederville Town Centre.

Part 3 of the plan provides an overview from access, movement and parking and includes planning principles with regards to cycling:

> Enhance the ‘fine grained’ street network to provide a multiple choice of routes for pedestrians, cyclists and vehicles.

> Develop cycle routes to a standard suitable for all classes of cyclists.

As part of the detailed area plan, it also provides recommendation to promote cycling and walking by providing way-finding facilities at Leederville, West Leederville Station and various strategic street corners, and end-of-trip facilities installed at various locations in the commercial and retail area.

3 Crash Analysis

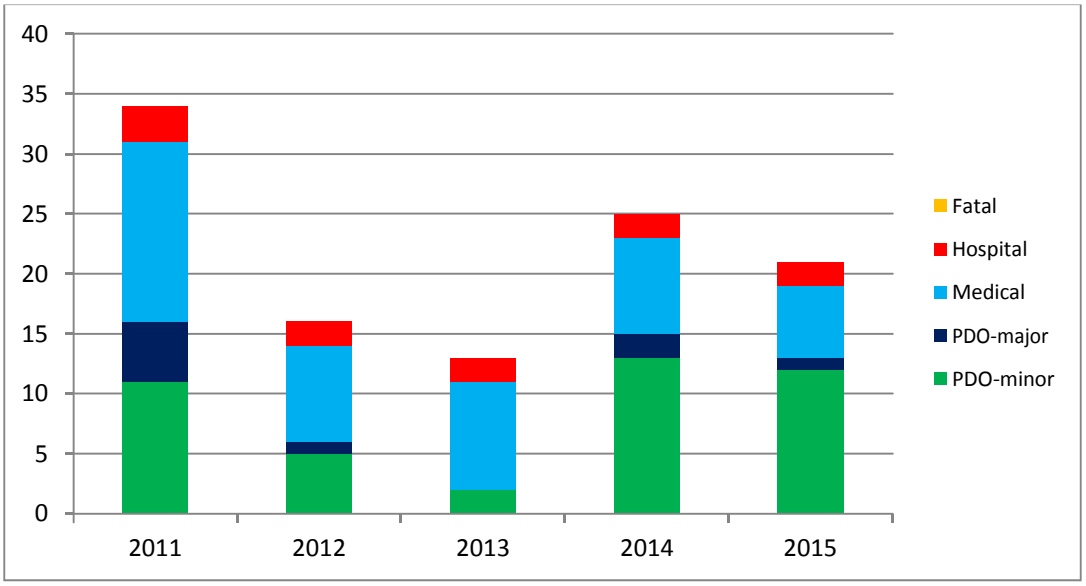
3.1.1 Crash Data

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 Town of Cambridge.

Over the past five-year period from 1 January 2011 to 31 December 2015, a total of approximately 3500 crashes have occurred within the Town of Cambridge, with 3.2% (115 crashes) of them involving cyclists. The number and severity of crashes involving cyclists per year is shown in **Figure 3-1.**

Out of a total of 115 crashes, 48% of the total number crashes are property damage only and 52% of crashes required medical attention or hospital treatment. No fatalities were recorded in the five-year period from 1 January 2011 to 31 December 2015.

Figure 3-1 Severity of Crashes Involving Bicycles



The number of crashes above represents reported crashes only and it is very likely that crashes that only involves minor property damage are not reported.

The number of crash over the 5 year period has fluctuated with significant decrease in 2012 and 2013 from the previous year of 2011 before increasing again in 2014. The overall trend however, shows that there is a reduction in bicycle crashes.

3.1.2 Crash Locations

Roads where crashes occurred more than once are listed **Table 3-1** and shown in **Figure 3-2.** From the data presented, it can be seen that The Boulevard and Cambridge Street have the highest number of crashes. This may only be an indicator that these streets are highly used by cyclists, but further investigation is required to determine appropriate mitigation options.

Table 3-1 Crash Location and Number of Occurrence

Road	Number of Crashes	Road	Number of Crashes
The Boulevard	10	Gregory Street	3
Cambridge Street	10	Southport Street	3
Jersey Street	6	Selby Street	3
Graham Farmer Fwy (Westbound) off to Loftus St	6	Harborne Street	3
Salvado Road	5	West Coast Highway	3
Underwood Avenue	5	Bold Park Drive	2
Grantham Street	5	Howtree Place	2
Marlow Street	4	Empire Avenue	2
Railway Parade	4	Corboy Street	2
Railway Street	3	Northwood Street	2
Challenger Parade	3	Ruislip Street	2
Birkdale Street	3	Lake Monger Drive	2
Dumfries Road	3		

On Cambridge Street, it is notable that 5 out of 10 crashes occurred at driveways. To raise awareness of the presence of cyclists along the path on Cambridge Street, linemarking or/and signs could be installed alerting motorists to look for pedestrians and cyclist. Along both sides of Cambridge Street, the path runs immediately adjacent to the fence line, restricting sightlines for reversing vehicles.

75 crashes or 65% of the total bicycle related crashes occurred at intersections and out of those, 13 crashes occurred at roundabouts. Intersection crashes hotspots can be seen in **Figure 3-2 ,** including:

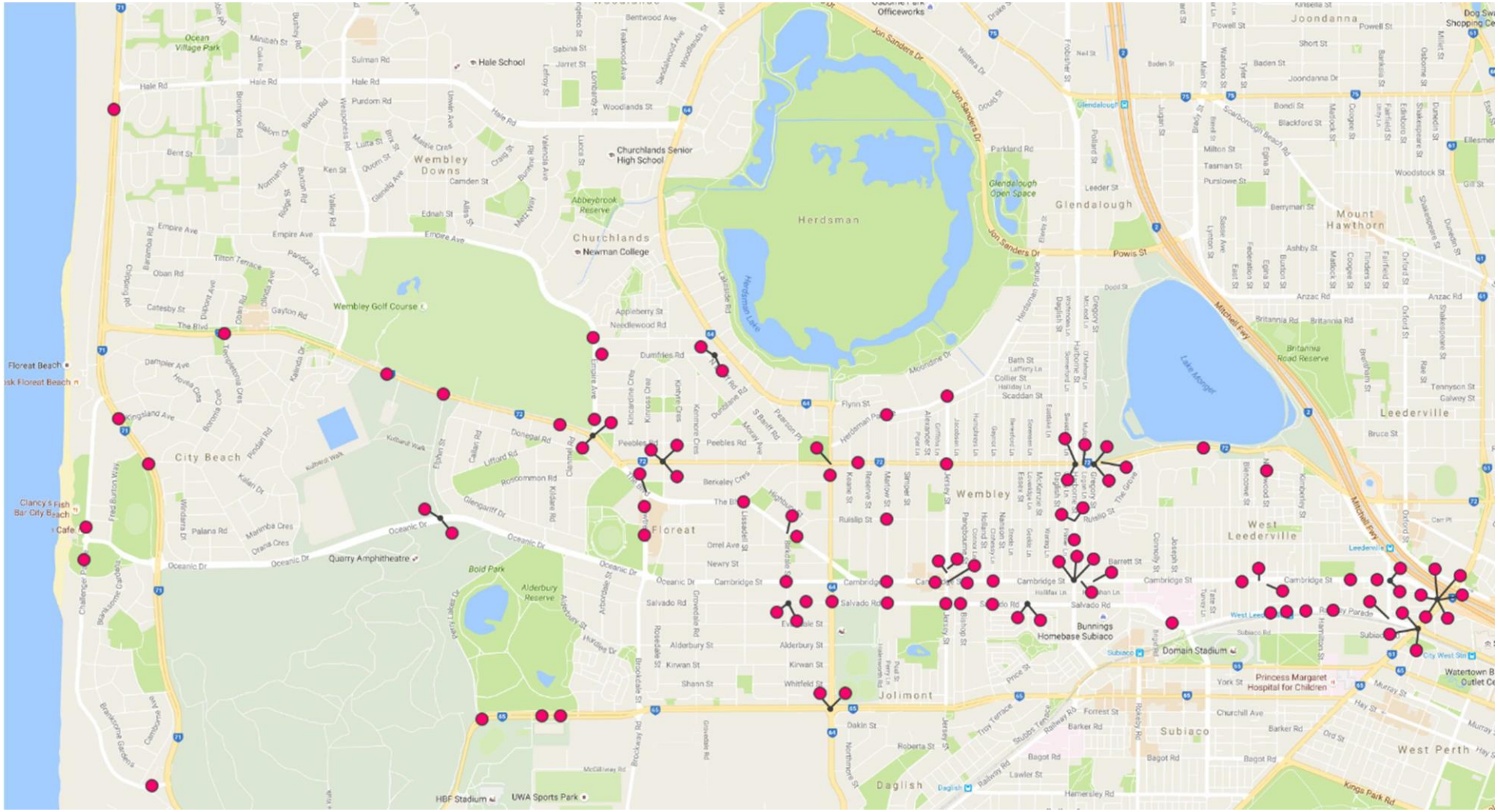
> In the vicinity of Grantham Street and Harborne Street

> Cambridge Street and Harborne Street

> Cambridge Street and Loftus Street

The Town should view this crash data as an indicator to identify locations for safety improvements, including potential for Blackspot funding for vulnerable road users.

Figure 3-2 Crash Location within the Town of Cambridge



4 Consultation

The stakeholder consultation guided the development of the bicycle plan and provided considerable insight into the issues throughout the network. For this reason, garnering the local knowledge and opinions of the community was a key precursor to preparing the Bicycle Network Plan.

The public consultation was held in two stages. In the first stage, a 'blank-slate' survey was presented to the members of the community in order to seek issues, gaps, as well as feedback regarding major routes that are being investigated. The survey questionnaire was developed in conjunction with the Town and advertised on the Town's website, newspapers, and on social media.

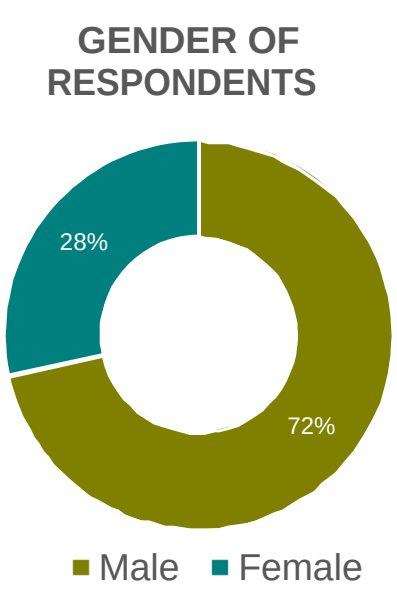
To complement the survey, a community workshop was also held during the survey period to provide opportunity for community members to discuss issues directly with the project team.

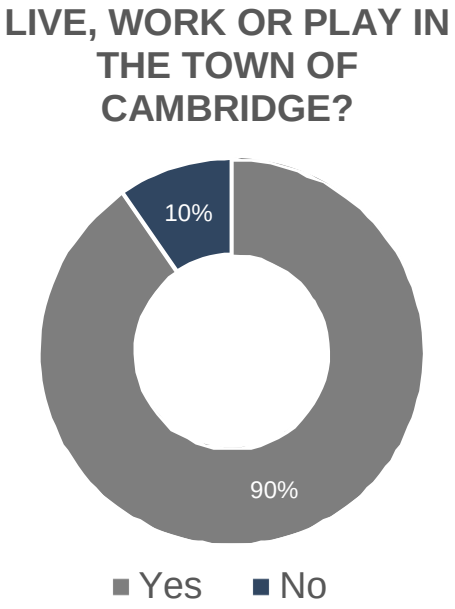
4.1 Survey Results

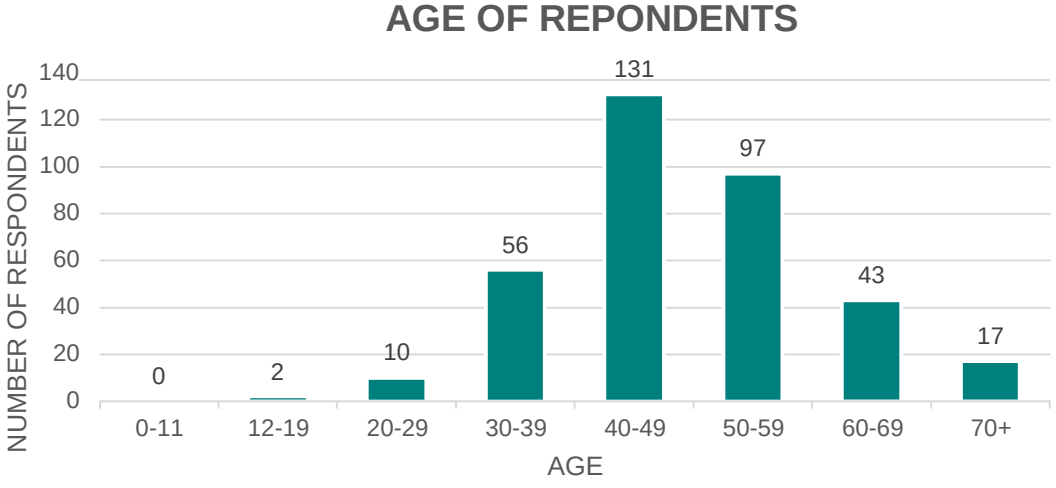
A total of 356 responses were received to the survey, the results of which are summarised below:

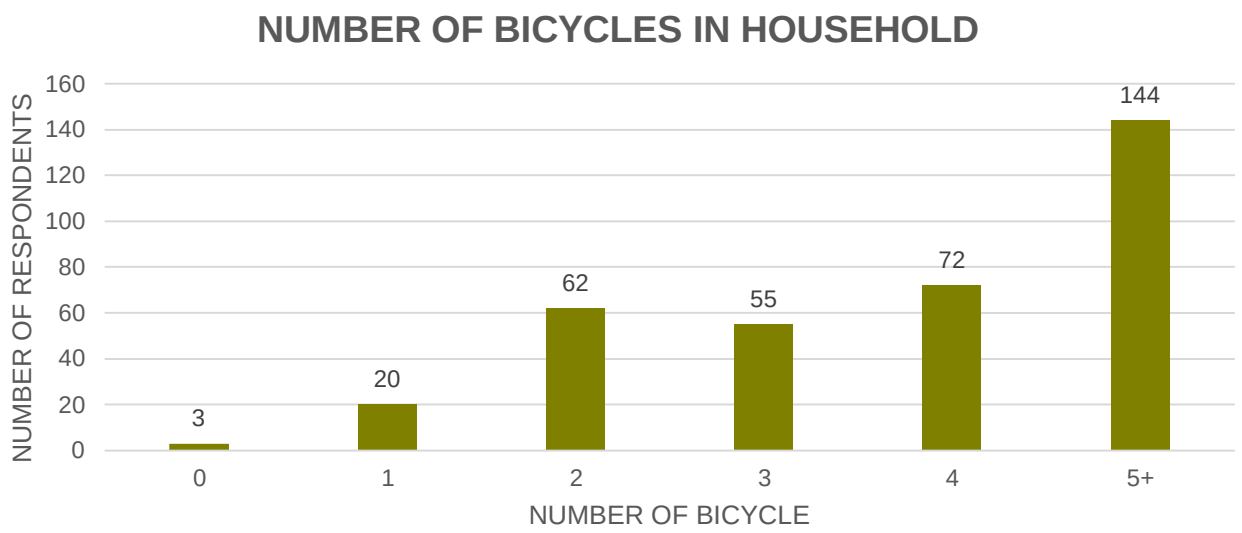
Demographics

The survey respondents demographic are summarised in the following series of graphs





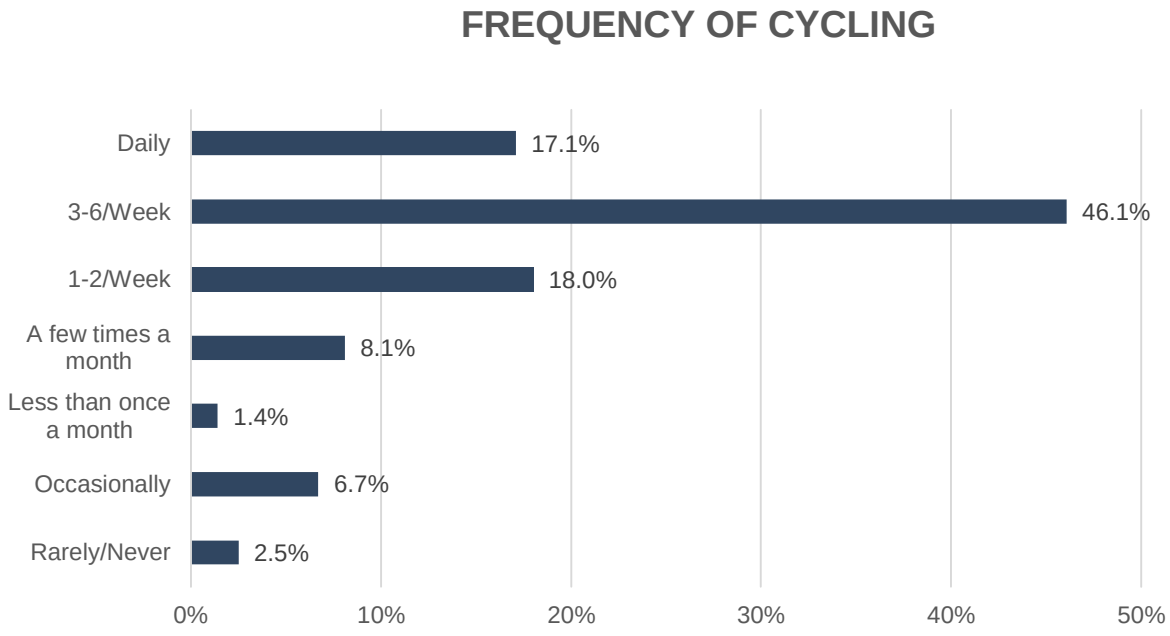


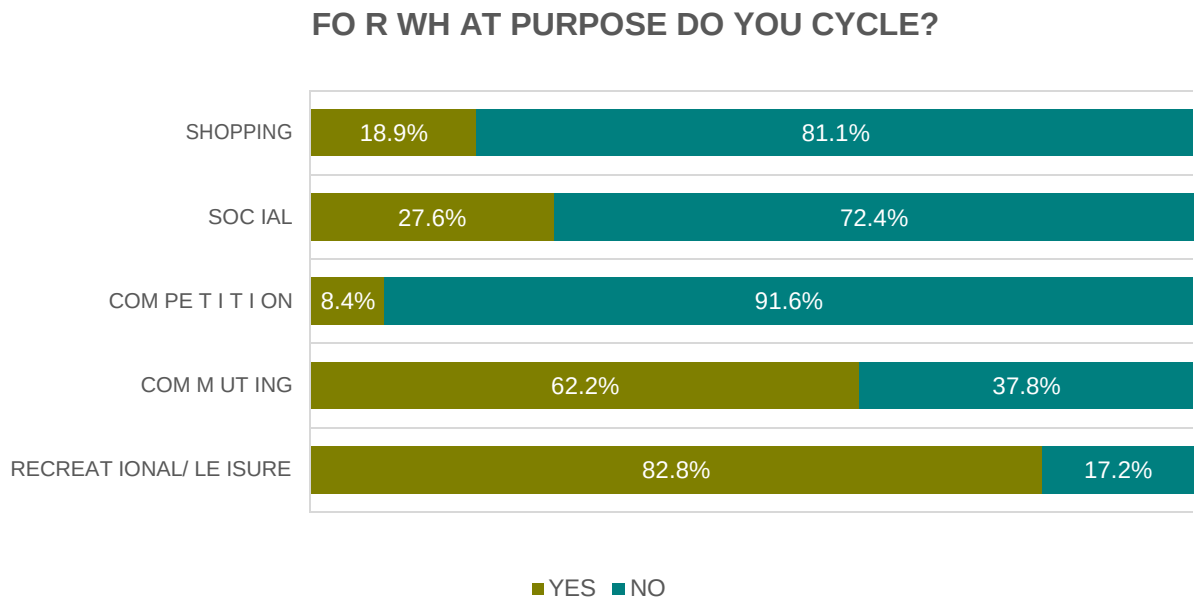


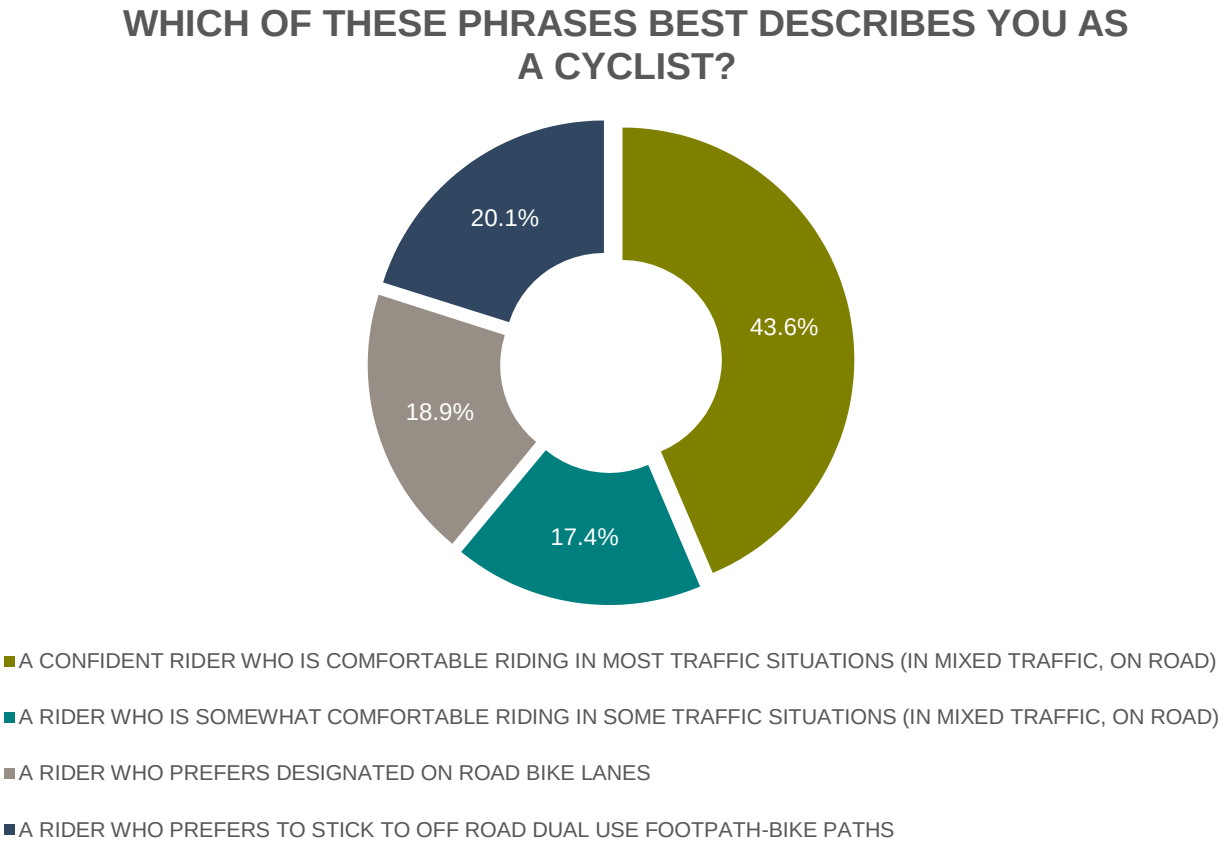
It can be seen from the graphs above that the majority of the respondents are male, which consists of 72% of the total respondents. 40 – 49 years old forms the major part of the age group. 94% of the respondents (333 out of 356) stated that they have at least two bicycles at home indicating strong demands for cycling among the residents.

Attitudes, trip purpose, and frequency

The following series of graphs summarises respondents' trip frequency, purpose and attitude towards cycling.



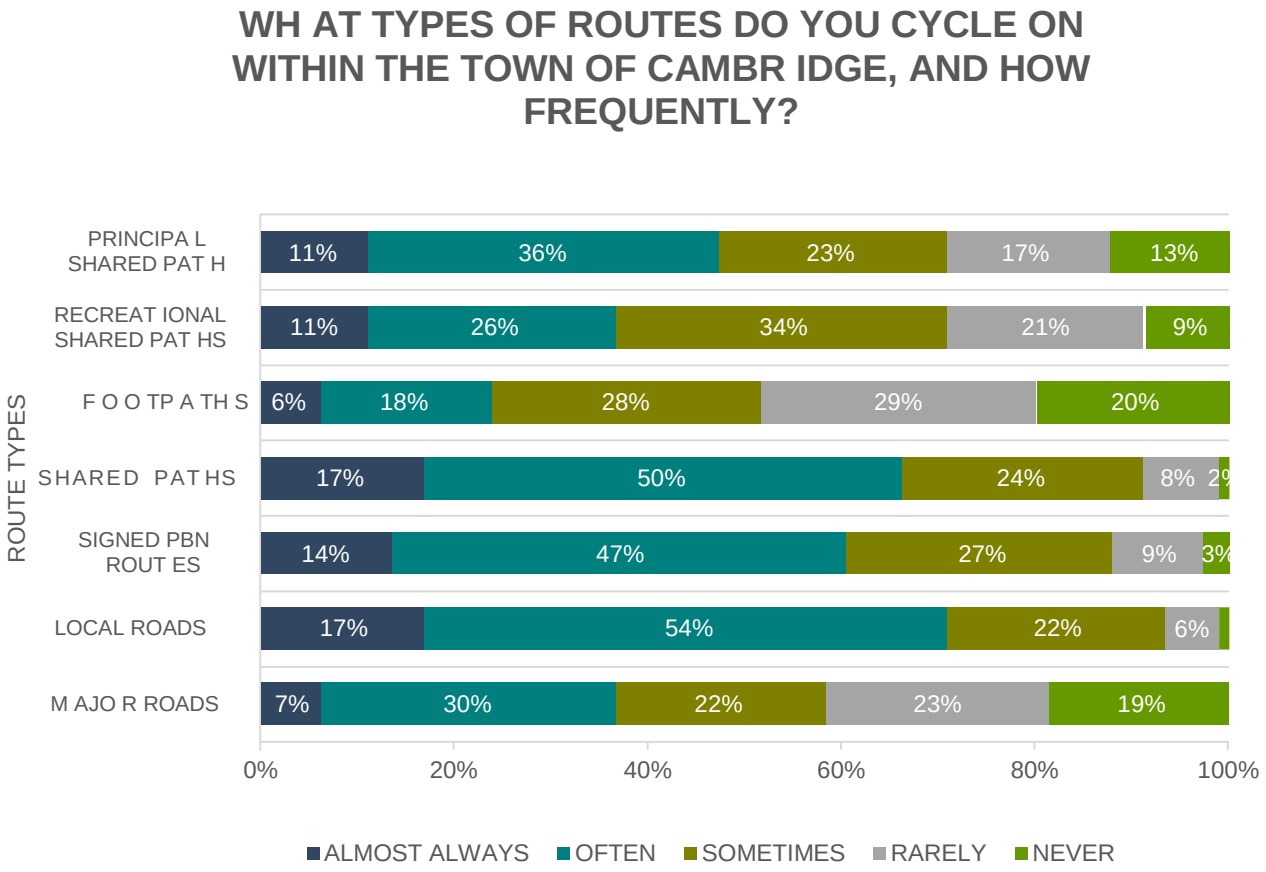




From the graphs shown above it is noted that there is a high of response rate from the recreational and commuter cyclists. The high proportion of respondents stating that they are comfortable riding on the road reflects that the majority of respondents are experienced cyclists.

2.5% of the respondents cited that they rarely or never cycled. These non-cyclist respondents cited that lack of safe places to ride with children, busy roads, and impractical as the main reason for not riding. Consequently, these respondents would like to have a safer and better bike paths.

Route Types



It can be observed that shared paths, signed PBN routes, and local roads are the most popular route types with combined response for ‘almost always’ and ‘often’ exceeding 60% for each of these routes. This is consistent with the ‘experienced cyclists’ profile of the survey respondents. Footpath was found to be the least popular type of cycling route.

4.2 Cycling Routes

The survey also presented a series of existing and proposed major cycling routes that are being investigated for comment by the public. The respondents are encouraged to highlight issues or present ideas for improvement to these routes. The summary of comments from the survey is shown in **Table 4-1.**

While not every comment, issue or recommendation can be addressed in this bike plan, all input from the community have been taken into account and used to help with prioritising recommended projects presented in (**Section 7**).

Table 4-1 Summary of Comments/Issues with Regards to Existing/Proposed Cycling Routes

Jersey Street	◈ Parked cars on both sides of the street, which are hazardous due to dooring. ◈ Medium to high traffic volume. Many consider Jersey Street to be too dangerous to cycle on the road. ◈ Traffic calming measures creating squeeze points for cyclists. ◈ Difficult crossing at Grantham and Cambridge Streets. ◈ Demand for dedicated cycling facility either on-road cycle lanes or bike path.
Gregory Street – Barrett Street – Station Street	◈ Difficult to cross at Powis Street, Lake Monger Drive, Cambridge Street, and Salvado Road. ◈ Crossing at Lake Monger Drive was the most common issue mentioned in the survey. ◈ Dodd Street is unsuitable for on-road cycling due to reversing cars and pick-up/drop-off activity at peak times. The pavement condition is also poor at the eastern end. ◈ Strong desire for a connection to Powis Street shared path. ◈ Described by respondents as generally quiet. There is a desire for cycle path south of Lake Monger Drive.
Selby Street	◈ High traffic volume and speed. Road carriageway too narrow for cyclist and cars. ◈ Poor connection into Herdsman Parade. ◈ Difficult crossing at Flynn Road Roundabout. ◈ Many expressed the desire for on-road cycle lanes, however the narrow carriageway and effect on vehicular traffic are noted to be impediments for implementation. ◈ Shared path between Salvado Road and Hay Street is considered to be good to cycle, however it would be beneficial to extend the path north to Herdsman Lake and south to Shenton Park. ◈ No pedestrian and cycling signals at The Boulevard and Cambridge Street intersection.
Brookdale Street / Howtree Place	◈ Section between Underwood Avenue and Oceanic Drive, is hazardous due to cars parked on-street. ◈ Howtree Place is also mentioned as a section of the route that is hazardous due to various factors including, on-street parked cars, heavy vehicle deliveries to Floreat Forum, and cars entering exiting Floreat Forum car park. ◈ Cycle lanes disappear at Oceanic Drive intersection. ◈ A desire to extend the shared path southward of Underwood Avenue to allow for connectivity with schools along Brockway Road in the City of Nedlands.
The Boulevard	◈ Central median causes pinch points for on-road cyclists as cars are unable to overtake. ◈ Shared path quality is below average and in need for maintenance or upgrade. ◈ Many respondents state that conflict with pedestrians, dog walker, other path users, and lack of priority over driveways and intersections deter commuters from using the shared path. ◈ A desire for on-road cycle lanes.
Oceanic Drive	◈ Unsmooth shared path surface due to debris cracks and tree roots. Needs maintenance and/or upgrade. ◈ Conflict with other path users on the shared path. ◈ Some considered on-road cycling to be acceptable as dual traffic lane allows cars to overtake, while others feel that it is dangerous due to high traffic speed and glare at sunset. Notwithstanding, there is a desire for an on-road bike lanes to be provided.
Ruislip Street	◈ On-street cycling generally considered safe due to low traffic and low number of parked cars, however the traffic calming measures (blister islands) at West Leederville are hazardous for cyclists. ◈ Riding on the off-road path is very inconvenient due to lack of priority at intersections, which require cyclists to stop - start at every intersection. ◈ While Ruislip Street have priority for the most of the length, many reported that cars at intersecting roads do not stop, causing cyclists to be alert at every intersection. ◈ Difficult crossing at Selby Street and Harborne Street.
Cambridge Street	◈ Hazardous to cycle on-road due to parked cars, high traffic volume, and lane narrowing at West Leederville.

	◈ Cycling off – road is not viable due to narrow path, pedestrian traffic, and numerous street furniture (bench, bus stop, etc) ◈ A desire for dedicated on-road cycle lanes. Others also suggested to invest on alternative parallel roads such as Ruislip Street and Salvado Road instead.
Grantham Street	◈ Hazardous to cycle on-road road due to parked cars, high traffic volume, and central medians. ◈ There is a desire for on-road cycle lanes, while others expressed that it is better to provide cycling facility on Ruislip Street.
Salvado Road	◈ Section west of Selby Street is quiet and is considered to be acceptable to cycle on the road. ◈ East of Selby, on-road cycling is considered to be unsafe due to parked cars, unsafe crossing at Harborne Street signalised intersection, and roundabouts. ◈ A desire for a cycling connection into the Fremantle rail line PSP to the east and Oceanic Drive to the west. ◈ A desire for improved crossing at Selby Street intersection. ◈ Shared path surface west of Jersey Street is unsmooth and damaged by tree roots. Needs to be maintained.
Lake Monger - Southport Street - Cambridge Street	◈ Demand for the Lake Monger path to be connected to Powis Street shared path and northward. ◈ Conflict with pedestrians and dog walkers at Lake Monger, need for clear separation. ◈ Dangerous crossing at Powis Street off ramp and Southport Street/Lake Monger Drive intersection. ◈ Path condition is poor at some sections caused by tree roots creating bumps.
West Coast Highway and Challenger Parade	◈ Desire to improve connectivity from the Town to the south of the Town into City of Nedlands and Town of Claremont. Crossing at Rochdale Road was mentioned as particularly dangerous. ◈ Desire for the existing West Coast Highway shared path to be improved/upgraded due to increase pedestrian traffic. ◈ Discontinuous path along the western side of Challenger Parade. Conflict with pedestrians is also an issue. ◈ Cars turning into car parks not paying attention to cyclists on the shared path. ◈ On – road cycling along West Coast Highway is deemed by many to be unsafe due to traffic speed. ◈ On – road cycling on Challenger Parade is considered to be much more conducive for cycling due to lower traffic volume and speed. Many wished for the existing cycle lanes to extend southward. ◈ Discontinuous on-road cycle lane along West Coast Highway
Railway Parade	◈ On –road cycling is not considered safe due to on-street parking, roundabouts, and central medians. ◈ A desire to extend the existing shared path between Haydn Bunton Drive and Northwood Street to Loftus Street and link into the newly built shared path on the southern side of Railway Street in the City of Perth. ◈ Railway Parade and Loftus Street signalised intersection needs to be improved for cyclists. ◈ Very few access points to the Fremantle rail line PSP
Hay Street (Underwood Avenue)	◈ A desire to continue existing shared path on the northern side (east of Selby Street) eastward. ◈ On-road cycling is considered to be dangerous due to traffic speed. As such, there is a desire for on-road cycle lanes among many of the respondents ◈ A desire for on-road cycle lane connection into Perry Lakes Drive.

4.3 Stakeholder Consultation

The following stakeholder groups were contacted in the process of formulating this Bike Plan:

> Department of Transport

> Public Transport Authority

> Main Roads WA

> WestCycle

> Bicycle Western Australia

> City of Stirling

> City of Subiaco

> City of Perth

> City of Vincent

> City of Nedlands

> Floreat Forum Centre Management

> Wembley West Leederville Association

> West Leederville Residents Association

> City Beach Residents Association

> UWA Cycling Club

> St. John of God Hospital Subiaco

> Perth Netball Association

> City of Perth Surf Life Saving Club

> Floreat Surf Life Saving Club

> Schools

> Athletics WA

> North Coast Triathlon Club

4.4 Draft Bike Plan Advertisement

The Draft Bike Plan was circulated to the community and stakeholders for their feedback between 30 April and 30 May 2018. A public information session was also held mid-way through the consultation period on 23 May 2018 to allow community members to discuss the Plan directly with the Project Team.

A total of 79 submissions were received. The majority of respondents (62) expressed their support for the Plan, with only 4 stating objections. 10 respondents stated that they neither supported or objected to the plan, but identified some additional issues. 3 respondents did not specify their feedback.

Respondents submitted written comments regarding the bike plan, as summarised below:

> The majority of respondents supported the bike plan

> Respondents were appreciative that effort had been made to create a cycling network, rather than just a path plan.

The main issues identified were as follows:

> Provision of safe crossing and/or crossing improvement/upgrades at busy intersections (e.g. Lake Monger Drive/Gregory Street, Selby Street/Salvado Road) along proposed routes

> Importance of wayfinding to guide cyclists to the best and safest route and to promote the use of the cycling routes

> Concerns from on-road cyclist commuters regarding the effectiveness of the proposed Salvado Road path.

> Concerns regarding the impact of the proposed infrastructure to the street amenities, e.g. trees, on-street parking.

> Need for regular maintenance along paths, including sweeping, vegetation trimming, and replace/fix uneven surfaces.

5 Planning for Cyclists

5.1 On-Street Facilities

Table 5-1 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.

Table 5-1 Design Considerations for On-Street Cycling Facilities

Issue	Considerations
Traffic speed	Traffic speeds are based on 85th 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. 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 85th 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.
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.
Traffic calming devices	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.

Issue	Considerations
	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. Road humps can be uncomfortable for cyclists however when used, the preferred type is a 'flat top' road humps as illustrated in **Figure 5-1**.
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 *Road Traffic Code 2000*, should be used where it is likely that vehicles will park in the sealed shoulders and create an unsafe conflict between cyclists and vehicles.
Surface treatments for cycle lanes or sealed shoulders	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 (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. Rear-to-kerb parking may be mandated through appropriate signage.
1 metre minimum passing distance	A driver of a motor vehicle passing to the right of a bicycle that is travelling on a road in the same direction as the vehicle must pass the bicycle at a safe distance from the bicycle, with safe distance being: ▪ If the speed limit is 60km/h or less: **1m** ▪ If the speed limit is more than 60km/h: **1.5m** This new legislation also allows drivers cross center line markings, including single and double continuous white lines and painted islands, only when it is safe to do so. Designer must consider this rule when considering on-road cycling, such as cycle lanes or mixed traffic cycling to ensure that enough space is available for drivers to pass cyclist at a safe distance of 1m.

5.2 Off-Street Facilities

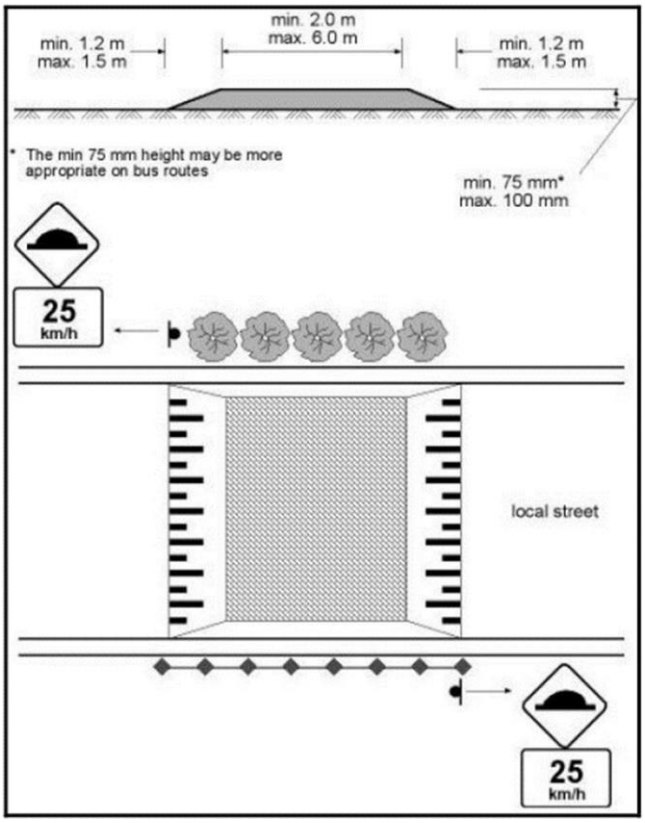
Table 5-2 provides a summary of key considerations when planning typical off-street facilities, i.e. shared paths.

Table 5-2 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 Town 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 volumes of cyclists. An example of a bicycle lantern is shown in **Figure 5-2.**

Issue	Considerations
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.

Figure 5-1 Typical Flat Top Road Hump



Source: Austroads Guide to Traffic Management Part 8

Figure 5-2 Bicycle Lanterns

5.3 Bicycle Boulevards (Safe Active Street)

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. In WA, the DoT is funding bike boulevard projects under the Safe Active Street program. 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. Below are some examples of bicycle boulevards.

Figure 5-3 Shakespeare Street Bicycle Boulevard – City of Vincent, WA

Source: Department of Transport

Source: Nearmap February 2017

Figure 5-4 Spokane Street Bicycle Boulevard Utilising Contra-Flow Bicycle Lane with Partial Road Closure – Portland, Oregon USA

Source: Oregon Live (photo mirrored to reflect left-hand traffic flow)

Figure 5-5 Williams Avenue Bicycle Boulevard Utilising Diagonal Road Closure – Portland, Oregon USA

Source: National Association of City Transport Officials, USA (photo mirrored to reflect left-hand traffic flow)

5.4 Protected/Separated Cycle Lanes

Protected or separated cycle lanes are on-road cycling facility where bicycles are physically separated from main vehicular traffic. Protection or separation from vehicular traffic can be in form of solid kerb barrier, on-street parked cars, or painted chevrons. If the cycle lane is placed between parked cars and the road kerbing, a minimum of 1m gap would need to be provided to allow room for opening car doors without impeding the cycle lane. The cycle lanes can be configured as bidirectional cycle lanes on one side of the street, or one-way in each direction on both sides of the street.

Refer to **Figure 5-6** to **Figure 5-8** for examples of protected cycle lanes in different configurations. Further information regarding protected cycle lanes can be found in *Technical Note 128: Selection and Design of Cycle Tracks* by Queensland Department of Transport and Main Roads, which provide comprehensive design guidance for protected cycle lanes.

Figure 5-6 Protected/Separated One-way Cycle Lanes, Between Parked Cars and Road Kerb – Swanston Street, Carlton VIC

Source: Bicycle Network Australia

Figure 5-7 Protected/Separated One-way Cycle Lanes, Painted Chevron – Victoria Street, North Melbourne VIC

Figure 5-8 Protected/Separated Bidirectional Cycle Lanes, Solid Kerb Separated – Fitzroy Street, St. Kilda VIC

5.5 Cycle Lane / Sealed Shoulder Termination

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.

5.5.1 Signalised Intersection

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 5-9**. 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.

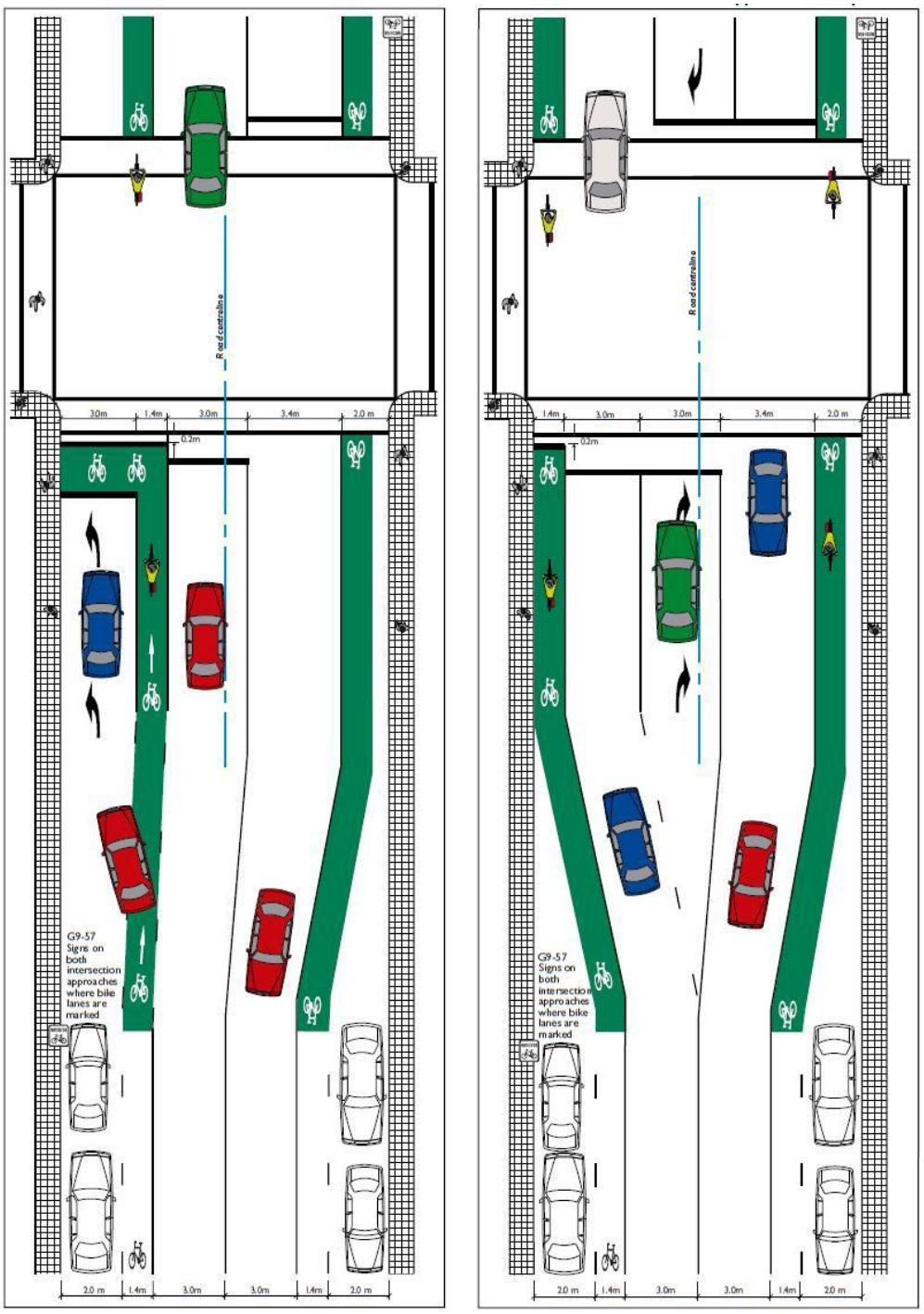
The most important aspects of this treatment are that:

> 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 5-9 Example of Cycle Lane / Sealed Shoulder Termination Treatment Where Road Widens on Approach to a Signalised Intersection



5.5.2 Roundabouts

At single lane roundabouts, current practice in the Town 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 5-10.**

The most important aspects of this treatment are that:

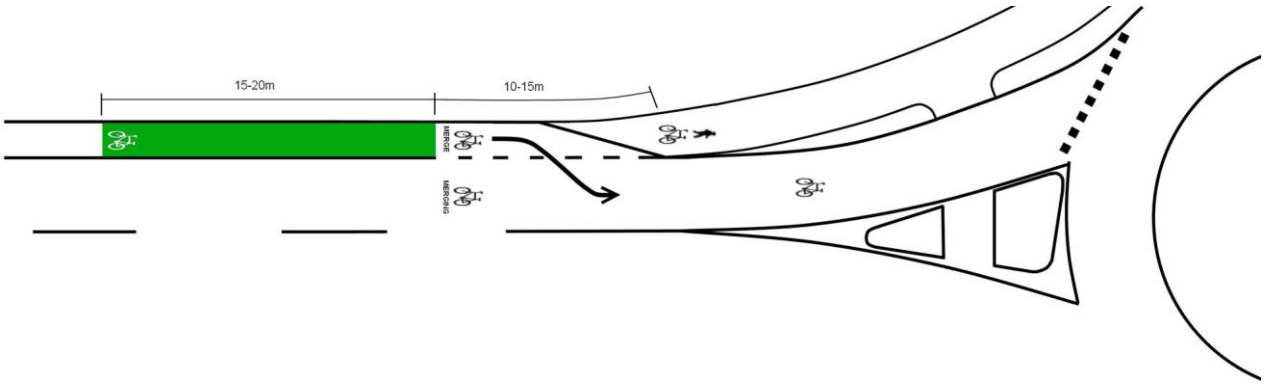
> The termination of the cycle lane/sealed shoulder occurs well before the give way line at the roundabout

> 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 5-10 Example of Cycle Labe / Sealed Shoulder Termination Treatment at Single-Lane Roundabout



6 Wayfinding

6.1 Best Practice

Western Australia has a number of wayfinding strategies. The more recent examples include the *City of Cockburn – Your Move* and at the City of Joondalup. Refer to **Table 6-1**.

Table 6-1 Best Practice Examples

City of Cockburn - Your Move	
 ***Source: City of Cockburn***	In 2013, the Department of Transport and the Department of Sport and Recreation, in collaboration with the City of Cockburn, rolled out the 'Your Move Cockburn' pilot project. The project involved engaging more than 10,000 households and empowered them to replace regular car trips with trips on foot, bicycles and public transport. One of the most crucial aspects of the project was the addition of way-finding signs around the City of Cockburn. These signs were placed on pavements along the City of Cockburn. The aim of these signs was to inform residents and visitors of destinations nearby and the time it took to walk there. From feedback collated, a significant number of residents were unaware of the number of amenities that were within walking distance. The bright and attractive nature of the sign generated interest from the local community to use it as well. As a result the following was achieved: ▪ Over 410,000 car trips avoided. ▪ Over 8 million reduced car minutes travelled. ▪ Increase of 10.5 minutes in physical activity per person per day. ▪ A shift of more than 8% of the population being reclassified from insufficient to sufficient levels of physical activity.
City of Joondalup	
 ***Source: City of Joondalup***	A wayfinding Signage Strategy was developed for the City of Joondalup with the aim of supporting the City's overarching "Walkability Plan 2013-2018'. In addition, the strategy also assists the City of Joondalup to create a useful wayfinding system for the benefit of its users. In doing so, the system should be: ▪ Highly visible. ▪ Lead the user to their destination. ▪ Highlight key places within the immediate area. ▪ Integrate with the existing signage.

a) Implementing a Wayfinding Signage Project

Implementing a signage project consists of the following phases. Refer to **Table 6-2**.

Table 6-2 Implementing a Wayfinding Signage Project

Process	Description
Audit and Removal of existing signage	Initially an audit on each key cycling area would need to be conducted to itemise any existing signage and determine signs requiring removal. Approval may be required for the removal of signs.
Development of sign context	Prior to choosing types required and developing sign contents, a map detailing location of signs is needed. This may require an on-site audit of the area to identify cycling movements in the project area.
Installation of signage	Installation undertaken by an external signage company for manufacture and installation.
Promotion	The following publications could be used to promote a signage project. ▪ Town of Cambridge Website ▪ Social Media ▪ Local Newspaper
Developing supporting materials	Consider developing the following supporting materials to complement signage projects ▪ Add data and information to website. ▪ Hard copy and electronic maps. ▪ Marketing documents e.g. brochures. ▪ Integrate with existing technologies (such as Google maps, mobile phone applications, etc.)
Maintenance and repairs	Maintenance and repairs must be reported to the Town's Works Department.

b) Sign Selection and Placement

Signs should be selected and applied according to the following guidelines to establish a consistent and clear system of Wayfinding Signage System:

> The sign chosen must be the appropriate sign.

> Place in a prominent and highly used location with minimal sun reflection.

> Have clear and unimpaired sight lines.

> Located within 5 metres of an existing light pole or illuminated if existing light is unavailable.

> All $2m^2$ around the signs for footing.

> Consider electricity requirements where digital screens are proposed.

> Signs must not hinder the existing CCTV sight lines.

7 End of Trip Facilities (EoT)

7.1.1 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 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 three train stations either within of near the Town's boundary (Subiaco, West Leederville, and Leederville). 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.

Figure 7-1 End of Trip Facility

7.1.2 Locations

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

7.1.3 Development Provisions

The latest Town Planning Scheme TPS 1 Policy manual does include requirements for long-stay bicycle parking to provide EoT facilities requirements are shown in **Table 7-1**.

Table 7-1 End of Trip Facilities Requirements

No. of long-stay bicycle spaces provided	No. of Lockers[1]	No. of Showers [2]
1-2	1-2	0
3-5	3-5	1
6-10	6-10	2 (one male, one female)
11-20	11-20	4 (two male, two female)
More than 20	20 or more	4 (two male, two female) **Plus** Additional showers at the rate of 2 showers (one male, one female) for every 10 long-stay parking spaces over 20 provided thereafter

Notes:

[1] To be of suitable volume and dimensions to allow storage of clothing, towels, cycling helmets and footwear; well ventilated, secure and lockable; and located close to shower and change room facilities (where provided). A ratio of one locker to one bicycle space is to be provided.

[2] Change room facilities must also be provided and may either be a combined shower and change cubicle or communal change room for each gender directly accessible from the showers.

7.1.4 Bicycle Parking at Schools

Bicycle parking at school is important to encourage students to ride to/from school. All schools within the Town of Cambridge 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.

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 Town to upgrade bicycle parking at schools should be coordinated with the further development of the cycle network in the area.

8 Encouraging Behaviour Change

While constructing new infrastructure is crucial to the promotion of cycling in the Town, 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 Town, will be outlined.

8.1 Method of Travel

The methods of travel for Cambridge residents are displayed in **Table 8-1** below. It is interesting to note that the number of those travelling by car as driver and the number of those travelling via bicycle has grown. The Town has seen a growth in cycling similar to the Greater Perth area.

Table 8-1 Cambridge Mode of Travel

Main method of travel	2006			2011			Change
	Number	%	Greater Perth %	Number of	%	Greater Perth %	2011-2006
Train	212	2%	4.9	321	3%	3.7	109
Bus	559	6%	4.9	752	8%	4.0	193
Ferry	5	0%	0	0	0%	0.0	-5
Tram	5	0%	0.2	3	0%	0.0	-2
Taxi	39	0%	0.2	33	0%	0.2	-6
Car, as driver	6,875	76%	75.8	7,265	73%	78.8	390
Car, as passenger	496	6%	6.9	524	5%	6.4	28
Truck	41	0%	1.2	31	0%	0.7	-10
Motorbike/Scooter	55	1%	0.7	92	1%	0.7	37
Bicycle	264	3%	1.2	402	4%	1.4	138
Other	59	1%	1.3	89	1%	0.7	30
Walked only	390	4%	2.4	477	5%	2.7	87
Total	9,000	100%	100	9,989	100%	100	989

Source: ABS 2011

8.2 Target Audience

To achieve the Town'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 Town of Cambridge'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 Town.

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.

8.3 Cycling Segmentation

Cycling segmentation (as illustrated in **Figure 8-1** below with the segments described in **Table 8-2)** is a best practice model for identifying the type and needs of existing and potential cyclists.

Figure 8-1 Cycling Segmentation

Source: Roger Geller, Portland Bureau of Transportation, https://www.portlandoregon.gov/transportation/article/264746

Table 8-2 Cycling Segmentation – Descriptions

Type	Approximate Proportion	Description
Strong and Fearless Enthused and Confident	1% 6%	Will ride anywhere and in any weather conditions. 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 8-1**) and the community survey results, it is likely that the majority of those cycling regularly or for transport (such as to work) in the Town of Cambridge 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 Town, an emphasis for activities has therefore been placed on encouraging the remaining portion of the population that may cycle occasionally or for recreation. The community survey results also estimate that approximately 83% of the population cycle 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 Cambridge.

8.4 Recommended Behaviour Change Approach and Activities

There are many models for using promotion to encourage behaviour change. **Table 8-3** provides an overview of the considerations of behavioural change. This model is considered appropriate for the Town, 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.

Table 8-3 Behaviour Change Approach

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 *information*.
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.

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.

8.5 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 Town of Cambridge, 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 Town of Cambridge 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.

8.6 Tools and Resources

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.

8.7 To be Able to Ride Appropriately

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.

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

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

8.8 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.

8.9 Positive Reinforcement

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.

8.10 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 Town of Cambridge 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.

8.11 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 Town, 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.

8.12 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 Town of Cambridge and the corresponding facilities they provide are as follows:

> West Leederville Station

> Subiaco Station

> Leederville Station

Compared to similar stations across metropolitan Perth, the provision of bicycle lockers and U-Rails at the stations in the Town of Cambridge 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.

8.13 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.

9 Conclusion

Cardno has been commissioned by the Town of Cambridge (the Town) to develop a bicycle plan for the Cambridge Local Government Area (LGA). This report focuses on reviewing relevant background information to inform future cycling network expansion strategy for the Town, which include:

> Review of relevant planning documents

> Community consultation and workshop

> Stakeholder Consultation

In addition, a saddle survey was undertaken at key routes within the Town in order to confirm the findings of the desktop review and to identify deficiencies in the network that are not documented.

All of the above will inform the planning of the Town's future network, which will be further discussed in the Bicycle Plan document along with proposed recommendations to expand the cycling network.