

# City of Subiaco

## Integrated Transport Strategy 2015-2020: Transport Assessment Report

CEP02360

Prepared for  
City of Subiaco

26 October 2015



CITY OF  
**SUBIACO**

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## Executive Summary

Cardno was commissioned by the City of Subiaco (the city) to develop an Integrated Transport Strategy (ITS) for 2015-2020. The city currently has an ITS which was developed in 2007. Whilst some actions have been completed, some are still ongoing and changes have taken place since which have affected the priorities of the city.

These upcoming changes include:

- > The relocation of the AFL from Subiaco Oval to the new stadium in Burswood.
- > The redevelopment of the Princess Margaret Hospital site following the completion of the new Children's Hospital at the Queen Elizabeth II Medical Centre (QEII MC) site.
- > The relocation of King Edward Memorial Hospital (KEMH) to the QEII MC site.

These changes have made some actions in the 2007 ITS redundant and new actions must be developed to take into consideration the State Government's strategic changes. The ITS has been developed in accordance with the Western Australian Planning Commission's Guidelines for Preparation of Integrated Transport Plans 2012. A literature review of the all documentation related to the ITS was compiled and a brief summary is provided for each document.

Throughout the literature review, inconsistencies between various documents were observed and noted. Some of these inconsistencies include:

- > Conflict between road closures and space for cyclists and the Subiaco Shuttle on Rokeby Road.
- > Mixed community responses from the Think2030 project.
- > Parking demand and supply.

An analysis of the existing transport network was also completed detailing the current state of traffic and transport in the city. This includes information on the road network, trains, buses, pedestrian, cycling and parking infrastructure. Issues regarding the current operation of Subiaco's transport network include the following:

- > High percentage of trips are by private vehicular transport.
- > Poor pedestrian crossing opportunities along strategic roads.
- > Disconnected cycling paths throughout Subiaco.
- > Perception of a shortage of parking in Subiaco.

An ITS has been developed which identifies components of the transport framework which will need to be addressed or considered to ensure continued operation of the city's network. The primary focus of this ITS is to:

- > identify constraints in current and planned road capacity, using the projections of the city (as captured in the most recent update of the Main Roads Road Operations Model (ROM), Directions 2031 and Beyond and the Central Sub-regional Strategy.
- > identify measures to upgrade and improve the regional and local road connections to facilitate safe and efficient vehicle movement, manage freight movements and to reduce congestion.
- > consider the implementation and management of 'Moving People' (TransPriority) principles to facilitate an efficient movement system.
- > identify measures to upgrade and improve public transport connections and facilities to reduce congestion.
- > create a safe environment for pedestrians and cyclists.
- > promote the use of active transport and therefore reducing the reliance on private vehicle transport.

The ITS is based on the information provided from the literature review, the issues present in the existing transport network and the policies and proposals in the future transport network. Cardno has accumulated and refined the information that was available and determined a set of robust and practical recommendations in accordance to the city's requirements. Several options that were previously implemented or in progress were retained where relevant along with new proposals provided to reflect the future direction of the city.

In the previous Subiaco ITS (2007), five elements were used to highlight the ITS. For the sake of consistency and legibility, the same five elements have been referred to in this report. The five different elements have been listed below and with each being discussed in detail as well as recommended actions for the following key elements:

- > Managing travel demand.
- > Improving walking and cycling.
- > Improving public transport.
- > Managing vehicular traffic.
- > Managing parking.

In focusing on these five elements, the intended result is that the city's vision is realised which aims at the following:

- > An effective and integrated transport system with a range of sustainable transport options for residents, visitors and workers, which makes the city less car dependent.
- > The city has a comprehensive, safe and convenient network of cycle and pedestrian routes, and public transport is efficient and accessible to all.
- > The city's roads are managed in such a way that there is less congestion and parking spaces are available to those who need them.
- > Be proactive and innovative in its approach to environmental sustainability and climate change.

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# 1 Introduction

## 1.1 Context

Cardno was commissioned by the City of Subiaco to develop an Integrated Transport Strategy (ITS) for 2015-2020. The city currently has an ITS which was developed in 2007. Whilst some actions have been completed, some are still ongoing and changes have taken place since which have affected the priorities of the city. These upcoming changes include:

- > The relocation of the AFL from Subiaco Oval to the new stadium in Burswood.
- > The redevelopment of the Princess Margaret Hospital site following the completion of the new Children's Hospital at the Queen Elizabeth II Medical Centre (QEIMC).
- > The relocation of King Edward Memorial Hospital (KEMH) to the QEIMC in the future.

These changes have made some actions in the 2007 ITS redundant and new actions must be developed to take into consideration the State Government's strategic changes. The ITS has been developed in accordance with the Western Australian Planning Commission's Guidelines for Preparation of Integrated Transport Plans 2012.

## 1.2 What is an Integrated Transport Strategy?

An ITS is intended to identify and address the diverse needs of a variety of different users. It is generally required to address the broad transport and land use system, including benefits and impacts from transport and the implications of these within the community.

The Department of Transport in 1999 described the purpose of an ITS as:

*"Maximising accessibility of the transport system, utilising a variety of transport modes and to manage transport demand in a way that improves liveability and minimises overall costs to users and the community".*

The Department of Transport's Metropolitan Integrated Transport Strategy (1995–2029) sets out six main principles for planning and delivering transport systems. Integrated Transport Strategies must address these key strategic principles for sustainability:

1. **Safety** – the transport system should be safe for all users.
2. **Efficiency** – the transport system should be provided, operated and used efficiently.
3. **Effectiveness** – the transport system overall should provide effective access and movement for all persons and business for employment, health, education, commercial, service, social, leisure and freight purposes.
4. **Environmental Responsibility** – the transport system should be provided and used in an environmentally responsible manner.
5. **Social Responsibility** – the transport system should provide equitable travel and transport opportunities for residents and businesses, with social benefits and costs being shared by all beneficiaries.
6. **Robustness** – the transport system must provide service in the face of ongoing change during the coming years and must be able to respond to and take advantage of unpredictable economic, social and technological changes.

**At the Local Government level, actions included in any ITS developed should aim at fulfilling the following objectives:**

- > Reduced car use.
- > Reduced journey lengths.
- > Increased use of public transport, walking and cycling.

### 1.3 Vision

A series of objectives determined through the Strategic Community Plan have been chosen as particularly important for the ITS:

- > An effective and integrated transport system with a range of sustainable transport options for residents, visitors and workers, which makes the city less car dependent (page 18).
- > The city has a comprehensive, safe and convenient network of cycle and pedestrian routes, and public transport is efficient and accessible to all (page 18).
- > The city's roads are managed in such a way that there is less congestion and parking spaces are available to those who need them (page 18).
- > Be proactive and innovative in its approach to environmental sustainability and climate change.

In order for an ITS to be successful, the vision should be community-based. The Think 2030 community survey indicated that the community would like to increase infrastructure for walking, cycling and public transport and for Subiaco to become less car-dependent (page 21).

### 1.4 Key Drivers

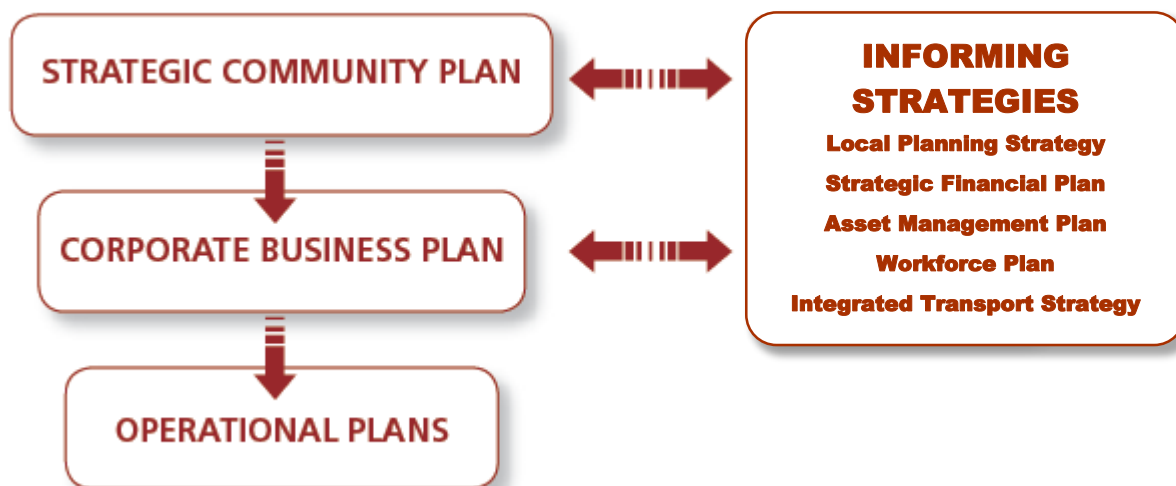
Key drivers of the ITS include:

- > The impact of congestion on local roads, both from traffic generated by residents and people travelling through the city.
- > Parking issues including the perception of the availability of parking.
- > Subiaco Central Development Plan.
- > Increases in density and the impact on transport infrastructure.
- > The projected increase in the number of people travelling into the city for work.
- > The need to reduce car use and increase the use of sustainable transport modes.
- > Road safety.
- > Oil vulnerability, air pollution and greenhouse gas emissions.
- > Health impacts including increased opportunities for regular, incidental exercise through walking, cycling, and walking/cycling to public transport.
- > Improved viability of local businesses.
- > Liveability and place management – reduced traffic congestion and parking problems can make the city a more enjoyable place to live, work and visit.

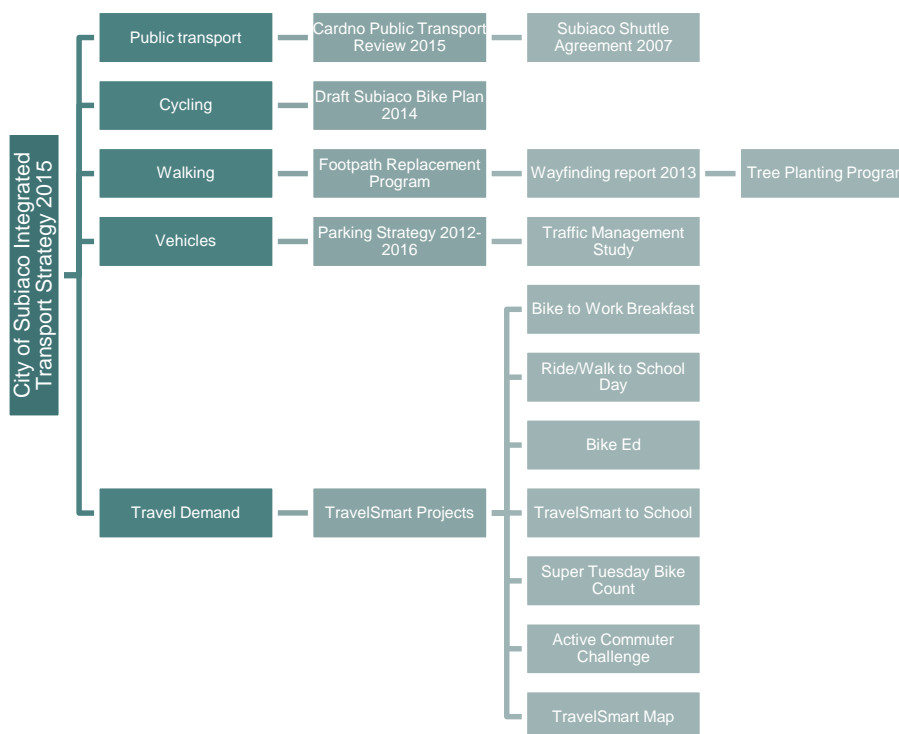
## 1.5 Where does the Integrated Transport Strategy fit?

The ITS works in conjunction with the city's Strategic Community Plan and the Corporate Business Plan, as shown in **Figure 1-1** and **Figure 1-2**.

**Figure 1-1 Relationship between Strategic Community Plan 2012 and Corporate Business Plan 2013-2017**



**Figure 1-2 Integrated Transport Strategy Hierarchy**



Referring to the Strategic Community Plan 2012, the ITS falls under the informing strategies section. The Subiaco ITS is therefore an overarching strategic document that guides the development of transport infrastructure in the context of the needs of the community, and to facilitate the land uses within the Local Government Area, as well as maintain effective transport across the network.

## 2 Literature Review

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### 2.1 State Government

#### 2.1.1 Directions 2031 and Beyond

Directions 2031 and Beyond is a high level spatial framework and strategic plan that establishes a vision for the future growth of the metropolitan Perth and Peel region; and provides a framework to guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate a range of growth scenarios. "Directions 2031" builds on many of the aspirational themes of previous metropolitan plans which sought to guide the future structure and form of the city.

Three integrated networks that form the basis of the spatial framework have been identified:

- > Activity centres network – a network and hierarchy of centres that provide a more equitable distribution of jobs and amenity throughout the city.
- > Movement network – an integrated system of public and private transport networks that are designed to support and reinforce the activity centres network.
- > Green network – a network of parks, reserves and conservation areas that support biodiversity, preserve natural amenity and protect valuable natural resources.

The central sub-region, of which the City of Subiaco is a part, has been allocated a target of 121,000 additional dwellings by 2031.

Directions 2031 replaces all previous metropolitan strategic plans for the Perth and Peel region, and supersedes the draft Network City policy.

Previously, local authorities were required to prepare a "centre plan" for each Regional Centre but this is no longer a requirement. Regardless, the City of Subiaco has already prepared and adopted such a plan (Subiaco Activity Centre Structure Plan). The plan has been submitted to the WAPC and is awaiting approval for public consultation.

#### 2.1.2 Moving People Network Plan

The Moving People Network Plan is a proposal from the Department of Transport aimed at improving the transport system throughout the Perth metropolitan area. The framework focuses on several key themes which include the following:

- > Investing in public transport.
- > Optimising road network efficiency.
- > Expanding the road network.
- > Demand management.
- > Future planning and integration.

This led to the development of three separate plans which include:

- > Public Transport for Perth in 2031 Plan.
- > Perth CBD Transport Plan 2012 to 2016.
- > Western Australia Bicycle Network (WABN) Plan 2014-31.

The details of these plans are mentioned in the sections below.



### 2.1.3 **Public Transport for Perth in 2031 Plan**

The aim of this plan is to increase the level and quality of public transport provision in Perth; this will entail improvements in speed, frequency, reliability, safety and security. The current mass transit system is the rail network; however, it is very much constrained to existing corridors, with expansion through land acquisition or tunnelling being prohibitively expensive.

The plan is focused on the delivery of a new mass transit system for Perth, using existing road transport corridors. This will be implemented through provision of Light Rail Transit (LRT) in more active, central areas and Bus Rapid Transit (BRT) in outer areas.

The following figures describe graphically the proposed progression of large-scale public transport across the Perth Metropolitan Area.

#### **Key outcomes for Subiaco include:**

- > Construction of light-rail 'Knowledge Arc' to connect QEIMC and UWA with the Perth CBD and Curtin University. Delivery is identified for 2020, however the inception of this project has been delayed.
- > Construction of a light-rail corridor connecting to the previously identified 'Knowledge Arc' light rail link and running from Subiaco through to Glendalough Station. Delivery is identified for 2031, however the delay in the inception of the Knowledge Arc project is likely to impact on the implementation of other light-rail infrastructure projects.
- > Light rail between the Perth CBD and QEIMC possibly via Thomas Street and Hampden Road (stage 1).
- > Bus rapid transit between the Perth CBD and UWA (stage 1).
- > Light rail connecting Stirling and UWA via Glendalough and Subiaco, although the route is not clear (stage 2).
- > Light rail connecting Perth CBD to Subiaco Station (stage 2).
- > Bus rapid transit between QEIMC and Shenton Park train station (stage 2).
- > Increased passenger carrying capacity along the Fremantle railway line.
- > Future rapid transit infrastructure between UWA and Canning Bridge (undefined mode or timeframe, and crossing the Swan River).



## PROPOSED **STAGE 1** PROJECTS FOR RAPID TRANSIT INFRASTRUCTURE







#### 2.1.4 **MAX Light Rail Plan (2010)**

An on-road light rail system has the capacity to move up to 7,500 people per hour, operating at a frequency of about two minutes, if it is provided with priority running along the route. The light rail service would need to be introduced at a frequency of about four minutes initially with the capacity to move about 3,250 people per hour in the peak direction and in excess of 30,000 people per day two-way at the point of highest demand. As well as accommodating the projected travel demand along the corridor, light rail has two other significant advantages:

- > The permanence of light rail provides certainty and encouragement for developers to move towards more consolidated, higher density development along the route.
- > The observed phenomenon, often known as the “sparks effect”, applies to rail or light rail, and results in between 10% and 25% additional patronage when compared with buses operating at an equivalent frequency. This is a result of improved comfort, improved legibility (easy to navigate) and other factors relating to passenger preference for rail.

The implementation of the light rail project is to be completed in two separate stages; Stage 1 is the construction of the Central Northern Corridor/UWA while the proposed Glendalough/Subiaco/UWA route is part of stage 2.

*The State Government has announced the deferral of the MAX Light Rail project for three years, which will see overall completion of the project by late 2022.*

The Central Northern Corridor/Curtin/UWA provides a light rail service that links Mirrabooka, Perth and three universities. The proposed light rail network will enable growth to occur at all of the three universities and at QEIIIMC, without unacceptable levels of congestion due to high levels of car traffic that could otherwise be expected. It will also encourage and facilitate transit oriented development at various points along the route, including West Perth, North Perth, East Perth, Victoria Park and Bentley on the periphery of Curtin University.

The Glendalough/Subiaco/UWA route will be required by about 2031 to relieve pressure on the inner section of the Northern Suburbs Railway and create an important connection between the Stirling Strategic Centre, Subiaco, the Fremantle line and UWA/QEIIIMC.

It is likely that this route would need to be serviced by light rail in the longer term, although the technology would be determined following master planning closer to the time of implementation.

##### **Key outcomes for Subiaco include:**

- > Confirmation of the need for and timing of light-rail infrastructure recommended in the Public Transport for Perth in 2031 Plan including the Central Northern Corridor/ Curtin/ UWA route and Glendalough/ Subiaco/ UWA route.

#### 2.1.5 **Perth CBD Transport Plan 2012 to 2016**

The CBD Transport Plan seeks to ensure that the city has a sustainable, integrated and more balanced transport system in the short-to-medium term which can accommodate and complement major city development projects, as well as the major changes in population and economic development currently occurring across metropolitan Perth.

The effectiveness of the transport system within the CBD is affected by the transport needs of the city, its nearby suburbs, and ultimately of the metropolitan region as a whole. This Plan recognises these influences, but will focus on modifying the transport system in central Perth to achieve more balanced and acceptable levels of service for all modes, whether travelling to, within or around the city centre, using these principles:

- > A clear ‘road function hierarchy’ will assign specific modal and network purposes to particular streets to ensure a well-balanced, integrated and efficient system is achieved.
- > Strategic public transport routes into the city centre will be identified, protected and enhanced to achieve improved service levels.
- > City centre (and other major pedestrian areas) will be legible, permeable and have reduced traffic speeds. This will, in part, be achieved by converting most of the existing one-way streets to two-way.

- > Well connected transport systems will encourage destination planning to the city core and other major pedestrian areas.
- > As demand for road space increases, priority will be given to efficient and more sustainable modes – in particular walking, cycling and public transport.

**Key projects relevant to Subiaco include:**

- > Improvements for Buses: The new Central Area Transit (CAT) service (Green CAT) operating between the Leederville and Esplanade train stations via West Perth. The new service allows passengers on the Joondalup Line, who work in the western end of the city, to transfer at the Leederville Train Station onto the Green CAT; passengers on the Fremantle Line to transfer at City West; and those on the Mandurah Line to transfer at the Esplanade Station.
- > Two-way Streets: Continuation of the program to convert most one-way streets in the CBD to two-way operation with only a handful of narrow local streets remaining one-way, including Murray Street (William Street to Thomas Street).
- > Improvements for Cyclists: Extension of Roe Street PSP from Milligan Street to Thomas Street.

**2.1.6 Western Australia Bicycle Network (WABN) Plan 2014-31**

The Draft Western Australian Bicycle Network Plan (WABN) has recently been released by the Department of Transport. This plan replaces the Perth Bicycle Network (PBN) and provides a framework for infrastructure improvements across Western Australia, including both Metropolitan and regional areas.

The WABN 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.
- > Perth and Regional Bicycle Network Grants - Additional funding to Local Government Agencies to plan and provide cycling infrastructure within their jurisdictions. This includes funding of Local Bike Plans, path infrastructure, signage and linemarking.
- > 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 - 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 the Draft Subiaco Bike Plan will be eligible for grant funding via this mechanism.

**Key actions arising from this plan and relevant to Subiaco include:**

- > Review of Local Bicycle Routes.
- > Expansion of the PSP Network.
- > Connecting Stations Program.
- > Perth Bicycle Network Grants Program.
- > Review of Traffic Management on Local Roads.
- > Regional Bicycle Network Grants Program.
- > CBD Transport Plan Cycling Projects.
- > Planning for Cycling Facilities in the Regions.
- > Bicycle Counting and Monitoring Strategy.
- > Online Journey Planner.
- > End-of-Trip Facilities Perth CBD and Activity Centres Study.
- > Connecting Schools.

**2.1.7 State Planning Policy 1 (SPP1) State Planning Framework Policy**

The State Planning Framework is an amalgamation of all planning policies, strategies and guidelines of the State that provide direction on the form and methods of growth and development. The Framework will be used in the following ways:

- > As a Statement of Planning Policy, under Part 3 of the Planning and Development Act (2005), the Commission and local governments must have due regard to the provisions that form part of this Framework in preparing planning schemes and making decisions on planning matters.
- > A Region Scheme made pursuant to the Planning and Development Act (2005) may, by the procedure established under that Scheme, incorporate any provision of the Framework by reference so that it forms part of the Region Scheme and has the force of law.
- > The Commission will assess local government town planning schemes against the State Planning Framework to ensure the scheme is consistent with State and regional policies.
- > With the consent of the Minister, a local government may incorporate any provision of the State Planning Framework by reference so that it forms part of a town planning scheme of the local government and has the force of law.

The State Planning Framework is divided into two parts:

- > Part A General Principles for Land Use Planning and Development

These principles are derived from the State Planning Strategy (1997) and form the basis for all other provisions of this Framework. As well, they will act as the underlying principles for all State and regional plans, policies and strategies.

- > Part B State and Regional Provisions

The plans, policies and strategies that form the State Planning Framework are listed in this Part. They are divided into functional categories and may be amended from time to time. Each policy, strategy or guideline listed shall be called a provision for the purposes of this Statement of Planning Policy.



### **2.1.8      The Western Australian State Sustainability Strategy 2003**

Sustainability is meeting the needs of current and future generations through the integration of environmental protection, social advancement and economic prosperity. This aspiration enables processes to be developed that provide mutually reinforcing outcomes that can benefit the economy, the community and the environment.

Sustainability is a global process but Western Australia is the first Australian State to undertake a comprehensive assessment of what it means for forty-two areas of government. The State Sustainability Strategy is based on a Sustainability Framework of eleven sustainability principles, six visions for Western Australia and six goals for government.

Actions across government that support the framework are presented and will be implemented over a ten-year period and beyond. Six principles of sustainability have been established to be applied across the whole of government.

- > Ensure that the way we govern is driving the transition to a sustainable future.
- > Play our part in solving the global challenges of sustainability.
- > Value and protect our environment and ensure the sustainable management and use of natural resources.
- > Plan and provide settlements that reduce the ecological footprint and enhance our quality of life.
- > Support communities to fully participate in achieving a sustainable future.
- > Assist business to benefit from and contribute to sustainability.

### **2.1.9      Development Control Policy 1.6**

This policy seeks to maximise the benefits to the community of an effective and well used public transit system by promoting planning and development outcomes that will support and sustain public transport use, and which will achieve the more effective integration of land use and public transport infrastructure.

The policy is an integral part of a range of policies directed towards greater urban sustainability, in accordance with the State Planning Strategy and State Planning Policy 3 Urban Growth and Settlements (SPP3). The following policy measures from SPP3 are particularly relevant to this policy:

- > Supporting higher residential densities in and around neighbourhood centres, high frequency public transport nodes and interchanges.
- > Clustering retail, employment, recreational and other activities which attract large numbers of people in activity centres around major public transport nodes so as to reduce the need to travel, encourage non-car modes and create attractive, high amenity mixed-use urban centres.
- > Providing access for all to employment, health, education, shops, leisure and community facilities by locating new development so as to be accessible by foot, bicycle or public transport rather than having to depend on access by car.

The policy objectives are as follows:

- > To promote and facilitate the use of public transport as a more sustainable alternative to the private car for personal travel, to enhance community accessibility to services and facilities, including employment opportunities, community services and recreational facilities, and to improve equity in accessibility for those who do not own or have access to a car.
- > To encourage spatial patterns of development that make it easier to plan and efficiently operate public transport services, and for the existing and potential users of public transport to access those services.
- > To encourage balanced public transport rider-ship along transit corridors by creating places that are destinations as well as points of departure.
- > To ensure the optimal use of land within transit oriented precincts by encouraging the development of uses and activities that will benefit from their proximity and accessibility to public transport, and which will in turn generate a demand for the use of transit infrastructure and services.

- > To ensure that opportunities for transit supportive development are realised, both on public and privately owned land, and that transit infrastructure is effectively integrated with other development, to maximise safety, security and convenience for transit users.
- > To promote and facilitate walking and cycling within transit oriented precincts by establishing and maintaining high levels of amenity, safety and permeability in the urban form, and to promote and facilitate opportunities for integrating transport modes by creating opportunities for convenient, safe and secure mode interchange.

This policy will be implemented by the WAPC in the following ways:

- > In providing advice to the Minister on the preparation, review and amendment of local planning schemes.
- > In providing advice to local government on the preparation, review and amendment of town planning schemes, and the preparation of local planning strategies.
- > In considering applications to subdivide land within transit oriented precincts.
- > In determining applications to develop land within transit oriented precincts.
- > In considering structure plans for new development areas and for the redevelopment of existing urban areas.

In regards to the City of Subiaco, this approach places much of the emphasis for the detailed delivery of transit related development outcomes upon local government planning processes, through the preparation and consistent application of appropriate provisions within town planning schemes, and associated planning policies and design controls, developed and applied under the guidance provided by this WAPC policy. Achieving the policy's objectives will therefore require a collaborative approach between the WAPC and local governments.

#### **2.1.10      State Planning Policy 4.2 (SPP4.2) Activity Centres for Perth and Peel**

This Perth and Peel regional planning framework seeks to:

- > reduce the overall need to travel.
- > support the use of public transport, cycling and walking for access to services, facilities and employment.
- > promote a more energy efficient urban form.

The planned network of activity centres in Directions 2031 aims to provide an even distribution of jobs, services and amenities throughout Perth and Peel. The main purpose of this policy is to specify broad planning 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.

Other purposes of the policy include the integration of activity centres with public transport; ensuring they contain a range of activities to promote community benefits through infrastructure efficiency and economic benefits of business clusters; and lower transport energy use and associated carbon emissions.

The policy objectives are as follows:

- > Distribute activity centres to meet different levels of community need and enable employment, goods and services to be accessed efficiently and equitably by the community.
- > Apply the activity centre hierarchy as part of a long-term and integrated approach by public authorities and private stakeholders to the development of economic and social infrastructure.
- > Plan activity centres to support a wide range of retail and commercial premises and promote a competitive retail and commercial market.
- > Increase the range of employment in activity centres and contribute to the achievement of sub-regional employment self-sufficiency targets.
- > Increase the density and diversity of housing in and around activity centres to improve land efficiency, housing variety and support centre facilities.



- > Ensure activity centres provide sufficient development intensity and land use mix to support high-frequency public transport.
- > Maximise access to activity centres by walking, cycling and public transport while reducing private car trips.
- > Plan activity centre development around a legible street network and quality public spaces.
- > Concentrate activities, particularly those that generate high numbers of trips, within activity centres.

**As Subiaco has been designated as a Secondary Centre in this Activity Centres Policy, there are a number of key requirements to implement the policy:**

- > Preparation and review of local planning strategies.
- > Amendment of local planning schemes.
- > Preparation of activity centre structure plans and district and local structure plans.
- > Application of development control provisions.
- > Retail needs assessment and/or retail sustainability assessment.

## 2.2 Integrated Transport Strategy Review

### 2.2.1 Strategic Community Plan 2012

The Strategic Community Plan is the overarching plan that will guide the future direction of the City of Subiaco and its community. The formation of this plan is a direct result of the Think 2030 process. The plan is broad, with a long term focus and strong emphasis on the community's aspirations, priorities and vision for the future. It is the community's plan and many stakeholders will contribute to its implementation.

In 2010/11 3,700 community members participated in the Think2030 community engagement process which asked the community to provide input on their vision of the future of the city and how to achieve these goals. The engagement process generated over 29,000 ideas, which were condensed into six key focus areas:

- > Our sense of community.
- > Parks, open spaces and places.
- > A unique destination.
- > The built environment.
- > An effective and integrated transport system.
- > Council leadership.

The Strategic Community Plan will inform all of the city's operational plans, including the Corporate Business Plan.

In regards to transport, the community stated that they "want to ensure that in the future it is easy to get in and around the City of Subiaco. The public transport system should be convenient, accessible and high-tech, and must cater to all types of users. The city should have a comprehensive, safe and convenient network of cycle and pedestrian routes. Alternative transport options are vital in reducing traffic congestion and parking pressures, which have been identified as critical future issues. An efficient and high quality public and alternative transport system will help to decrease dependence on cars in the community."

**Table 2-1 An effective and integrated transport system – key strategies**

Key Objective	Objective No.	Objective	Community Outcomes
1. A road management system that meets the needs of all users	5.1.1	Manage and plan our road networks to reduce congestion, while incorporating the increasing population and major developments.	Reduced congestion and increased safety on our roads for all users.
	5.1.2	Reduce the impact of traffic on local roads	
2. A range of sustainable and accessible transport options	5.2.1	Investigate the opportunities for regular public transport services that are free for users.	Knowledge of the potential to bring such services to Subiaco.
	5.2.2	Work to ensure that the proposed light rail system services and benefits the city.	Light rail connections which enhance access to, from and around the city.
	5.2.3	Improve the public transport system that services the city	Improved public transport accessibility and linkages.
	5.2.4	Improve and enhance the city's pedestrian and cycle networks.	The ability to walk and cycle in and around the city
3. An effective parking system that is accessible to all users	5.3.1	Develop a comprehensive parking system that considers both the supply and management of parking.	Parking options that are easy to access, flexible and appropriate for all users. Innovative management of the city's parking facilities.
	5.3.2	Ensure flexibility for commercial parking requirements in the city.	Flexibility in parking requirements that encourage businesses to come to the city.

**When considering the vision for the future of Subiaco, the community plan suggested the following:**

- > Streets designed to minimise vehicle use.
- > Reduced traffic through the Subiaco town centre.
- > Public bike hire facilities.
- > Pedestrian-friendly streets.
- > Light rail links between destinations and facilities.
- > More parking.

These ideas appear to be paradoxical: on the one hand the community would like streets designed to minimise vehicle use and yet would also like an increase in parking. This statement defines the conflict for space; not just competition within the road environment across cycling, public transport, freight and private vehicles, but also in the roadside environment between pedestrians, cyclists and parking of all forms.

It is the competition for space that forms the basis for this ITS. By constructing a hierarchy of transport modes for each transport corridor based on function, geometry and adjacent land use, the conflicts between modes can be reduced and the infrastructure designed to support the desired behaviour.

In the above instance, the community has expressed a desire for easy access to pedestrian-friendly streets. This can be achieved through careful management of road hierarchies, car parking management and roadside environment. By this method, the access and legibility of parking can be improved without increasing parking supply and while creating an improvement in the pedestrian realm.

### **2.2.2 City of Subiaco Corporate Business Plan 2014 – 2018**

The City of Subiaco Corporate Business Plan 2014–2018 outlines the city's key priorities and actions over the next four years. The plan is informed by the Strategic Community Plan and aims to integrate the community's aspirations into the city's operations. It sets out the specific actions that will deliver on the objectives and strategies outlined in the Strategic Community Plan.

The Strategic Community Plan is the result of eighteen months of community engagement events and activities through the Think2030 visioning project. Think2030 was initiated with a commitment to delivering a true community plan, one that reflects the community's priorities, values and vision for the future of Subiaco. Almost 29,000 pieces of information collected during Think2030 informed development of the Strategic Community Plan.

The Corporate Business Plan is structured around the six key focus areas from the Strategic Community Plan. Each focus area includes the objectives and strategies from the Strategic Community Plan. The objectives are statements that describe what the community wants to achieve and the strategies are the measures required to achieve these objectives. To realise the objectives and strategies, the city identified a number of key actions.

**The key focus areas and strategies related to this ITS include:****The built environment**

- > Identify appropriate locations for increased density, and plan effectively in order to accommodate the 3600 new dwellings required by Directions 2031.
- > Work to ensure appropriate infrastructure exists to support increased density.
- > Investigate and consider opportunities for the development of affordable and diverse housing.

**An effective and integrated transport system**

- > Manage and plan our road networks to reduce congestion, while incorporating the increasing population and major developments.
- > Reduce the impact of traffic on local roads.
- > Investigate the opportunities for regular public transport services that are free for users.
- > Work to ensure that the proposed light rail system services and benefits the city.

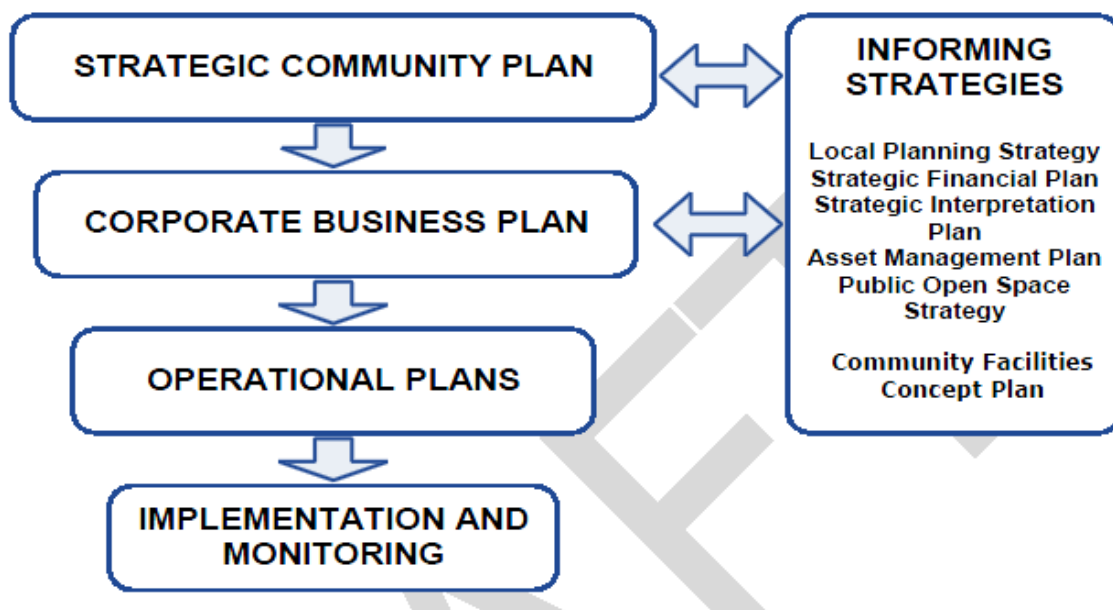
- > Improve the public transport system that services the city.
- > Improve and enhance the city's pedestrian and cycle networks.
- > Develop a comprehensive parking system that considers both the supply and management of parking.
- > Ensure flexibility for commercial parking requirements in the city.
- > Create organisational and community culture that is underpinned by sustainable practice.

### 2.2.3 City of Subiaco Integrated Transport Strategy 2007

The City of Subiaco developed an ITS in 2007. The purpose of the transport study that accompanied the Strategy was to provide planning, policy and societal context and outline the method used to assess the options included within the Strategy.

The following flowchart demonstrates how the Community Facilities Concept Plan fits within the City of Subiaco's Integrated Planning and Reporting Framework; listing those city plans, strategies and policies which are relevant to facility planning. Significant interrelationship exists between all strategic plans and documents, and all plans provide pivotal direction to achieving the city's vision. Consequently, the strategies, recommendations and targets outcomes set out in the above plans have been incorporated into the Community Facilities Concept Plan. With each update and revision of the City's informing strategies, the Community Facilities Concept Plan will also be updated to ensure that community facilities continue to be developed in line with the Strategic Community Plan, and in line with community needs and expectations.

**Figure 2-1 Integrated Planning and Reporting Framework**



Source: City of Subiaco; CommPlan Alliance.

The Strategy identifies five key activity areas:

1. Managing Travel Demand.
2. Improving Walking and Cycling.
3. Improving Public Transport.
4. Managing Vehicular Traffic.
5. Managing Parking.

The Strategy was developed in consultation with the community, stakeholders and a reference group. Staff from Infrastructure, Parking, Planning and Building, TravelSmart, and Community Development were involved in the implementation of the Strategy.

The Strategy has two aspects to implementation:

- > Policies or principles that guide decisions on travel and the transport network.
- > Actions in support of the policies, intended to have direct impact upon access in Subiaco.

This report defines the previous outcomes of assessment, and has been used as one of the key pillars for the Subiaco Integrated Transport Strategy Review 2014 (this study).

**A number of actions recorded positive scores for most or all of the deliverability criteria. These were:**

- > Extend the appropriate traffic calming of city centre streets through a variety of traffic management and speed limit reduction measures, aimed at improving the amenity, comfort and safety of streets for all road users.
- > Use an increase in car parking revenue to fund improvements to public transport, walking and cycling within Subiaco and, if warranted by demand, additional car parking stations.
- > Support parking management associated with hospital and university expansion as outlined in individual parking or traffic management reports.
- > Support the parking policies for QEIIIMC that limit the supply of parking for users during the peak demand period 7.00am to 6.00pm, as outlined in their parking plan.
- > Support no increase in parking supply at UWA, other than limited parking for small commercial ventures, and support parking management strategies to limit overflow of university parking onto surrounding streets.
- > Develop and implement a TravelSmart program for small businesses to be facilitated by the city.
- > Re-run the TravelSmart household program (last run in 2002).
- > Liaise with small businesses to develop incentives to reduce peak demand for parking, such as supermarkets and other shops offering specials on off-peak days and times.
- > Provide more intensive lighting (possibly spotlighting) on the existing pedestrian crossing on Hay Street, east of Rokeby Road and review signing with Main Roads WA.
- > Consider implementation of another zebra crossing on Hay Street west of Rokeby Road with appropriate signing and lightning.
- > Where pedestrian crossing of median islands is encouraged by a marked or railed median, ensure the width is sufficient to cater for gophers, school children and disabled access.
- > Provide information for journey planning for pedestrians, including mapping of safe routes and the most direct route between major uses.
- > Introduce a 5-year plan to undertake a safety and condition audit on all footpaths and shared-use paths inside the city, beginning with city centre street routes.
- > Liaise with MRWA to implement shorter traffic signal phases at key sites to reduce waiting time for pedestrians at key intersections.
- > Construct the remainder of the Principal Shared Path along the railway within Subiaco and assess the safety of existing and planned sections, particularly near rail stations.

## 2.2.4 Subiaco Integrated Transport Strategy Review 2014

The Subiaco ITS Review 2014 is a review of the recommended actions in the 2007 report and provides a status update on the current situation as well as the expected complete date for uncompleted projects.

### 2.2.4.1 Review of the Subiaco Integrated Transport Strategy 2007

**Table 2-2** describes the actions identified in the Subiaco ITS 2007 and their current status at the time of this review.

**Table 2-2 Review of actions recommended by the Subiaco Integrated Transport Strategy 2007**

Strategy 1 – Managing Travel Demand			
Ref	Action	2015 Update	Action Completed?
1.1	Encourage businesses to develop incentives to reduce peak demand for parking.	Not Completed.	No
1.2	Require major institutions to develop green transport plans.	St John of God – yes. QEII MC – yes. Path West at QEII MC – yes. KEMH and PMH – yes but no TravelSmart Officers. UWA – yes but no TravelSmart Officers.	Yes
1.3	Re-run the TravelSmart household program.	Has since been change to the 'Your Move' Program. Expressions of interest will be offered to local governments in the future.	No
1.4	Develop and implement a TravelSmart program for small businesses.	Completed.	Ongoing
1.5	Improve the quality of directional information for pedestrians.	Wayfinding report completed but not implemented	No
1.6	Encourage schools to develop safe walking and cycling to schools program.	Completed, programs are run annually.	Ongoing
1.7	Request the WA Football Commission to further enhance the use of public transport, walking and cycling to events at Subiaco Oval.	Completed 2008.	Yes
1.8	Consider a review of the Town Planning Scheme to increase density and/or land use mix to encourage more people and destinations to be located within the public transport catchment.	Currently being finalised and will be incorporated as part of the development of LPS5.	Ongoing
1.9	Provide employers with information regarding long-term parking and alternative travel options for employees.	Parking maps have not been distributed since 2012 and are currently outdated (last updated in 2010). TravelSmart maps are up to date and are still being distributed.	No
1.10	Develop a City of Subiaco cycling to shops and parks program incorporating engineering, education and encouraging elements.	Draft Subiaco Bike Plan completed and ready to be implemented. Active Shopper Challenge completed.	Ongoing

Strategy 2 – Improving Walking and Cycling			
Ref	Action	2015 Update	Action Completed?
2.1	Review the need for additional zebra pedestrian crossings and enhancements to existing crossings (e.g. lighting).	Completed.	Yes
2.2	Consider design features in building application to enhance pedestrian movement and comfort.	Completed June 2006.	Yes
2.3	Ensure marked or railed median pedestrian crossings are of a sufficient width to cater for gophers, school children and disabled access.	Completed.	Yes
2.4	Liaise with Main Roads to implement shorter traffic signal phases at key sites to reduce waiting times for pedestrians.	Completed March 2009.	Yes
2.5	Construct the remainder of the principle shared path along the railway within Subiaco and ensure the safety of existing and planned sections, particularly near rail stations.	Completed.	Yes
2.6	Request the WA Football Commission to develop a system of secure bike parking at Subiaco Oval.	Not completed due to relocation of Oval.	N/A
2.7	Encourage the provision of end of trip facilities in new developments.	Partially completed.	Yes
2.8	Enforce the appropriate usage of existing bike storage facilities.	The city does not have enforcement capabilities.	N/A
2.9	Ensure car parks, residential areas and routes to the CBD have adequate street lighting for pedestrians.	Completed March 2009.	Yes

Strategy 3 – Improving Public Transport			
Ref	Action	2015 Update	Action Completed?
3.1	Liaise with the State Government and its agencies on the development of a light rail system through Subiaco to service UWA, QEIIIMC and other major demand generators.	The light rail route and scope of work has been developed.	Ongoing
3.2	In the interim period prior to the light rail, liaise with the State Government and its agencies to provide bus services along the general light rail route.	Currently 3 high frequency bus routes exist; 950, 97 and 103. Unlikely that additional routes will be added as the area is well serviced.	Yes
3.3	Liaise with the State Government and stakeholders to implement improvements to the Subiaco Shuttle, including the extension of the service to Leederville and the foreshore, and extended hours of operation in the evenings.	UWA extension completed. The Town of Cambridge was unwilling to contribute to the cost of the extension to Leederville.	No
3.4	Liaise with the State Government to increase the capacity of the train system over time, especially at peak periods.	Public Transport for Perth in 2031 released.	Yes
3.5	Liaise with the State Government to implement improvements to bus service frequencies outside peak periods and to facilitate bus priority for high frequency transport routes.	No State Government funding for improvements.	No
3.6	Investigate opportunities to improve access for patrons to entertainment venues with the city.	Taxi Rank to be completed with installation of CCTV by 30 March 2015.	Yes



Strategy 4 – Managing Vehicular Traffic			
Ref	Action	2015 Update	Action Completed?
4.1	Continue to develop and implement a variety of traffic management and street design measures, aimed at improving the amenity, comfort and safety of streets for all road users.	The Subiaco Bike Plan will ensure that traffic calming devices cater for cyclists.	Yes
4.2	Develop a laneways strategy to assist in the ongoing management of laneways so that they contribute to effective circulation of vehicles and to the long term amenity of the city.	Laneway Report 2013 completed.	Yes

Strategy 5 – Managing Parking			
Ref	Action	2015 Update	Action Completed?
5.1	Request development of a parking strategy / plan for existing and future parking needs and supply at all major hospital sites within and adjacent to the city.	Completed, initiative continues to be pursued through the WESROC Regional Transport Group.	Ongoing
5.2	Request the implementation of parking plans on hospital sites that encourage the use of alternative transport modes during peak demand period.	Completed, initiative continues to be pursued through the WESROC Regional Transport Group.	Ongoing
5.3	Review parking management around major institutions to prevent overflow parking onto surrounding streets.	Completed, initiative continues to be pursued through the WESROC Regional Transport Group.	Ongoing
5.4	Request UWA to fully implement strategies to limit and prevent increase in parking for educational purposes and commercial ventures on University Campus land.	Completed, initiative continues to be pursued through the WESROC Regional Transport Group.	Ongoing
5.5	Ensure parking on the Swan River foreshore balances the needs of users, other than university students and staff, e.g. leisure, business and residents.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing
5.6	Refine the zonal parking system for short and long-term parking including the pricing and type of parking appropriate with each zone.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing
5.7	Assess the justification for additional car parking capacity based on supply and demand following introduction of the proposed pricing strategy.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing
5.8	Consult with private car park operators to investigate opportunities to convert or expand existing sites or to redevelop sites for long-term parking.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing
5.9	Develop a coherent pricing structure in liaison with private sector car park owners, which recognizes commercial viability and marketing aspects.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing
5.10	Complete the review of the cash-in-lieu policy to provide for funding of a variety of transport and access measures, including provision of public parking in suitable and accessible locations.	Completed 2009.	Yes
5.11	Assess options for car parking revenue to fund improvements for the provision and management of public car parking within the city.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing
5.12	Complete the review of the residential parking permit system to ensure appropriate provision and use of permits by residents.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing



Strategy 5 – Managing Parking			
<b>5.13</b>	Work with private sector car park providers to ensure consistent signage is erected at all car parks showing the location of alternative car parks.	Will continue to be considered as the Parking Strategy 2012-2016 is implemented.	Ongoing

## 2.3 Planning

### 2.3.1 City of Subiaco Local Planning Strategy 2014

This Local Planning Strategy (LPS) provides the framework for long-term planning and development in Subiaco, and the strategic basis for the development of the proposed City of Subiaco Local Planning Scheme No. 5 (LPS5).

The LPS forms the interface between regional and local planning, and sets out the city's long-term planning directions and objectives for future planning and development. It also includes a broad framework within which the city will pursue those objectives.

The LPS is divided into two parts:

1. Part One contains the LPS itself and contains a list of objectives along with strategies and the implementation or actions taken.
2. Part Two contains the background, technical information and analysis of issues, which, together with the strategic direction provided by Council, informed the development of the LPS.

### 2.3.2 Subiaco Town Centre Public Realm Design and Streetscape Enhancement Plan 2014

The Plan has developed a Schematic Design proposal for the Hay Street and Rokeby Road streetscapes within the Subiaco City Centre Precinct. Further detailed consideration was given for a 'Demonstration Project' on Rokeby Road between Hay Street and Roberts Road.

The Plan focuses upon the basic function of the streets and the proposed demarcation of the key streetscape elements – vehicular carriageway, pedestrian pavements, utilities and service corridors and opportunities within what is typically considered as the parking s trip.

The study looks at dividing Rokeby Road into three discrete, identifiable sections at the intersection of east-west thoroughfares Barker Road and Hay Street. Each section has a central 'Community Square' which together and individually have significant potential to greatly increase the pedestrian/al fresco experience associated with the Town Centre (Subiaco Activity Centre). The current amount of parallel parking provided in Rokeby Road is proposed to be reduced, in order to accommodate vibrant pedestrian 'friendly' people spaces.

Emphasis has been on retaining the traditional heritage street character and improving the pedestrian/al fresco experience by designing to allow for the provision of non-permanent amenity 'park' spaces within the traditional car parking strip.

Based on the analysis conducted, the following actions were considered:

- > Flexible spaces.
- > Festive spaces.
- > Interconnected public spaces.
- > Improved connectivity within the street.
- > Improved comfort.
- > Increased greening.
- > Heritage celebration.
- > Increased commerce.
- > Creation of urban core.
- > Active well lit spaces.

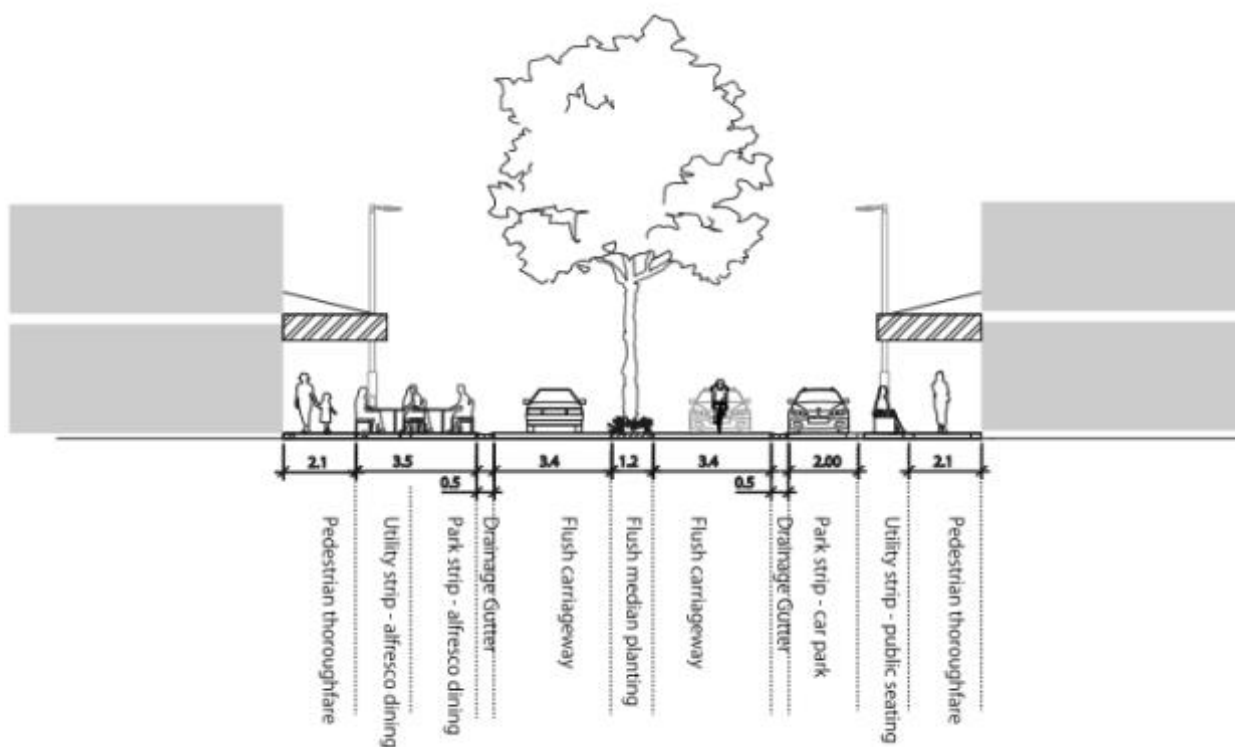
- > Equal access.
- > Increased external dining.

The report aimed to address the following transport issues:

- > **Parking:** parking in Subiaco is seen as a major detractor in visiting the town. Addressing the public parking issue within the Subiaco Activity Centre is beyond the scope of the Brief and project site boundaries. It would appear that as part of revitalising the Centre, a broader wayfinding and parking strategy is required.
- > **Pedestrians:** The pedestrian faces many obstacles within the street, including the signage and infrastructure clutter noted above but also the semi mountable kerbs to the carriageway and median hinder direct access from one side of the street to the other. The “paved” speed humps appear to be pedestrian crossings but are in fact signed otherwise, causing confusion and further relegating the status of pedestrians.

The result of this Plan was a series of recommendations, including a representative cross-section form, as shown below, **Figure 2-2**.

**Figure 2-2 Design Proposal – Rokeby Road and Hay Street**



### 2.3.3 **North Subiaco Urban Design Study 2014**

Following release and endorsement of Subiaco's strategic Think 2030 plan a Local Planning Strategy was prepared and endorsed by the Western Australian Planning Commission (subject to modifications) to inform a new Town Planning Scheme. Concurrently, the city has undertaken activity centre structure planning for the town centre. As part of that process, it was recognised a separate planning and urban design study was warranted for the North Subiaco Precinct. This was based on it being separate, though complementary, to the functionality of the town centre.

North Subiaco is a place under transition and will face major change through Princess Margaret Hospital (PMH) moving to the Perth Children's Hospital at the QEIIIMC and AFL football to the new Perth Stadium at Burswood.

Key strategic drivers relevant to the ITS have been extracted from the document and described below:

#### **Transition from Perth City to Subiaco Activity Centre.**

- > Improve quality of the urban fabric over time by establishing appropriate development standards that accommodate contemporary design standards and promote redevelopment.
- > Improve the public realm at strategic locations throughout the precinct area. This can be done by lowering street curbs, providing street trees and applying alternative treatments to roads; all of which helps to slow vehicles and creates a safer environment for pedestrians and cyclists.
- > Mark the transition from West Perth to Subiaco by promoting landmark redevelopment of the Princess Margaret Hospital site.

#### **A Prioritised Approach to Transport Modes.**

- > Install cycle paths and end of trip facilities within the precinct area.
- > Reinforce the Hay Street local node to provide a destination for local workers and residents.
- > Focus on the creation of an attractive streetscape that is comfortable for a variety of different transport options.
- > Improve wayfinding between Hay Street and the West Leederville train station.
- > Slow traffic where activity and pedestrian crossings are required.

#### **Employment, People and Activity.**

- > Promote an increase in residential, office and local node intensity to increase opportunities in the precinct.
- > Promote a distinct sense of place by enhancing North Subiaco's local node at the corner of Hay Street and Coghlan Road.
- > Maximise the potential of urban assets like Mueller Park and Subiaco Oval by helping to programme and promote events.

#### **Convenience and Amenity: A Local Node and Neighbourhood Focus.**

- > Improve amenity in the neighbourhood local node through public realm enhancements.
- > Introduce wayfinding between the local node and West Leederville train station.
- > Encourage an appropriate mix of convenience retail, cafe, restaurant and their relevant land uses to support the local node.
- > Encourage an appropriate intensity of development.

#### **Informed Density.**

- > Target a number of potential redevelopment areas: Hay Street, near to West Leederville train station, adjacent Subiaco Oval and Princess Margaret Hospital site.
- > Appropriate building setbacks above the street interface, street trees and pedestrian line of sight to maintain the human scale in the precinct while also meeting density targets.

This report presents two urban design framework scenarios for public comment. The City of Subiaco will review formal submissions and then prepare a preferred framework for adoption by Council to inform statutory development provisions.

#### **2.3.4 Car Parking Amendment – End of Trip Facilities 2004**

The scheme amendment addresses a number of issues principally involving car parking provisions. With this issue in mind, the city commissioned:

- > A review of its current car parking standards to identify any significant anomalies with respect to standards used in comparable commercial areas elsewhere.
- > A review of current practices with respect to the application of car parking requirements, and the implications of these for new development, additions and changes of use.

The outcomes of this review were contained in a report entitled Review of Parking Provisions Town Planning Scheme No 4. This report was used to develop and progress the earlier Amendment No 3 to the Scheme which was not adopted by Council due to pending modifications to the cash in lieu provisions.

The report recommends the inclusion of end-of-trip bicycle facilities in accordance with the Austroads Standard as a requirement for future development.

#### **2.3.5 Planning Policy Manual – End of Trip Facilities 2009**

This Policy seeks to complement Clause 70(A) and Schedule 7 of the City of Subiaco Town Planning Scheme. Clause 70(A) states that end of trip bicycle parking facilities are to be provided in accordance with the standards set out in Schedule 7. Schedule 7 depicts the number and type of bicycle parking facilities to be provided for staff (long stay) and shoppers/visitors (short stay) based on net lettable area for different use classes.

##### **The policy supplements the existing scheme requirements by:**

- > Detailing specifically how bicycle parking facilities are to be provided.
- > Requiring showers to be provided as part of end of trip facilities.

The objective of this policy is to discourage the use of private vehicle transport through the provision of secure and effective on site end of trip facilities including bicycle storage facilities and showers.

### **2.3.6 Precinct policies**

To provide additional aspects of development control and guidance for the development of sites, the Town Planning Scheme No. 4 allows the council to adopt planning policies that guide both residential and non-residential development.

Planning policies are designed to ensure a high quality of development is maintained through consistent decision making and the processing of development applications in a fair and equitable manner. Precinct policies contain specific planning requirements relevant the precincts in the City of Subiaco. Listed below are the precinct policies of each district.

- > Jolimont Precinct.
- > Daglish Precinct.
- > North Subiaco Precinct.
- > Town Centre Precinct.
- > Hay Street East Precinct.
- > Rokeby Road South Precinct.
- > Civic and Cultural Precinct.
- > Triangle Precinct.
- > West Subiaco Precinct.
- > Shenton Park Precinct.
- > Hollywood Precinct.
- > University Precinct.
- > Forrest Walk Design Guidelines.
- > Hampden Road Hollywood Neighbourhood Centre - Built Form Policy and Guidelines.

### **2.3.7 Urban Design Framework 4 – Explanatory Report for Public Release 2013**

Urban Design Framework 4 is provided in response to community engagement and technical stakeholder consultation for the Subiaco Activity Centre Structure Plan.

The approach to Urban Design Framework 4 for the Subiaco Activity Centre reinforces its existing structure and emphasises the importance of improved public spaces. In this regard, Rokeby Road, Hay Street and Bagot Road form the key movement and activity spines within the activity centre.

The approach to the urban design framework takes into account urban form, activity and movement with an overall consideration towards a more sustainable Subiaco.

The framework outlines a prioritised approach to movement networks in the activity centre, whereby the pedestrian is prioritised over all other forms of transport, with cyclists second, public transport third, service and freight accessibility fourth, and the car fifth. This emphasises the importance of active transport in the future development of the activity centre.

#### **The document discusses the following key aspects relevant to the ITS:**

- > High frequency public transport – plans for a light rail connection through the centre, past the existing train station and along Rokeby Road, connecting then onto Thomas Street
- > Urban design approach – a focus for activity along Rokeby Road and Hay Street, anchored by activation points at the Subiaco train station and at the civic node. Retail and hospitality activity continuing to activate these key spines

**2.3.8      Planning Policy 2.13 Shortfall Cash Payments in Lieu of Car Parking in the Town Centre and Commercial/Residential Zones 2013**

The concept of cash-in-lieu contributions for car parking is based on the Town Planning philosophy that where commercial developments have a shortfall of car parking, it is reasonable for the 'Council' to assist by accepting money for this shortfall to provide car parking bays in an adjacent or nearby existing or proposed public 'car park', if possible.

The purpose of this Planning Policy is to set out the objectives and policy provisions which the Council shall have due regard to in its consideration of applications seeking to pay cash-in-lieu of the provision of car parking.

## 2.4 Transport

### 2.4.1 Public Transport Review 2013

The Public Transport Review 2013 is a review conducted on the existing public transport modes in the Subiaco area. The report contains detailed information on the current demand and frequency of service for the various modes for public transport which include buses, trains and the CAT services.

**Based on the information provided in the report the following recommendations have been made by the City of Subiaco and endorsed by the Council:**

- > Extension of the light rail route between Subiaco and Glendalough and/or Stirling train stations (currently identified in stage 2) be brought forward for construction during stage 1 to provide a direct connection for commuters through Subiaco to the major employment and educational hub of the Queen Elizabeth II Medical Centre/University of Western Australia specialised centre to support the government's planned growth and development of these centres as identified in Directions 2031.
- > As an additional and immediate action, the Subiaco Shuttle Bus (Route 97) be extended to Leederville Station to provide a direct connection between the northern rail line and the Queen Elizabeth II Medical Centre/University of Western Australia specialised centre.
- > Further detailed investigation into the light rail route between the Queen Elizabeth II Medical Centre and the University of Western Australia (notionally Hampden Road) is required to identify and manage any impact on existing properties along the route during and post construction.
- > Consideration be given to the implementation of the bus rapid transit connection between the Queen Elizabeth II Medical Centre and Shenton Park train station being brought forward to stage 1 in recognition of the expansion of the medical facility currently under construction by the state government and the limited parking options available for commuters.
- > Consideration be given to the extension of a rapid transit service along Stirling Highway to the west of the University of Western Australia in the longer term with appropriate planning being considered as part of the implementation of the Public Transport Plan.
- > In recognition of the role of transit oriented development and increased patronage of public transport, the state government must invest in the improvement and upgrading of existing infrastructure and facilities at train stations with detailed planning considering the needs of pedestrians and cyclists transferring to the transit services.
- > There are significant concerns regarding the proposal to vest Main Roads Western Australia or any other state agency with additional powers designed to give that agency the ability to direct local government to implement and/or maintain transit infrastructure or the authority to take control over local roads to implement transit infrastructure.
- > Main Roads Western Australia, the Public Transport Authority and any other government agency involved in the provision of the public transport network and associated infrastructure should be responsible for funding all infrastructure under that agency's control.
- > There are significant concerns that the projected expenditure on public transport provision is less than that which has spent over the past seven years. On this basis, it is questionable as to whether the funding will be sufficient to deliver the level of public transport travel desired. It is noted that Directions 2031 and other related state government strategic documents identify that considerable public investment in infrastructure and urban design around train stations is necessary for transit oriented development to succeed.
- > A fair cost recovery model should be implemented for private sector contributions which does not deter local development and investment nor expect prohibitive upfront payments on transit infrastructure.



### 2.4.2 **Draft Subiaco Bike Plan 2014**

This Bike Plan sets out an action plan for immediate improvements to the cycle network and environment, and a strategic vision for the continued development and promotion of cycling within the city.

In the development of the Draft Subiaco Bike Plan due consideration was given to improving cycling safety and linking communities and facilities, as well as the needs of all categories of cyclists, regardless of their age, gender, experience or reason for cycling.

The main objectives of the Bike Plan include:

- > Evaluating cycling and its associated infrastructure in the study area, along with the existing Integrated Pedestrian and Cyclist Facility Plan (2003).
- > Consulting with key stakeholders (Local Government, State Government and Local Community) regarding the future of cycling within the City of Subiaco.
- > Planning the expansion of the bicycle network.
- > Encouraging and promoting cycling.
- > Developing a prioritised schedule of works.
- > Developing a maintenance schedule for the protection of new and existing assets.

**The Draft Subiaco Bike Plan proposes a list of projects to improve cycling infrastructure which include the following:**

- > Bicycle lanes on Rokeby Road, Hay Street, Hamersley Road, Princess Road, The Avenue, ~~Townshend Road~~, Nicholson Road, Onslow Road, Jersey Street, Fairway and improvements to the bike lanes on Aberdare Road and Hackett Drive.
- > Amendments to the Roberts Road PSP separated path and construction of a Salvado Road separated path.
- > Shared path construction or improvements on Hay Street West, Thomas Street, Market Square, Aberdare Road, Selby Street, Nash Street, Monash Avenue, Harborne Street and Derby Street.
- > Shared space / traffic calming improvements along Station Street and Hampden Road.
- > Cycling / Pedestrian Overpass at Hamersley Road.
- > Underpass Improvement Strategy.
- > Way-finding and Directional Signage Strategy.
- > Bicycle Awareness Route Strategy.
- > Integration of separated/shared paths through parks.

Other non-infrastructure projects present in the Bike Plan include the following:

- > Implement a maintenance program for bicycle infrastructure.
- > Develop an inventory of end of trip facilities, and investigate a central end of trip facility.
- > Continue to implement TravelSmart initiatives.
- > Investigate the possibility of a public bike hire scheme.
- > Conduct bike commuter workshops.
- > Inventory of bicycle crash data.
- > Undertake regular bike counts.



### **2.4.3 Draft King Edward Medical Hospital (KEMH) Transport and Access Plan 2007**

The King Edward Memorial Hospital transport and access plan sets the framework for a sustainable transport solution that is consistent with planned future land uses and regional travel patterns in and around significant destinations or locations.

The following were identified as key issues by various stakeholders:

- > The lack of suitable and available parking, especially for patients and visitors.
- > Increased transport and access pressure being experienced in the area.
- > Impacts of the hospital on the adjoining local areas.
- > The limited facilities available to cyclists, pedestrians and other alternative transport users.
- > Difficulties accessing the northern suburbs rail line without first going into the city.
- > The possible impacts of changes on the recruitment and retention of staff in a competitive health care employment environment.
- > The need to recognise and prioritise the needs of people accessing the KEMH site.
- > Limited public transport services in non-peak times.

**The following six transport and access strategies have been identified by stakeholders in response to these issues:**

1. Promote a positive and sustainable staff travel culture.
2. Supply and manage parking to reflect priority patient, visitor and staff needs.
3. Encourage greater use of public transport.
4. Encourage walking, cycling, carpooling and other alternative modes of transport.
5. Position KEMH as a transport market leader and attractive employer.
6. Promote positive transport and site development outcomes through effective partnerships.

These strategies provide the basis for the implementation actions.

### **2.4.4 Driverless Cars Briefing Paper 2014**

This briefing paper outlines the potential impact of driverless cars on the City of Subiaco. Driverless cars will be taken into greater consideration as part of the ITS review.

Key highlights include:

- > An overview of driverless car technology, the predicted adoption rate of driverless cars in the next couple of decades and overall advantage of driverless cars.
- > A detailed discussion on the possible impacts of driverless cars on the City of Subiaco in regards to parking, traffic congestion and road design, travel patterns and services.
- > A list of suggested actions on what the City of Subiaco can do to prepare for driverless cars.

#### **2.4.5 Western Suburbs Regional Organisation of Councils (WESROC) Transport Review 2011**

WESROC includes the Town of Claremont, Town of Cottesloe, City of Nedlands, Town of Mosman Park, Shire of Peppermint Grove and City of Subiaco. These councils incorporate the suburbs of Claremont, Cottesloe, Crawley (part), Daglish, Dalkeith, Floreat (part), Jolimont (part), Karrakatta, Mosman Park, Mount Claremont, Nedlands, Peppermint Grove, Shenton Park, Subiaco and Swanbourne.

This report represents a review of the initial Transport Review completed in 2008 by Worley Parsons and sets out the progress of the infrastructure schemes and strategic and local planning initiatives previously reported on as well as information on new initiatives being developed or planned. The purpose of this report is to inform discussions held between WESROC members and provide information on schemes and measures which directly impact upon strategic planning and the transport network in the western suburbs of Perth.

The outcomes of this report are contained within succinct document that updates investigations initially completed in 2008, concerning:

- > The current regional road, rail, bus, bike and pedestrian infrastructure and transport services, including updating of maps and discussion since 2008.
- > Update progress on strategic planning initiatives for both land use planning and the transport network.
- > Developments and proposals that will considerably affect transport within the study area and their impacts, including discussion and implications of each project.

The report also contains a summary on all previous and upcoming transport projects.

#### **2.4.6 TravelSmart Projects**

This document contains a summary of TravelSmart initiatives and projects that have either been completed or planned. These projects/programs include:

- > Bike to Work Breakfast.
- > National Ride to School Day and Walk to School Day.
- > Walk Over October.
- > Bike Ed.
- > TravelSmart to School.
- > TravelSmart Map.
- > Super Tuesday Annual Bike Count.
- > TravelSmart Workplace.
- > Active Commuter Challenge.
- > TravelSmart materials for various events, programs and information.

#### **2.4.7 Laneway Report 2013**

The objective of this report is to investigate the laneways within the City Town Centre and provide the Council with sufficient information and recommendations in order to allow the Council to determine policies covering improvements to laneways which will provide certainty and clarity when dealing with applications for development of or improvements to properties that abut laneways.

Nine Rights of Ways (ROW) have been identified within the City of Subiaco's town centre adjacent to Rokeby Road. The laneways provide for vehicle and pedestrian access providing important links to the area abutting Rokeby Road from Roberts Road to Bagot Road.

Recommendations have been made to upgrade these rights of way to their full potential now and for the future. Estimated costs have also been provided to give an indication of funds to carry out these works.

#### **2.4.8 Infrastructure 5 Year Capital Works Plan 2013/14 – 2017/18**

The Infrastructure Five Year Capital Works Improvement Plan's objective is to provide a list of roads that are in need of upgrades or repairs and determine the required funding for these improvements for the period 2013/14 to 2017/18.

The city's road network was investigated by Infrastructure staff and the following data was collected for evaluation:

- > Local surface defects.
- > Potholes/ patches.
- > Cracking- type, severity and extent of the cracks.
- > Asphalt- type, oxidation and condition.
- > Type of stone – wearing of the stone and surfaces.
- > Kerb condition and height.
- > Mechanical testing of the pavement.

Selection of the roads also reflects the age of the pavement and surface wear and tear; this came about from the increase in traffic and negligence of the pavement management over the past few years. This data was also evaluated by an external consultant and subsequent treatment recommended. Some of the funding for the proposed treatment was obtained from Main Roads WA and the balance is proposed to be funded by the city.

#### **2.4.9 Subiaco Car Sharing Service Report 2006**

The purpose of this report is to determine the viability of a car sharing service in Subiaco. A car sharing service can provide many benefits such as improving air quality, reducing greenhouse gases, increasing the community's transport options, easing parking pressures, and providing financial savings to members.

The options and potential for developing a car sharing service in Subiaco was examined through:

- > A review of the literature to develop an overview of car sharing.
- > A review of other car sharing services in Australia.
- > An analysis of Subiaco's urban and demographic characteristics.
- > The establishment of a Car Sharing Working Group including representatives from the City of Subiaco, University of Western Australia and the Queen Elizabeth (II) Medical Centre.

The report recommends that the city facilitates the establishment of a car sharing service in Subiaco by inviting tenders for "Special Parking Permits for the Purpose of a Car Sharing Program". The tender would be for a car sharing service to use a specific number of parking bays within the City of Subiaco. This would include parking controlled by City of Subiaco, UWA and QEII MC.

The special parking permits would identify specific bays, the purpose they can be used for and under what conditions. As part of the tender process applicants will have to provide a business plan for the car sharing service, allowing skilled organisations to make a proposal on how the service could be run.

The car sharing service would be privately owned and run and would be responsible for managing all aspects of the business including management, technology, vehicles, insurance, marketing, memberships etc. The City of Subiaco and other partners will not take any financial or operational role in the car sharing service. The City of Subiaco, UWA and QEII MC will only provide the car parking bays and some in-kind promotional support.

## **2.5 Parking**

### **2.5.1 Multi Deck Car Park Study 2006**

This study involved analysis and subsequent recommendation of a preferred site for a decked car parking facility at one of five prospective sites, consisting of:

- > Forrest, Rowland and Denis Streets (Forrest Walk).
- > Rowland Street and Barker Road.
- > Park Street.
- > Seddon Street.
- > Churchill Avenue.

As a result of the evaluation, a two-part recommendation was made:

Of the options considered, Churchill Avenue was identified as the lowest cost, highest parking yield development due to its simple, efficient layout and the opportunities afforded by the slope of the site to develop a two-deck layout with entry/exit from both Churchill Avenue and Barker Road.

Forrest Street offered a good combination of a modest increase in parking while also extending the Forrest Walk pedestrian mall with retail and commercial space at ground level, satisfying greater planning and development opportunity goals.

### **2.5.1 Subiaco Parking Utilisation Survey 2007**

Eight car park sites within the city of Subiaco were surveyed to ascertain the utilisation rates in those car parks. It was found that while there were a few instances where car parks were at capacity, generally there appeared to be adequate availability of parking within the city.

Results showed that in almost all car parks, utilisation remained comparable to the 2005 levels. Average utilisation rates in the current survey were at 53% in 2007, compared to 51% in 2005 and in 2002.

### **2.5.1 KEMH Deck Parking Report 2008**

This report was written to guide decisions regarding the potential for deck parking at KEMH. It contains an initial business case viability assessment of the proposed car park based on estimated capital costs, revenue and operating costs over a 20 years loan repayment term.

The opportunity to build a deck car park on this site was considered viable and would provide additional parking capacity for both KEMH and for the City of Subiaco. The car park would meet KEMH's future parking needs and create additional capacity on street. It would also provide additional public parking capacity at night and on weekends.

### **2.5.2 City of Subiaco Forrest Street Carpark Development Feasibility Study 2010**

The City of Subiaco commissioned a feasibility assessment for a multi-purpose carpark development on the Forrest Street site. The report contains the following:

- > A detailed analysis of the site in question, highlighting the current situation in regards to parking, activity, land uses and movement patterns in the surrounding area.
- > A traffic assessment found that the estimated future traffic can be fully accommodated by the abutting road network and no capacity issues are expected. As part of the proposal, it is suggested that:
  - the footpath on the western side of Rowland Street should be constructed.
  - some of the existing on-street parking on Denis Street should be removed.
  - Forrest Street between Rowland Street and Denis Street should be downgraded to become more pedestrian friendly.
- > A development feasibility study of three options, with recommendations made on a preferred form.

### **2.5.3 Parking Study Research Report 2012**

This study was commissioned by the City of Subiaco to undertake research, analysis and consultation for a future parking management strategy covering the entire Local Government Area. Integral to the preparation of the strategy was an extensive community and stakeholder engagement process in order to understand the nature and scale of issues to be addressed by the strategy.

This report provides an overview of current parking characteristics, identifies key issues and recommends ways to address these issues. It is a reference document for developing a parking programme for the next ten years.

The key objectives of this study are as follows:

- > Engage with all aspects of the community – residents, workers, students and visitors - to identify the nature and scale of parking related issues, building on the feedback provided as part of Think2030.
- > Draw on local and international leading practice on techniques to address parking management issues.
- > Develop a strategic document to shape the programme for parking management for the next ten years.

The extensive research that was conducted uncovered several key issues in regards to parking in Subiaco. To address these core issues, five key aspects for review have been identified:

- > Time controls and costs.
- > Enforcement.
- > Resident permit schemes.
- > Match supply with demand.
- > Traffic safety.

Short to long-term recommendations have been made to address these aspects.

#### **2.5.4 Parking Strategy 2012 – 2016**

The City of Subiaco Parking Strategy 2012 – 2016 is intended to assist the council in establishing strategic direction for future parking management. This strategy applies the research information conducted by the Parking Study Research Report, analyses the findings and suggests recommendations for each of the specific parking related issues in the Subiaco area.

The main strategic outcomes or recommendations of this report are as follows:

##### **Time controls, costs and compliance.**

- > Preservation of amenity and access to residential properties.
- > Establish criteria for appropriate parking controls, including paid parking in all long-stay parking facilities.
- > Establish parking compliance priority on a fine-grained precinct basis.
- > Maximise the allocation of enforcement resources, as practical.
- > Research the feasibility of preserving kerbside parking for short-stay parking, whilst creating more all day off-street parking.

##### **Residential permits scheme.**

- > Reduce the allocation of visitor parking permits.

##### **Match supply with demand.**

- > Identify all on-street and off-street parking facilities within the Subiaco Town Centre Parking Zone.
- > Conduct surveys and implement vehicle detection to record and generate data for city-owned parking.
- > Consider demand-responsive fees for off-street parking facilities.
- > Provide more motorbikes and scooter facilities.
- > Investigate options for future provision of a viable multi-deck car parking facility.
- > Through demand management measures maintain a consistent parking utilisation across the city, including both public and private supply.

#### **2.5.5 Parking Summary**

The above investigations have identified potential locations for large-scale public car parking. However, this type of infrastructure requires a significant investment and is therefore best funded through means other than public funds.

The city currently envisages localised public car parking only in those areas which are likely to have a significant increase in density and have a sufficient mix of land uses to support public parking demand. In all instances, the shared parking supply would be incorporated within the development area and intended to service this area.



## 2.6 Major Destinations

### 2.6.1 Princess Margaret Hospital for Children (PMH) Travel Plan 2009

The Travel Plan for PMH is consistent with the Transport and Access Plan completed in 2007. This earlier plan set a broad framework for sustainable transport solutions that are consistent with planned future land uses and regional travel patterns in and around PMH. The Transport and Access plan gave consideration to all modes of transport and access including private vehicles, public transport, cycling and walking.

The PMH Travel Plan provides a more detailed focus. It has been developed to manage travel and access to and from the site, and the impact of this both on the surrounding area and the experience of those working at and visiting the hospital. The main motivations for developing the Travel Plan are summarised as:

- > Building capacity for managing site access to support additional clinical services development.
- > Promotion of efficient and equitable access for all site users and ease pressure on limited car parking.
- > Promotion of employee health and wellbeing.
- > Sustainable transport management, including the reduction of the community and environmental impacts of traffic generated by the hospital.
- > Integral to ongoing health and site planning processes as part of the West Australian Planning Commission (WAPC) requirements for approval of development of the site.

The Travel Plan has three overarching objectives:

- > Embed sustainable transport management within the culture of the hospital, including commitment to implementation and continuous improvement.
- > Reduce single occupant car driving through management of parking, particularly targeting employees working within normal business hours.
- > Increase use of public transport, cycling and walking by improving the quality and availability of infrastructure and services for people accessing the site.

In order to achieve these objectives that were set out a number of actions have been devised and grouped within five key strategic areas. These strategies are:

- > Embedding sustainable travel in hospital planning and operations.
- > Promoting a sustainable travel culture.
- > Managing parking to meet priority needs.
- > Encouraging greater use of public transport.
- > Encouraging carpooling, cycling and walking.

The appropriate actions were then devised for the respective sites in regards to these strategies.

As of May 2015, the PMH does not have a TravelSmart Officer to implement the plan. However, the car parking actions, such as the shuttle service to off-site car parks, have been implemented.

### 2.6.2 Queen Elizabeth II Medical Centre (QEIMC) Survey Report 2012

QEIMC conducted surveys of the staff on their travel modes to and from the medical centre. Surveys were conducted online in addition to hardcopy handouts available to staff that were unable to access the online survey.

The survey results show that there are a wide range of viable transport options available for staff and visitors, and that these are generally well utilised. It should be noted that the significant reduction since 2009 in private vehicle mode share can be predominantly attributed to the on-site parking supply shortage, rather than improvements to alternative transport modes. Analysis shows that approximately 50% of drivers currently park on-site, and that this demand represents 100% of the available capacity (approximately 1,300 bays).

The largest single travel mode choice is still by private vehicle, as this mode still provides the greatest convenience and shortest travel time. Lack of public transport coverage and low frequency bus service at home locations is a significant barrier to staff usage, as is the lack of “safe”, frequent services after-hours.

The results of this survey suggest that the existing supply restrictions and diverse transport options available at the QEIMC have had a significant impact on travel modes.

### **2.6.3 Queen Elizabeth II Medical Centre (QEIMC) Travel Plan 2007**

QEIMC is a significant generator of traffic. This Travel Plan identifies actions to reduce car commuting to the site and improve and encourage greater use of travel alternatives. This will help to address the impacts of car trips, enhance site access for all users and improve travel options for employees.

This plan proposes a package of actions, organised under four strategies: embedding travel demand management within the culture of QEIMC, reduction of single occupant car driving, improving public transport access and enabling cycling and walking.

QEIMC is also keen to improve on-site infrastructure including paths and EOT and supports improvements to the external network that make it easier and safer for staff.

#### **Key actions proposed and relevant to the ITS include:**

- > Implement a comprehensive Parking Management Plan that incorporates employees, visitors and patients.
- > Implementation of the Public Transport Master Plan including improved bus services to the site in the short-term, including more direct and frequent connections with the city and train stations.
- > Investigation of incentives to encourage public transport commuting.
- > Development and implementation of Masterplan for pedestrian and cycle improvements, including provision of additional secure bicycle parking and shower and change facilities for employees.

As of May 2015, the travel plan has been written and is being managed by a TravelSmart Officer. The city is supporting the travel plan by restricting on-street access to parking. QEIMC has also initiated a new bus service via Mounts Bay Road.

### **2.6.4 UWA Commute Survey Report 2013**

A survey of University of Western Australia (UWA) staff and students was completed in 2013, to investigate commuting behaviour and the factors that influence such behaviour.

The increased focus for the 2013 survey on issues regarding parking at UWA provides some insight into the likelihood of staff and students taking up alternative travel methods if parking permit fees were to increase.

UWA has successfully implemented parking permit and fee increases, student carpooling, a policy for end-of-trip facility provision, more bike racks, a Bicycle Users Group and a program to encourage staff to cycle, supported by annual promotional events. Information has been improved through surveys of staff and student travel patterns. Access maps showing public transport and cycle routes are produced and distributed annually.

#### **Key results relevant to the ITS were:**

- > The percentage of trips to and from UWA involving a private vehicle that is parked at UWA has decreased since 2010 for both staff and students.
- > Public transport and cycling increased for staff since 2010.
- > The main motivators for travel mode choices are travel time and flexibility.
- > Increasing permit parking fees to \$3 per day may reduce the reliance on cars, particularly for staff and students who live relatively close to UWA.
- > The main options likely to be taken up if people do reduce car use are increased working or studying from home and increased use of public transport. Increased cycling and walking were also popular options for respondents from suburbs closer to UWA.

UWA is currently reviewing their Travel Plan, with completion expected in late 2015. UWA no longer has a TravelSmart Officer.

## **2.7 Parks**

### **2.7.1 Street Tree Policy - Management Guidelines 2012**

The Street Tree Policy aims to preserve and enhance the 'Urban Forest' character of the city, assist in achieving the objectives of the city's Environment Plan and Green Plan, and to ensure the city is not exposed to an increase in legal risks for public liability claims by virtue of diminished standards. The report contains a number of guidelines to consider for trees in Subiaco.

### **2.7.2 Significant Tree Register - Street Trees 2012**

This document is limited to the assessment of trees growing within the road reserve only and proposes management strategies for them. It is proposed that a further two stages will be developed in time covering park trees and a voluntary register of significant trees growing on private property.

The methodology used to assess the significance of a tree included but was not limited to the following criteria:

- > Botanic / Scientific Values.
- > Cultural / Commemorative Values.
- > Historic.
- > Visual / Aesthetic Values.

In total 486 trees across 61 streets were assessed as being significant for one reason or another. They include:

- > 114 trees that are highly significant.
- > 34 trees of moderate significance.
- > 338 trees that form significant avenues of trees.

In general the health of the trees was good, with approximately 60% having useful life expectancies of at least 40 years.

Being mostly large trees within the landscape, they will require active management and as such, works have been recommended.

The final significant tree information will be incorporated into an overlay on the city's Map info systems which will alert developers and planners of significant trees that may impact on proposed development.

### **2.7.3 Public Open Space Plan 2014**

Public open spaces are defined as parks, gardens, reserves, road reserves and other parcels of land owned and/or managed by Council, which is accessible to the public and is designated for open space purposes. This includes spaces provided for passive, active, formal and informal recreation as well as for conservation purposes.

The purposed is this document is to list all relevant planning policies and strategies and they apply to the Subiaco Public Open Space Plan.

#### **2.7.4      Playspace Strategy 2013**

This Playspace Strategy was developed using a staged approach and included the following steps:

- > Desktop literature review to identify and summarise key evidence and good practice guidelines relating to playspace design and development.
- > Generation of guiding principles to underpin strategy and assessment of current playspaces.
- > Examination of the existing distribution of parks and playspaces within the city and assessment of current play opportunities.
- > Identification of potential development or redevelopment options, including illustrative examples of design elements (provided as a supplementary document) that may be incorporated into future playspaces.

The objectives and guiding principles presented within this report serve as a framework for the overall Playspace Strategy, for assessing the adequacy of current playspaces and planning for the provision of new or upgraded play environments across the City of Subiaco.

## 2.8 Environment

### 2.8.1 Environment Enhancement Plan 2012-2016

The Environment Enhancement Plan 2012–2016 details new initiatives to build upon past successes and further advance sustainability outcomes.

Six focus areas were identified as part of the Think2030 visioning process and are documented in the Strategic Community Plan. They are:

- > Our sense of community.
- > Parks, open spaces and places.
- > A unique destination.
- > The built environment.
- > An effective and integrated transport system.
- > Council leadership.

**The Environment Enhancement Plan 2012-2016 aligns with the Strategic Community Plan through the following recommended strategies:**

- > Preserve and maintain valued street trees.
- > Continue to be the forefront of supporting sustainable verges.
- > Manage the city's parks and greenery in a way that is water wise.
- > Ensure that parks, open spaces and public places are developed and utilised to maximum benefit for current and future community members.
- > Identify appropriate locations for increased density, and plan effectively in order to accommodate the 3600 new dwellings required by Directions 2031.
- > Investigate and consider opportunities for the development of affordable and diverse housing.
- > Be proactive and innovative in its approach to environmental sustainability and climate change, especially resource conservation, recycling and green energy.

### **2.8.2      Local Climate Change Adaptation Action Plan 2013 – 2017**

The City of Subiaco undertook a strategic risk assessment of the projected impacts of climate change on the city's key asset and service delivery areas. This Local Climate Change Adaptation Action Plan (LCCAAP) focuses on actions to reduce the city's vulnerability to the potential impacts of climate change.

The city identified a total of 53 risks across the six key asset and services areas. Overall, 30% of these were ranked high, while the rest were medium or low. The high risks are summarised as follows:

- > Threat to infrastructure (e.g. river wall, recreation amenities) adjacent to estuarine foreshore from erosion and inundation and from extreme storm events.
- > Impact of climate changes on management and maintenance of infrastructure, drainage and wastewater networks.
- > Impact of extreme weather events and increased range of vector-borne diseases on community health and the emergency response.
- > Impact of climatic changes on natural resource management, including biodiversity of native bushland areas and landscaped gardens and environmental water quality.

Actions include those that build adaptive capacity, and those that deliver governance improvements or on-ground projects.

The city's priority climate change adaptation actions relevant to the ITS are:

- > Prioritise required infrastructure upgrades and incorporate into the asset management process.
- > Incorporate local climate change projections in the development of the new local planning scheme.
- > Create a community awareness and participation program to facilitate climate change adaptation at the household level.

This LCCAAP complements the work being done at a regional level by the Western Suburbs Regional Organisation of Councils (WESROC).

## 2.9 Community Engagement

### 2.9.1 Think 2030 Survey - Transport Responses 2013

Think 2030 is a community engagement campaign which invites the general public to provide input on their vision of the future of the city and how to achieve these goals. The spreadsheet provides the community feedback from the questionnaire relating to transport in the city.

### 2.9.2 Community Perceptions Survey 2014

In May 2014, the City of Subiaco administered a Community Perceptions Survey with the purpose of better understanding the needs of residents living in the city and to evaluate community perceptions against key performance indicators in the Strategic Community Plan. The survey was conducted by phone with 402 random selected residents.

**The community described a series of priorities for the provision of transport in Subiaco, as follows:**

**High priorities:**

- > How the city centre is being developed.
- > Parking (residential and commercial areas).
- > Footpaths and cycleways.

**Secondary priorities:**

- > Management and control of traffic.
- > Planning and building approvals.
- > Street lighting.



## 2.10 Economic Development and Placemaking

### 2.10.1 City of Subiaco Economic Development Strategy 2013– 2017

The city has developed its Economic Development Strategy 2013–2017, which details a number of initiatives and actions that seek to improve the level of community wellbeing and stimulate business activity and employment in the city.

The city's economic development activities have previously been guided by the Economic Development Strategy 2005–2009. In preparation of its new strategy, the city conducted research into other local government strategic documents and additional sources of information such as local business surveys and statistics. The city's new strategy also incorporates feedback from its own business community, which was gathered through a series of forums and workshops held by the Subiaco Business Association. Furthermore, a workshop was held in July 2013, where key stakeholders came together to further develop the economic development strategy and its associated actions and initiatives.

The Economic Development Strategy 2013–2017 closely aligns to all focus areas as identified in the Think2030 visioning process.

**Focus area 5: “an effective and integrated transport system”, is the primary goal of the ITS. Recommendations attached to this focus area include:**

- > Improve and enhance the city's pedestrian and cycle networks.
- > Ensure flexibility for commercial parking requirements in the city – to ensure that business interests are incorporated into the ITS.

Actions (listed below) were recommended to achieve these strategic goals along with the completion timeframe and the primary contributors to these actions.

- > Improve the linkages between the large activity and accommodation hubs of UWA and QEII for pedestrians and cyclists.
- > Ensure that business interests are incorporated into the ITS.
- > Promote and encourage evening entertainment and hospitality activity, such as alfresco dining and theatre, in appropriate areas throughout the city.
- > Develop plans for known future changes within the city particularly for the Subiaco oval/Princess Margaret Hospital precinct.
- > Explore options to leverage the night-time economy (5 pm to midnight).
- > Improve activation of underused spaces such as laneways and upper levels of existing buildings.
- > Ensure the activity centre structure plan includes infrastructure planning.

Place management is the process of making places more economical, liveable and socially cohesive. This is practiced through programs to improve a location or to maintain an already attained desired standard of operation. Place management is usually undertaken with a mixture of private, public and business organisations working together on projects, initiatives and reactivation of public space. Despite the wide variety of place management initiatives, the underlying common factor is usually a desire to maximise the effectiveness of a location for its users, whether they are residents, shoppers, tourists, investors, property developers or business owners. The majority of the city's place making activities sits under Strategic point 3: A unique destination.

## **2.11 Access and Inclusion**

### **2.11.1 Disability Access and Inclusion Plan (DAIP) 2012-2017**

Council adopted the original city's 'Disability Service Plan' in 1995 to ensure that people with disabilities have access to Council's functions, facilities and services. This was replaced in 2007 by the Disability Access and Inclusion Plan. The reviewed Plan (2012 – 2017) is subject to ongoing reassessment and may be amended or extended as priorities and needs are identified, or to meet relevant legislative changes.

The most relevant outcome of the DAIP to the ITS is that people with disabilities should have the same opportunities as other people to access the buildings and other facilities of the relevant public authority. This has the potential to transform the transport network to ensure that it is legible for all users, with a significant positive impact for a range of users.

## **2.12 Built Environment**

### **2.12.1 Street Improvements – Oculus 2010**

This document has been prepared to assist in the coordination of the enhancement of several streetscapes within the city. The aim of the document is to draw together the concept design proposals and synthesize them into one document that will be used to inform and coordinate the design process for the street improvements whilst allowing sufficient flexibility for designers and council officers to create streetscapes within each area.

The document contains overall guiding principles, the most relevant to transport are as follows:

- > Create a green pedestrian friendly, vibrant public domain for the residents of the city.
- > Establish streetscapes for a variety of end users: pedestrians, cyclists, motorists, residents, visitors, and special events.

In order to create a successful pedestrian oriented precinct, these four precincts will need to be integrated with the main roads of Hay Street and Rokeby Road.

A clear network of pedestrian pathways offers a variety of experiences for users and creates a dynamic walkable suburb that prioritises pedestrian choice and comfort. Most streets and laneways are proposed to have shaded footpaths on both sides, and frequent pedestrian crossing opportunities.

The pedestrian paths described would provide a high level of comfort, safety and amenity for pedestrians. Existing street parking is retained and improved using trees and new surfaces. This parking form is intended to activate the street while providing separation between moving vehicles and pedestrians.

## 2.13 Other Local Government Integrated Transport Strategies

### 2.13.1 Shenton Park Integrated Transport Plan

The Shenton Park Integrated Transport Plan is a package of changes that reflect broad stakeholder views is proposed for the Shenton Parks area. As part of the package it is proposed that additional rail crossing opportunities be provided by constructing a subway south-west of Aberdare Road, a bus bridge north of Aberdare Road and a pedestrian underpass adjacent to the Nash Street subway.

**The recommended package of projects and actions are summarised below.**

- > Subway south-west of Aberdare Road.
- > Single lane bus-bridge.
- > Increased train stops at Shenton Park Station during peak hours.
- > Wider lanes in Nash Street subway.
- > Transport interchange at Shenton Park Station on Stubbs Terrace.
- > Replacement of car parking capacity with public transport improvements.
- > Selby Street shared path.
- > Karrakatta shared path.
- > Shared path links to railway crossings.
- > University of WA/hospital cycle link.
- > Cyclist facilities at major trip generators.
- > Safe road crossings for pedestrians at Shenton Park Station.
- > Shared use tunnel north of the Nash Street subway.
- > Various local pedestrian improvements.
- > TravelSmart initiatives package.

The recommended plan provides a cost-effective solution to transport needs in the district with the following key advantages:

- > Improved local access and safety for vehicles, pedestrians and cyclists crossing the railway line without encouraging more traffic to pass through the region from other areas.
- > Offers bus priority facilities that will improve the attractiveness of public transport to substitute for car trips particularly for access to the major health and education institutions.
- > Improved pedestrian and cyclist safety and amenity.
- > Working with the educational and health institutions in the area to promote increased use of public transport.
- > Maximising safety and accessibility for all stakeholders including the new Shenton College.

### **2.13.2 Nedlands Travel Plan and Actions 2009-2012**

The City of Nedlands Travel Plan primarily coordinates actions within administration relating to alternative modes. The focus areas are:

- > Encouraging replacement of short, local car trips with alternative modes.
- > Ensuring public transport meets the needs of the City of Nedlands.
- > Facilitating pedestrian access and safety.

The Travel Plan Actions guide the work of the TravelSmart Officer over a three year period. Some actions are cross-departmental in nature and will be completed in conjunction with other officers. This approach ensures that the diverse skills across the divisions are utilised and works to embed alternative travel considerations in the city's operational procedures. It is not intended that actions are duplicated across departments, rather that there is an avenue for the support of alternative transport modes where there are no statutory requirements.

## 3 Summary of Stakeholder Consultation

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### 3.1 Background

As part of the ITS Review, a range of stakeholders were consulted and asked to provide their feedback on existing issues and future needs with respect to transport infrastructure and land-use integration.

Information has been supplied from a variety of Local Government, State Government and community stakeholders, including:

- > City of Subiaco.
- > Department of Transport (DoT).
- > Public Transport Authority (PTA).
- > Main Roads WA.
- > City of Perth.
- > Shenton College.
- > City of Vincent.
- > Town of Cambridge.
- > Department of Health/QEII Medical Centre Trust.
- > Jolimont Primary School.
- > Subiaco Primary School.

It is understood through consultation that some stakeholders are currently in the process of compiling or modifying their transport and planning strategies, and that this work was not yet completed at the time of this Strategy. Other stakeholders were contacted, but did not provide comments on the ITS.

It is recommended that the city undertake follow-up consultation with the following stakeholders after their strategic planning has been completed:

- > Department of Transport (Central Area Transport Plan).
- > Botanical Gardens and Parks Authority (BGPA).
- > LandCorp (Shenton Park Hospital Redevelopment).
- > Metropolitan Redevelopment Authority (Princess Margaret Hospital Redevelopment).
- > University of Western Australia.
- > QEII requested follow up consultation with the city regarding the ITS, to be attended on-site organisations including QEII MC, Sir Charles Gairdner Hospital and the North Metro Health Service.

### 3.2 Summary

A summary of the feedback from stakeholders is provided below:

#### 3.2.1 Department of Transport (DoT) and Public Transport Authority (PTA)

The meeting was conducted in person with parties representing the Department of Transport and the Public Transport Authority on 6 of January 2015.

Comments that were brought up during the meeting include:

- > Both support the conversion of Hay Street and Roberts Road from one-way to two-way to support future cycling and light rail infrastructure.
- > Incorporation of the Subiaco Draft Bike Plan into the Strategy.

- > In support of increasing frequency of bus services as a response of increased demand or an incentive to increase demand.
- > Improved pedestrian access and crossings.
- > PTA is currently investigating a railway line route extension to Glendalough Station.
- > In support of future light rail.
- > The Department of Transport and the City of Perth plan to construct a shared path on the eastern side of Thomas Street in conjunction with the widening of Thomas Street. There are bike lanes planned for Murray Street. The bike lanes would go from George Street to Thomas Street, then continue via Thomas Street underpass through the existing PMH MRA redevelopment site to Hay Street.
- > Difficult for pedestrians to cross Thomas Street.
- > Difficult to cross Railway Road at Daglish Train Station. This has previously been mentioned to the Department of Transport by the City. Railway Road is a local road.
- > The proposed shared space on Rokeby Road would require modification to be compatible with bus services. Further information on the shared space design is required to understand what is proposed. Generally, these forms of design are incompatible with public transport services.

### **3.2.2 Public Transport Authority**

### **3.2.3 Main Roads WA**

The meeting was conducted via teleconference with Main Roads representatives on 3 May 2015.

Comments that were brought up during the meeting include:

- > Considers the introduction of light rail to be most important for the city.
- > Currently planning for bus priority along Stirling Highway in the vicinity of UWA.
- > Ensure all other road interfaces are designed in accordance the relevant MRWA guidelines.

### **3.2.4 City of Perth**

The meeting was conducted via teleconference with the City of Perth representatives on 3 May 2015.

Comments that were brought up during the meeting include:

- > Road widening and cycling infrastructure upgrades are planned on Thomas Road, and works are scheduled to start in 2018-19.
- > Currently developing a Central Area Transport Plan. This plan has not been finalised and is subject to change. The Department of Transport will brief the City Subiaco when the plan has been finalised.
- > Planned extension of the 950 bus route to Shenton Park.
- > Planning to convert Hay Street and Murray Street to two-way movement in 2016-17.

### **3.2.5 Shenton College**

The meeting was conducted via teleconference with Shenton College representatives on 22 May 2015.

Comments that were brought up during the meeting include:

- > Issues with lack of capacity and frequency of train services during school peak hours. The school staggers student release between 7-9 and 10-12, with a 10 minute gap to control student numbers.
- > Cardno recommended changing the on-street restrictions to allow pick-up/drop-off parking along Stubbs Terrace which was met with support.
- > New school proposed in the vicinity of the College is likely to influence the local transport environment.

- > Congestion issues around the school – Stubbs Terrace is very busy with background traffic, and a high proportion of parents drive students to school.
- > The school is promoting alternative travel modes as much as possible.

### **3.2.6 City of Vincent**

The meeting was conducted in person with the Town of Vincent representatives on 26 May 2015.

Comments that were brought up during the meeting include:

- > There is very little interface between the City of Subiaco and the Town of Vincent.
- > Suggested improved legibility and wayfinding and end of trip facilities for Leederville Station and West Leederville Stations.
- > Support the extension of a bus service extension to Glendalough Station.
- > In support of improved north-south cycling connectivity.

### **3.2.7 Town of Cambridge**

The meeting was conducted in person with the Town of Cambridge representatives on 26 May 2015.

Comments that were brought up during the meeting include:

- > West Leederville Planning and Urban Design Study includes strengthened connections to Subiaco via Northwood.
- > Suggested improved legibility and wayfinding and additional facilities for Leederville Station and West Leederville Stations.
- > Currently addressing duplication of the PSP along the Fremantle line on the northern side.

### **3.2.8 Department of Health / QEII Medical Centre Trust**

The meeting was conducted in person with the QEII Medical Centre (QEII MC) Trust representatives on 3 June 2015.

Comments that were brought up during the meeting include:

- > A need for improved cycling infrastructure and end of trip facilities both on-site and in the surrounding neighbourhood.
- > Support for Light Rail with changes underway to the existing Masterplan to better accommodate LRT infrastructure.
- > Understanding of parking's importance, the need to manage it carefully and the impact on the surrounding neighbourhood.
- > Masterplan includes 'sky bridges' between multi-deck parking, Children's Hospital and Sir Charles Gairdner Hospital.
- > The parking supply ratio is at its highest before the Children's Hospital is occupied. When the additional staff come on site the impact on parking will increase. This includes both on-site and off-site parking, which may cause an overflow of parking in the surrounding area.
- > QEII requested follow-up consultation with the city regarding the ITS, to be attended by on-site organisations.

### **3.2.9 Jolimont Primary School**

The meeting was conducted via teleconference with Jolimont Primary School representatives on 18 June 2015.

Comments that were brought up during the meeting include:

- > School in favour of development and local population growth but parking facilities are at their limit.
- > Safety was raised as a concern at Hay Street and driveway crossings.



**3.2.10      Subiaco Primary School**

The meeting was conducted via teleconference with Jolimont Primary School representatives on 18 June 2015. Comments that were brought up during the meeting include:

- > School encourages access away from primary road frontages to improve safety.
- > Cycling on-road is considered unsafe by parents and children – local paths are uncomfortable to ride on.
- > Positive feedback on the new flashing School Zone signage – recommend implementation on Rokeby.
- > Public transport provision effective.

## 4 Consistency in Documentation

The previous section summarised a wide range of State Government and Local Government level policy documents. While each report is internally consistent, due to differences in priorities between levels of government, across departments or over time, there are various inconsistencies between the documents analysed in the literature review. These inconsistencies are summarised in this chapter.

### 4.1 Walking and cycling

#### 4.1.1 Cycling and public transport on Rokeby Road

The Public Realm document proposes a 'shared space' on Rokeby Road, to be utilised by cars, cyclists and safe crossing by pedestrians. The document also describes a concept proposal to close off sections of Rokeby Road to provide space for temporary, weekend or night time events such as markets or concerts. This comprises a flexible approach for closure of one or multiple areas depending on the event. It is noted that this plan does not mention the role of public transport along Rokeby Road.

There is an apparent conflict between the intent of the Public Realm Plan for Rokeby Road and the provision of a reliable bus or light rail service. In particular, the Public Transport Authority has voiced some reservations regarding the possibility of partial closure; as while buses are able to operate in shared spaces, the frequency is necessarily reduced due to the additional restriction and delay. Deviation of services at event times tends to reduce legibility and patrons may come to view such a service as unreliable as a result.

The ability of bus services to be redirected is not shared by light rail transport. In the future, where light rail forms one of the primary access modes to and through Subiaco, restriction or deviation would be very detrimental to the overall Level of Service, potentially necessitating replacement bus services or other mitigation.

The Subiaco Bicycle Plan proposes bicycle lanes on Rokeby Road (from Bagot Road to Thomas Street) and a shared space from Salvado Road through Subiaco Square to Bagot Road. The function of these bicycle lanes could be compromised under a shared space environment; i.e. the linemarking associated with bicycle lanes gives the impression of priority, while the intent of the shared space is to give priority to pedestrians.

### 4.2 Built Environment and Parking Management

#### 4.2.1 Street Improvements – Oculus 2010

This document has been prepared to assist in the coordination of the enhancement of several streetscapes within the city. The aim of the document is to draw together the concept design proposals and synthesize them into one document that will be used to inform and coordinate the design process for the street improvements whilst allowing sufficient flexibility for designers and council officers to create streetscapes within each area.

The document contains overall guiding principles, the most relevant to transport are as follows:

- > Create a green pedestrian friendly, vibrant public domain for the residents of the city.
- > Establish streetscapes for a variety of end users: pedestrians, cyclists, motorists, residents, visitors, and special events.

In order to create a successful pedestrian oriented precinct, these four precincts will need to be integrated with the main roads of Hay Street and Rokeby Road.

A clear network of pedestrian pathways offers a variety of experiences for users and creates a dynamic walkable suburb that prioritises pedestrian choice and comfort. Most streets and laneways are proposed to have shaded footpaths on both sides, and frequent pedestrian crossing opportunities.

The pedestrian paths described would provide a high level of comfort, safety and amenity for pedestrians. Existing street parking is retained and improved using trees and new surfaces. This parking form is intended to activate the street while providing separation between moving vehicles and pedestrians.

There is a level of inconsistency between the recommendation to retain parking in the Oculus Report, and the recommendation to reduce on street parking in the Public Realm Plan, in order to create vibrant pedestrian 'friendly' people spaces. However, both visions for the future of streetscapes in Subiaco can co-exist, providing concessions on car parking location and quantum can be reconciled against pedestrian amenity and green space.

#### **4.2.2 Parking Policy**

The current parking strategy addresses the issue of perceived parking shortage with a program for increased off-street public supply and long-term retention of on-street parking. The lack of parking is consistently viewed by the community as an issue that must be remedied to promote a prosperous City Centre.

There is a fundamental conflict between the provision of parking and the use of the road environment for other modes. That is, a choice between access by car immediately outside the destination and mobility along the road. Of all of the uses for the public environment, parking is the one which is most exclusive – no other mode may share this space.

Parking information on the city's website states that "Free short-term parking exists along some roadside verges in Subiaco, ranging from 15 minutes to two hours in duration". By providing this information, the city is implicitly encouraging visitors to 'cruise' and look for free parking. Cruising in itself is a major contributor to congestion. If parking is considered a limited commodity, then the price of parking can be legitimately used to manage demand. Effective management of parking then relies on removing free parking where there is sufficient demand to support parking fees. This creates a more sustainable system and reduces the requirement for costly parking infrastructure, a cost that is largely borne by the city.

#### **4.2.3 Subiaco Activity Centre Structure Plan - Consultation Summary Report August 2013**

This document explores the possible negative impact of the light rail. A general preference was for the light rail or rapid transit route (high frequency bus) following the Rokeby Road alignment. It was felt this would address the importance of the Rokeby Road spine and add vibrancy to the Town Centre.

#### **4.2.4 Community Responses for the Think2030 project**

Respondents clearly desire further public transport options including trams or light rail through the city, as well as more local bus routes.

A large number of respondents want the city to reduce traffic by investing in more pedestrian/cycle friendly pathways and local buses. Parking too is clearly an important issue for respondents throughout the data collected.

The range of community responses shows that there is little consensus in the appropriate use of the street environment across the different transport modes. Respondents as a whole want more parking and less traffic, more street trees and more transport choice.

The prioritisation of road space is a vital part of the Subiaco ITS and is encapsulated in a strategic sense in the TransPriority mapping included in Section 5 of this report. Further detail regarding road cross-sections and functional use of individual corridors is described in Part B of this report.

## 5 Existing Transport Network

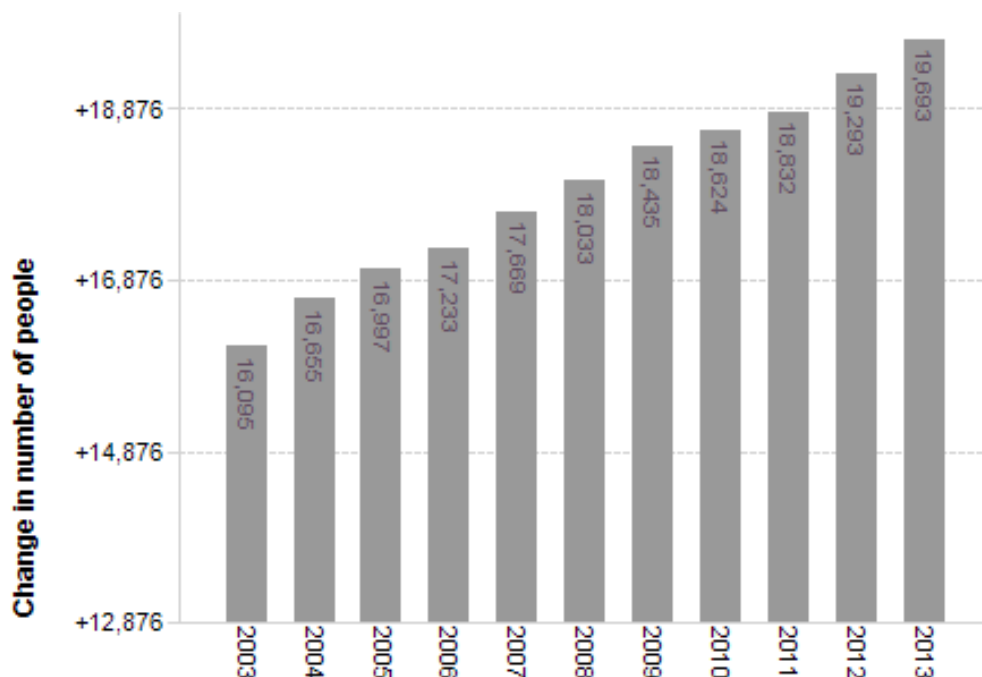
### 5.1 The City of Subiaco in context

The City of Subiaco covers an area of approximately 7 km<sup>2</sup> in inner western metropolitan Perth. The city lies about 3 km west of the Perth CBD and serves as the local council for several suburbs including:

- > Crawley.
- > Daglish.
- > Jolimont.
- > Shenton Park.
- > Subiaco.

The current estimated population of people residing in Subiaco is approximately 19,700 based on Census data collected in 2011. As shown in **Figure 5-1**, the residential population has increased by 22% over the last ten years. Given the current rate of growth it can be assumed that the population will continue to increase in the future.

**Figure 5-1 Population of City of Subiaco**



Source: Australian Bureau of Statistics, Regional Population Growth, Australia (3218.0). Compiled and presented by .id the population experts

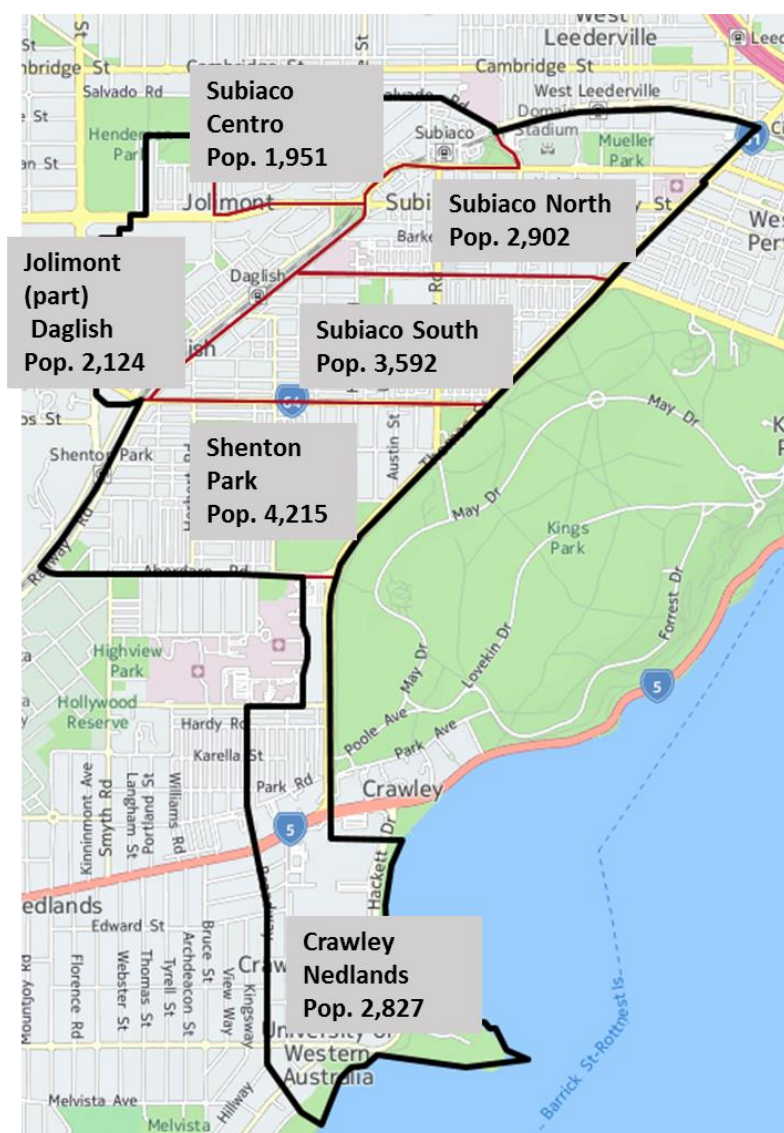
Source: Profile.id (2015)

**Figure 5-2** shows the residential population of the city by 2011 ABS Census District (SA2).

Shenton Park and Subiaco South have the highest population, while Subiaco Centro District having the lowest population as a result of the high density of commercial uses.

However the Subi Centro area has the highest local residential growth rate, including a significant component of dense apartment and townhouse living.

**Figure 5-2**      **Population Figures for City of Subiaco**



Source: Profile id

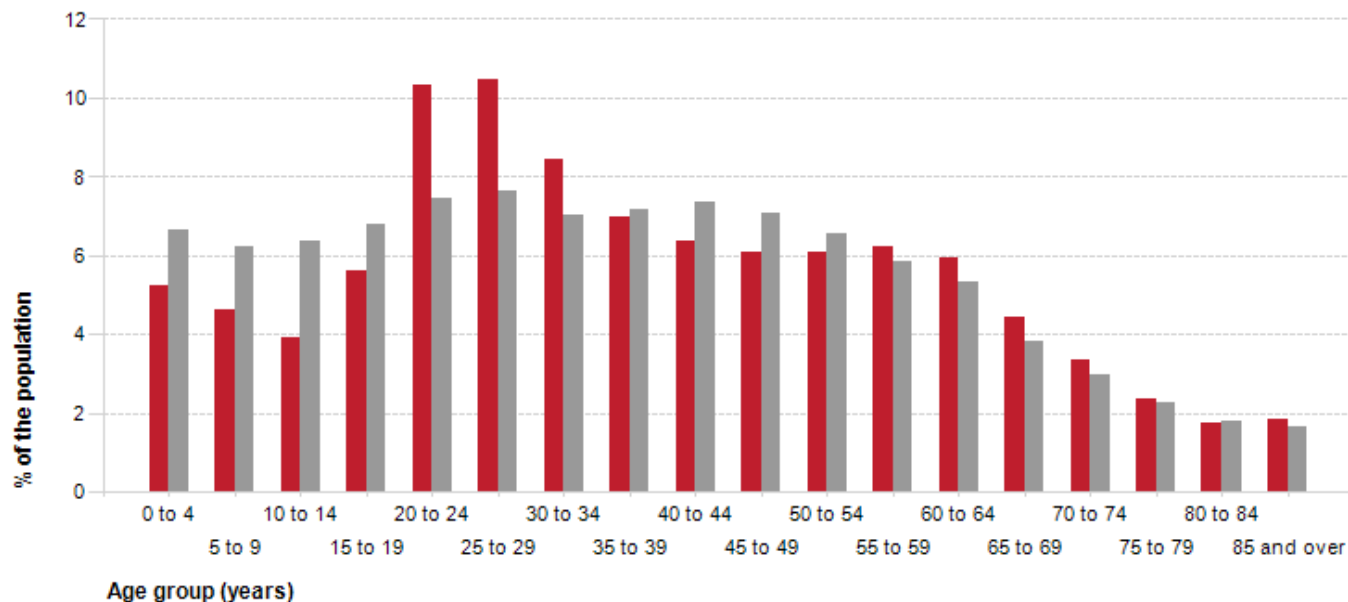
**Figure 5-3** shows the breakdown of the age structure of the residents of the city and compares them to the greater Perth area. The population demographic is largely made up of a young workforce (25 to 34), parents and homebuilders (35 to 49) and older workers and pre-retirees (50 to 59). It is notable that Subiaco has a significantly lower proportion of children (0 to 19) than the Greater Perth average. This is largely considered to be a result of the higher property prices and relatively small building size which drives self-selection by a particular age bracket (20 to 34 year professionals).

**Figure 5-3 City of Subiaco Age Groups**

### Age structure - five year age groups, 2011

Total persons

■ City of Subiaco ■ Greater Perth



Source: Australian Bureau of Statistics, Census of Population and Housing, 2011 (Usual residence data)  
Compiled and presented in profile.id by .id, the population experts.

**.id** the population experts

## 5.2 Land Uses

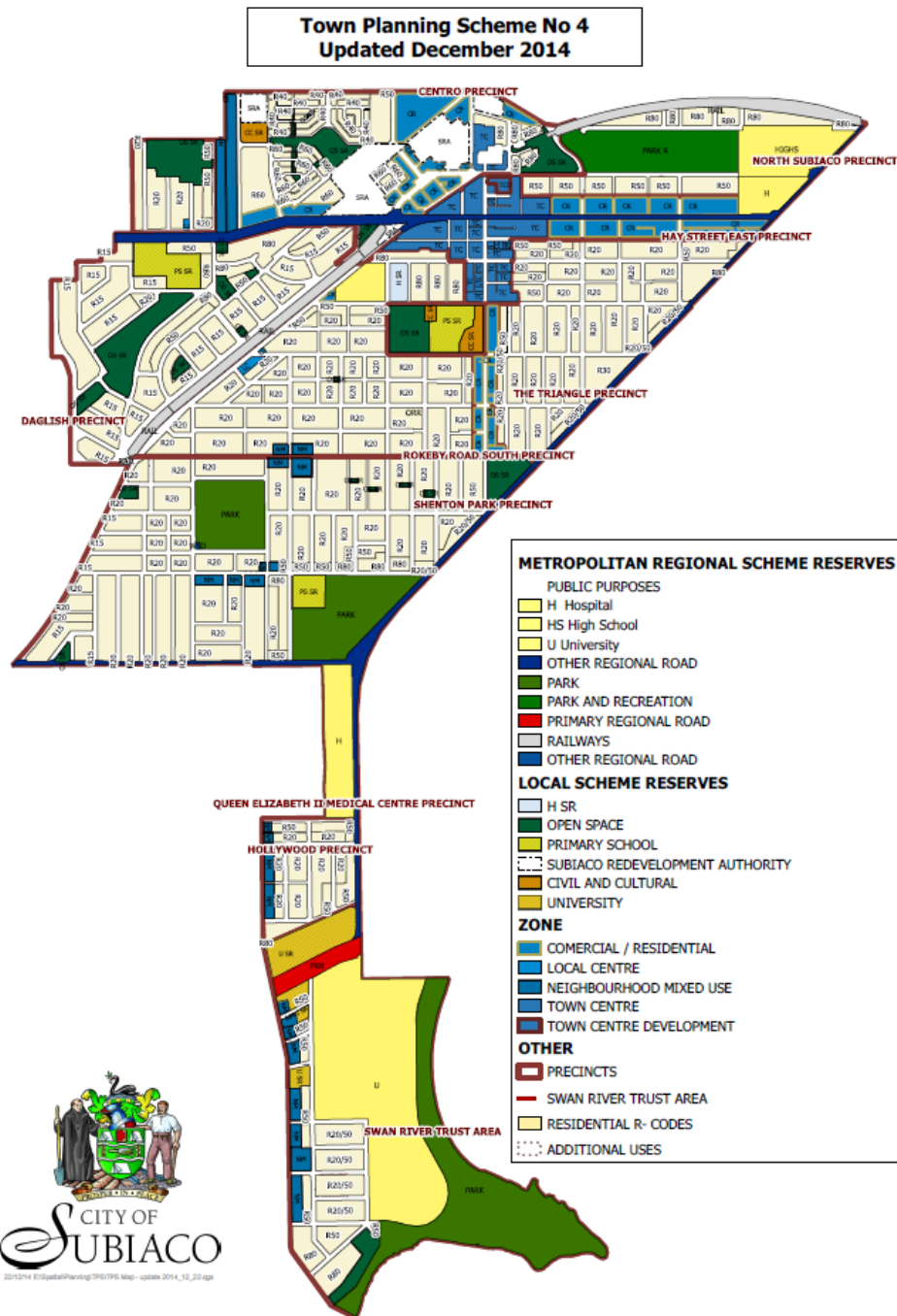
**Figure 5-4** shows the Town Planning Scheme for the City. Currently the area is separated into 12 precincts each with their own planning policies related specifically to their area. The area is primarily made up of low density residential in the central area, public purpose facilities in the south and commercial and mixed use in the northern precincts.

The town centre, oriented around Rokeby Road, serves as a focal point for business, employment and visitors. The street functions as a small scale activity corridor featuring a high degree of variety in land use, narrow road reserve, excellent street frontage and a mix of night and day uses. Being a relatively old suburb, there is little vacant or underutilised land area within the town centre.

Subiaco is also characterised by a cluster of significant health facilities, which tend to generate a large number of private car trips. Additionally, Subiaco has dedicated a fairly large area to parks and open spaces.



Figure 5-4 City of Subiaco Town Planning Scheme No 4



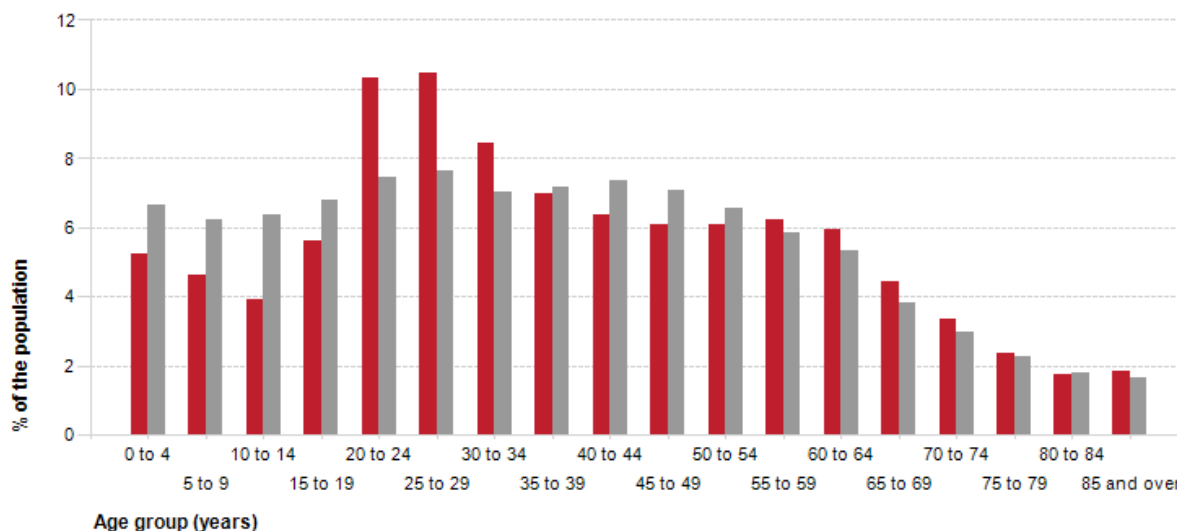


**Figure 5-5 City of Subiaco Age Groups**

### Age structure - five year age groups, 2011

Total persons

City of Subiaco Greater Perth



Source: Australian Bureau of Statistics, Census of Population and Housing, 2011 (Usual residence data)  
Compiled and presented in profile.id by .id, the population experts.

**.id** the population experts

**Figure 5-5** shows the breakdown of the age structure of the residents of the city and compares them to the greater Perth area. The population demographic is largely made up of a young workforce (25 to 34), parents and homebuilders (35 to 49) and older workers and pre-retirees (50 to 59). It is notable that Subiaco has a significantly lower proportion of children (0 to 19) than the Greater Perth average.

This is largely considered to be a result of the higher property prices and relatively small building size which drives self-selection by a particular age bracket (20 to 34 year professionals).

### 5.3 Travel Behaviour in the City of Subiaco

As shown in **Table 5-1** below, 44.3% of residents still use private vehicles as their preferred mode of transport to and from work although the trend seem to have shifted during recent years. This is evident in the rise in public transport use and the increased emphasis on active transport modes such as walking and cycling.

More information on the other methods of transport to work are shown below in **Table 5-1**, **Figure 5-8** and **Figure 5-9**.

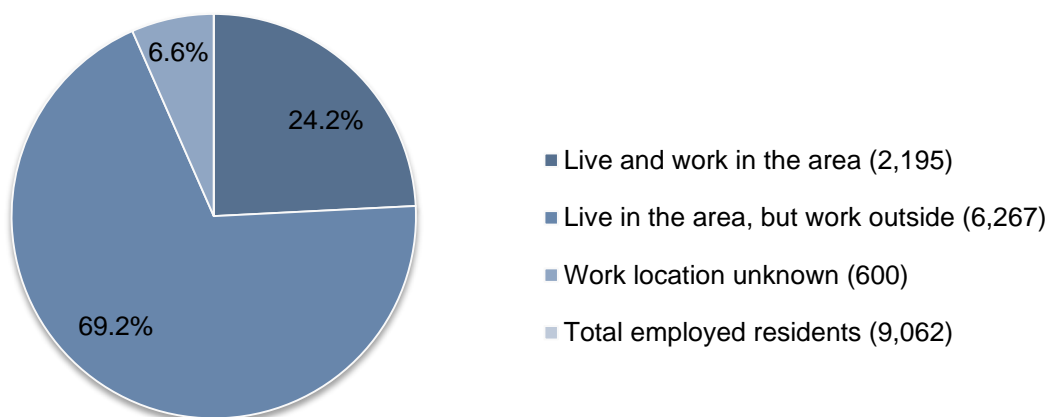
**Table 5-1 Method of Travel to Work – City of Subiaco**

Main method of travel	2011			2006			Change
	Number	%	Greater Perth %	Number	%	Greater Perth %	2006 to 2011
Train	627	7.0	6.7	469	5.4	4.1	+158
Bus	930	10.4	3.7	748	8.7	4.1	+182
Tram or Ferry	5	0.1	0.0	0	0.0	0.0	+5
Taxi	29	0.3	0.2	33	0.4	0.2	-4
Car - as driver	3,965	44.3	62.2	4,070	47.3	63.0	-105
Car - as passenger	375	4.2	5.3	358	4.2	5.8	+17
Truck	18	0.2	0.8	16	0.2	1.0	+2
Motorbike	77	0.9	0.6	54	0.6	0.6	+23
Bicycle	396	4.4	1.1	320	3.7	1.0	+76
Walked only	912	10.2	2.2	854	9.9	2.0	+58
Other	100	1.1	1.5	70	0.8	1.1	+30
Worked at home	446	5.0	3.5	460	5.3	3.6	-14
Did not go to work	994	11.1	10.9	1,072	12.5	11.6	-78
Not stated	85	0.9	1.3	82	1.0	1.7	+3
Total employed persons aged 15+	8,959	100.0	100.0	8,606	100.0	100.0	+353

Source: Profile.id (2015)

Of the people residing in Subiaco, approximately a quarter of those residing in Subiaco also work in the area while the rest either work outside the area or the place of workplace is unknown. Subiaco, being a central business district, also attracts a large number of workers from outside of the area. **Figure 5-6** and **Figure 5-7** goes into greater detail on the workplace travel behaviour in Subiaco.

**Figure 5-6 Employment Location of Residents 2011**



Source: Profile.id (2015)

**Figure 5-7 Residential Location of Workers**

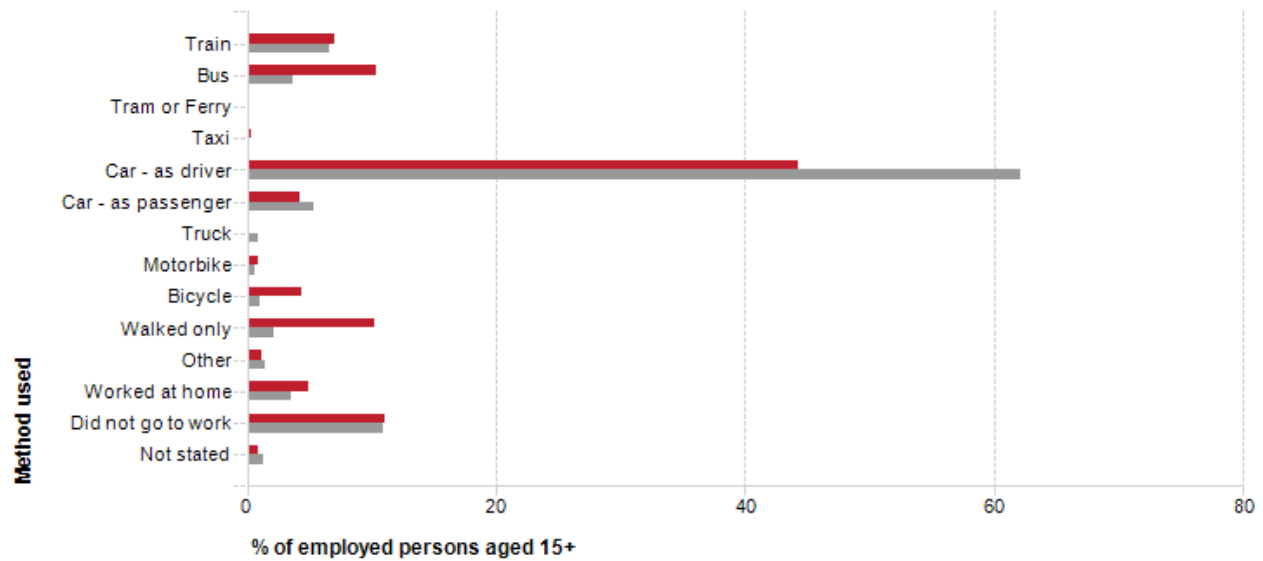


Source: Profile.id (2015)

**Figure 5-8 Transport Mode Share**

Total employed persons

City of Subiaco Greater Perth



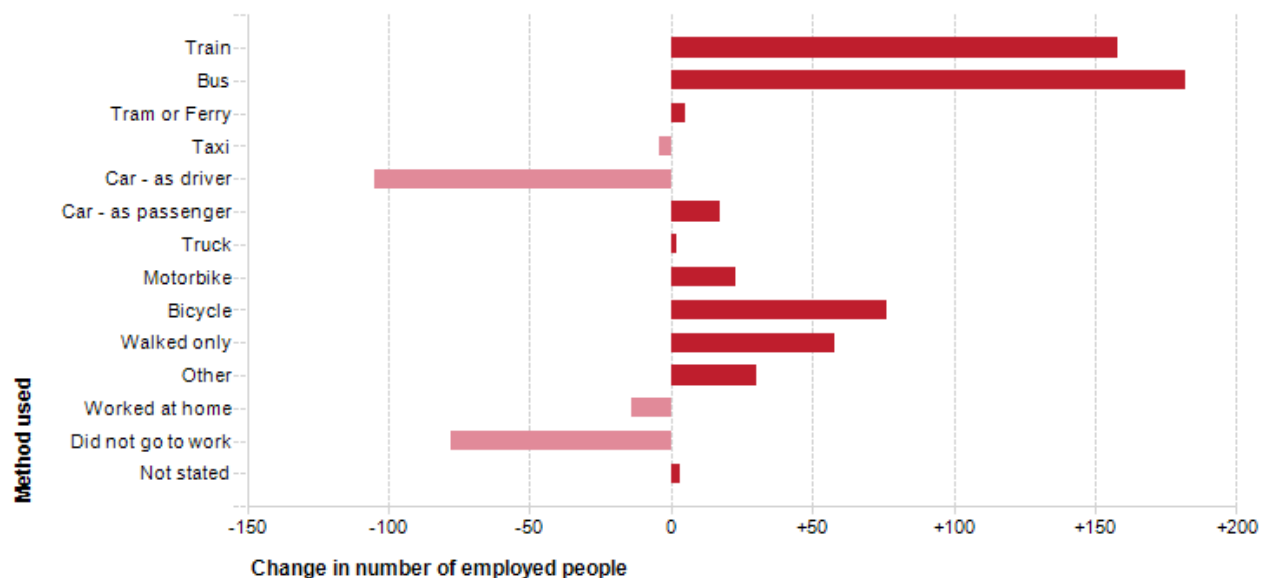
Source: Australian Bureau of Statistics, Census of Population and Housing, 2011 (Enumerated data)  
Compiled and presented in profile.id by .id, the population experts.

**.id** the population experts

Source: Profile.id (2015)

**Figure 5-9 Change in Transport Mode Share from 2006 to 2011**

City of Subiaco - Total employed persons



Source: Australian Bureau of Statistics, Census of Population and Housing, 2006 and 2011 (Enumerated data)  
Compiled and presented in profile.id by .id, the population experts.

**.id** the population experts

Source: Profile.id (2015)

### 5.3.2 Public Transport Demand

Throughout the years, the demand for public transport has increased substantially and will continue to increase as the population of Perth continues to grow. According to the *Public Transport Plan 2031*, public transport in the near future will account for:

- > One-in-eight of all motorised trips (currently one-in-fourteen).
- > One-in-five motorised trips in the morning peak period (currently one-in-eight).
- > Over 30% of peak hour distance travelled (currently around 20%).
- > Nearly 70% of all trips to the CBD (currently around 47%).

The total patronage for each of the different public transport modes which operate in the Subiaco area are shown in the tables below. The given data provide further evidence that the trend for public transport use has grown consistently over the previous five years, and is likely to continue to do so into the future.

The minor reduction in total patronage over the 2013/14 period may be attributed to a prolonged period of wet weather which caused a series of delays.

**Table 5-2 Total Public Transport Patronage (bus, train and ferry)**

Year	Total Patronage
2013/14	147,640,687
2012/13	149,697,303
2011/12	144,130,087
2010/11	135,975,469
2009/10	131,629,344

Source: Public Transport Authority (2015)

**Table 5-3 Fremantle Line Patronage**

Year	Total patronage
2013/14	8,284,716
2012/13	8,866,211
2011/12	8,679,139
2010/11	8,198,224
2009/10	Data not available

Source: Public Transport Authority (2015)

**Table 5-4 Total Bus Patronage**

Year	Total Patronage
2013/14	83,714,090
2012/13	83,543,424
2011/12	80,626,481
2010/11	76,636,351
2009/10	74,756,477

Source: Public Transport Authority (2015)

**Table 5-5** shows the change in patronage among bus routes operating in the city. Of these routes, the 79 service experienced the most dramatic shift in patronage; a direct result in the travel demand management measures implemented by QEIMC, not least of which was the significant reduction in car parking supply.

The growth in demand for the Subiaco Shuttle (Route 97) may also be attributable to the changes at QEIMC, but may also reflect the increase in residential and commercial development throughout the Subi Centro area over this time.

**Table 5-5 Bus Route Patronage**

Route	2009	2010	2011	% change
23	138,423	141,046	143,450	3.6
24	314,659	303,997	331,551	5.4
25	159,137	157,267	148,611	-6.6
27	281,271	280,110	289,540	2.9
28	191,875	192,299	206,789	7.8
79	347,463	392,393	554,447	59.6
97	326,704	348,994	375,505	14.9
98	2,522,468	2,625,969	2,609,558	3.5
99	2,490,625	2,573,417	2,538,666	1.9
102	700,732	719,163	737,701	5.3
103	576,703	566,382	580,861	0.7
107	310,427	315,614	333,237	7.3
<b>TOTAL</b>	<b>8,360,487</b>	<b>8,616,651</b>	<b>8,849,916</b>	<b>5.9</b>

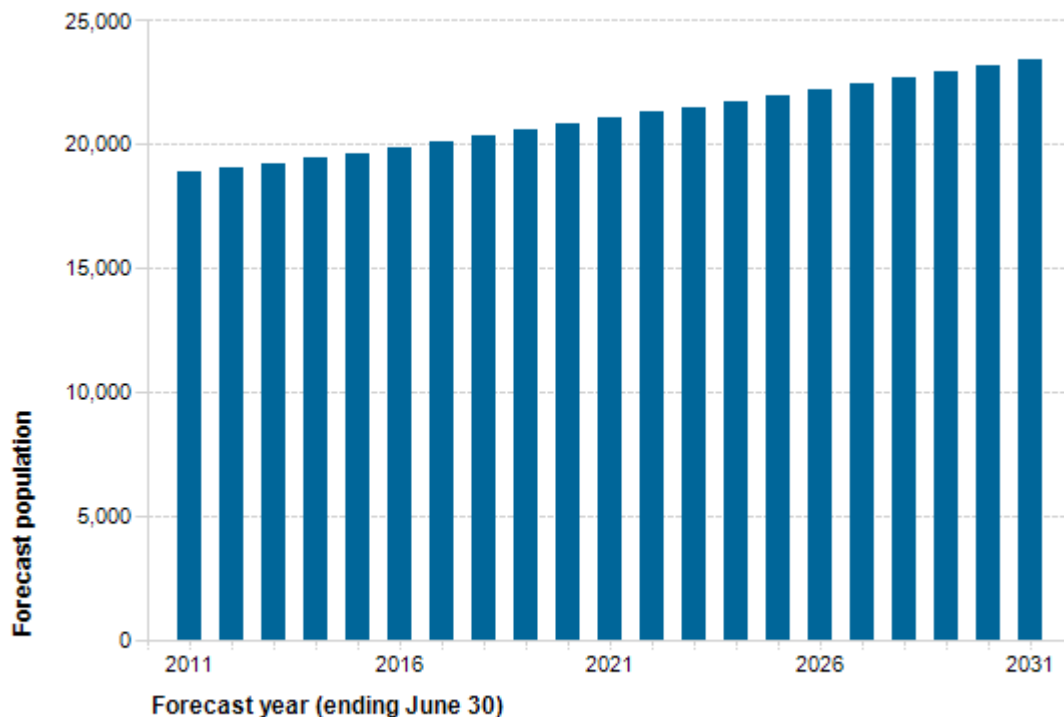
Public Transport Authority (2013)

### 5.3.3 Population Forecast

The population of Subiaco is estimated to reach 23,419 people by 2031 which is an increase of approximately 19% over the next decade and a half. This represents a relatively modest growth per annum, but one which will have a significant cumulative effect with respect to density, peak period transport demands and the local economy.

**Figure 5-10 Forecast Population from 2011-2031**

City of Subiaco



Population and household forecasts, 2011 to 2031, prepared by .id, June 2012.

**.id** the population experts

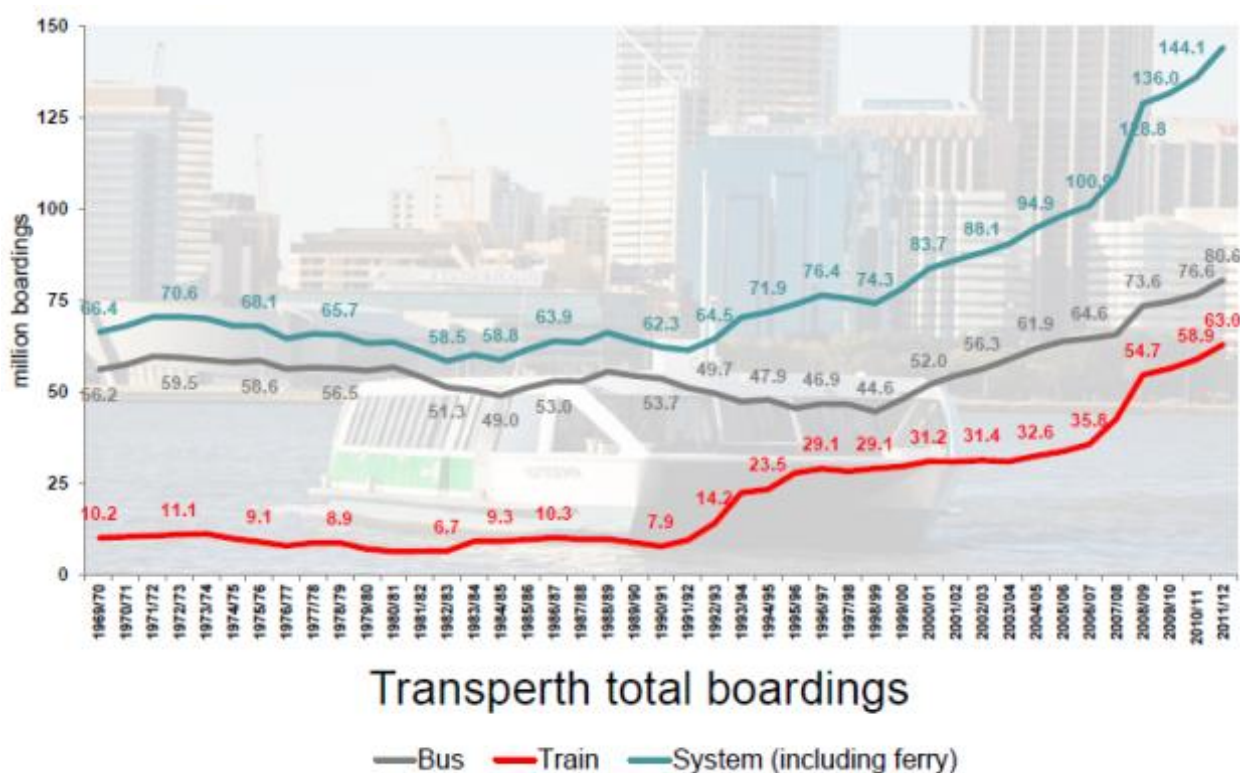
### 5.3.4 Transport Usage Forecast

Based on previous years' data, public transport patronage is likely to continue to increase as new infrastructure projects are completed. In contrast, personal vehicle mode shares are projected to decrease as a result of shifting focus towards active transport modes, along with the rising costs associated with driving (e.g. parking, congestion and fuel).

Research conducted by the Department of Transport projects that the population of Perth will reach 2.2 million people by 2031. This population growth would see a 33% increase in personal travel from 5.8 to 7.7 million trips per day across the full range of modes (private vehicles, public transport, walking and cycling). In the longer term, a future city with up to 3.5 million people could see a further 59% increase in passenger travel to over 12 million trips per day, or more than double the current level of activity.

By 2031 it is predicted that Perth's 2.2 million people will make more than twice as many trips by public transport than they do now, in the order of 760,000 trips per day. This 120% increase is an average of 3.85% per annum, or slightly lower than the average for the past decade to 2009, due to a lower forecast rate of population growth. By the time the city grows to 3.5 million people, nominally by 2050, daily patronage is likely to be in the order of 1.5-2.0 million trips per day.

**Figure 5-11 Transperth Total Boardings (Historic Trends)**



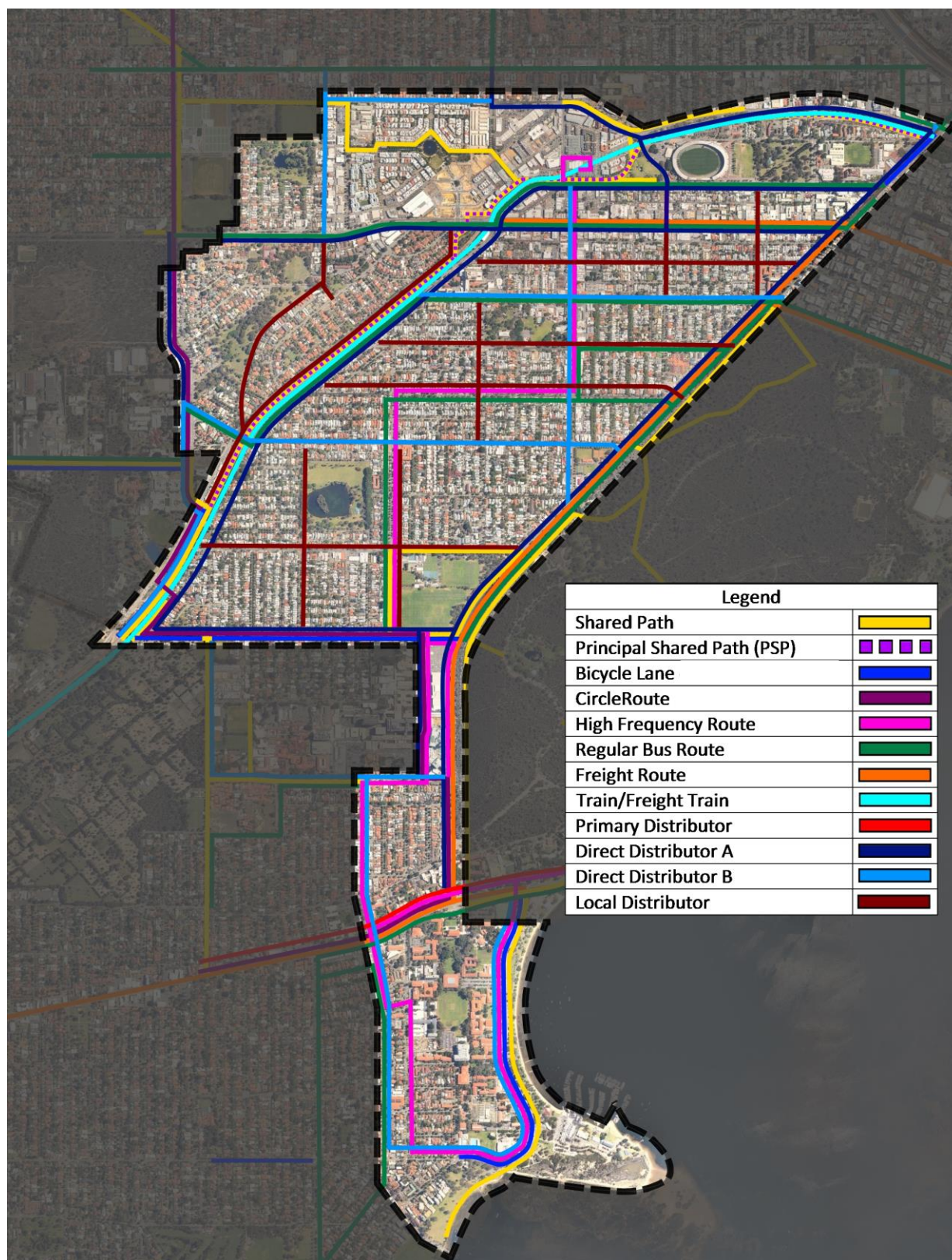
Source: Public Transport Authority WA



## 5.4 The City's Current Transport System

Figure 5-12 is a map of all transport modes combined showing the integration between the existing transport systems.

**Figure 5-12 Existing Transport Network (City of Subiaco)**





The internal roads have been categorised roughly according to the diversity of transport modes accommodated and the level of integration between the transport modes in the network.

The basic structure of a road corridor is assumed to comprise space for private vehicles on-street and a minimal level of pedestrian infrastructure (footpath, streetlights etc.)

- > High level of integration – contains multiple transport modes along the road network that integrate with each other providing a high level of accessibility and ease-of-transition between different modes of transport. These roads also have the highest demand for space, creating an inherent competition for use of the constrained road space.

Examples include Railway Road, Thomas Street, Hay Street, Aberdare Road, Rokeby Road, Stirling Highway and Hackett Drive.

**Figure 5-13 Example of a Highly Integrated Road - Railway Road**



Source: Nearmap (2015)

- > Medium level of integration – contains several transport modes along the road network that integrate with each other to provide an average level of accessibility and transition, with significant room for infrastructure improvement or space allocation.

Examples include Roberts Road, Nicholson Road, Derby Road, Broadway, Heytesbury Road, Fairway and Selby Street.

**Figure 5-14**      **Example of a Medium Level of Integration - Hay Street**



Source: Nearmap (2015)

- > Low level of integration – roads that accommodate at most a single additional transport mode. This may be due to limitations on road width, council or other regulations which prevent change, or a genuine lack of need for multi-modal access. Examples include Bagot Road, Hensman Road, Subiaco Road and Jersey Street.

**Figure 5-15**      **Example of a Low Level of Integration - Jersey Street**



Source: Nearmap (2015)

The competing needs of the various transport modes have been investigated through the 'Moving People' (TransPriority concept) with the hierarchy for each road determined according to the existing planning framework.

The aim of the ITS is to structure the road network so that the needs of different land uses can be met, both within the city and beyond, within a broad framework as follows:

- > Road networks should be based on appropriate use and connectivity, connecting origins and destinations but not forming barriers to sustainable modes.
- > Land-uses define the requirements for car parking quantum and location (short stay and on-street parking close to retail precincts, long-stay commuter parking on the periphery of the centres near to employment centres and along regional access routes).
- > Public transport routes are designed to fit within the regional context and support sustainable transport access to activity, particularly employment.
- > Pedestrian facilities knit the various complementary land uses together to create a single, effective mixed-use community. Of particular importance are the 'Activated Pedestrian Zones' and routes from car parking to primary activity locations. Quality and safety are vital to the effective operation of pedestrian spaces.
- > Cycling facilities follow primary desirelines and provide fine-grained access to all areas of the Activity Centre. Cycling is unique in that it allows both macro- and micro- levels of access to land-uses. Through the 'Moving People' framework assessment, cycling facilities are allocated as on-street or off-street, minimising conflict and safety issues for cyclists, cars and pedestrians. (E.g. in Activated Pedestrian Zones, cyclists are encouraged to ride on-street).
- > Road hierarchies are then defined by combining the above requirements with the existing and expected future background traffic demands, as well as the traffic volumes expected to be generated by the Activity Centre itself. By considering the Activity Centre holistically in this manner, a functional and effective transport environment can be built up.

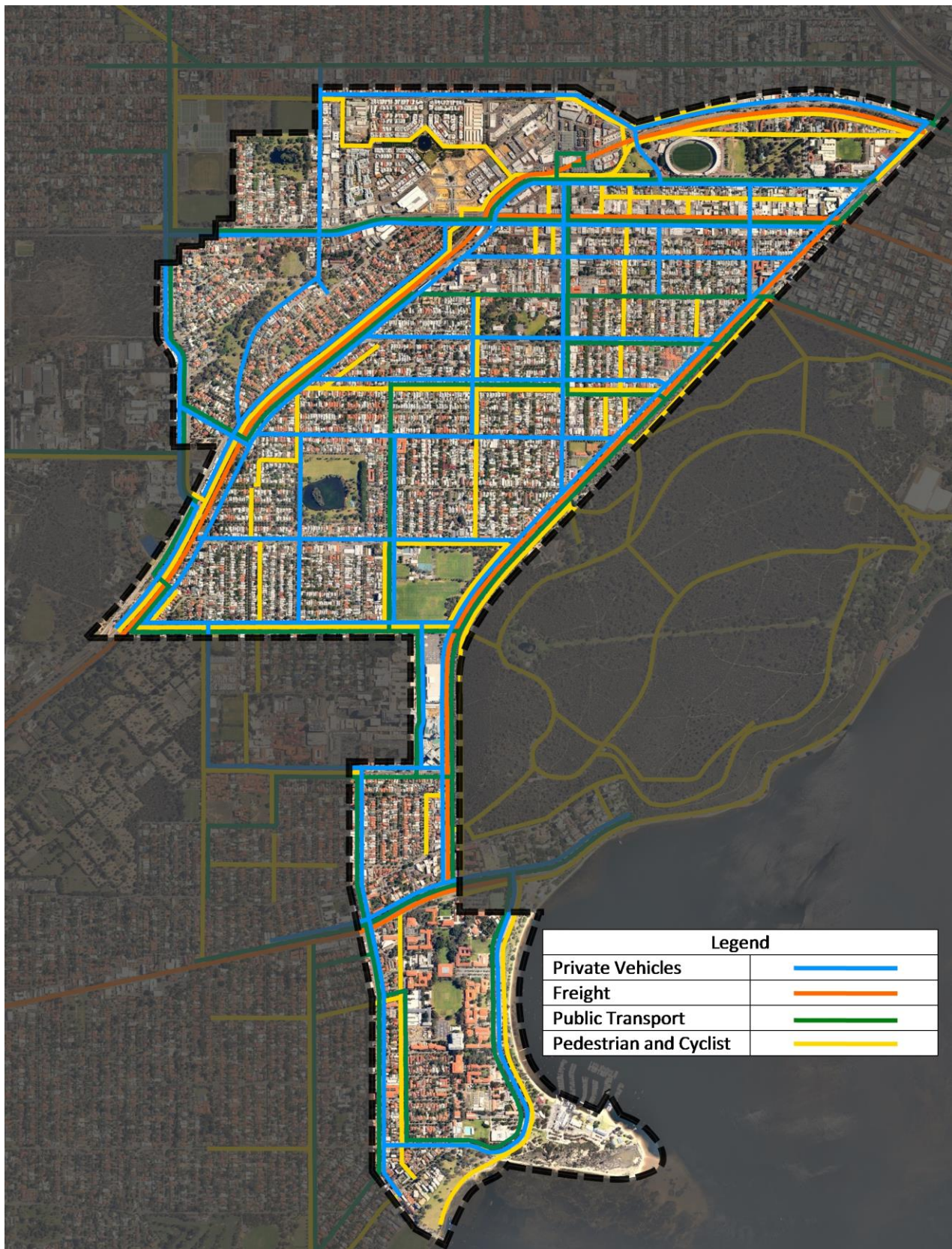
The hierarchy of transport evidenced by the existing planning and policy framework for the city is described in **Figure 5-16**.

It is noted that this hierarchy may not be adequately represented by the infrastructure in place. In particular, many of the roads identified as cycling routes have little or no infrastructure to support this mode. If the use of alternative transport modes is to be supported along a given corridor, appropriate infrastructure must be provided.

This may take many forms, but the framework described above gives the minimum basis for facilities required to accommodate the various, sometimes competing, needs of the community.



**Figure 5-16 Existing Transport Network (City of Subiaco)**



## 5.5 Pedestrians and Cycling

### 5.5.1 Pedestrian Network

Most of the local streets in Subiaco include footpaths on either one or both sides of the road. This provides a high level of accessibility and permeability as well as added safety for pedestrians. The current conditions of these footpaths are in relatively good order and initiatives have been taken by the Council to improve those that require attention.

Subiaco also has a number of shared paths and recreational walking trails. In addition, the local council also provides a number of programs and events that promote and encourage walking. A list of these programs includes:

- > **Walking Subiaco** - Walking Subiaco is a series of pamphlets developed by the city to provide local residents and visitors with self-guided walks through different areas of Subiaco. Brief historical notes in the text enhance the walker's appreciation of their surroundings.
- > **See Subi on Sunday** - See Subi on Sunday is a popular program of ninety-minute guided walks with historically themed commentary. Researched, organised and led by city volunteer Marion Gathercole, the free walks are held bi-monthly from July through to May.
- > **Walking Groups** - Walking groups are a great way to meet new people and enjoy regular exercise. The city, in partnership with Heart Foundation walking, invites community members to keep active and have fun by joining a local walking group.
- > **Whadjuk Trail Network** - The Whadjuk network of walking trails lies on Nyungar land, connecting remnant bushland areas in the western suburbs of Perth. With links to iconic, heritage and Nyungar trails in the area, they offer users a unique experience and appreciation for the land. The 16.3 kilometre Bush to Beach trail starts in Rosalie Park and finishes in Cottesloe.

The pedestrian network in the Subiaco City Centre is compromised by the high volume of traffic and generally poor crossing opportunities along strategic roads. In particular, Hay Street and some sections of Rokeby Road suffer from a lack of safe pedestrian crossing facilities. The level of congestion along Rokeby Road does assist to allow pedestrian movements across queued traffic, but the general Level of Service Remains poor. Safe legible crossing is mainly restricted to signalised intersections within the Activated Pedestrian Zone.

### 5.5.2 Cycling Network

The city contains a network of cycling paths ranging from shared pedestrian and cyclist paths to bicycle lanes. Located along Railway Road is a high quality principal shared path (PSP) which is part of the Perth Bicycle Network. The Fremantle PSP, as it is known by, has an average daily volume of 1078 cyclists. Various end-of-trip facilities have also been provided throughout the area which includes bicycle rails and bike lockers located at key destinations. The relatively small area that Subiaco occupies makes cycling a viable and attractive transport alternative.

The city also provides various programs and incentives to promote and encourage people to switch to cycling and walking. A summary of these programs are as follows:

- > **Bike to Work Breakfast** - The Subiaco Bike to Work Breakfast is held annually in March. Commuters receive a free breakfast for cycling all or part of the way to work, school or university.
- > **National Ride to School Day** - In 2014, all three primary schools participated in National Ride to School Day. The city provides event ideas and promotion, and sponsors a healthy breakfast at each of the schools.
- > **Walk Over October** - The city participates in Walk to School Day and Race around Subi.
- > **Bike Ed** - A training program aimed at primary school students and covers bike checks, mounting, dismounting, pedalling, braking, emergency braking, one handed riding, signalling, scanning, gearing, and group riding.
- > **TravelSmart to School** - The TravelSmart to School program works with primary schools to promote the use of cycling, walking and public transport to get to school.



- > TravelSmart Map - The map shows all of the cycling, walking and public transport routes in the Subiaco area, as well as the location of bike rails, bike shelters, bike shops, water fountains, shopping areas, and community facilities.
- > Super Tuesday Annual Bike Count - Super Tuesday is a national bike count that takes place in March each year. Volunteers count the number of cyclists between 7am and 9am at 22 locations on a Tuesday.
- > TravelSmart Workplace - The program assists workplaces to implement practical actions to enable employees and visitors to cycle, walk, carpool or use public transport.
- > Active Commuter Challenge - People that live, work or study in the city could go in the draw to win prizes by committing to make four active transport trips per month as part of the Active Commuter Challenge.
- > TravelSmart materials for various events, programs and information.

An issue with the previous PBN bicycle routes is that a number of these routes are either disconnected or come to an abrupt end, creating problems for cyclists when navigating through Subiaco. These disconnected paths have a negative impact on the entire network as it becomes a series of disjointed bike paths rather than being an integrated and connected network. Existing infrastructure is also heavily biased towards strategic commuter trips, bypassing the main attractors in Subiaco.

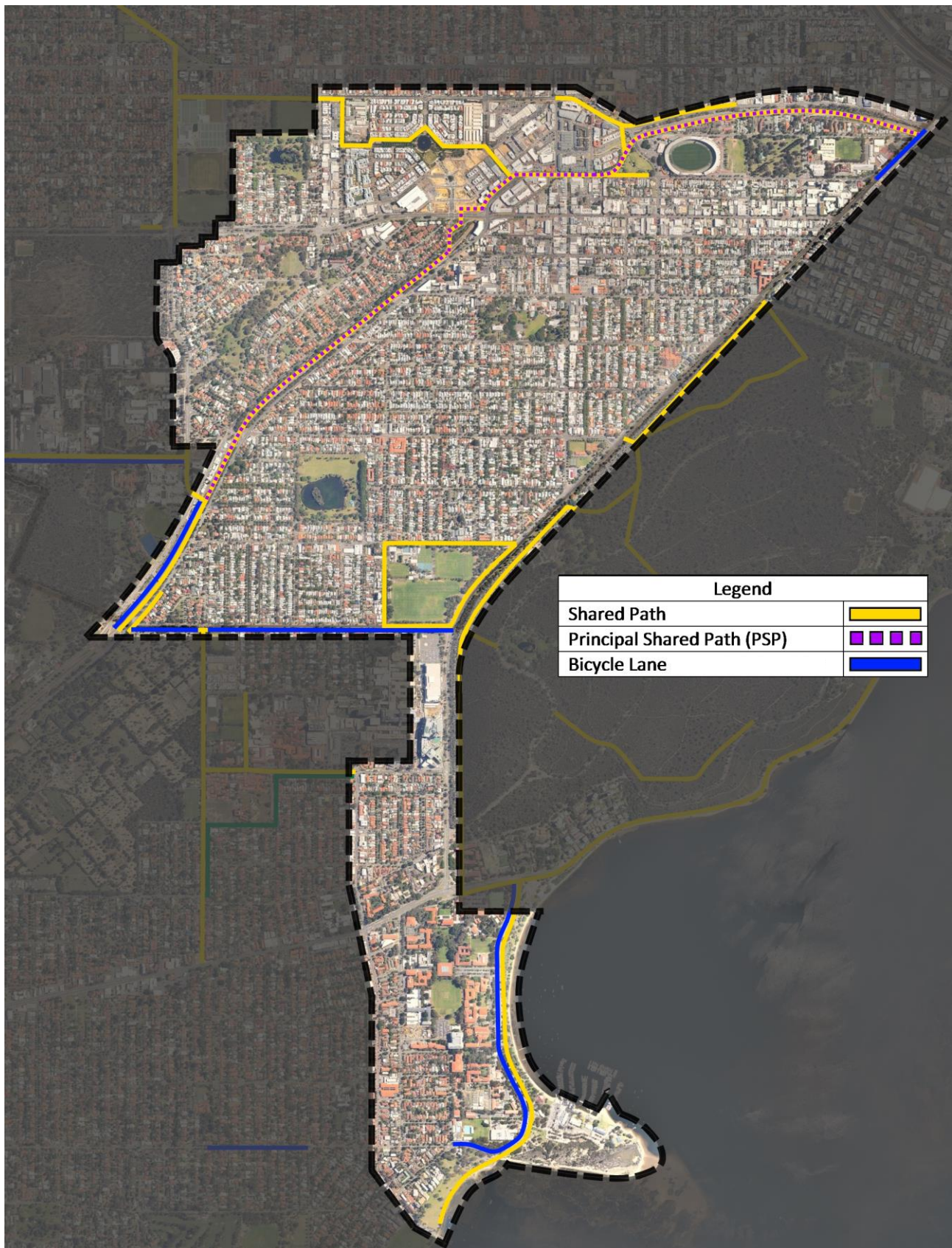
The 2014 Draft Subiaco Bike Plan proposes a range of infrastructure improvement measures that attempts to fill existing gaps, creating a coherent and legible network through the city. This plan integrates both with internal land uses and external infrastructure provisions to further develop cycling as a viable transport mode.

A vital benefit of cycling infrastructure provision is that it can serve a variety of different needs. In addition to benefiting existing commuter cyclists it can also function to:

- > Provide mobility and access for the young, poor and disadvantaged, giving these people a much larger degree of transport independence.
- > Create safe, legible infrastructure for people with disabilities, particularly those with mobility impairments. Aspects of off-street cycling provision such as kerb ramps, grab rails and other features can greatly improve the safety of road crossings for this vulnerable community.
- > Provide ongoing health benefits for all sectors of the community by allowing safe recreational and utility transport using active modes. This is particularly important for young children, as the habits learned early in life can significantly impact their long-term health.
- > Better integrate the community through social and cultural interaction.
- > Present a much greater economic benefit than any other transport provision – the commercial success of a neighbourhood is greatly enhanced by pedestrian-scale infrastructure which makes it attractive to shop, eat and recreate in the area.



**Figure 5-17 Existing Pedestrian and Bicycle Network (City of Subiaco)**



### 5.5.3 **Mobility Aids**

Mobility aids provide facilities to aid people with disabilities to ensure ease of accessibility throughout the city. These include amenities such as ramps, hand rails, disabled parking bays and disability access on public transport.

The Recharge Scheme involves a network of Recharge Points in the community where people who use electric wheelchairs or scooters can recharge their equipment. The aim of the scheme is to help people avoid the risk of getting a flat battery whilst out and about, or reduce the fear of a flat battery which can sometimes lead to people isolating themselves. The city currently has five locations set up.

## 5.6 **Freight**

There are four major freight transport routes that travel through the Subiaco area. Three are located in the Subiaco area which includes:

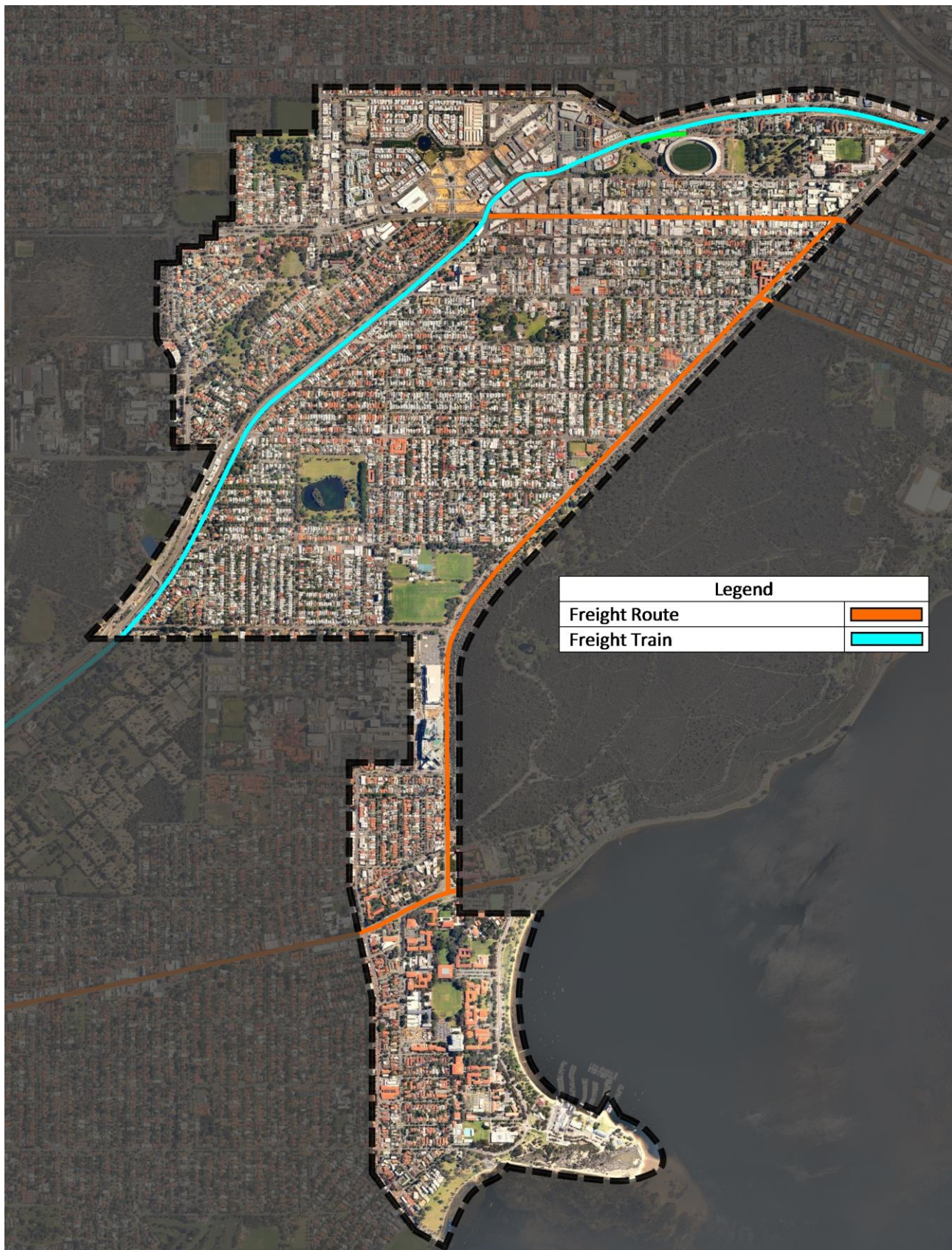
- > Stirling Highway.
- > Thomas Street.
- > Hay Street.

**Figure 5-18** shows the extent of strategic freight routes across the new City of Subiaco LGA. This lack of strategic freight is generally a significant boon for the city, removing one of the most significant conflicts along major road corridors: the interaction between heavy vehicles and other road users.

However, this lack of a defined strategic network means that the distribution of service and delivery vehicles needs to be managed carefully by the city, ensuring that service/delivery traffic is maintained along strategic road corridors and minimising the use of lower-order residential streets.



**Figure 5-18 Existing Freight Network (City of Subiaco)**

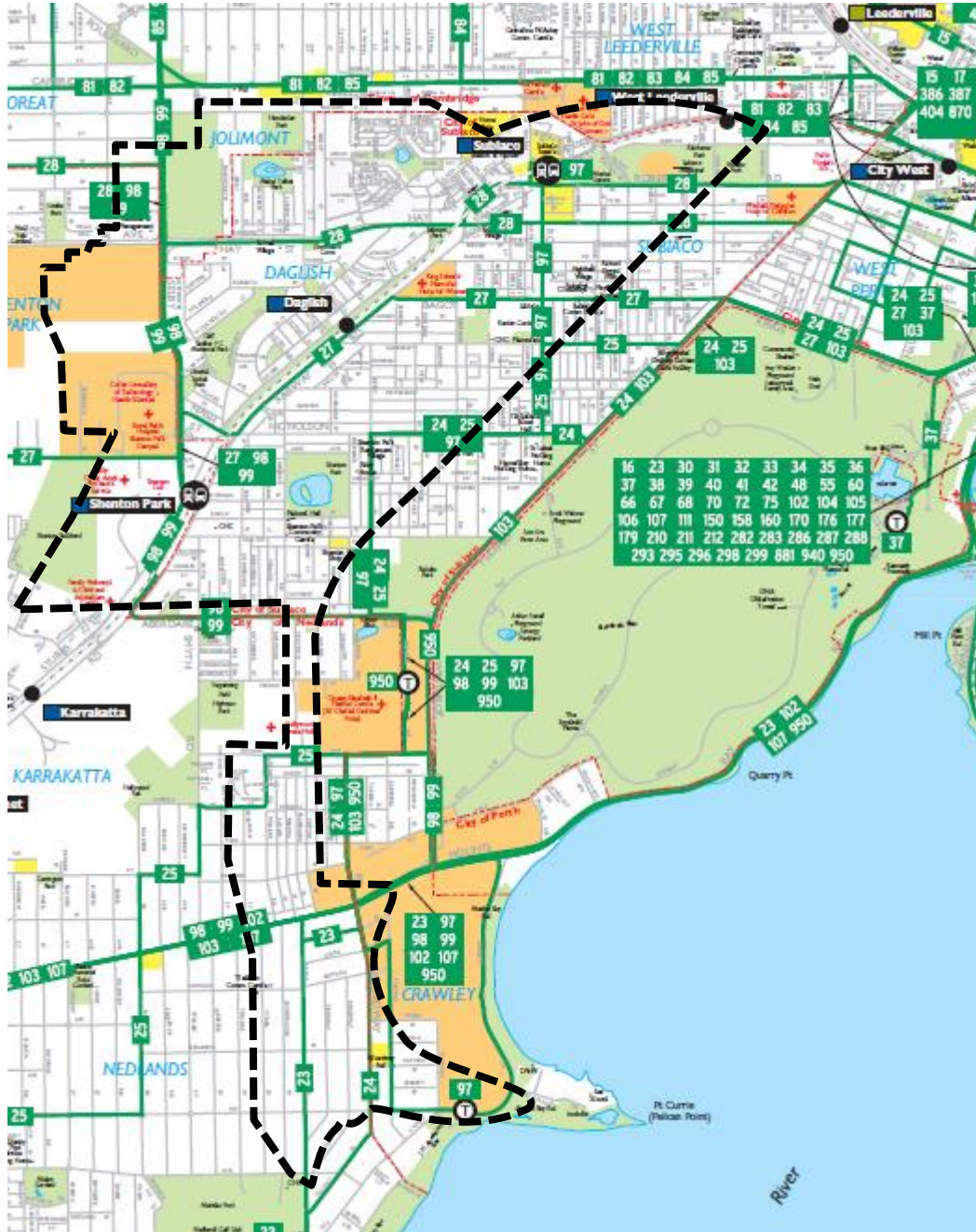




## 5.7 Public Transport

The primary modes of public transport are buses and trains both operated by Transperth. The Community Perceptions Survey 2014 found that 96% of respondents are satisfied with the city's effort in providing better access to public transport (Refer **Figure 5-19**).

**Figure 5-19 Existing Train and Bus Network (Subiaco LGA)**



Source: Transperth (2015)

### 5.7.2 Buses

The Subiaco LGA is serviced by a number of bus routes, covering most of the Subiaco area with multiple services operating along key transport corridors such as Railway Parade, Hay Street, Selby Street and Rokeby Road. The majority of routes are designed to support coverage service, supplementing the rail network.

These bus services have the highest patronage by Subiaco residents out of all available public transport modes, which is expected given its vast network coverage and frequency of service compared to trains.

**Table 5-6 City of Subiaco Bus Service Frequency**

Route no.	Route	Frequency			
		Peak	Off peak	Saturday	Sunday
23	Claremont Stn – Perth via Mounts Bay Road & Beatrice Rd	30min	60min	None	None
24	Claremont Stn - East Perth via Kings Park Road & Waratah Av	20min (approx.)	1hr	1hr (approx.)	1hr
25	Claremont Stn - East Perth via Kings Park Road & Princess Rd	20min (approx.)	1hr	1hr	None
27	East Perth - Claremont Stn via Bagot Road & Lemnos St	15min	30min	1hr	1hr
28	East Perth - Claremont Stn via HBF Stadium	20min	1hr	1hr	1hr
97	UWA - Subiaco Stn via QEIMC	15min	15min	30min	1hr
98	Circle Route – Clockwise	10–15min	15min	30min	15min
99	Circle Route – Anti-Clockwise	15min	15min	30min	30min
102	Perth - Cottesloe Stn via Claremont	20-30min	30min	30min	30min
107	Perth - Fremantle Stn via Claremont & Mosman Park	20-25min	60min	1hr	2hrs
103	East Perth – Fremantle Stn via Thomas Street & Stirling Hwy	30min	1hr	30min	1hr
950	Morley Bus Stn - QEIMC via Beaufort St, Perth & UWA	3-5min	15-20min	10-30min	10-30min

Source: Transperth (2015)

### 5.7.2.2 Subiaco Shuttle

The Subiaco Shuttle is a high-frequency local bus service that connects Subiaco Train Station, QEIMC and the University of Western Australia.

The Subiaco Shuttle runs every 15 minutes from 6.43am to 6.30pm on weekdays, every 30 minutes between 8.55am and 5.55pm on Saturdays and hourly on Sundays and public holidays.

### 5.7.2.3 Route 950 Bus

The Route 950 bus service runs from Morley Bus Station to the QEIMC. It is a high frequency service which runs at 3-5 minute intervals during the weekday peak hours and at 10 minute intervals for the weekend peak hours.

### 5.7.3 Trains

The Fremantle Line serves the city from West Leederville, Subiaco, Daglish and Shenton Park stations. The frequency of services at these stations is outlined in the table below.

**Table 5-7 Train Timetable**

Line/Station Number	Timetable - to Perth	Timetable - from Perth	Connecting Bus Services
West Leederville	Every 10-20min from 5:44am to 8:52pm Every 30min until 12:52am	Every 10-20min from 5:27am until 6:49pm Every 30min until 12:04am	None
Subiaco	Every 10-20min from 5:43am to 8:51pm Every 30 min until 12:51am	Every 10-15min from 5:29am until 6:51pm Every 30min until 12:06am	Route 97, 28
Daglish	Every 10-20min from 5:41am to 8:49pm Every 30min until 12:49am	Every 10-20min from 5:30am until 6:52pm Every 30min until 12:07am	Route 27

Line/Station Number	Timetable - to Perth	Timetable - from Perth	Connecting Bus Services
Shenton Park	Every 10-20min from 5:40am to 8:48pm Every 30min until 12:48am	Every 10-20min from 5:32am until 6:54pm Every 30min until 12:09am	Route 98, 99

Source Transperth (2015)

The areas of Subiaco further to the west do not have effective access to train services, meaning that the only available public transport service is provided by buses.

The facilities provided at the stations are generally adequate to satisfy the existing demand, although some of the stations lack amenities such as public toilets or other end-of-trip facilities.

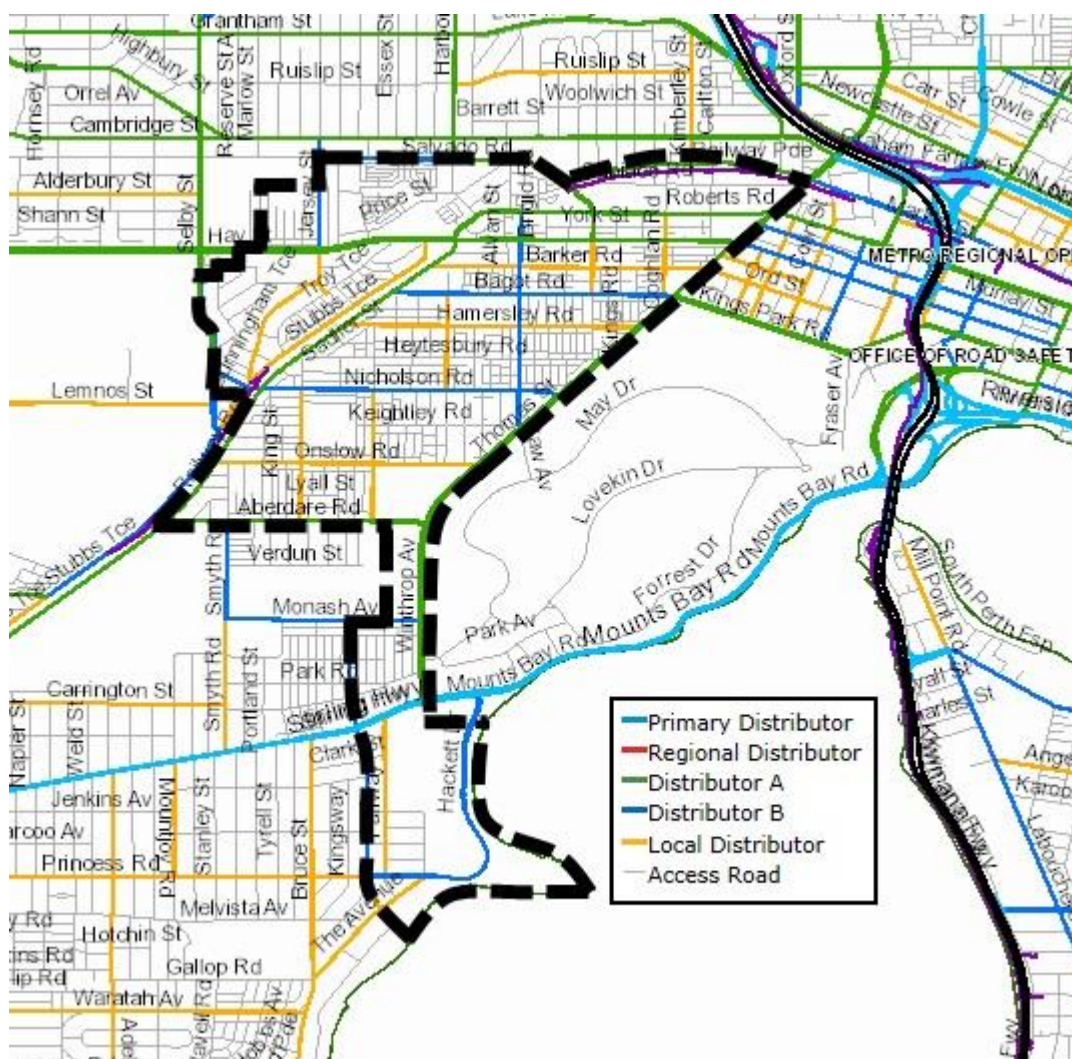
West Leederville Station is the only station within the precinct that does not have a bus service directly connected to the station. The closest available bus service is 200m north of the station along Cambridge Street or 300m southbound on Roberts Road.

Data given by Transperth shows that the patronage of the Fremantle line in 2013/14 amounted to almost 8.3 million passengers. While this is a decrease from the previous year, this may be attributed to several reasons which include overcrowding and delays of service due to power outages. It is still expected that the usage of trains will increase as the population of Perth continues to grow.

## 5.8 Road Network

### 5.8.1 Road Hierarchy

Figure 5-20 Road Hierarchy (Subiaco LGA)





The roads listed in **Table 5-8** are the part of the main arterial road network within the city. This existing hierarchy has been used to identify the primary road network along which traffic is generally supported.

**Table 5-8 Description of Major Roads/Streets within the City of Subiaco**

Road Name	Road Type
Stirling Highway	Primary Distributor
Selby Street	Distributor A
Stubbs Terrace	Distributor B
Nash Street	Distributor B
Salvado Road	Distributor A
Jersey Street	Distributor B
Haydn Bunton Drive	Distributor A
Harbome Street	Distributor A
Thomas Street	Distributor B
Bagot Road	Distributor B
Railway Road	Distributor A
Nicholson Road	Distributor B
Railway Parade	Distributor A
Roberts Road	Distributor A
Hay Street	Distributor A
Rokeby Road	Distributor B
Aberdare Road	Distributor A
Winthrop Road	Distributor A
Hampden Road	Distributor B

These classifications are defined in the Metropolitan Functional Road Hierarchy as follows:

- > Primary Distributors: These provide for major regional and inter-regional traffic movement and carry large volumes of generally fast moving traffic. Some are strategic freight routes and all are National or State roads. They are managed by Main Roads.
- > District Distributor A: These carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by local government.
- > District Distributor B: Perform a similar function to type A District Distributors but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 kilometres apart. They are managed by local government.

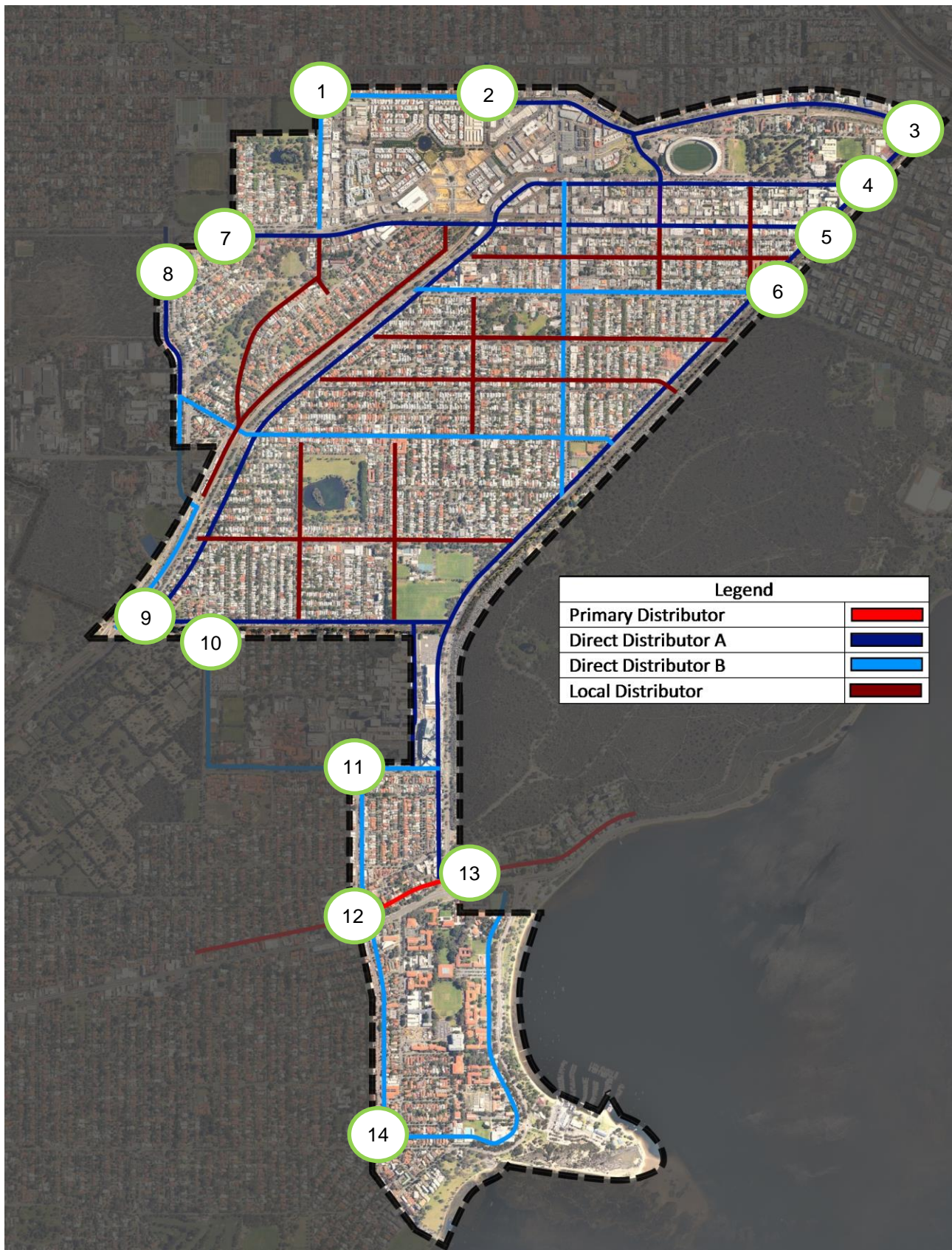
These principal roads provide access towards the Subiaco town centre and other key locations and attractions in the area.

The local road network generally adheres to a grid pattern, providing strong connectivity to the regional road network. The road network in Subiaco is generally well established with few opportunities for further expansion which is acceptable due to the shifting focus to active transport modes such as public transport, cycling and walking. The roads are generally well maintained which can be credited to the various programs aimed at repairing and upgrading the existing road network.



## 5.8.2 Strategic Road Network

Figure 5-21 Roads Leading in/out of Subiaco



**Table 5-9 Road Access to/from Subiaco**

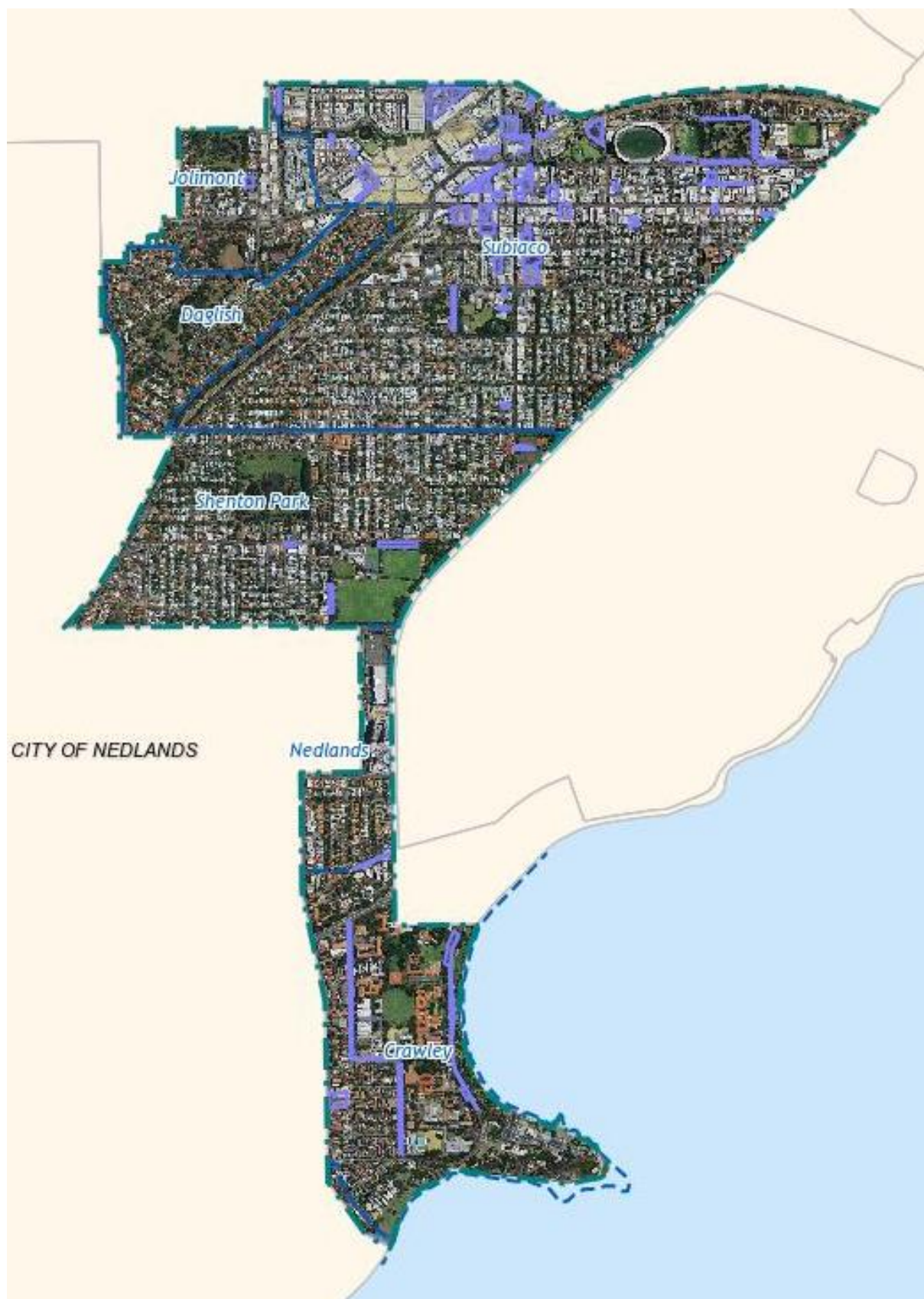
Road Name	Point on map
Jersey Street	1
Harborne Street	2
Railway Parade	3
Roberts Road	4
Hay Street	5
Bagot Road	6
Underwood Avenue	7
Selby Street	8
Railway Road	9
Smyth Road	10
Monash Avenue	11
Stirling Highway	12
Mounts Bay Road	13
Princess Road	14

There is a high degree of vehicular accessibility to and from Subiaco from all directions. However, there are constraints associated with barriers to vehicular movement at the periphery of the LGA. These constraints include the Fremantle and Northern Rail Lines, Thomas Road and the Mitchell Freeway.



## 5.9 Current Parking Situation

Figure 5-22 Parking Stations in Subiaco



Source: City of Subiaco (2015)

**Figure 5-23** Parking Stations in the Subiaco Town Centre



Source: City of Subiaco

The majority of available parking in Subiaco is located in the town centre and the areas that surround it. Other key locations with parking available to the public include Subiaco Oval and University of Western Australia.

**Figure 5-22** marks the public car parking available in the Subiaco area.

A parking study was conducted by Arup in 2012 detailing the current parking management approach adopted by the council. The key points are listed below:

- > Short term parking is concentrated in Subiaco town centre and neighbourhood centres.
- > Longer term parking is located more remote from and on the periphery of centres.
- > Restrictions are in place in streets to prevent all day parking in residential precincts around key areas of activity. In most cases a two hour restriction applies.
- > Special restrictions apply to on-street parking on match days within 1.5 km of Subiaco Oval.
- > Residents can apply for a permit exempting them from time controls (certain conditions apply for qualifying for a permit).
- > Commercial parking permits are available to assist trades.
- > Off-street paid parking (first hour free shopper parking).
- > Bay detection technology and guidance system are in place in certain locations (e.g. Rowland Street's car station 13).
- > Public and private providers of parking operate in Subiaco.

## 5.10 Key locations/attractions

The city is not only a business oriented area but also contains many local attractions such as parks, open spaces, tourist attractions and recreational facilities. Key locations and trip generators are shown below:

### 5.10.1 Subiaco Town Centre

The Subiaco Town Centre is the primary activity centre of the Subiaco area and is part of Perth's inner-city core. It contains a variety of retail stores, restaurants and cafés as well as being a key commercial district for businesses. Some attractions in this area include:

- > Home Base.
- > Station Street Markets.
- > Subiaco Square.
- > Subiaco Railway Station.
- > Rokeby Road.
- > Hay Street.

### 5.10.2 Subiaco Railway Station

Subiaco is a Transperth railway station located 3.7 kilometres west of Perth, Western Australia, on the Fremantle Line. Until the opening of the William Street platforms at Perth station, it was the only underground railway station in the Transperth network. The station is located close to Subiaco's most well-known landmarks including the Regal Theatre, Subiaco Hotel, Station Street Markets, Subiaco Oval and Rokeby Road.

### 5.10.3 Princess Margaret Hospital for Children

Princess Margaret Hospital for Children (PMH) is a centre for paediatric research and care. The hospital is located on Roberts Road in Subiaco, Western Australia. It is the state's only specialist children's hospital. Together with the Child and Adolescent Community Health Division it makes up the Child and Adolescent Health Service. The hospital is currently in the process of relocating to the Perth Children's Hospital at QEII MC. The relocation is anticipated to occur during October 2015.

### 5.10.4 Queen Elizabeth II Medical Centre

The 28 hectare QEII MC (QEII MC) is the largest medical centre in the southern hemisphere and globally recognised in health care, research and education.

Situated 4km from the Perth central business district in Nedlands Western Australia, the QEII MC has grown over 45 years to include over 40 organisations. The QEII MC has not-for-profit, public and private organisations and is dedicated to facilitating the highest quality of health care, educating future generations of health workers and conducting related scientific research.

### 5.10.5 King Edward Memorial Hospital

King Edward Memorial Hospital for Women (KEMH) is located at 374 Bagot Road, Subiaco, Western Australia. It is Western Australia's largest maternity hospital and only referral centre for complex pregnancies.

It provides obstetric and neonatal care within the greater Perth Metropolitan area. In cases where patients have gone to private maternity clinics, they may be moved to KEMH if complications occur. All cases of complicated pregnancy in Western Australia are transferred to KEMH by the Royal Flying Doctor's Service.

The King Edward Memorial Hospital is due to relocate to the Queen Elizabeth II Medical Centre (QEII MC) in the future, though the date for relocation is still unknown at this stage.

### 5.10.6 Subiaco Oval

Subiaco Oval is a football stadium located in Subiaco, a suburb of Perth, Western Australia. The highest capacity stadium in Western Australia and one of the main stadiums in Australia, seating 43,500 people, the ground is the home of Australian Rules football in Western Australia, being the home ground for the West Coast Eagles and Fremantle Football Clubs, the two Western Australian teams in the Australian Football



League. The ground is also used for occasional West Australian Football League matches, including the competition's yearly grand final. The stadium has also hosted Perth Glory games, including two National Soccer League grand finals, International rules Test matches, rugby union games and rock concerts. It was the home ground for the Western Force between 2006 and 2009. AFL Matches are due to relocate to the new stadium located in Burswood in 2018.

#### **5.10.7 University of Western Australia**

The University of Western Australia (UWA) is a research-intensive university in Perth, Australia that was established by an act of the Western Australian Parliament in February 1911, and began teaching students for the first time in 1913. It is the oldest university in the state of Western Australia and is colloquially known as a "sandstone university". It is also a member of the Group of Eight.

#### **5.10.8 Additional Trip Generators**

Other key destinations of travel include:

##### **Schools**

- > Rosalie Primary School.
- > Jolimont Primary School.
- > Subiaco Primary School.
- > Perth Modern School.

##### **Civil and cultural.**

- > Subiaco City Library.
- > Subiaco Arts Centre.

##### **Railway Stations.**

- > Daglish Station.
- > Shenton Park Station.
- > West Leederville Station.

### **5.11 Land Use**

Currently the area is separated into twelve precincts each with their own planning policies related specifically to their area. **Figure 5-24** shows the current land uses in the city and a list of the precincts have been provided below.

- > Jolimont Precinct.
- > Daglish Precinct.
- > North Subiaco Precinct.
- > Town Centre Precinct.
- > Hay Street East Precinct.
- > Rokeby Road South Precinct.
- > Civic and Cultural Precinct.
- > Triangle Precinct.
- > West Subiaco Precinct.
- > Shenton Park Precinct.
- > Queen Elizabeth II Medical Centre Precinct.
- > Hollywood Precinct.

- > University Precinct.
- > Parks and Open Spaces
- > Kings Park
- > Mueller Park
- > Theatre Garden
- > Cliff Sadlier Reserve
- > Shenton Park

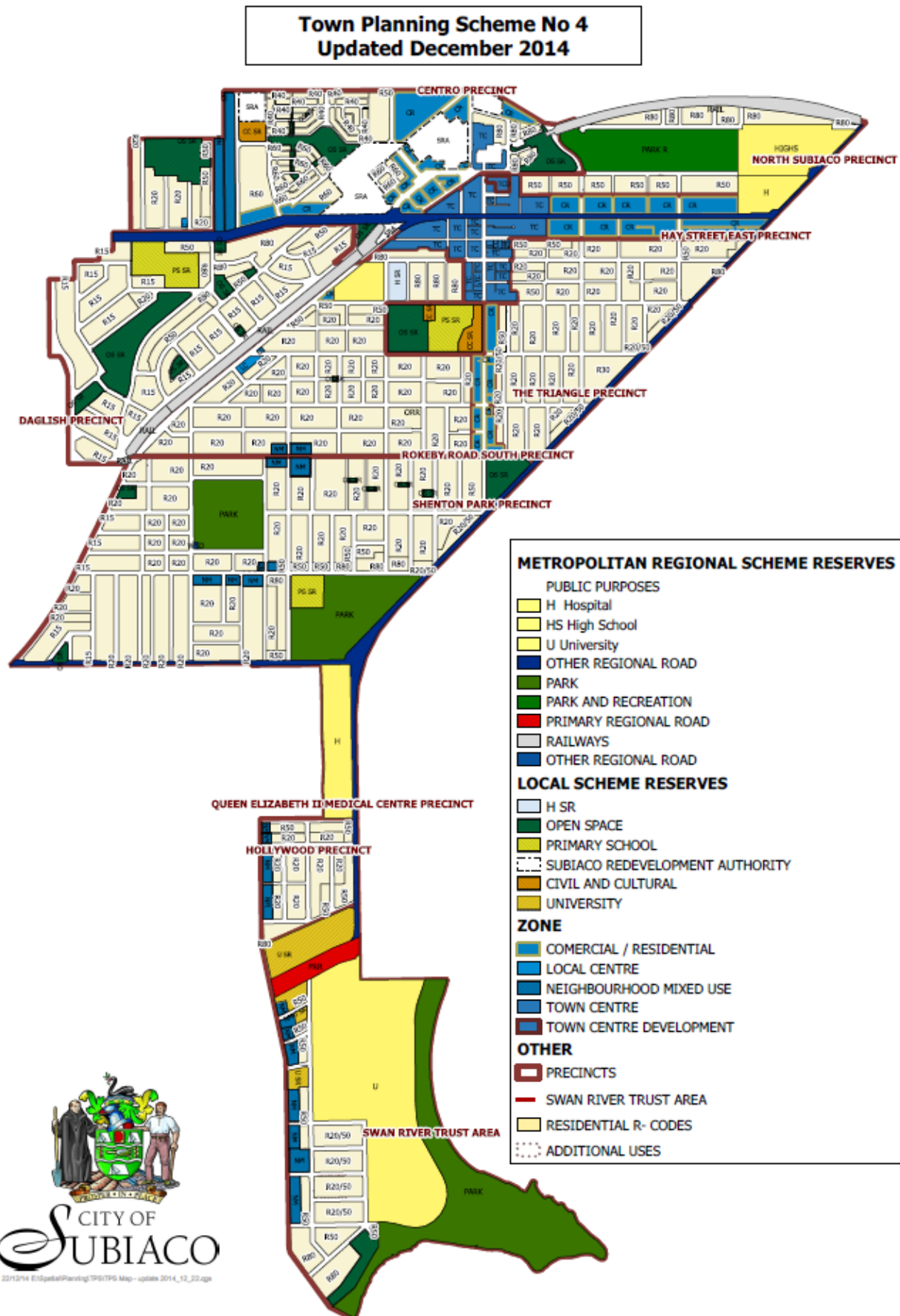
The area is primarily made up of low density residential in the central area, public purpose facilities in the south and commercial and mixed use in the northern precincts.

The town centre, oriented around Rokeby Road serves as a focal point for business, employment and visitors. The street functions as a small scale activity corridor featuring a high degree of variety in land use, narrow road reserve, excellent street frontage and a mix of night and day uses. Being a relatively old suburb, there is little vacant or underutilised land area within the town centre. A detailed breakdown of the lands uses in the town centre is shown in **Figure 5-25**.

The city is also characterised by a cluster of significant health facilities, which tend to generate a large number of private car trips. Additionally, Subiaco has dedicated a fairly large area to parks and open spaces.



Figure 5-24 City of Subiaco Town Planning Scheme No 4



Source: City of Subiaco (2014)

**Legend**

- Landmark/threshold
- Mixed Use
- Residential
- Public Focus/Park
- Shared Carpark and Plaza
- Town centre
- High Frequency Transit
- Transit Stop
- Active Frontages
- Public Parking (multi-deck)
- Public Purpose
- Town Centre Conservation Area
- Local Development Plan Required
- Activity Centre Boundary
- Suggested Access Ways
- 400m threshold
- Subiaco Station

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26 October 2015

## 6 Future Transport Network

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### 6.1 How can travel be improved in Subiaco into the future?

There are five different elements comprising the 2007 Subiaco ITS. They are discussed separately under the following five sections:

1. Managing travel demand.
2. Improving walking and cycling.
3. Improving public transport.
4. Managing vehicular traffic.
5. Managing parking.

The Strategy for each of the above five elements, is discussed under the following headings:

- > Strategic objectives.
- > Policy directions.
- > Ongoing and future policies.

This section details the future policies, proposals and concept plans that have been identified from the literature review and various other sources. The ITS in the next section will build upon the proposals and policies described in this section and provide recommendations based on the city's future transport requirements.

### 6.2 Managing Travel Demand

#### 6.2.1 Strategic Objective

To improve access to facilities and services within the city without increasing car travel and to manage demand for vehicle travel at peak times.

#### 6.2.2 Policy Directions

P1. Continue to promote walking and cycling for local trips.

P2. Through good urban design, encourage direct and legible routes between key destinations and encourage complementary uses to be located within proximity to each other (whereby several purposes can be met through a single trip, e.g. shop, library, bank, chemist).

P3. Continue to promote the use of public transport by providing information on new, improved and existing services on a regular basis.

P4. Employers should be encouraged to support alternative travel means for their staff through education to employees and incentives/ travel benefits.

#### 6.2.3 Ongoing and Future Policies

As a result of the 2007 ITS the following actions to manage travel demand were completed:

- > Green Travel Plans were developed by St John of God Hospitals, QEII MC, KEMH and UWA participated in the TravelSmart Workplace program. Partially completed.
- > TravelSmart Household Program. This was completed before the 2007 ITS was developed.
- > TravelSmart program for small businesses.
- > Cycle/walk to school day - ongoing.
- > Bike education.
- > TravelSmart Map. Ongoing and updated every two years.
- > Bike to work breakfast. Ongoing and implemented annually.

The ITS 2015-2020 will retain the majority of the actions contained in the 2007 ITS with some modifications to account for the changing priorities of the city.

#### **6.2.3.1 Your Move – City of Cockburn**

The Your Move program is the first large-scale implementation of a community-based behaviour change intervention integrating both sustainable transport and physical activity objectives. Targeting increases in walking, cycling and public transport utilisation, the project is sponsored through a partnership between the WA State Departments of Sport and Recreation and Transport (in conjunction with the City of Cockburn).

Your Move is a free and personalised active lifestyle program providing information to support households to become more active, healthy and connected in their local area.

When residents take part in Your Move they receive:

- > Assistance with local travel options.
- > Handy tools and information to help you get physically active.
- > Ongoing support and advice.

The project reached over 10,000 households and the total project cost was \$2.2 million.

The Your Move program is now considered to be best-practice for TravelSmart implementation and it is recommended that the city apply for selection by the State Government (Department of Sport and Recreation and the Department of Transport) in future projects.

### **6.3 Improving Cycling and Walking**

#### **6.3.1 Strategic Objective**

To encourage walking and cycling for local and daily trips as a sustainable alternative to private car use by providing a safe, connected and enjoyable walk/ cycle environment.

#### **6.3.2 Policy Directions**

P1. Provide a safe and enjoyable pedestrian/cycle environment. Wherever possible, pedestrian routes should have active building frontages, direct and legible connections, weather protection, good lighting and should avoid public access ways and high fence lines that prevent passive surveillance.

P2. Incorporate universal access into street design, public transport infrastructure and building design.

P3. Ensure that the road network allows for safe pedestrian and cycle crossing.

P4. Buildings and facilities should provide for end of trip facilities, this should be a requirement for new buildings in the city in line with the Austroads Standards.

P5. The city should encourage a fine grain mix of land uses whereby residents can satisfy daily needs at local neighbourhood shops by walking or cycling.

#### **6.3.3 Ongoing and Future Policies**

##### **6.3.3.1 Walking improvements**

As part of Subiaco's footpath improvement program, a list of proposed footpath upgrades for 2014/15 have been identified by the city:

- > Hensman Road - Keightley Road to Nicholson Road (east).
- > Hensman Road - Keightley Road to Gloster Street (west).
- > Aberdare Road - Herbert Road to Derby Road (north).
- > Austin Street - Keightley Road to Nicholson Road (north).
- > Bedford Avenue - Bagot Road to cul de sac (west).
- > Bishop Street - Upham Street to Upham Street +64m (east).

- > Gloster Street - Coleraine Street to View Street (north).
- > Hensman Road - Bagot Road to cul de sac (east).
- > Hensman Road - Bagot Road to cul de sac (west).
- > Heytesbury Road - Chester Street to Salisbury Street (north).
- > Heytesbury Road - Ada Street to Railway Road (north).
- > Morgan Street - Railway Road to Fortune Street (south).
- > Myers Street - Fairway + 38m (north).
- > Robinson Terrace - Troy Terrace to cul de sac (north).
- > View Street - Gloster Street to Heytesbury Road (east).
- > Thomas Street - Barker Road to Hay Street and Roberts Road to Subiaco Road.
- > Waylen Road - Railway Road to Herbert Road (south).

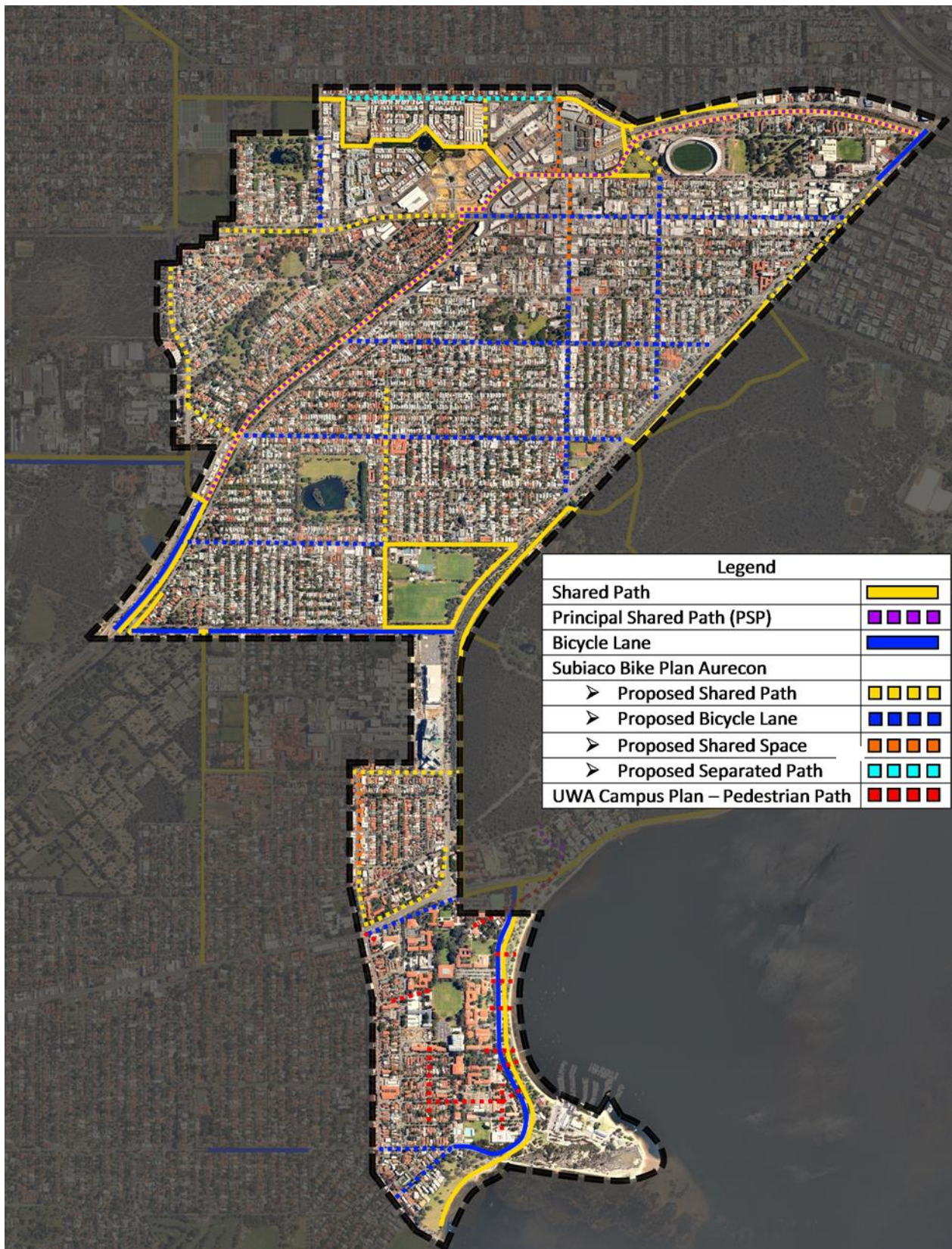
The selection of these footpaths was based upon various factors such as their condition, history of repairs, usage frequency, proximity to pedestrian attractions, existing utility services in the road reserve, community needs such as nursing homes, hospitals and schools and whether the street has single or parallel footpaths.

Continual footpath maintenance and network extension is vital to ensure a safe walking environment. Subiaco's commitment to improving pedestrian amenity should be continued, with a focus on replacing degraded sections and network improvements informed by the Draft Subiaco Bike Plan and Placemaking planning.



### 6.3.3.2 Cycling

**Figure 6-1 Proposed Pedestrian and Bicycle Network**



*Adapted from the City of Subiaco Draft Bike Plan 2014*

**Figure 6-1** shows the completed network recommended by the city's 'Bike Plan'. The addition of new cycling infrastructure will make Subiaco into a more cyclist friendly area. The proposed cycling paths also provide connections to existing paths which results in a more coherent system and improve accessibility and mobility for cyclists and pedestrians.

In addition, the introduction of shared spaces will allow the integration of cars, cyclists and pedestrians to operate together. Shared spaces are low speed environments with limited line markings and kerbing to encourage mixing instead of separation of pedestrians, cyclists and cars. The advantage of a shared space is that it creates a safer environment for pedestrians and cyclists to travel while reducing the costs associated with signalised crossings and additional infrastructure for separate users.

The UWA Campus Plan is a series of proposed internal and external changes which aim to provide universal access, meet occupational health and safety standards and compliance to design and statutory requirements. In its current form, several pedestrian routes were proposed to provide better access ways in and out of the campus while the other details are yet to be finalised.

The completion of the Draft Subiaco Bike Plan allows the city to apply for funding annually from the Department of Transport's Perth Bicycle Network Grants in order to gradually implement the associated recommendations.

### 6.3.3.3 End-of-trip Facilities

**Table 6-1 Facilities per Available Bicycle Parking Spaces**

BICYCLE PARKING SPACES	SHOWERS
0 (>20 staff)	No requirement
1 – 2 (20 – 40 staff)	One shower
3 – 10 (60 – 200 staff)	Two showers (one male, one female)
11 – 20 (220 – 400 staff)	Four showers (two male, two female)
<20 (<400 staff)	Additional showers to be provided at a rate of two showers (one male, one female) for every ten (200 staff) bicycle parking spaces required.

According to the standards introduced in the *Planning Policy Manual – Policy 2.14 End of Trip Facilities*, end of trip facilities for commercial developments are to be provided in accordance with the following:

- > Located as close as possible to bicycle parking facilities or major entrances to the building.
- > Dispense hot and cold water.
- > Include non-slip surfaces, hooks and/or benches for belongings, adequate lighting and ventilation.
- > Regularly cleaned and maintained.
- > The number of shower facilities to be provided in accordance with the above table.

### 6.3.4 Contemporary approaches to encouraging walking and cycling

#### 6.3.4.1 Improving Access for People with Disabilities

This section discusses the link between walking and accessibility for people with disabilities. The most relevant outcome of the city's DAIP is Outcome 2: People with disabilities have the same opportunities as other people to access the buildings and other facilities of the relevant public authority.

Connectivity is one of the most important aspects of an accessible transport network for people with a disability. Connectivity affects the degree to which transport networks such as streets and paths connect people to their destinations and public transport. Good connectivity provides easy access to key destinations for all pedestrians. Excellent connectivity discourages car use for short trips as local trips are easier and more pleasant by foot than by car. For people who do not have a disability, any gaps in a transport network can be filled by driving a car, walking, cycling or using any mode of public transport. For a person with a disability, any gap in trip connectivity such as lack of ramp, safe crossing or suitable path may mean that they cannot reach their destination without assistance. This reduces their overall independence and makes it more difficult to access workplaces, schools, recreation, medical appointments or shopping areas.



Disability Access and Inclusion Plan's developed by local governments in WA can play a valuable role in addressing some aspects of the built environment that cause breaks in trip connectivity for people with disability as well as benefit other path users such as people pushing prams. Accessibility improvements will address the needs of many people living in the area or just visiting, whether they have a disability or not.

Source: [http://www.transport.wa.gov.au/mediaFiles/about-us/ABOUT\\_Transport\\_Items\\_DSC\\_green.pdf](http://www.transport.wa.gov.au/mediaFiles/about-us/ABOUT_Transport_Items_DSC_green.pdf)

#### **6.3.4.2 Walk WA - A Walking Strategy for Western Australia (2007 –2020)**

The vision of the Walk WA: A Walking Strategy for Western Australia (2007 –2020) is that 'by 2020, Western Australia will be a vibrant, safe, accessible place with a supportive walking environment where all Western Australians enjoy walking for health, recreation and transport'.

The Strategy defines four aspects that create a supportive walking environment and contribute to the achievement of the walkability targets and goals set in the various strategies:

- > **Access** – easy to reach walks and attractive public open spaces for people of all physical activity levels and abilities. Ensuring facilities are accessible to seniors, people with disabilities, and people with prams through such treatments such as ramps, wide pathways, large signs and unisex toilets, will also benefit people who wish to walk in and through their local communities. Access issues may also include suitable provision of bus stops, car parking and bike racks.
- > **Aesthetics** – an environment offering pleasant, clean surroundings in which to walk. The location has a natural or developed attractiveness that encourages people to use it. Considerations may include heritage preservation, litter control and excellence in landscaping.
- > **Safety and security** – walkers must feel that they and their belongings are safe. People need to feel that they can relax and enjoy their walk on paths that are well maintained, stable and built with personal safety as a priority. Security is also important and walking environments should be created or enhanced using the principles of 'designing out crime' (adapting environmental design principles for crime prevention).
- > **Comfort** – walkers can be confident of shelter, conveniences and rest stops. Amenities such as drinking water, seating and shade or shelter must be available.

In order to achieve these objectives, Department of Transport created a walkability audit tool. The Walkability Audit Tool is a tool for use by officers of local government authorities, consultants and community groups to identify issues to improve pedestrian safety, accessibility and amenity, identify appropriate countermeasures, and document the findings of the situation in an audit report to develop an action plan for the Council.

Walking audit tools are useful in two ways. First they flag what an auditor needs to check so that a street is audited in a comprehensive way. Secondly audit tools ensure audits are conducted in consistent and comparable way and that outcomes are recorded and can be compared.

It is recommended that the city use Department of Transport's walkability audit tool to audit pedestrian footpaths in high demand precinct areas, key public transport stops and around all community facilities and major destinations to identify access and safety issues.

Equally as important to providing pedestrian footpaths is also maintaining the infrastructure. Local governments should ensure that reporting hazards or maintenance issues is an easy process. For example, providing a link on the city's home page to allow people to report issues can help maintain footpaths. A similar tool is used by the Department of Transport for reporting cycling hazards (see **Figure 6-2**).

**Figure 6-2 Screenshot of Department of Transport's online cycling hazard report tool**

### Online hazard report form

Reporting a hazard is essential to the maintenance of cycling infrastructure.

Before you report a hazard

**Note:**  
Prior to reporting a hazard using the online form below, please read the information provided on the [Reporting a hazard or crash page](#).

Online hazard report form

Denotes a mandatory field \*

**City of Stirling** reports should go directly to the [City of Stirling website](#). There is no need to complete this form.

Reports to all other authorities may be made below:

**Type of hazard \*** ☐ Road ☐ Shared path

**Local Council or Department \***

**Street name \***

**Intersecting street \***

**Nearest landmark**

**Suburb \***

**Description of hazard \***

<input type="checkbox"/> Pothole	<input type="checkbox"/> Road Bump	<input type="checkbox"/> Sand on surface
<input type="checkbox"/> Grass on surface	<input type="checkbox"/> Broken Glass	<input type="checkbox"/> Overhanging branches
<input type="checkbox"/> Grab rail	<input type="checkbox"/> Kerb ramp	<input type="checkbox"/> Drainage grate
<input type="checkbox"/> Traffic light sensor not responding	<input type="checkbox"/> Caltrop or other thorns	

**Other hazard(s):**

**Comments**

**Reported by \***

It is recommended that the city develop a Footpath Policy and reporting system so that footpaths and shared use paths are well maintained and kept clear of hazards and obstructions similar to the Department of Transport's online cycling hazards tool (<https://www.transport.wa.gov.au/activetransport/25460.asp>)

Strategic planning of footpaths connects local areas such as libraries, shopping centres, and train/bus stations. This can be achieved by first measuring the walkability of the area around high activity areas. Without good walkability it is difficult for people with disabilities to move through an area.

Land use planning should take into account non-car travel as many people with disability do not travel by private motor vehicle. Wayfinding can also assist people to locate local areas.

It is recommended that the city install universally designed wayfinding signage at key locations in the local area including town centres, train/bus stations, libraries, community centres and parks.

Another issue encountered by pedestrians and cyclists is the lack of infrastructure in the vicinity of construction sites. During construction of new buildings, often vehicles are provided with detours and deviations to ensure they can still reach their destination but cyclists and pedestrians are often left to their own devices. For example they may be forced to walk on the road if there is no alternative. This situation is particularly unsafe for people with disabilities.

As part of applying for a permit to obstruct a road, footpath, or verge applicants should ensure that access is maintained at any road works sites, works on footpaths, shared paths and bike paths (that are contracted by the local government authority). Alternative temporary infrastructure should be equal to the existing infrastructure and take into account the access needs of people with disability.

#### **6.3.4.3      *International Charter for Walking***

Walk21 is an organisation that exists to champion the development of healthy sustainable and efficient communities where people choose to walk. Through the Walk21 Conference series and the International Charter, Walk21 have a vision to create a world where people choose and are able to walk as a way to travel, to be healthy and to relax. Walk21 is considered one of the best sources of information on how to make cities walkable.

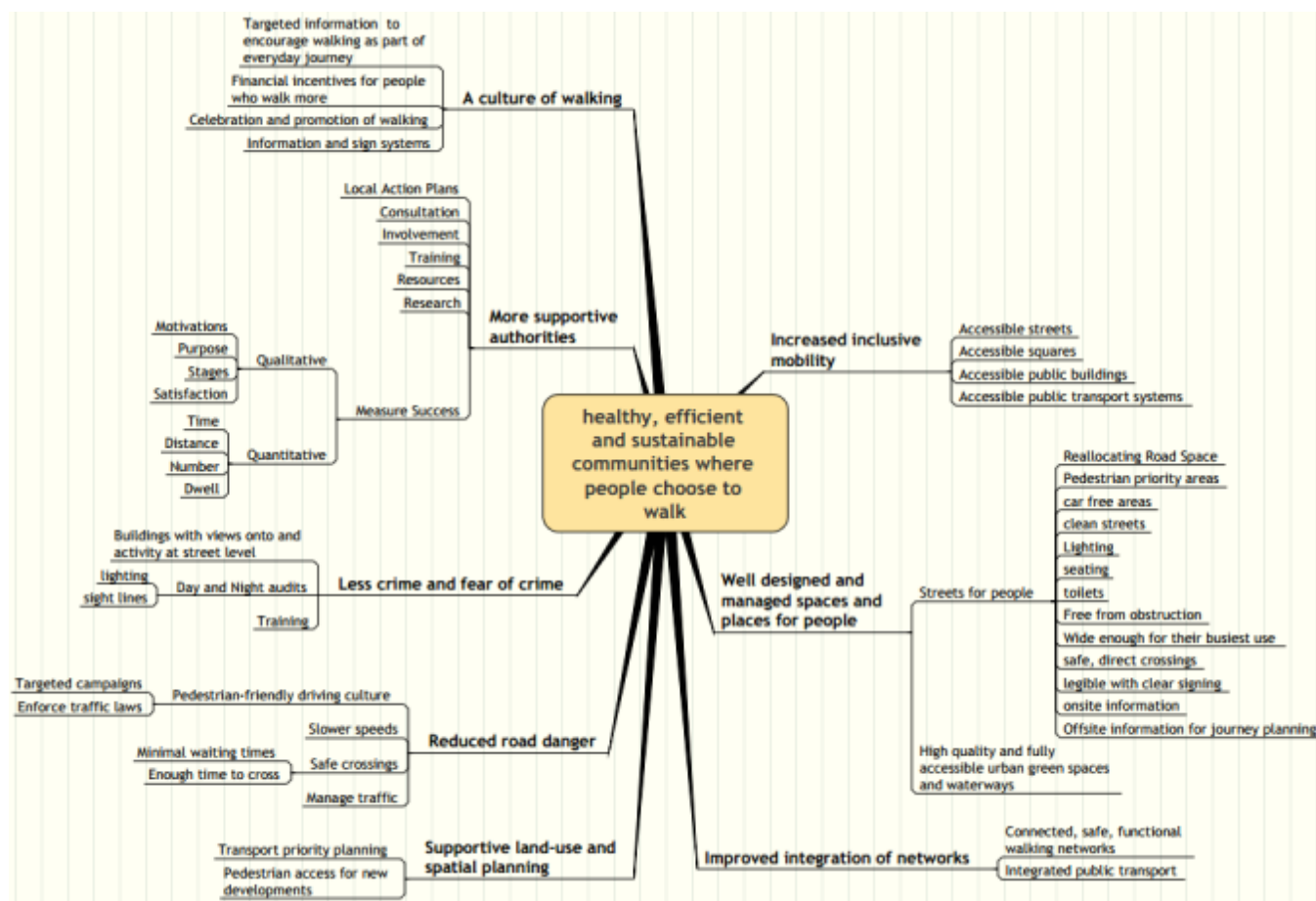
The International Charter for walking aims at creating healthy, efficient and sustainable communities where people choose to walk: The Charter is worded as follows:

I/We, the undersigned recognise the benefits of walking as a key indicator of healthy, efficient, socially inclusive and sustainable communities and acknowledge the universal rights of people to be able to walk safely and to enjoy high quality public spaces anywhere and at any time. We are committed to reducing the physical, social and institutional barriers that limit walking activity. We will work with others to help create a culture where people choose to walk through our commitment to this charter and its strategic principles:

1. Increased inclusive mobility.
2. Well designed and managed spaces and places for people.
3. Improved integration of networks.
4. Supportive land-use and spatial planning.
5. Reduced road danger.
6. Less crime and fear of crime.
7. More supportive authorities.
8. A culture of walking.

Walk21 urges local governments to sign up to the charter and implement its strategic principles throughout all the local government's operational and strategic aspects. Although the principles are broad, they show what can be achieved by having a commitment and implementing actions to improve the walkability of a city. These impacts are shown in **Figure 6-3**.

**Figure 6-3 Impacts of creating a walkable community**



Source: Walk 21

It is recommended that the City of Subiaco sign up to the International Charter for Walking and investigate how to embed its processes into the city's current policies. It may also be beneficial for key Subiaco staff to attend a Walk21 conference. The purpose of the conference is to support, encourage and inspire professionals to develop the best policies and implement the best initiatives, which create and promote environments where people choose to walk as an indicator of liveable communities.

## 6.4 Improving Public Transport

### 6.4.1 Strategic Objective

Mode shift to public transport should be encouraged through improved infrastructure and services as well as information and education on the benefits of public transport over private car use.

### 6.4.2 Policy Directions

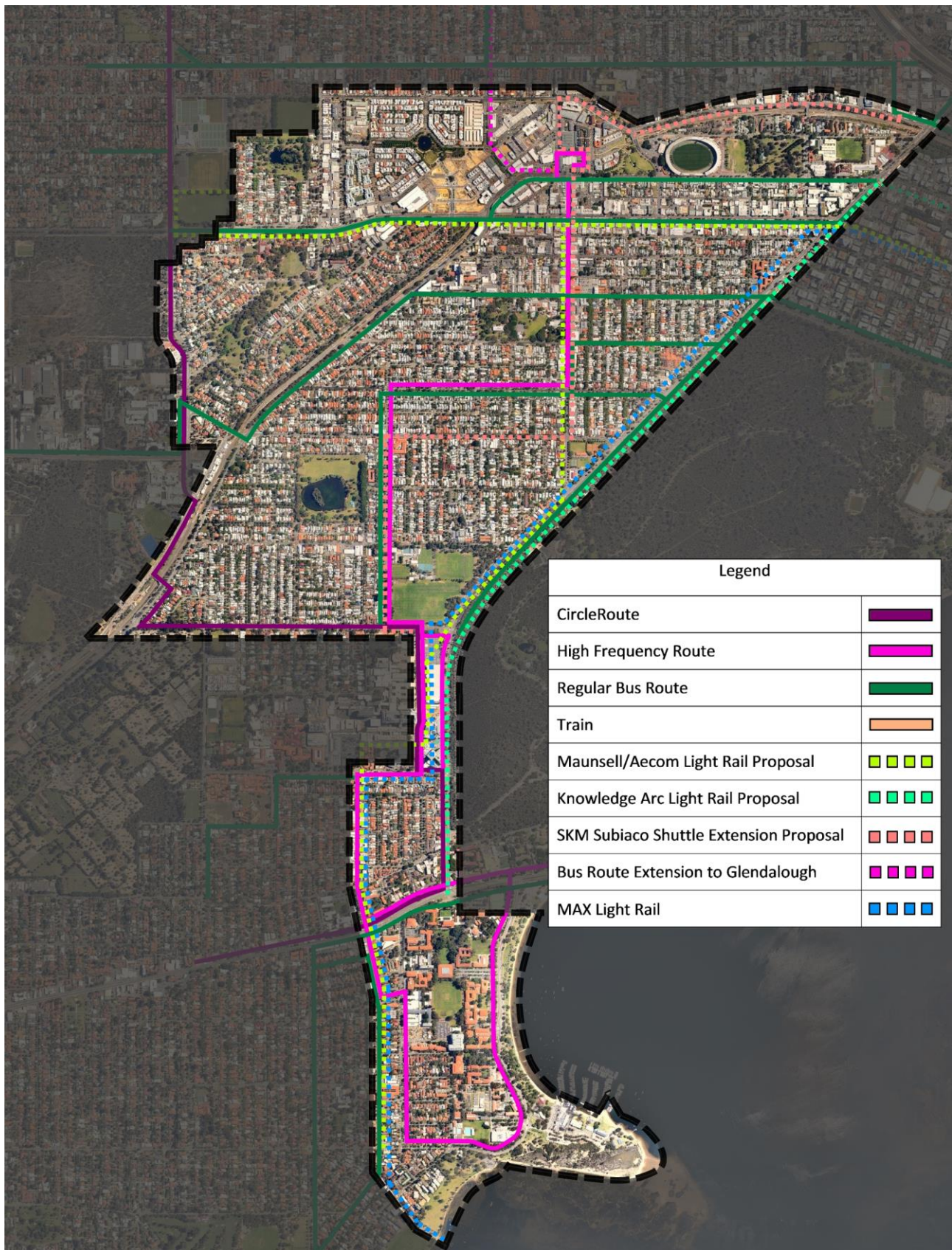
P1. The city should support, and work with the Public Transport Authority to increase the rail and bus infrastructure/ service to meet current demand, and to provide a service that will encourage more people to use public transport when travelling to, from and within the city.

P2. Encourage land use patterns that are conducive to public transport use. This includes a suitably high density, fine grained street network with mixed land uses and catchments with a high number of potential patrons over the full week (i.e. not simply a commuter service).



### 6.4.3 Ongoing and Future Policies

**Figure 6-4 Proposed Public Transport Network**





#### 6.4.3.2 **Buses**

It has been proposed in the Public Transport Plan 2031 that the addition of a bus rapid transit system be implemented throughout the Perth metropolitan area. Local bus services will act as feeders to the train and transit network, connect local centres and destinations across the metropolitan area, and provide a local distribution function.

Bus routes will be designed to maximise accessibility, whilst maintaining travel speed and ride comfort. Buses will take advantage of bus priority infrastructure to move through congestion and maintain on-time running.

#### 6.4.3.3 **Subiaco Shuttle Extension**

This plan proposes that the current Subiaco Shuttle service be extended to include Leederville station in the route as shown as the 'SKM Subiaco Shuttle Extension' in **Figure 6-4**. The extension alters the current terminus to Leederville Station, stopping the West Leederville Station and St John of God Hospital.

This plan provides an alternative to the Glendalough alignment for the Subiaco Shuttle Extension.

Each of these alternatives has different benefits:

- > There are many more bus interchange opportunities at Glendalough Station and the proximity of existing park 'n' ride facilities may reduce the burden of long-stay parking in Subiaco. The Perth Station to Glendalough Station forms much more of a strategic function, rather than a local service.
- > The proximity of the Leederville Station means that there will still be the opportunity for fast connection between the Northern and Fremantle Lines while retaining a Local Shuttle service.

#### 6.4.3.4 **'Green' Bus Proposal**

The city has proposed further investigation into a 'low cost small green' bus service linking with the Transperth Central Area Transit (CAT) system to assist and encourage Subiaco businesses as a destination, particularly the West Perth link.

This type of Green Bus service may form a functional bridge between the existing Route 97 Subiaco Shuttle and a more extensive CAT system. Investigation into the viability and cost of such a service would assist in future decision-making.

#### 6.4.3.5 Subiaco Central Area Transit (CAT) Service

The Subiaco Activity Centre Structure Plan investigates the potential future CAT bus routes (see **Figure 6-5**).

**Figure 6-5 Potential CAT Services in Subiaco**



The first (light green line on **Figure 5-5**) represents a modification to the current Green CAT alignment, which involves rerouting via Wellington Street, Roberts Road/ Subiaco Road, Hamilton Street, Railway Parade and Southport Street. The second (dark green line on **Figure 5-5**), a potential new Transperth service aligned via Wellington Street, Roberts Road/ Hay Street, Haydn Bunton Drive, Railway Parade and Harborne Street, could terminate at Glendalough Train Station and service a broader catchment.

Advice from the State Government indicates that a Subiaco CAT service is not currently being considered by Department of Transport or Public Transport Authority. Subiaco does not have the travel demand to warrant such a high level service and is too far from the CBD for a CAT service. Such a service would only be considered only if Subiaco was subject to the Perth Parking Act, or if fully funded by the city or another external source.

Given that a CAT service can be of significant benefit in providing highly legible, sustainable transport connection, it is recommended that the city investigate viable funding options for the initiation of such a service. This may include a staged roll-out consisting of smaller 'Green Bus' services, or other means.

#### 6.4.3.6 Proposed Light Rail

Discussions have been made in various publications about the feasibility of a light rail line in Perth. A list of the proposed light rail systems have been described in the section below.

#### 6.4.3.7 Public Transport Plan 2031

The proposed light rail systems mentioned in Public Transport Plan 2031 has two stages. The first stage is a light rail line connecting the Perth CBD to Mirrabooka with additional stops at key destinations such as Queen Elizabeth II Medical Centre (QEIMC), University of Western Australia (UWA) and Curtin University. The expectation is that the first stage would be completed before 2020. The second stage includes an expansion of the light rail infrastructure to provide connections to the Stirling Strategic Centre, Subiaco, the Fremantle line and UWA/QEIMC precinct. It is expected that the projects within this stage be completed before 2031.

*The Public Transport Plan has recently undergone a substantial change as a result of funding priority shifts at the Federal Government level. The State Government has announced the deferral of the MAX Light Rail project for three years, which will see overall completion of the project by late 2022.*

#### **6.4.3.8 Maunsell/Aecom Light Rail (2007)**

A light rail study was conducted by Maunsell/Aecom to identify a light rail service that could link Subiaco with East Perth. The project included an engineering feasibility study to investigate the physical dimensions of a light rail system that could be suitable for Perth. Through various consultations, research and analysis, the following option shown in **Figure 6-4** was considered to be the best option as it satisfies the needs of the community and achieves the strategic objectives set out by the Department of Planning.

The route follows Winthrop Avenue and Thomas Street between the QEIMC precinct and West Perth and then follows Murray Street from Thomas Street to Barrack Street in the CBD and then Hay Street through East Perth. The route would also serve the centre of the Subiaco Activity Centre with a second line linking Jolimont to West Perth along Hay Street. The focus of this route is to service commuters traveling to UWA the QEIMC and the Subiaco town centre.

The route alignment is proposed to be along Hay Street, Rokeby Road and Thomas Street/Winthrop Avenue en route to the QEIMC.

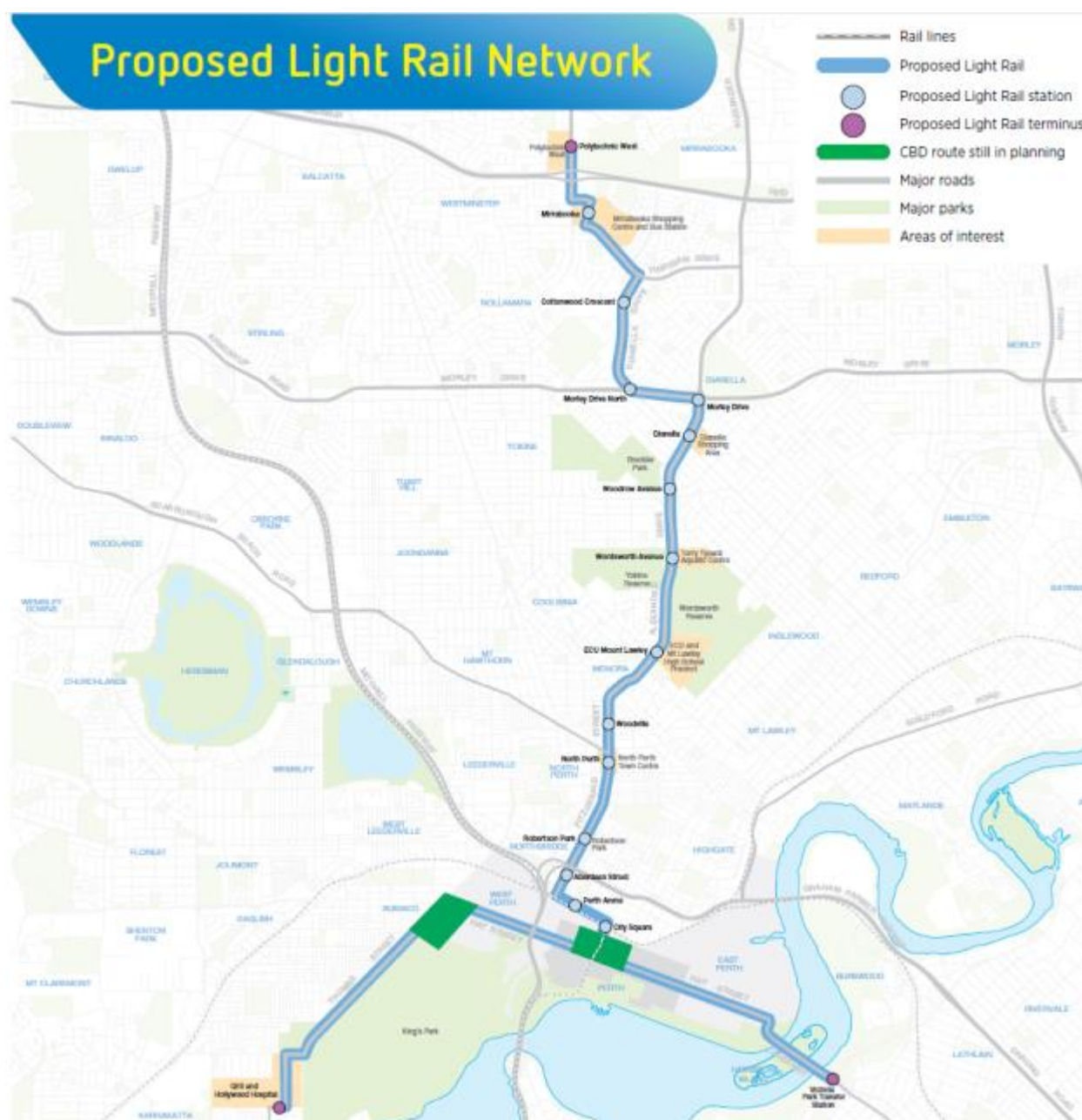
This proposal has now become irrelevant as the State Government has decided on the MAX Light Rail Project.

#### **6.4.3.9 MAX Light Rail (2010)**

The Metro Area Express (MAX) Light Rail project is a proposed light rail network which runs from Mirrabooka to the Perth CBD before splitting into two separate routes, one travelling to the QEIMC and the other towards the Causeway. This is part of Stage 1 of the Public Transport Plan 2031. The State Government has recently announced that the project has been delayed and that construction is set to begin at 2019 and expected to be completed by 2022. The complete route map is shown in **Figure 6-6**.

*The State Government has announced the deferral of the MAX Light Rail project for three years, which will see overall completion of the project by late 2022.*

**Figure 6-6 MAX Light Rail Network**



Source: Public Transport Authority (2015)

#### 6.4.3.10 Knowledge Arc Light Rail (2010)

As part of the Department of Transport's strategic plan to improve public transport in the city, it is working on mapping a proposal for a light-rail network between Curtin University in Bentley and the University of Western Australia, travelling through the CBD.

The route through the city would either be along Murray Street and Adelaide Terrace, or Hay Street-St Georges Terrace-Adelaide Terrace. Thomas Street and the Causeway would be the connecting points west and east of the CBD. The network - dubbed the "Knowledge Arc" to connect Perth's universities - was first proposed by public transport expert Peter Newman.

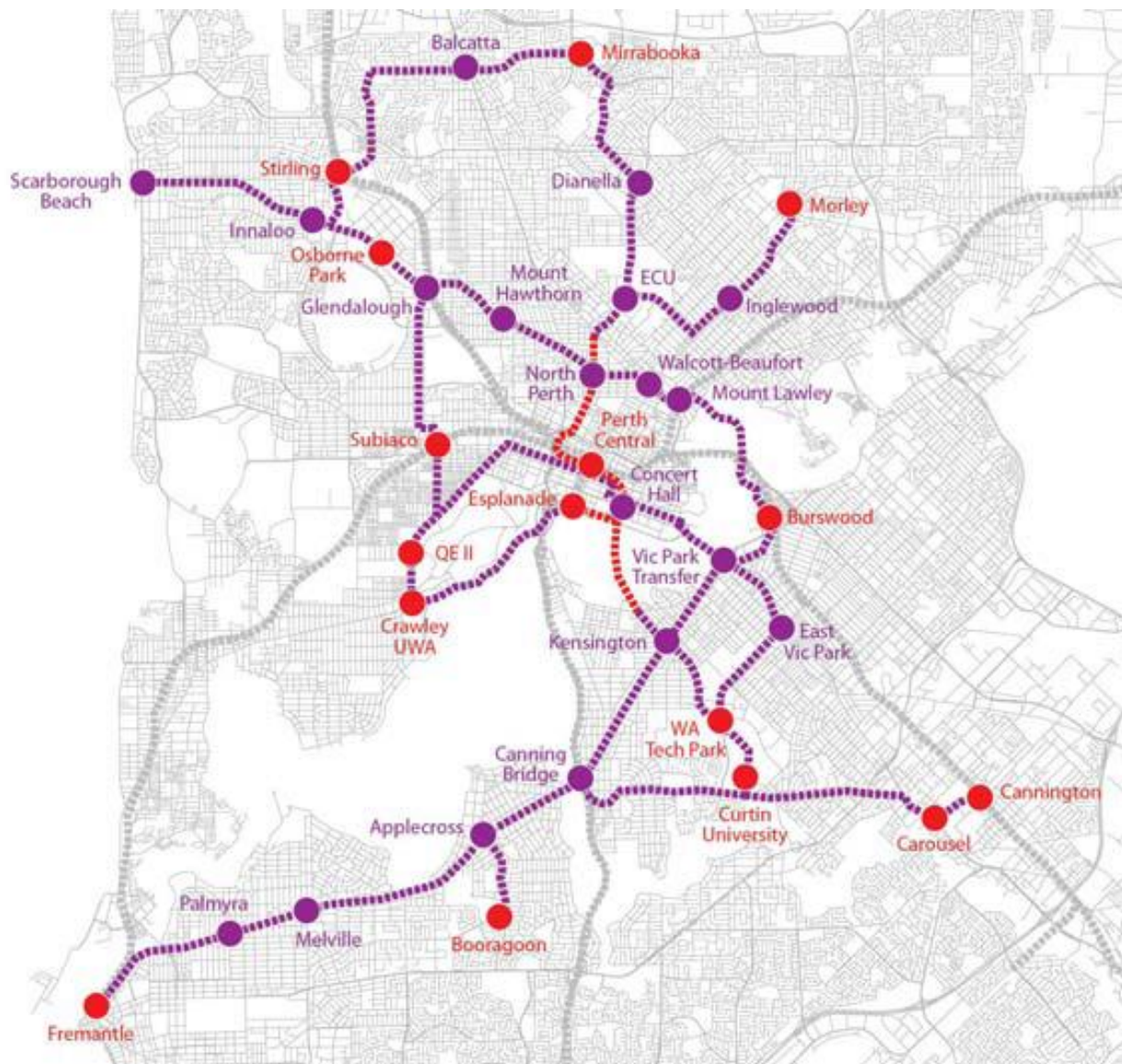
The Knowledge Arc Light Rail Proposal was a concept for delivering the next phase of public transport in Perth which proposes a light rail network to connect the Universities of WA and Curtin through the city. **Figure 6-7** shows the full concept of the Knowledge Arc LRT network that has been envisioned to fulfil Perth's long term transport requirements. This is part of Stage 1 of the Public Transport Plan 2031



The proposed route, as shown in **Figure 6-4**, links the university/health and knowledge precincts of Crawley, UWA, QEII/IMC and WA Tech Park to Curtin University, passing through West Perth, the CBD (including Perth station), East Perth and the WACA/Gateway precinct, and the Albany Highway corridor in Victoria Park. Beyond Curtin University, the route links to Canning Bridge train station.

Delivery is identified for 2031; however the delay in the inception of the Knowledge Arc project is likely to impact on the implementation of other light-rail infrastructure projects. The status of the project is uncertain and it is unlikely that any light rail will be constructed in the Perth Metropolitan area by 2020, however the City can continue to liaise with State Government to support light rail.

**Figure 6-7 Proposed Future Light Rail Network**



Source: *The Knowledge Arc Light Rail (2010)*

The status of the project is uncertain and it is unlikely that any light rail will be constructed in the Perth Metropolitan area by 2020, however the City can continue to liaise with State Government to support light rail.

It is understood that the city is very interested in the local effects of light rail on sustainable transport and economic growth. While the immediate future of Light Rail roll-out in Perth is unknown, it is recommended that the city's preferred alignment be determined and sufficient preliminary design and planning be completed to allow for implementation should funding become available.



## 6.5 Managing Vehicular Traffic

### 6.5.1 Strategic Objective

Provide for safe movement of vehicles around the city and efficient use of existing road infrastructure.

### 6.5.2 Policy Directions

P1. Manage competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day in accordance with TransPriority principles

P2. Provide a safe street network and maintain a high level of safety for vehicle movements, including interactions with other users, into the future.

### 6.5.3 Ongoing and Future Policies

In terms of infrastructure, there does not appear to be any proposals for road extensions or expansions. The city has placed a large amount of emphasis into public transport developments. Most of the road works projects involve maintenance and minor upgrades on existing roads. The table below highlights upcoming road projects to be completed in 2014/2015.

**Table 6-2 Current Road Projects in Subiaco**

Location of Street	Scope
Selby / Nash Road	Modifying left turn slip lane and LED upgrade
Station / Hood street	Install roundabout
Barker Road / Axon Street	Install median island
Railway Road	Traffic signals modification
Thomas Street	Seagull island and slip lane

Source: City of Subiaco (2015)

#### 6.5.3.2 Laneway Upgrades

A recent review of several laneways in the Subiaco town centre identified the need for repairs and upgrades to a number of laneways.

These laneways have the potential to become important links for pedestrians, refuse collection and private vehicle access away from activated street frontages.

#### 6.5.3.3 Infrastructure Five Year Capital Improvement Program

The Infrastructure Five Year Capital Improvement Program introduces several road infrastructure improvement programs to be implemented within the period between 2013 and 2018.

##### > Major Road Rehabilitation Program and Streetscape Improvements.

The Road Rehabilitation projects are those eligible for funding through the Metropolitan Regional Road Group (MRRG) pool of funds. The nature of the work eligible under the key warrants is for pavement rehabilitation. That is, the focus is on the road pavement component and not on major streetscape, footpath, street lighting, and drainage improvements.

##### > Local Road Renewals - 2013/2014.

To maintain the asset condition to an acceptable level of service for any road system, routine resurfacing is undertaken. The program proposed is based on the forward estimates in the Strategic Financial Plan, physical inspection by staff, recorded pothole patching and other maintenance undertaken as an indicator of pavement life.

##### > Footpath Replacement Program.

The objective of this program is to replace slab footpaths on the city's streets which are in need of replacement to be constructed by using in-situ concrete, and progressively replace all pre-cast concrete slab paths based on a need basis and funding levels within the Strategic Financial Plan.

> Traffic Management and Black Spot Projects.

The Black Spot Project is funding provided for roads with a high risk of vehicle crashes. The funding provided is based on the severity of crash and its priority.

> Roads to Recovery.

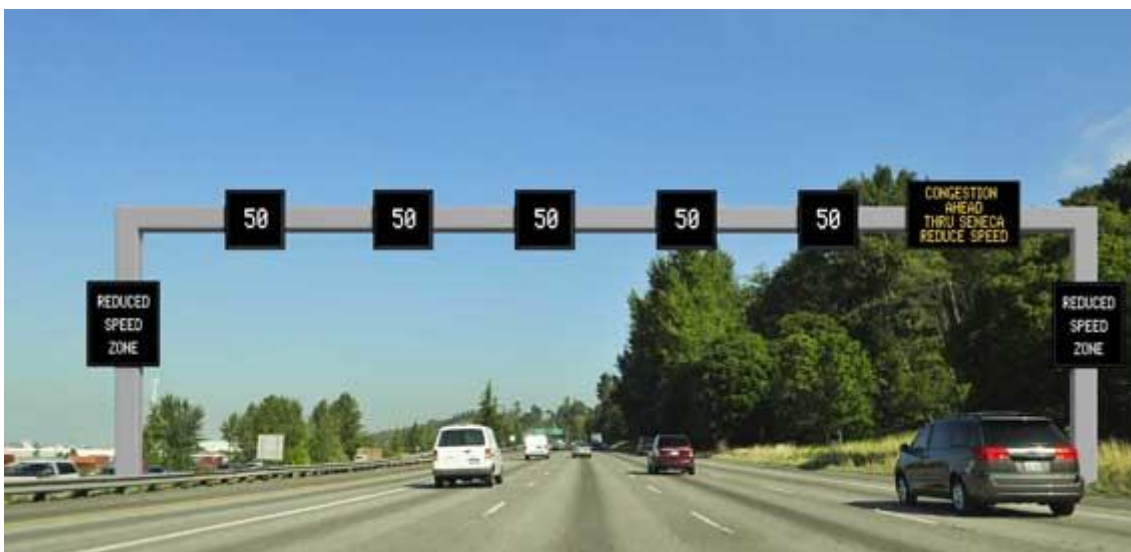
This is funding provided by the Federal Government which goes towards road infrastructure upgrades.

#### 6.5.3.4 Active Traffic Management

Active traffic management (ATM) is the ability to dynamically manage recurrent and non-recurrent congestion based on prevailing and predicted traffic conditions. Focusing on trip reliability, it maximises the effectiveness and efficiency of the facility. ATM aims to maintain maximum road safety and traffic capacity by minimising disruptions from crashes, vehicles break-downs and illegal clearway parking on key roads. The following elements form the basis for an ATM system.

- > Incident Management – this provides a set of actions to be conducted in the event of a traffic incident. The plan identifies the hazard, analyses the damage and applies the appropriate corrective measures. These set of activities provide the incident response team with the correct procedures to work effectively and efficiently and ensure the safety of those on the road.
- > Incident Response Teams – this service can provide quick responses towards traffic incidents effectively reducing traffic build-up and improving safety.
- > CCTV – CCTV cameras can provide better coverage of congestion hotspots and incidents, which will allow for incident detection and proactive real-time traffic signal timing changes to improve traffic flow.
- > Real Time Information – this can come in several forms including live traffic reports and traffic control infrastructure such as dynamic speed limits, adaptive traffic signal controls, dynamic lane use controls and queue warning.
- > Travel Advice – this could be a service that provides information such as directions to a particular location, alternate routes and congestion or toll road avoidance.
- > Event Management – a plan on how to manage traffic for special events that may results in abnormal levels of traffic ensuring that traffic runs smoothly.
- > Technological Innovations – variable message signs, incident detection, travel time signs, use of phone apps and vehicle to vehicle technologies.
- > Future Technology – this includes self-driving vehicles and other futuristic technologies.

**Figure 6-8 Active Traffic Management**



Source: Washington State Department of Transport

### 6.5.3.5 *Contemporary approaches to managing vehicular traffic*

According to VicRoads, SmartRoads is an approach that manages competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day. In WA, the Department of Transport's Draft Moving People Network Plan has relabelled SmartRoads as 'TransPriority' with the principals remaining the same. In accordance with TransPriority, a network for the city must be created which shows the prioritisation of individual roads for different transport modes (pedestrians, public transport, private vehicles, freight and cycling).

In keeping with TransPriority principals, the management of congestion requires an integrated approach. For this reason, the road hierarchy must be determined for each road based on its function, rather than on traffic speed and volume.

Subiaco has the potential to become an even more vibrant Town Centre with its own identity and amenity. To assist with this, the main streets where cafes, retail and mixed use developments are located should be prioritised for cycling and pedestrians. This maximises the opportunities for pedestrian-scale development and creates an environment where social, cultural and economic exchange can evolve successfully.

It is therefore recommended that the impacts of place-making and public realm improvements on private vehicle and freight movements be considered and the road network modified to support more sustainable urban development.

### 6.5.3.6 *Car Sharing Report 2012*

The city has many of the attributes required to make car sharing viable. Car sharing can form a vital part of an integrated transport package that includes public transport, walking and cycling. The Car Sharing Report (2012) discusses the advantages and barriers to implementing a car sharing service in Subiaco.

It is proposed that the city facilitates the establishment of a car sharing service in Subiaco by inviting tenders for "Special Parking Permits for the Purpose of a Car Sharing Program". The tender will be for a car sharing service to use a specific number of parking bays within the city. This will include City of Subiaco bays, UWA bays and QEIIIMC bays.

The special parking permits will identify specific bays, the purpose they can be used for and under what conditions. As part of the tender process applicants will have to provide a business plan for the car sharing service, allowing skilled organisations to make a proposal on how the service could be run. This approach was taken recently by the City of Melbourne for their car sharing service in Carlton.

The car sharing service would be privately owned and run and would be responsible for managing all aspects of the business including management, technology, vehicles, insurance, marketing, and memberships. The city and other partners would not take any financial or operational role in the car sharing service. The City of Subiaco, UWA and QEIIIMC would only provide the car parking bays and some in-kind promotional support.

Other car sharing trials have shown that there is considerable risk in such a venture. However, there is significant benefit to the city if such a service can be maintained. It is recommended that the city promote and support car sharing through policy and planning, including preferential parking permits.

### 6.5.3.7 *Driverless cars*

Driverless car technology is still considered to be in its early stages but Google expects to release its autonomous vehicle technology in five years and GM, Audi, Nissan and BMW all expect to have driverless cars on the road by 2020. Some actions that the city can do to prepare for driverless cars include;

- > Plan for reduced parking demand in the future.
- > Plan for electronic payment of parking and reduced need for parking monitoring.
- > Reduced car ownership may impact on the demand for parking permits.
- > Plan for a reduced need for traffic calming devices and road signage in the future.
- > The city's fleet could become driverless in the future.
- > Consider the impact of driverless cars on the city's services, including the community transport service, waste services, shopper bus, secure taxi rank, and rangers.

- > The city could be involved in driverless car and car sharing trials.

## 6.6 Road Capacity Assessment

A review of data from the Regional Operations Model (ROM24) supplied by Main Roads Western Australia (MRWA) was undertaken with an aim of identifying road links within the study area that have potential capacity constraints. For the purpose of this initial assessment, all roads modelled as operating with a Volume / Capacity (V/C) ratio of 0.80 or greater in the 2031 AM peak hour and PM peak hour were included in this review. Intersections adjoining links with V/C ratios greater than 0.80 are likely to experience significant performance issues and may therefore require some form of mitigation measure to cater for the modelled 2031 peak hour volumes.

### 6.6.1 Methodology

The methodology that was used to undertake this analysis is detailed below.

- > Regional Operations Model (ROM24) data was obtained from Main Roads Western Australia (MRWA) with regards to the link volume plot and the volume capacity ratio plot. The most recent 2031 ROM traffic forecasts for the AM/PM peak periods have been utilised to analyse the future expected performance of the intersections. These outputs are provided in **Appendix A**.
- > Based on this data, a number of intersections were identified as having the potential for future capacity issues, and were therefore selected for further analysis. These sites have been listed below:

#### *City of Subiaco LGA*

- Harborne Street – Salvado Road.
- Aberdare Road – Smyth Road.
- Bagot Road/Kings Park Road – Thomas Street.
- Hamilton Street – Roberts Road.
- Coghlan Road – Barker Road.
- Railway Street/Railway Parade – Thomas Street.
- Aberdare Road – Thomas Street/Winthrop Avenue.
- Winthrop Avenue – Monash Avenue.
- Rokeby Road – Barker Road.
- Haydn Bunton Drive – Salvado Road/Railway Parade.
- Hamilton Street/Kerr Street – Railway Parade.
- > The data provided includes directional mid-block traffic volumes. These have been translated into turning movements via a calibrated simple gravity model which were then input into SIDRA to analyse the future expected performance of the intersection.
- > Based on the results, a brief summary of the results and recommended actions is provided for the intersections that require attention. All SIDRA outputs referenced are available in **Appendix B**.
- > SIDRA assumptions and additional information are as follows:
  - A baseline Level of Service limit of LOS E has been used as a benchmark as to whether the intersection requires modification. For those that do not satisfy this requirement, an appropriate explanation has been provided to justify the proposed situation
  - Average delay, vehicle queue and queue distance have also been taken into account and appropriate recommendations have been suggested in order to reduce these values. For any situation where it is impossible to do so, an appropriate explanation has been provided to justify the proposed situation
  - Existing traffic phase information for signalised intersections has been obtained from Main Roads Western Australia. Modification to this phasing has been undertaken if there is considered to be a significant benefit

- The SIDRA models deal with the intersection in its current form and recommendations pertain to the function of this geometry under the forecasted traffic conditions
- Pedestrian movement has not been taken into consideration in the SIDRA model, to reflect an actuated pedestrian demand. In most cases, pedestrians can be included without significant impact on the intersection in either protected or filter form
- Gap acceptance assumptions have been determined by reference to the values stated in the *Austroads' Guide to Traffic Management Part 3: Traffic Studies and Analysis*.



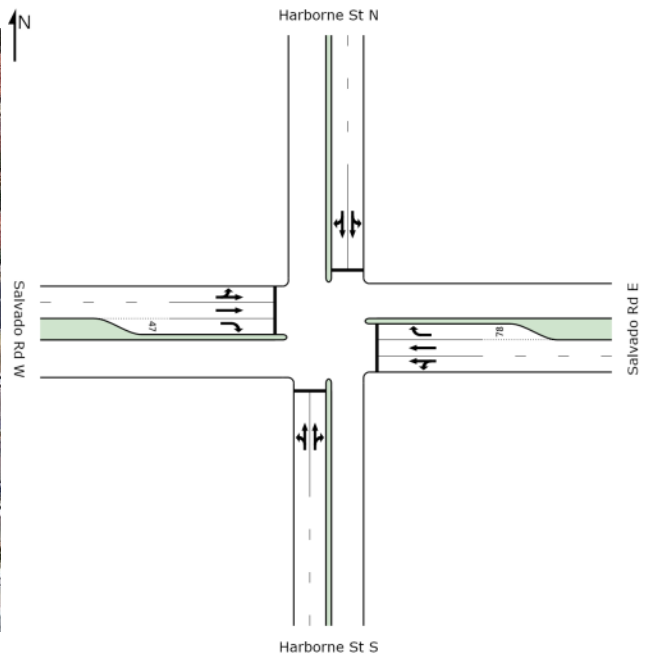
## 6.6.2 Harborne Street – Salvado Rd

**Figure 6-9** Harborne Street – Salvado Road Intersection



Source: Nearthmap (2015)

**Figure 6-10** Harborne Street – Salvado Road Layout



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-9** and **Figure 6-10**.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection still performs well with existing geometry. According to the SIDRA outputs, no changes are required for this intersection to accommodate the proposed 2031 scenario.

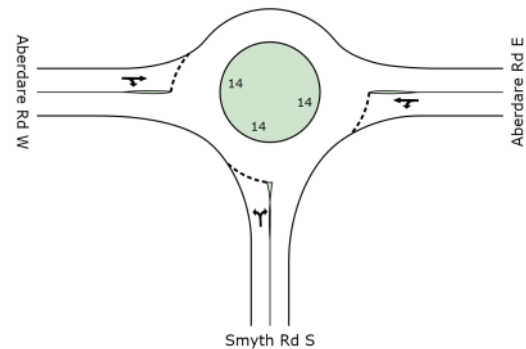
### 6.6.3 Aberdare Road – Smyth Rd

**Figure 6-11** Aberdare Road – Smyth Road Intersection



Source: Nearmap (2015)

**Figure 6-12** Aberdare Road – Smyth Road Layout



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-11** and **Figure 6-12**. The intersection between Aberdare Road and Smyth Road is currently a 3 way roundabout with a single approach and departure lane for each leg and a single circulating lane.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection still performs well under these scenarios. The roundabout operates with a LOS B with an average delay of approximately 16 seconds. According to the SIDRA outputs, no changes are required for this intersection to accommodate the proposed 2031 scenario.

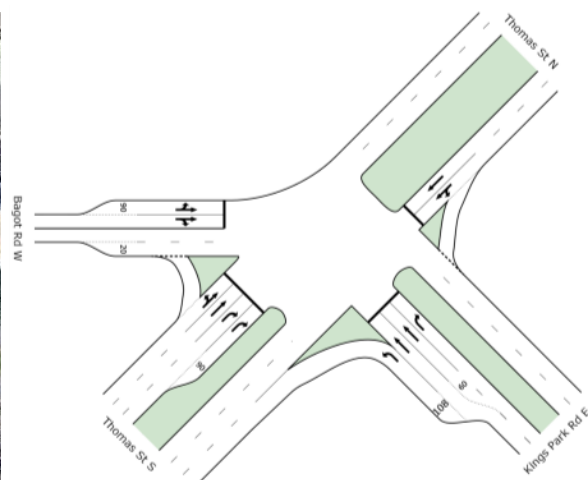
### 6.6.4 Bagot Rd/Kings Park Road – Thomas St

**Figure 6-13** Bagot Rd/Kings Park Road – Thomas Street Intersection



Source: Nearmap (2015)

**Figure 6-14** Bagot Rd/Kings Park Road Layout



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-13** and **Figure 6-14**. The intersection between Bagot Rd/Kings Park Road and Thomas Street is currently a signalised intersection. Thomas Street contains two lanes in each direction with 2 dedicated right turn lanes on the southern end. Kings Park Road also contains two lanes in each direction and Bagot Road comprises of a two lane approach

and one lane exit. Slip lanes are located on the north east and south west corners while the south east corner has a continuous lane which transition from Kings Park Road to Thomas Street.

Thomas St, being a major arterial road, is expected to generate a significant amount of traffic from vehicles travelling to and from Subiaco and the Perth CBD.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection is expected to fail under these circumstances. The intersection operates with a LOS F with an average delay of approximately 5 – 6 minutes. From the results obtained, all right turn movements are severely impacted with delays of up to 16 minutes during the AM peak periods. The north side of the intersection along Thomas Street is also significantly impacted with long delays and long traffic queues which require attention.

The 2031 traffic model scenario shows that the intersection will not cope with the future traffic conditions. Furthermore, in order for this intersection to operate efficiently and effectively, major infrastructure upgrades and a comprehensive traffic management plan are required as this intersection is expected to generate approximately 5000 – 6000 vehicles during the peak hour periods based off the ROM data.

Thomas Street is especially problematic due to it being a primary arterial road and currently experiences a large amount of congestion. According to the SCATS data provided by Main Roads WA, the road currently accommodates up to 3800 vehicles during the peak AM/PM periods.

A more detailed traffic assessment is required specifically at this intersection and the nearby surrounding area, as this is a crucial arterial road. A comprehensive analysis would be able to determine where the traffic is coming from and formulate solutions on how to either redirect traffic to other routes or determine the feasibility of expansion. A traffic assessment should also be completed for the entire length of Thomas Street/Winthrop Avenue.

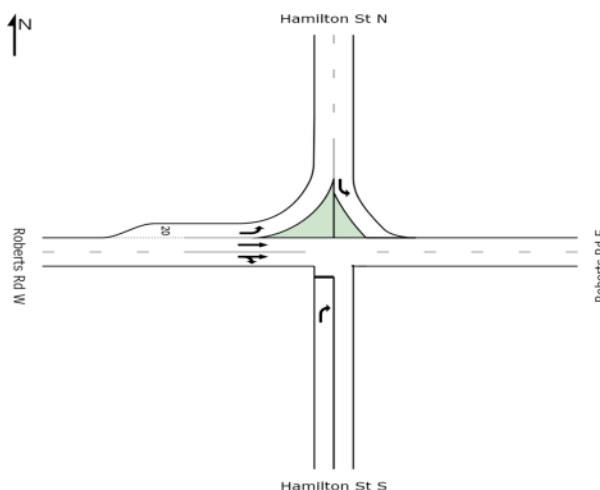
#### 6.6.5 Hamilton Street – Roberts Road

**Figure 6-15**      **Hamilton Street – Roberts Road Intersection**



Source: Nearthmap (2015)

**Figure 6-16**      **Hamilton Street – Roberts Road Layout**



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-15** and **Figure 6-16**. The intersection between Hamilton Street and Roberts Road is currently a 3 way priority intersection with Hamilton Street giving priority to Roberts Road. Roberts Road is a two lane road which runs in a single direction eastbound. The north side of Hamilton Street only allows for left in and left out movements while the south side of Hamilton Street is a regular stop and give way. The intersection in its current form is heavily restricted in terms of movement. The left in left out orientation prevents through movement from the south of Hamilton Street and the one way movement along Roberts Road severely reduce the accessibility.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection is expected to fail under these circumstances. The intersection operates with a LOS F with an average delay of approximately 1 to 1.6 hours

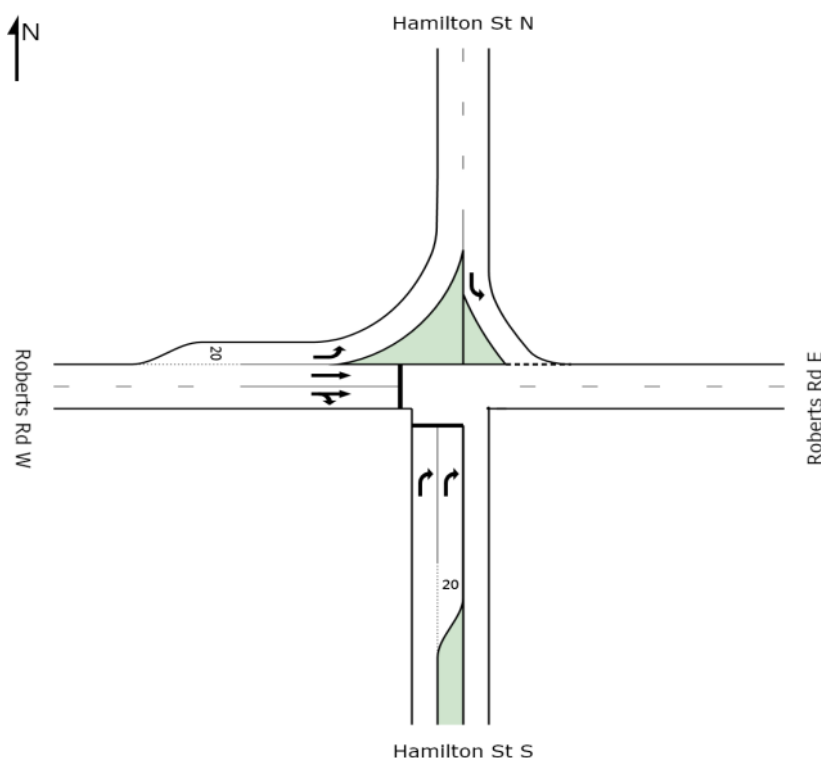
which is unacceptable. The main issue for this intersection is that traffic along Roberts Road is preventing adequate timing for vehicles turning from Hamilton Street causing a significant build-up and long delays.

A key point to take into consideration is that the current analysis is completed for the intersection in its current form. According to the *Subiaco Activity Centre Options Report* and the *Subiaco Central Development Plan*, Roberts Road and Hay Street is likely to be converted into a two way street. Currently there has yet to be a detailed study on the impacts of this reversion. If this eventuates, then the current analysis would need to be modified to accurately predict the future conditions that the intersection is likely to face. Nevertheless the alignment in its current form is extremely detrimental towards traffic movement at this intersection.

The recommended actions include modifying the existing intersection to the one shown below in **Figure 6-17**. The optimal solution in this case is to reconfigure the intersection so that it is signalised and the addition of a turning bay on Hamilton Street south. The traffic phasing used for this analysis is a simple two phase movement.

As stated previously, there is a possibility that Roberts Road will be changed into a two way street which would be the recommended course of action. If this is the case, additional information on the forecast traffic volumes are required and the SIDRA analysis would need to be redone. If no changes are made for Roberts Road then the solution below is viable. With these changes implemented, the level of service improves to LOS C and an average delay of 21 seconds for the AM peak period. For the PM peak period, the level of service is LOS B and an average delay of 17 seconds.

**Figure 6-17 Hamilton Street – Roberts Road Modified Road Layout**



Alternatively, modification of the intersection to a roundabout form could be viable, from an operations perspective, but would potentially have a detrimental impact on Hamilton Road due to induced traffic demands. It is understood that the restrictions to through movements along Hamilton Road are designed to impact the attractiveness of rat-running through the area, in addition to their intrinsic operational effects.

It is recommended that the future form of Roberts Road be considered with respect to two-way movements and a detailed analysis completed to assess the need for intersection controls and Local Area Traffic Management in this area. This review may be completed by the MRA or the city in coordination with planning for the Princess Margaret Hospital redevelopment.



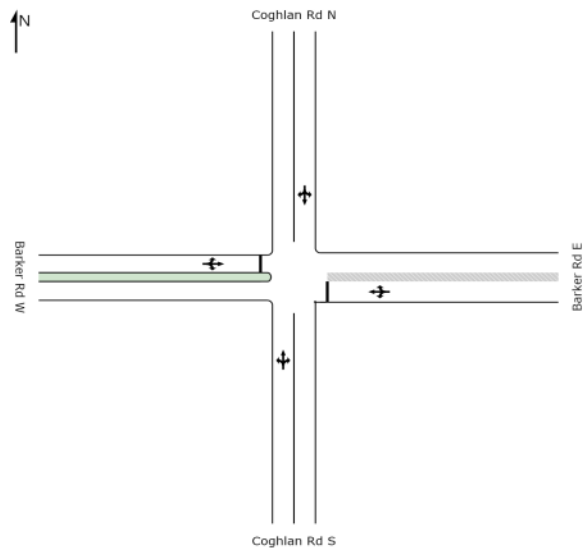
#### 6.6.6 Coghlan Road – Barker Rd

**Figure 6-18 Coghlan Road – Barker Road Intersection**



Source: Nearmap (2015)

**Figure 6-19 Coghlan Road – Barker Road Layout**



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-18** and **Figure 6-19**. The intersection between Coghlan Road and Barker Road is currently a priority intersection with Barker Road giving priority to Coghlan Road. Both roads are one way in both directions.

Most of the traffic through this intersection would be from residents that are living in the area as this entire area is made up of residential buildings. It is unusual that residential roads would have a lot of traffic but one theory is that drivers may use Barker Road as an access way to the Subiaco CBD but this is unconfirmed.

Based on the modelled 2031 AM peak hour volumes, the intersection fails under these scenarios. Coghlan Road operates well while Barker Road is under considerable stress which results in delays of up to 4 min and a LOS F. Conversely, the modelled 2031 PM peak hour volumes operate well with LOS B and an average delay of 13 seconds.

**It is recommended that the intersection be changed into a roundabout form to support future traffic function.**

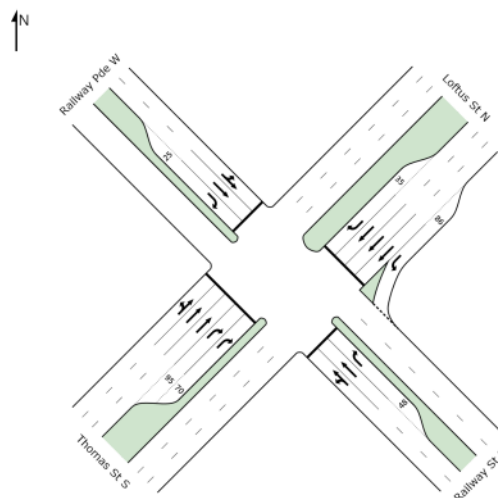


### 6.6.7 Railway St/Railway Parade – Thomas Street

**Figure 6-20**      **Railway St/Railway Parade – Thomas Street Intersection**



**Figure 6-21**      **Railway St/Railway Parade – Thomas Street Road Layout**



Source: Nearmap (2015)

The current satellite photo and geometric layout of the intersection is shown in **Figure 6-20** and **Figure 6-21**. The intersection between Railway St/Railway Parade and Thomas Street is currently a signalised intersection. Thomas Street contains three lanes in each direction in addition to two dedicated right turn lanes on the south and one in the north. Railway St/Railway Parade contains two lanes in each direction and a single right turn lane on each end (one on the east and one on the west). There is also a slip lane on the north east side of the intersection.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection is expected to fail under these circumstances. From the results obtained, almost all movements are severely impacted with delays of up to 10 minutes for some movements. The intersection operates with a LOS F with an average delay of approximately 10 minutes.

The 2031 traffic model scenario shows that the intersection will not cope with the future traffic conditions. Furthermore, there is very little that can be done in terms of expansion of the existing intersection due to its location. Thomas Street (south) is along a bridge while the corner of Railway Parade and Loftus Street has a building under construction. Modification of the traffic signal phasing does little to solve the problem at hand as allowing more time for movement in one direction significantly reducing the timing allowed for movement in other directions. In other cases, a balance would eventual be reached where the distribution of time is just enough for each movement that traffic is able to operate without issues. However, due to the sheer amount of traffic travelling through this road (approximately 7000 – 8000 vehicles during AM/PM peak hours) this equilibrium cannot be achieved. The level of service for the AM/PM peak period is LOS F with an average delay of 5 – 6 minutes. Comparatively the average delay may not be as high as some intersections but the queue distance would be unacceptable (approximately 2 km) on a primary arterial road such as this and would severely affect the surrounding road network.

A more detailed traffic assessment is required specifically at this intersection and the nearby surrounding area, as this is a crucial arterial road. A comprehensive analysis would be able to determine where the traffic is coming from and formulate solutions on how to either redirect traffic to other routes or determine the feasibility of expansion. A traffic assessment should also be completed for the entire length of Thomas St/Winthrop Ave.

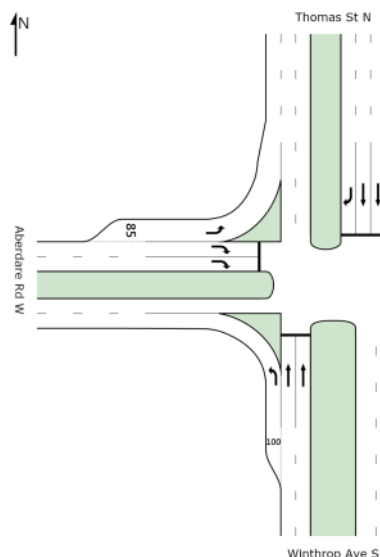
## 6.6.8 Aberdare Road – Thomas St/Winthrop Av

**Figure 6-22**      **Aberdare Road – Thomas St/Winthrop Ave Intersection**



Source: Nearthmap (2015)

**Figure 6-23**      **Aberdare Road – Thomas St/Winthrop Ave Road Layout**



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-22** and **Figure 6-23**. The intersection between Aberdare Road and Thomas St/Winthrop Ave is a 3-way signalised intersection. Winthrop Ave contains two lanes in both directions along with a right turning bay in the northern end. Aberdare Road also contains two lanes in both directions. There are also transition lanes on the northwest and south west of the intersection.

This intersection is especially important as it is a major access point to the QEIMC for both employees and patients. It has been mentioned in the *QEIMC Travel Plan* that they are making an effort to reduce the reliance on car travel through several strategic objectives which include:

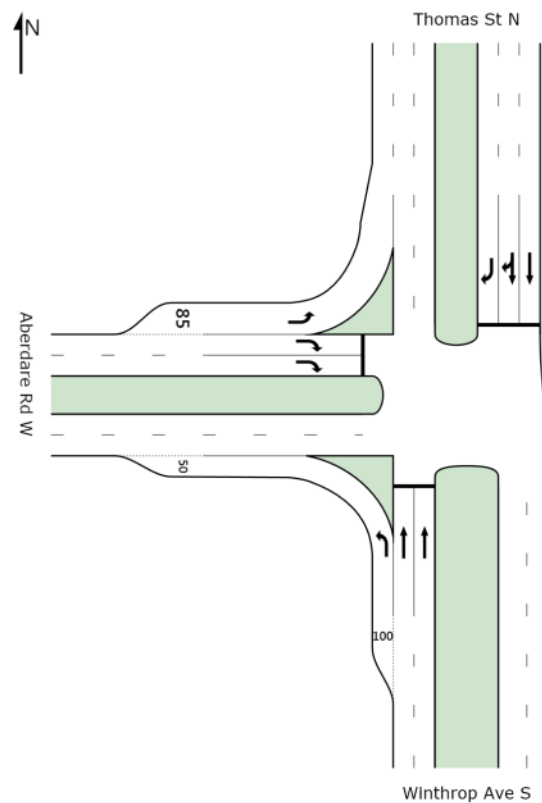
- > Increasing walking and cycling.
- > Increasing public transport usage.
- > Reducing single occupant car driver trips to the site.
- > Inducing a culture of sustainable transport.

The status of this plan is currently unknown but any plan or initiative that helps to reduce traffic volumes on the roads is a significant benefit towards the road network and community.

Based on the modelled 2031 AM peak hour volumes, some of the movements will be severely impacted such as the right turn movements and the through movement from Winthrop Ave south which all have a LOS F and average delays of over 110 seconds. Overall, the intersection operates with a LOS E with an average delay of approximately 57 seconds though the critical movements still need to be addressed. On the other hand, for the modelled 2031 PM peak hour volumes; the intersection operates fairly well and without issues. The intersection operates with a LOS C with an average delay of approximately 23 seconds for the PM peak period. This discrepancy can be attributed to the PM peak hour volumes being less than the AM peak volumes.

The recommended actions include modifying the existing intersection to the one shown below in **Figure 6-24**. The modifications include allowing two lanes to perform right turns on Thomas Street north and changing Aberdare Road west to allow two out movements. The left slip lane on Winthrop Ave south is altered so that rather than be continuous when transitioning into Aberdare Rd, it will transition into a separate lane and merge back into the right lane after a certain distance.

**Figure 6-24      Aberdare Road – Thomas St/Winthrop Ave Modified Road Layout**



The implementation of this would improve the level of service to LOS C and average delay would be reduced to 24 seconds for the AM peak period. The PM peak period also improves slightly with a level of service of LOS B and average delay of 17 seconds.

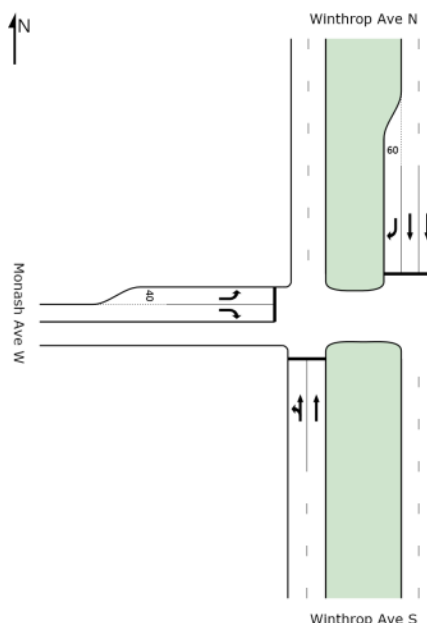
### 6.6.9 Winthrop Ave – Monash

**Figure 6-25 Winthrop Ave – Monash Ave Intersection**



Source: Nearthmap (2015)

**Figure 6-26 Winthrop Ave – Monash Ave Road Layout**



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-25** and **Figure 6-26**. This intersection between Winthrop Ave and Monash Ave is a 3-way signalised intersection. Winthrop Ave contains two lanes in both directions including a right turn lane on the northern end. Monash Ave contains a two lane approach and a one lane departure.

This intersection provides access to the QEII MC through the southern side which mean this is also another key access point for the Medical Centre. As mentioned in the previous section, the *QEII MC Travel Plan* has provided some recommendations on how to reduce reliance on private vehicle which would lead to an overall reduction in traffic congestion.

Another key point to highlight is that the Perth Children's Hospital is currently in construction and is situated on the north-west corner of the intersection. The estimated \$1.2 billion Perth Children's Hospital is set to replace the Princess Margaret Hospital as the State's dedicated children's hospital. Construction of this hospital began in January 2012 and is due to open in late 2015. It should be noted that the opening of this hospital will significantly increase the amount of traffic generated in the area.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection still performs exceptionally well under these scenarios. The intersection operates with a LOS B with an average delay of approximately 19 seconds during the AM peak period. The intersection operates with a LOS C with an average delay of approximately 23 seconds during the PM peak period. Therefore no changes are required for this intersection as it will continue to function as intended. In regards to the new Children's Hospital, a traffic assessment should be conducted to determine the amount of traffic that is generated by the site and its impact on the traffic movements in the surrounding area.

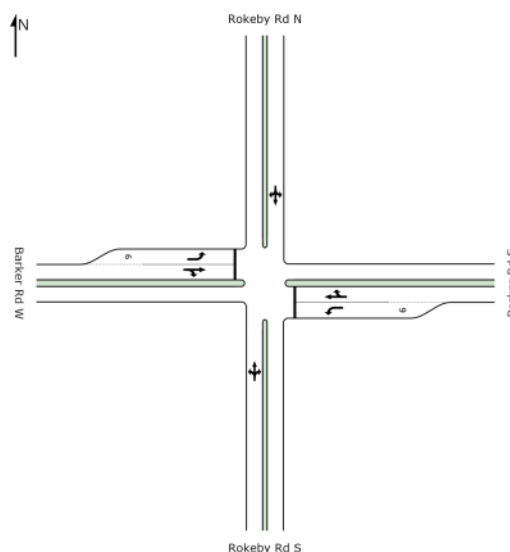


### 6.6.10 Rokeby Road – Barker Rd

**Figure 6-27 Rokeby Road – Barker Road Intersection**



**Figure 6-28 Rokeby Road – Barker Road Layout**



Source: Nearmap (2015)

The current satellite photo and geometric layout of the intersection is shown in **Figure 6-27** and **Figure 6-28**. The intersection between Rokeby Road and Barker Road is a priority intersection with Barker Road giving Priority to Rokeby Road. Both roads currently have one lane in each direction.

The ROM data for the in and out movements on Rokeby Road north was unavailable so the traffic volumes for this section is assumed to be a continuation from the southern section of Rokeby Road. The values obtained were then adjusted so that the in and out movements in the intersection are equal. Based on the modelled 2031 AM/PM peak hour volumes, the intersection is expected to fail under these circumstances.

The intersection operates with a LOS F with an average delay of approximately 30 seconds during the AM peak period and a delay of 90 seconds for the PM peak period. Barker Street will be heavily affected experiencing significant traffic delays.

There are currently several concept plans the present ideas on possible upgrades for Rokeby Road and Barker Road. These include:

- > Upgrading Barker Road streetscape to include quality pedestrian pavements and consistent street tree canopy in *Subiaco Central Development Plan*.
- > The *Subiaco Public Realm Concept Design Report* details several scenarios for Rokeby Road which include; infrastructure upgrades for pedestrian paths, the addition of 'community squares' at strategically placed areas to increase the pedestrian/al fresco experience, and kerbside parking along Rokeby Road be reduced.

These proposals are most likely aimed at reducing traffic along Rokeby Road and increasing amenities for pedestrians as it transitions into more of a 'pedestrian activated' area. Further analysis on the impacts on current and future traffic should be conducted on these proposals if they are to be implemented in the near future.

The recommended actions include modifying the existing intersection to a signalised intersection as required to retain safe crossing function for pedestrians and cyclists. If traffic along Rokeby Road can be reduced through place-making measures and LATM, then a roundabout at this location would be preferable.

It is recommended that the future form of this intersection be considered in the context of planning for Rokeby Road, and that modification to a signalised or roundabout form be completed with reference to all user groups, but particularly with an understanding of pedestrian and cycling use and safety.

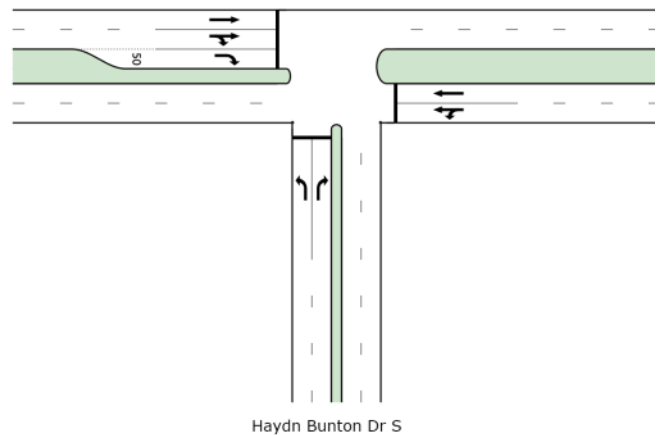


#### 6.6.11 Haydn Bunton Drive – Salvado Rd/Railway Parade

**Figure 6-29 Haydn Bunton Drive – Salvado Rd/Railway Parade Intersection**



**Figure 6-30 Haydn Bunton Drive – Salvado Rd/Railway Parade Road Layout**



Source: Nearmap (2015)

The current satellite photo and geometric layout of the intersection is shown in Figure 6-29 and Figure 6-30. The intersection between Haydn Bunton Drive and Salvado Rd/Railway Parade is currently a 3 way signalised intersection. Both roads contain two lanes in both directions along with a right turn bay on Railway Parade west.

Haydn Bunton Dr, despite being a short road, generates a fair amount of traffic which can be attributed to the close proximity of key trip generators such as Subiaco Oval and the Subiaco Town Centre. This situation may change with the relocation of AFL matches to the stadium to Burswood Stadium in 2018.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection still performs exceptionally well under these scenarios. The intersection operates with a LOS C with an average delay of 24 to 30 seconds. Therefore no changes are required for this intersection as it will continue to function as intended.

As stated above, the relocation of the stadium to Burswood would have an impact on the traffic conditions in the surrounding area in addition to the future plans for the site following the relocation.

It is therefore recommended that modifications to intersection form be completed only following detailed understanding of the impact of Subiaco Oval redevelopment.

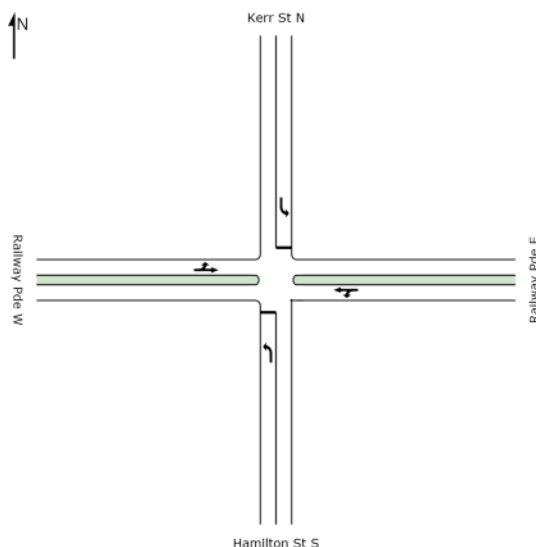
## 6.6.12 Hamilton St/Kerr Street – Railway Parade

**Figure 6-31**      **Hamilton St/Kerr Street –  
Railway Parade Intersection**



Source: Nearmap (2015)

**Figure 6-32**      **Hamilton St/Kerr Street –  
Railway Parade Road Layout**



The current satellite photo and geometric layout of the intersection is shown in **Figure 6-31** and **Figure 6-32**. The intersection between Hamilton Street/Kerr Street and Railway Parade is a priority intersection where Hamilton St/Kerr Street gives way to Railway Parade. Hamilton Street provides an important role by providing access across the rail line, but the attractiveness of this road as a rat-running route to the Mitchell Freeway has compromised its function, necessitating a series of turning restrictions. At this location, through and right turn movements cannot be performed from Hamilton Street or Kerr Street.

Based on the modelled 2031 AM/PM peak hour volumes, the intersection performs reasonably well with the exception of the left movement from Hamilton Street south which experiences significant delays. Traffic along Railway Parade prevents vehicles on Hamilton Street and Kerr Street from transitioning easily onto Railway Parade which is the main cause of delay and traffic build-up along minor roads. This impact is exacerbated by the roundabouts to the east and west, which tend to even out traffic flow and remove significant gaps.

While the deterrent to rat-running is required, upgrades to the Hamilton Street intersection are not recommended. Instead, improvements to Thomas Street should be pursued to alleviate the projected demand along Hamilton Street.

## 6.7 Comparison of SCATS and ROM

The SIDRA models were completed using the 2031 Regional Operations Model (ROM) data. However, there are some limitations of the data due to its status as a long-term strategic transport demand model. The following table is intended to illustrate the potential discrepancies in ROM outputs by referencing 2011 data and contrasting these results with observed SCATS data.

**Table 6-3 Peak AM/PM Traffic Volume Comparison**

Intersection	SCATS AM data 17/11/2014					SCATS PM data 17/11/2014					ROM 2011 AM	ROM 2011 PM
	Mon	Tue	Wed	Thu	Fri	Mon	Tue	Wed	Thu	Fri		
Harborne Street – Salvado Road	2283	2214	2249	2230	2270	2267	2330	2316	2247	2106	1558 -31%	2289 +2%
Bagot Rd/Kings Park Road – Thomas St	3635	3849	3730	3727	3602	3318	3537	3442	3492	3285	5190 +40%	4140 +21%
Railway St/Railway Parade – Thomas Street	N/A	4812	4824	4749	4620	4861	5129	5169	5147	4819	7044 +48%	6254 +24%
Winthrop Ave – Monash Ave	2675	3032	2946	2853	2729	2953	3124	3085	3058	2721	2587 -9%	1990 -33%
Haydn Bunton Drive – Salvado Rd/Railway Parade	2086	2036	2178	2226	2105	1897	2024	2039	2014	1831	1735 -18%	1340 -32%

The expectation is that the small amount of growth between 2011 and 2014 would have occurred, leaving the SCATS data slightly higher than ROM outputs, this would partially cancel out the intrinsic under-representation of SCATS, known to be in the order of 5-10%.

However, observations show that ROM tends to overestimate existing traffic volumes to a certain degree. For the above intersections, ROM overstates traffic demands by an average of 18% in the AM peak and 3% in the PM peak. This suggests that ROM is an accurate model in aggregate, but may overestimate or underestimate demand along individual routes or at intersections.

These discrepancies are important to understand and suggest that the use of ROM for future infrastructure decision-making should be done with caution.

A similar comparison has been completed for 2011 daily volumes, to identify whether the ROM outputs provided are more representative across the day or during the peak. The results are given below, **Table 6-4**.

**Table 6-4 Daily Total Traffic Volume Comparison**

Intersection	Total daily 17/11/2014 - 21/11/2014					ROM Daily Total
	Mon	Tue	Wed	Thu	Fri	
Harborne Street – Salvado Road	24478	25286	26454	26386	26840	18100 -30%
Bagot Rd/Kings Park Road – Thomas St	46011					57400 +25%
Railway St/Railway Parade – Thomas Street	N/A	67338	69799	70301	70932	84300 +21%
Winthrop Ave – Monash Ave	35543	38481	40173	40170	39367	26700 -31%
Haydn Bunton Drive – Salvado Rd/Railway Parade	22115	23006	24246	24663	24435	16700 -30%

For the above intersections, ROM overstates daily traffic demands by an average of only 2%. This suggests that ROM is a very accurate model in aggregate (i.e. on a cordon basis) but over- or underestimates demand along individual routes or at intersections. This is consistent with the function of ROM as a strategic model, and is generally expected, but confirms that long-term decision-making should be confirmed progressively, rather than locked into a rigid implementation framework.

## 6.8 Managing Parking

### 6.8.1 Strategic Objectives

To encourage the efficient use of and management of available parking resources by providing a mix of short and long term parking to accommodate current and future uses within the centre.

### 6.8.2 Policy Directions

P1. Short term and long term parking zones will ensure consistent parking application around the Subiaco Town Centre.

P2. Ensure sufficient parking supply to cater for the various uses with the Subiaco area.

P3. Ensure parking does not impact negatively on user groups or general amenity of the area.

P4. Ensure that parking provision supports other transport policy directions.

### 6.8.3 Existing Policies

#### 6.8.3.1 City of Subiaco Parking Strategy 2012-2016

The city's Parking Strategy details the current parking situation in Subiaco whilst providing recommendations to create an effective parking system that is accessible to all. These recommendations are based on the Parking Study Research Report completed by Arup on behalf of the city. The following is a list of strategies that the Strategy recommends for implementation:

#### *Time Controls Costs and Compliance*

- > Amenity of and access to residential properties be preserved through time controlled parking schemes in all residential streets. Restrictions should vary with an aim to remove or minimise non-residential traffic, whilst minimising the need for residents and visitors to display permits.
- > A set of criteria be established to determine the most appropriate controls to be applied, including ticket parking, the objective being to provide the ultimate service to various precincts based on land use.
- > In conjunction with the above, a second set of (possibly identical) criteria be developed to give each parking station and street a compliance priority, which will determine or influence the allocation of the compliance resources to that location.

- > The compliance staff roster be adjusted to maximise the allocation of that resource to parking control without prejudicing capacity to manage all core local government ranger duties, including servicing events at Subiaco Oval.
- > Verge parking continue to be managed as contained in the existing Local Laws Relating to Parking, clause 5.3 (1) and (2).
- > Research to be undertaken to determine the feasibility of preserving kerbside parking within and adjacent the Subiaco town centre for short-stay parking, whilst creating more all day off-street parking.
- > The use of yellow line marking to designate no stopping zones to be continued.
- > Whilst acknowledging the need to maintain human judgement in the compliance process, the progress in technology that may enhance compliance activity, be monitored.

#### *Residential Permit Scheme*

- > Effective 1 January 2014 the number of visitor parking permits be reduced to one throughout the municipality.
- > Although a maximum of two visitor permits will continue to be available, effective 1 January 2014 any household requiring additional visitor permits be required to pay a fee to be determined annually in conjunction with the budget process.
- > Further research be undertaken to assess the feasibility of introducing a single use visitor permit, or a new visitor permit style and format that makes it readily distinguishable from the residential permit.
- > Residential developments, excluding renovations and extensions, receiving approval after 30 June 2013 not be entitled to any residential permits. Future developments may, however, be entitled to the standard allocation of visitor parking permits.
- > Residential parking permits scheme be comprehensively reviewed.

#### *Managing Supply*

- > Develop an appropriate record that collates and presents details of off-street parking facilities within the Subiaco Town Centre Parking Zone.
- > Develop an appropriate database that records and presents details of kerbside parking schemes and facilities within the Subiaco Town Centre Parking Zone.
- > Develop information to be presented on the city's website on parking facilities and schemes.
- > Progressively implement vehicle detection equipment in car parking station bays (priority one) and kerbside bays (priority two) within the Subiaco Town Centre Parking Zone to record and generate data on the occupancy of parking spaces owned and operated by the city.
- > Conduct surveys periodically to measure occupancy of car parking facilities.
- > Develop a system that accommodates implementation of a flexible fee structure in off-street parking facilities, which more effectively manages demand for those facilities and ensures, by pricing, which occupancy rates remain at approximately 85 per cent.
- > In the future, public parking is not to be allocated to service the specific needs of a particular adjacent business enterprise, and any development or redevelopment of such sites be required to supply their own peculiar parking requirements on-site.
- > Progressively provide parking facilities that promote and encourage the use of motorbikes and scooters.
- > Investigate options for future provision of a viable multi-deck car parking facility.
- > The city, through its approach to management of its own parking schemes, endeavours to ensure the demand for parking is distributed evenly across the total supply, inclusive of that owned and operated by the private sector.



### Other Issues

- > Ticket machines and paid parking be installed in all long-term parking facilities, whether they be located on-street or off-street.
- > Research be undertaken to gain an understanding of the implications of introducing a City of Subiaco parking smart card.
- > That the city, as part of the Strategic Financial Plan, identify current service levels regarding parking management, and consider funding of strategies and resources that enable the reduction in parking non-compliance within the road reserve to a target of less than 10% of vehicles using that space.

### 6.8.3.2 Parking Requirements

Car parking requirements are in accordance with the requirements of the residential design codes for residential development and all other parking requirements are detailed in Table 2 of the city's Town Planning Scheme No.4.

The Town Planning Scheme describes a number of minimum parking requirements which tend to lag behind, or hinder the development of a community's strategic vision or plan. The following section reviews the objectives of the city's Strategic Community Plan against the parking requirements. It is not intended as a critique but as an analysis of how the plan's intentions are hampered by potential decisions made regarding minimum parking requirements.

The following table illustrates the implications of the city's Strategic Community Plan and its objective to increase parking. The table links the key objectives from the plan to parking requirements and provides arguments against providing an increase in ample free parking.

**Table 6-5 Comparison of objectives against parking requirements**

Objectives	Implications for Parking Requirements
A sustainable environment that is green and leafy. Reduce the impact on greenhouse gas emissions, air pollution and oil consumption. Manage the city's parks and greenery in a way that is water wise.	Parking reduces open spaces, natural vegetation and bushland. Parking requirements that lead to large amounts of surface parking and contribute to increased run off which is polluted.
A wide variety of accessible entertainment and hospitality options.	Parking requirements capture land that would otherwise be used for a variety of uses that constitute a complete neighbourhood, such as parks and community facilities.
Support and encourage both new and existing locally-owned businesses to remain in the city.	Lack of adequate parking can be a major constraint to small businesses. Increased walking, cycling and walking/cycling to and from public transport increases foot traffic around businesses.
Investigate and consider opportunities for the development of affordable and diverse housing.	Affordable housing becomes challenging when developers are required to provide parking. High parking requirements can indirectly prevent the construction of affordable housing.
A range of sustainable and accessible transport options.	Sustainable transport results in a reduction by car travel and therefore a reduction in car parking requirements.
Investigate the opportunities for regular public transport services that are free for users.	The investment in parking is often higher than investments in public transport, pedestrian facilities and cycling facilities.
A city that is frequented by local residents, workers and visitors. Work towards establishing the Subiaco town centre as a destination of choice.	Promote sustainable travel and discourage the use of the private car. This can result in a lower demand for parking requirements.
A sustainable city that accommodates the increasing population, whilst maintaining the valued character. Work to ensure appropriate infrastructure exists to support increased density.	Promote sustainable travel and discourage the use of the private car. This can result in a lower demand for parking requirements.

An effective and integrated transport system. Manage and plan our road networks to reduce congestion, while incorporating the increasing population and major developments. Reduce the impact of traffic on local roads.	Effective and comprehensive parking management strategy is needed.
An effective parking system that is accessible to all users.	Develop a comprehensive parking system that considers both the supply and management of parking.

The city's Town Planning Scheme stipulates minimum parking requirements depending on which land use is being developed. This blanket approach does not take into account the unique parking needs of the town centre and treats all areas as identical in their needs and approach to parking management.

#### **6.8.3.3 Advantages of the Strict Application of Statutory Rates**

- > Provides an attractive amount of dedicated parking for prospective developers.
- > Minimises risk of parking issues such as overspill/illegal parking.
- > Places responsibility for parking on developers rather than the city.
- > No obstacles for implementation.
- > Avoids formalisation of parking management strategies, which are often seen as time consuming and problematic (due to the difficulty in coordinating private landowners, tenants and multiple government departments).

#### **6.8.3.4 Disadvantages of the Strict Application of Statutory Rates**

- > May be difficult to later separate dedicated parking from the land use it initially served.
- > Has the highest cost of construction if the entire site is developed in this manner.
- > A large proportion of the car park will be empty, even during peak operation.
- > Land consumed for parking cannot be employed for more productive uses.
- > Significant additional cost for parking reduces the attractiveness and viability of development.
- > Unconstrained parking supports vehicle-dependent development.
- > Induced traffic impacts extending over a wider area which may require additional mitigation.

In addition, the parking ratios codified in Planning Schemes often lack empirical evidence and are not necessarily appropriate to the local context or to specific development. Statutory parking requirements rarely question how much parking is actually used and do not take into account levels of public transport, price of parking, income and economic objectives.

#### **6.8.4 Summary of parking policy in the City of Subiaco:**

The existing parking framework in the city presupposes the need for more parking, but without an understanding of the current supply of parking. A parking shortage is seen as a problem and increasing supply is the immediate reaction.

Parking information on the website states that "Free short-term parking exists along some roadside verges in Subiaco, ranging from 15 minutes to two hours in duration". The provision of this information is representative of an attitude that 'parking creates business but effectively encourages visitors to 'cruise' and look for free parking. Cruising in itself is a major contributor to congestion.

Advocates for parking management believe that a parking shortage is only one of many problems. Equally problematic is the oversupply or inefficient management of parking.

Parking should be priced so that motorists pay for the opportunity cost of their parking. This incorporates the cost of construction and maintenance into the price schedule, along with at least some of the externalities: loss of pedestrian scale interactions, reduction in developable area, increased costs of development dampening

demand etc. This form of 'free market' parking pricing is gaining traction, and presents an alternative to the 'predict and provide' model that is both flexible and in some measure, "fair".

If parking is priced at a sustainable level, as determined by the desired level of supply and private vehicle demand, behavioural patterns can be changed. Through simple pricing mechanisms, the city can influence mode share, parking location, even vehicle ownership. Without a strong parking management system, it can be difficult to ascertain which areas actually have parking shortages and which areas only have parking management problems.

Typically, to promote activity and vitality in a centre, short term and casual users should have priority access over long term and regular users including commuters. This suggests that parking priorities and infrastructure delivery should be changed to support all-day parking in existing or new off-street facilities, retaining on-street parking for the highest-yield uses: short-stay retail/visitor parking, public transport, taxis, and loading or on-street cycling facilities.

**Actions:**

- > Review the need for minimum car parking requirements in areas that are within walking or cycling distance of a public transport node and consider establishing maximum requirements.
- > Develop a plan to address the use of cash in lieu funds ensuring that appropriate funding is directed towards non-private car transport to facilitate a mode shift from the car to sustainable transport.
- > Investigate options for multi deck car parking facilities. Information should include business cases for construction and/or operation by the city and the funding of development.
- > Improve wayfinding and signage for available parking locations within the City of Subiaco.
- > Implement and review the Subiaco Parking Strategy 2012-2016, and ensure that the new Parking Strategy reflects the aims of the Integrated Transport Strategy.

### **6.8.5 Subiaco Activity Centre Structure Plan**

To enable a successful centre, the priority in terms of transport provision must be the amenity and comfort of pedestrians. In this regard, the order of prioritisation for transport in and around the activity centre must be:

- > Pedestrians.
- > Cyclists.
- > Public Transport.
- > Service vehicle accessibility.
- > Private cars.

Where centres are planned for cars, or even a balanced approach to mode share is sought, the overwhelming tendency is for vehicles to predominate. This is not to say that Subiaco should be anti-car, but rather, it is pro-city, pro-mode-choice. Prioritising transport in this way will ensure that all modes work better.

For this to occur, Subiaco must:

- > Adopt the 'power of nearness' – ensuring a great variety of land uses, transport and public space options are present within close walking distance of people.
- > The quality of the walking experience is emphasised in every detail through the public realm. Passive surveillance, active shop fronts (where required) and built form that addresses the street is critical.
- > Adopt a cycling strategy that provides for routes through and to Subiaco's activity centre, ideally with separation between bike lanes and traffic

#### **6.8.5.1 Relevance to parking**

In regards to multi deck parking, the Parking Strategy states that they will investigate options for future provision of a viable multi-deck car parking facility. Investigations of a multi-deck car parking facility are on hold pending the adoption of Subiaco Activity Centre Structure Plan which is currently in draft stage. The

structure plan only covers a portion of the city. Off street parking must be managed throughout the city and options for multi deck parking must be investigated in other areas of the city, including the hospital sites.

With respect to location, long-stay commuter car parking facilities should be located at the periphery of the City Centre. In particular, to maximise legibility and access while reducing the impact on road capacity, car parks should be located at precinct entry points. Short-stay/visitor parking is ideally located near entertainment and retail areas, sleeved by development or located in basement or podium parking levels.

The following schematic map (shows potential areas of interest which may support large-scale parking infrastructure.

For the purpose of this indicative overview, long-stay parking is shown at existing and future dense demand centres, i.e. QEIMC, the Princess Margaret Redevelopment Area, Subiaco Oval and King Edward Redevelopment Area. Additional long-stay commuter parking is recommended adjacent on the approach routes into Subiaco, i.e. Hay Street, Rokeby Road. These locations are opportunities presented in the context of proposed and future redevelopment. It is noted that they are only representative of appropriate positioning, and that the ultimate demand for parking must be established through detailed analysis.

Short stay visitor parking opportunities are identified just outside the CBD core, sleeved by development on Hay Street and Rokeby Road. Additional short-stay parking may be beneficial at the Subiaco Oval and Princess Margaret Hospital sites, depending on land use decisions.

The city should investigate options for multi deck car parking facilities within dense redevelopment areas. Possible sites include the PMH and KEMH redevelopment areas. These provide opportunities for public parking locations once these facilities are transferred to QEIMC.

Long-term parking demand requirements should be determined to better understand the future need for public car parking and mode shift. This should form the basis for a Parking Management Strategy and business case which considers acquisition and construction requirements.

## 6.9 Land use

Targeted growth areas within and around nominated activity centres:

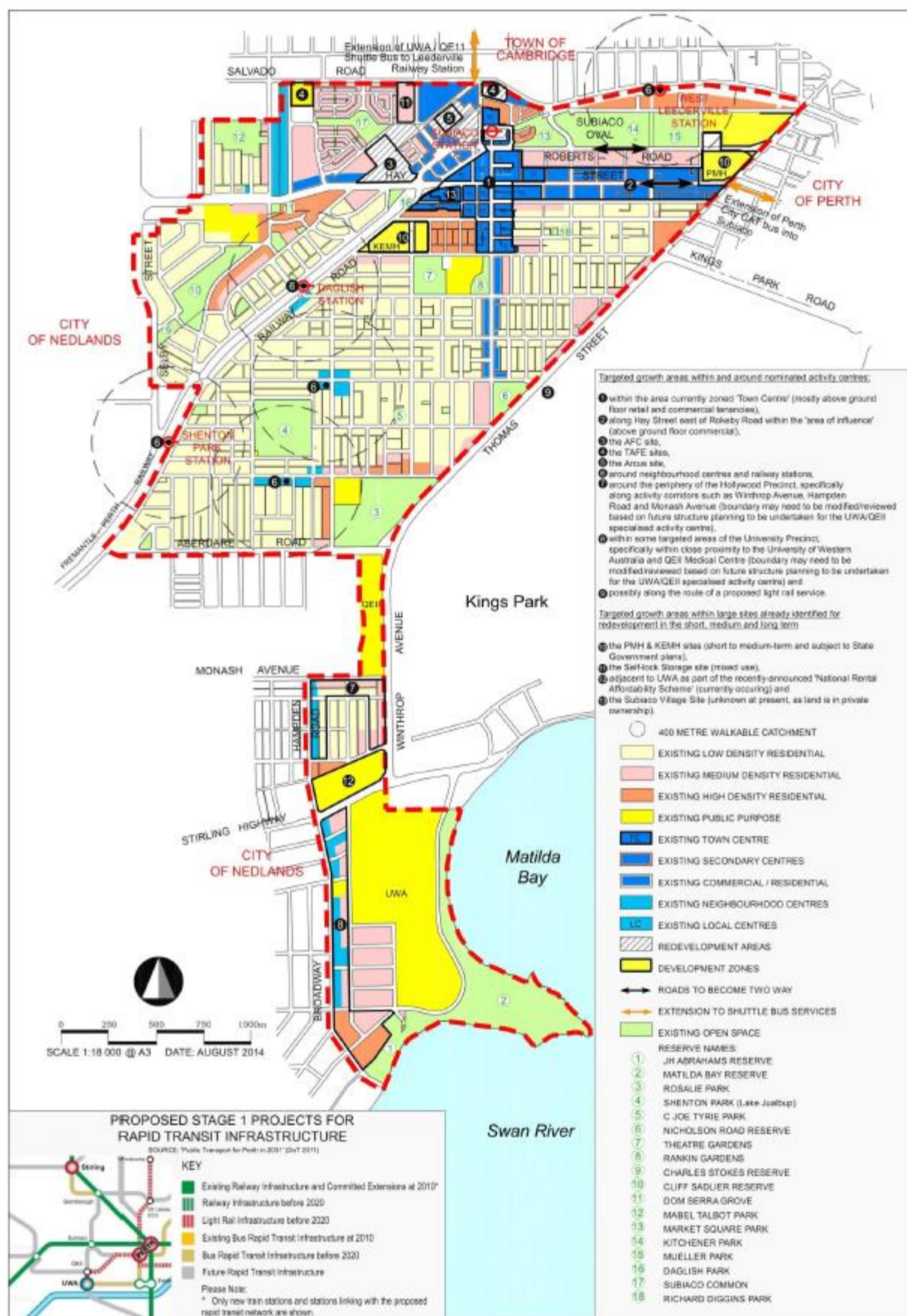
- > Within the area currently zoned 'Town Centre' (mostly above ground floor retail and commercial tenancies).
- > Along Hay Street east of Rokeby Road within the 'area of influence' (above ground floor commercial).
- > The Australian Football Club (AFC) – Rosalie Park Onslow Road (Corner Thomas Street) Shenton Park.
- > The TAFE site – 133 Salvado Road, Subiaco.
- > The Arcus site – 10 Roydhouse Street.
- > Around neighbourhood centres and railway stations.
- > Around the periphery of the Hollywood Precinct, specifically along activity corridors such as Winthrop Avenue, Hampden Road and Monash Avenue.
- > Within some targeted areas of the University Precinct, specifically within close proximity to the University of Western Australia and QEIMC.
- > Possibly along the route of a proposed light rail service.

Targeted growth areas within large sites already identified for redevelopment in the short, medium and long term:

- > The PMH and KEMH sites (short to medium-term and subject to State Government plans).
- > The Self-lock Storage site (mixed use), adjacent to UWA as part of the recently-announced 'National Rental Affordability Scheme' (currently occurring).
- > The Subiaco Village Site (unknown at present, as land is in private ownership).



**Figure 6-33 Draft Local Planning Strategy**



Source: City of Subiaco (2015)



## 7 Integrated Transport Strategy

### 7.1 Context

Cardno has developed an ITS which identifies components of the transport framework which will need to be addressed or considered to ensure continued operation of the city's network. The primary focus of this ITS is:

- > To identify constraints in current and planned road capacity, using the projections of the city (as captured in the most recent update of the Main Roads Road Operations Model (ROM), *Directions 2031 and Beyond* and the Central Sub-regional Strategy).
- > To identify measures to upgrade and improve the regional and local road connections to facilitate safe and efficient vehicle movement, manage freight movements and to reduce congestion.
- > To consider the implementation and management of 'Moving People' (TransPriority) principles to facilitate an efficient movement system.
- > To identify measures to upgrade and improve public transport connections and facilities to reduce congestion.
- > To create a safe environment for pedestrians and cyclists.
- > To promote the use of active transport and therefore reducing the reliance on private vehicle transport.

### 7.2 Overview

Based on the outcomes of the assessment works conducted in the previous sections, Cardno has prepared a set of robust and practical recommendations, including a priority list, to be further addressed in the compilation of the Transport Infrastructure Implementation Plan.

The competing needs of the various transport modes have been investigated through the 'Moving People' framework (TransPriority concept), with the hierarchy for each road informed by large-scale land-use planning, within a broad framework as follows:

- > Road networks based on appropriate use and connectivity, connecting origins and destinations but not forming barriers to sustainable modes.
- > Land-uses define the requirements for car parking quantum and location (short stay and on-street parking close to retail precincts, long-stay commuter parking on the periphery of the centres near to employment centres and along regional access routes).
- > Public transport routes designed to fit within the regional context and support sustainable transport access to activity, particularly employment.
- > Pedestrian facilities to knit the various complementary land uses together to create a single, effective mixed-use community. Of particular importance are the 'Activated Pedestrian Zones' and routes from car parking to primary activity locations. Quality and safety are vital to the effective operation of pedestrian spaces.
- > Cycling facilities follow primary desirelines and provide fine-grained access to all areas of the Activity Centre. Cycling is unique in that it allows both macro- and micro- levels of access to land-uses. Through the 'Moving People' framework assessment, cycling facilities are allocated as on-street or off-street, minimising conflict and safety issues for cyclists, cars and pedestrians. (E.g. in Activated Pedestrian Zones, cyclists are encouraged to ride on-street).
- > Road hierarchies are then defined by combining the above requirements with the existing and expected future background traffic demands, as well as the traffic volumes expected to be generated by the Activity Centre itself. By considering the Activity Centre holistically in this manner, a functional and effective transport environment can be built up.

### 7.3 Purpose and Drivers

The city has an ITS that was developed in 2007. Some actions in this strategy have been completed, some are ongoing, and others are unable to be completed.

This ITS Review (2015) has been updated to align with city's planning objectives and state and federal government priorities, including the Moving People Network Plan and the Public Transport for Perth in 2031

Plan. It provides a set of actionable goals for development of a transport network that can support the local community needs and the desires of the city with respect to land use growth and amenity.

## **7.4 Objectives**

The identified objectives include:

- > Review of the City of Subiaco ITS 2007.
- > Identification of access improvement options to key trip generators.
- > Understanding of the inputs from key stakeholders (such as Kings Park, UWA, QEIIIMC are doing to encourage sustainable transport and how the city may be able to assist with their objectives.
- > Determining the potential impact of developments that are proposed, under construction or planned for the future.
- > Better integration of land use and transport planning.
- > Improved integration of different transport modes.
- > Consideration for and inclusion of all types of trips (journey to work, during work, school, childcare, university, deliveries, medical, social, shopping and entertainment, and trip chaining).
- > Maintain and promote State Government Agency plans and requirements.

## **7.5 Major Issues and Needs**

The major issues and needs include:

- > Managing travel demand.
- > Improving walking and cycling.
- > To address parking issues including the perception of the availability of parking.
- > Improve viability of local businesses.
- > Increase in density and the impacts on transport infrastructure.
- > Managing parking.
- > Land use due to targeted growth.

## **7.6 Challenges and Opportunities**

Challenges associated with the ITS include:

- > Encouraging significant mode shift for travel to major facilities and trip generators.
- > Avoiding the 'predict and provide' approach of expanding the road network that has been proven to be ineffective in the management of traffic congestion.
- > Providing a high degree of access to support the economic vitality of businesses within Subiaco, whilst minimising the negative impacts of traffic.
- > Providing sufficient parking to allow for vehicle access to Subiaco, whilst encouraging alternative modes of travel to the centre and ensuring that parking does not have a negative impact on the amenity of the area.
- > Provision of a safe transport system, ensuring people can move around Subiaco in a safe and pleasant manner, by car, public transport, walk or cycle.
- > Achieving connectivity of traffic, walking, cycling and disability accessibility.
- > Provision for universal access and general information to develop a system that can be used by all members of the community.
- > Ensuring the most efficient use of land, infrastructure and services by building in a high degree of robustness and integration between different elements of the transport system.

If the challenges are successfully overcome in the implementation of the ITS, several opportunities emerge, these opportunities include:

- > Ability to apply for funding from the Department of Transport.
- > Encouragement of Innovation.

## 7.7 Principles

The Department of Transport's Metropolitan Transport Strategy (1995 – 2029) sets out six main principles for planning and delivering transport systems. Integrated transport plans must address these key strategic principles for sustainability. These same principles have been applied in the development of the city's ITS.

- > **Safety** – the transport system should be safe for all users;
- > **Efficiency** – the transport system should be provided, operated and used efficiently.
- > **Effectiveness** – the transport system overall should provide effective access and movement for all persons and business for employment, health, education, commercial, service, social, leisure and freight purposes.
- > **Environmental Responsibility** – the transport system should be provided and used in an environmentally responsible manner.
- > **Social Responsibility** – the transport system should provide equitable travel and transport opportunities for residents and businesses, with social benefits and costs being shared by all beneficiaries.
- > **Robustness** – the transport system must provide service in the face of ongoing and largely predictable during the coming 35 years and must be able to respond to and take advantage of unpredictable economic, social, technological and other changes.

## 7.8 Methodology

The Guidelines for the Preparation of Integrated Transport Plans that was developed by the Department of Planning was used as a base for the structure of the ITS. This report has adopted a similar structure to the Subiaco ITS (2007) and has been separated into six key sections:

1. Introduction – a brief introduction including the scope of works in addition to the key drivers and motivations for the development of the ITS.
2. Literature Review – this section contains a summary of all relevant documents provided by the city and consists of government policies, future proposals and plan and background information.
3. Outcome of Literature Review – this section highlights any inconsistencies and conflict between reports.
4. Existing Transport Network – this section summarises contains all existing transport infrastructure that is currently available in the city.
5. Future Transport Network – this section lists all upcoming plans or proposals in regards to transport in the city.
6. Transport Strategy – the ITS identifies the future requirements and issues that may arise in relation to traffic and transport and appropriate strategies are formed with suggested actions to achieve the required objectives and principles. The actions and strategies should also align with current State and Local government policies. The strategy is based on the information provided from the literature review, the issues present in the existing transport network and the policies and proposals in the future transport network.

## 7.9 Consultation and Partnership

Consultations take place to identify focus areas for consideration, when partnerships are developed with appropriate organisations the ease of implementing the ITS becomes significantly easier. Ongoing consultation with the following is recommended:

- > State and local Governments to identify gaps and potential route alignments. These include the following

- Main Roads WA.
  - Department of Transport.
  - Department of Planning and Infrastructure.
  - QEIMC.
  - Department of Sport and Recreation.
  - Department of Public Transport.
  - City of Subiaco.
  - Town of Cambridge.
- > Community, stakeholders and reference groups.

## **7.10 Strategies**

- > Access – easy to reach walks and attractive public open spaces for people of all physical activity levels and abilities. Ensuring facilities are accessible to seniors, people with disabilities, and people with prams through such treatments as ramps, wide pathways, large signs and unisex toilets, will also benefit people who wish to walk in and through their local communities. Access issues may also include suitable provision of bus stops, car parking and bike racks.
- > Aesthetics – an environment offering pleasant, clean surroundings in which to walk. The location has a natural or developed attractiveness that encourages people to use it. Considerations may include heritage preservation, litter control and excellence in landscaping.
- > Safety and security – walkers must feel that they and their belongings are safe. People need to feel that they can relax and enjoy their walk on paths that are well maintained, stable and built with personal safety as a priority. Security is also important and walking environments should be created or enhanced using the principles of ‘designing out crime’ (adapting environmental design principles for crime prevention).
- > Comfort – walkers can be confident of shelter, conveniences and rest stops. Amenities such as drinking water, seating and shade or shelter must be available

In the previous Subiaco ITS (2007), five elements were used to highlight the Integrated Transport Strategy. For the sake of consistency and legibility, the same five elements have been referred to in this report.

The five different elements have been listed below and with each being discussed in a separate section:

1. Managing travel demand.
2. Improving walking and cycling.
3. Improving public transport.
4. Managing vehicular traffic.
5. Managing parking.

### **7.10.1 Managing Travel Demand**

There are several key road sections throughout Subiaco that are expected to be overcapacity in the near future, which is why it is imperative that travel demand is managed effectively to reduce congestion especially during the peak AM/PM periods.

At its current state, private vehicular transport is still the most popular mode of transport to work with 44% of residents opting for this form of transport. There is evidence that vehicular transport has decreased over the years but that could also be attributed to rising petrol prices. With the recent drop in petrol prices, there is an incentive for people to switch back to private vehicle travel which would further increase congestion.

By providing programs and incentives informing and encouraging people to switch to alternate transport options, people are more likely to switch transport modes. This is evident in the success of the local community programs that are currently in progress or have recently completed such as the TravelSmart programs and various ride or walk to work days introduced.

It is also beneficial to encourage organisations to develop and update workplace travel plans, especially major institutions. It should be a requirement for major institutions that are responsible for a significant amount of trip generated. Major institutions such as QEIMC, KEMH and UWA all have travel plans but are currently outdated and no longer have TravelSmart Officers monitoring the plan.

The Your Move program is now considered to be best-practice for TravelSmart implementation. Its successful implementation in the City of Cockburn has seen the State Government extend its invitation to the program towards other local councils. It is recommended that the city apply for selection by the State Government (Department of Sport and Recreation and the Department of Transport) in future projects.

Disability Access and Inclusion Plans developed by local governments in WA can play a valuable role in addressing some aspects of the built environment that cause breaks in trip connectivity for people with disability as well as benefit other path users such as people pushing prams. All proposals and plans should refer to Outcome Two of the City's DAIP which states '*People with disabilities have the same opportunities as other people to access the buildings and other facilities of the relevant public authority*'.

#### **7.10.1.1 Actions**

- > Due to the success of the local community programs in the previous years, it is recommended that these continue to be implemented and updated on a regular basis to meet the current and future requirements of the City of Subiaco. These include the Cycle to School Day, Walk to School Day, bike education, TravelSmart maps and Bike to Work Breakfast.
- > Continue to promote the use of public transport by regularly providing information on new, improved and existing services.
- > Increase density and land use mix to encourage more people and destinations to be located within the public transport catchment.
- > Apply for selection by the State Government to participate in the Your Move program when it is offered to local governments.
- > Encourage organisations to participate in the TravelSmart Workplace program coordinated by the Department of Transport.
- > Ensure that managing travel demand recommendations align with Outcome Two of the City of Subiaco's DAIP.

#### **7.10.2 Improving Walking and Cycling**

In August 2014, the Draft Subiaco Bike Plan was completed. The Bike Plan sets out an action plan for immediate improvements to the cycle network and environment, and a strategic vision for the continued development and promotion of cycling within the city. The bike plan is also in accordance with the cycling outcomes of the Subiaco Activity Centre Structure Plan. As stated in the Structure Plan, Subiaco enjoys some of the strongest links to regional cycling infrastructure such as the Perth Bicycle Network; however, these links do not always suit trips within the centre. Subiaco's network of north-south bicycle links is notably lacking compared to the east-west direction. Enhanced cycle access through and to the town centre is proposed by designating cycle lanes on appropriate streets that will connect to the broader Perth cycle network. This will enable improved access for commuter and recreational cyclists through and to Subiaco.

In the development of the Subiaco Bike Plan due consideration was given to improving cycling safety and linking communities and facilities, as well as the needs of all categories of cyclists, regardless of their age, gender, experience or reason for cycling.

The summary list of prioritised projects contains various projects including on road facilities, off road facilities and further strategies to encourage cycling (e.g. wayfinding and TravelSmart initiatives).

Rokeby road was identified in the Bike Plan as an area which requires significant pedestrian and cycling improvements. Significant changes are proposed to improve the connectivity of routes and provide greater accessibility for walking and cycling. These changes are both recommended in the Bike Plan and the Public Realm Project. Rokeby road is a crucial missing link, given its north south alignment for cycling. The public realm document recommends several street scale improvements. These improvements aim at enhancing the quality of the walking and cycling environment through lowering traffic speeds and improving the streetscape.

There are many benefits of introducing end of trip (EoT) facilities in workplaces which include:



- > Reduced private vehicle use.
- > Promotes an active and healthier lifestyle.
- > Increased productivity from employees.
- > Promotes a positive image for the organisation.

It is recommended that new policies should be developed to require that end of trip facilities to be implemented in the design of new buildings. It is also known that end of trip facilities can be expensive and not all organisations are able to afford its implementation which is why incentives should be provided to commercial and retail properties to encourage the retroactive implementation of end of trip facilities in existing buildings. This can come in the form of monetary incentives for a certain amount of area dedicated to EoT facilities or tax rebates.

Disability Access and Inclusion Plan's developed by local governments in WA can play a valuable role in addressing some aspects of the built environment that cause breaks in trip connectivity for people with disability as well as benefit other path users such as people pushing prams. All proposal and plans should refer to Outcome Two of the City's DAIP which states '*People with disabilities have the same opportunities as other people to access the buildings and other facilities of the relevant public authority*'.

Walking audit tools are useful in two ways. First they flag what an auditor needs to check so that a street is audited in a comprehensive way. Secondly audit tools ensure audits are conducted in consistent and comparable way and that outcomes are recorded and can be compared. It is recommended that the city use Department of Transport's walkability audit tool to audit pedestrian footpaths in high demand precinct areas, key public transport stops and around all community facilities and major destination to identify access and safety issues.

It is also recommended that the city develop a Footpath Policy and reporting system so that footpaths and shared use paths are well maintained and kept clear of hazards and obstructions similar to the Department of Transport's online cycling hazards tool.

The implementation of both of these tools would ensure that the footpaths throughout the city remain in good condition as safe for anyone accessing them. In addition, it will provide pedestrians and auditor a useful tool to quickly report any damages or hazards on a footpath where the Council can quickly rectify the problem.

There are also a number of organisations and events that the city can participate in in order to further investigate and implement best practice policies and initiatives. Therefore it is recommended that the city sign up to the International Charter for walking and attend a Walk21 Conference. The next Walk21 Conference is being held during late October in Vienna, Austria.

### 7.10.2.1 Actions

- > Apply for annual funding from the DoT's Perth Bicycle Network Grant to implement the recommendations from the bike plan.
- > Support pedestrian and cyclist improvements to Rokeby Road in conjunction with the objectives of the public realm plan.
- > Implement the recommendations of the Draft Subiaco Bike Plan.
- > Support the Department of Transport's plans to construct cycling facilities in conjunction with the widening of Thomas Street.
- > Investigate the development of a central end of trip facility located in the Town Centre. As part of this action, undertake an End of Trip Facility Study to generate an inventory of private and public end of trip facilities in the city.
- > Review the policies that require end of trip facilities to be included in the design of new buildings.
- > Provide incentives to commercial and retail properties to retrofit end of trip facilities in existing buildings.
- > Ensure that improving walking and cycling recommendations align with Outcome Two of the City of Subiaco's DAIP.
- > Use the Department of Transport walkability audit tool to audit footpaths in high demand areas, key public transport stops and around community facilities and major destinations to identify access and safety issues.
- > Develop a Footpath Policy and reporting system so that footpaths and shared use paths are well maintained and kept clear of hazards and obstructions.
- > Install universally designed wayfinding signage at key locations including town centres, train/bus stations, libraries, community centres and parks.
- > As part of applying for a permit to obstruct a road, footpath or verge, applicants should ensure that access for cyclists and pedestrians is maintained. Alternative temporary infrastructure should be equal to the existing infrastructure and take into account the access needs of people with disabilities.
- > City of Subiaco to sign up to the International Charter for Walking and investigate how to embed its processes into the local government's current policies.

### 7.10.3 Improving Public Transport

The demand of public transport is estimated to increase substantially in the future as mentioned in the previous section. As the patronage for public transport increases, there also needs to be an increase in services in order for the delivery of exceptional services and prevent overcrowding. In order to encourage people to switch travel modes from driving to public transport, the services need to be:

- > Reliable – services should be punctual and delays prevented or minimised.
- > Frequent – there should be enough services so to prevent overcrowding and sufficient number of services during on peak and off peak hours.
- > Convenient – public transport should be easily accessible to all within a short distance and provide routes key locations and suburbs.

#### 7.10.3.1 Trains

Subiaco is currently serviced by four stations (Shenton Park, Subiaco, West Leederville and Daglish) and is relatively established providing little opportunity for further expansion.

It is recommended that the City liaise with the State Government to increase the capacity of the train system over time, especially at morning and evening peak periods. This may also include additional late night services during weekends. Train patronage should be monitored for the Fremantle train line and reactionary changes are made in accordance to the increase in demand.

#### 7.10.3.2 Buses

Buses play a prominent role in the city's transport system and ensuring that there are enough services at a relatively reasonable frequency is the key to providing an efficient and effective transport network for the community. It is recommended that the following option be considered:

- > Increasing the capacity of the bus especially during morning and evening peak periods. Evidence (see Section 4.2.2 Public Transport Demand) shows that the patronage for buses has increased year over year. It is recommended that bus patronage should be monitored for routes traveling to and from Subiaco and reactionary changes are made in accordance to the increase in demand.
- > The extension of the Subiaco Shuttle to Glendalough along with additional services. The current Subiaco Shuttle travels from UWA to Subiaco Station. The extension to the north would provide routes to key locations north of Subiaco Station as well as being a key transport route towards the northern suburbs.
- > Investigate the feasibility and possible routes for a Subiaco CAT service. This bus service can potentially provide routes to key locations throughout the Subiaco area at a high frequency.
- > Small buses have provided effective transport alternative in places such as Paris, Italy, England and Singapore and would be especially useful if implemented in Subiaco. Currently there are several small bus services that operate in the Subiaco area which include Street John of God shuttle for patients and the Community Services shopper bus. It is recommended that further investigation on the feasibility of a small bus service be completed.

Recently it has been brought to attention that the Town of Cambridge is unwilling to contribute funding of the Subiaco Shuttle, therefore alternate funding methods are required if renegotiations are unsuccessful. The City can provide the full funding or look to an external source.

#### **7.10.3.3     *Light Rail***

In terms of light rail, the proposed Metro Area Express (MAX) Light Rail project received the go ahead for construction but is currently delayed due to a shortage of fund resulting in the estimated start and completion date to be around 2019 and 2022 respectively. It is advised that the MAX Light Rail Project be monitored closely to stay up to date with any updates or changes. Due to the delay of the light rail project, a bus service should be set up as a temporary replacement. The bus service should travel along the same route as the light rail and the stops located at the same location as the light rail stops.

The most recent proposal has the light rail start/end at QEII Medical Centre (QEIMC). A proposal should be made to the State Government to extend the proposed starting/end point from QEIMC to University of Western Australia (UWA). UWA generates a large amount of commuter trips and it would be beneficial if the light rail system is able to service this area. Other key trip generators within Subiaco should also be taken in consideration when determining the light rail route.

It is also important to ensure that disability access for the following public transport modes align with outcome 2 of the city's DAIP. Accessibility to stops should contain safe passageways (such as ramps or lifts) for those with special needs. Buses, trains, and light rail should also contain amenities (such as tilting buses with extendable and retractable ramps) for access onto the vehicle.

Consideration should also when planning for road closures on Rokeby Road. Large scale events or construction of road upgrades may require existing public transport services to be redirected through alternate routes. This would have a profound impact on the existing bus service and could possibly affect the future light rail route. Currently, the proposed MAX light rail does not run along Rokeby Road but this possibility should still be considered for long term planning purposes where there may be an extension of the light rail onto Rokeby Road. Development of a contingency plan would ensure that existing and future public transport services are still able to operate in the event of a road closure on Rokeby Road.

#### 7.10.3.4 Actions

- > Liaise with the State Government and its agencies on the development of a light rail system through Subiaco to service UWA, QEII MC and other major demand generators.
- > Liaise with the State Government and stakeholders to implement improvements to the Subiaco Shuttle, including the extension of the shuttle service to Glendalough and extended hours of operation in the evenings.
- > Investigate the feasibility and possible routes for a Subiaco CAT service. This may include a staged roll-out consisting of smaller 'Green Bus' services, or other means.
- > Investigate the feasibility and possible routes for a small bus service.
- > Liaise with the State Government to increase the capacity of the train system over time, especially at peak periods.
- > Liaise with the State Government to implement improvements to bus service frequencies outside peak periods and to facilitate bus priority for high frequency transport routes.
- > Support connections between the light rail and nearby resident/employment zones, and between light rail and bus transport.
- > When planning regular road closures for events on Rokeby Rd, consider the impact on buses and the future light rail.
- > Ensure that improving public transport recommendations align with Outcome Two of the City of Subiaco's DAIP.
- > In the interim period prior to light rail, liaise with the State Government and its agencies to provide bus services along the general light rail route.

#### 7.10.4 Managing Vehicular Traffic

The road duplications as defined by the 2031 Road Operations Model (ROM) and **Section 6.5** of this report are considered to be necessary in the context of the modelled traffic volumes. Periodic assessment of traffic growth will be required to ensure that the duplication of these roads is undertaken as needed. The triggers for duplication will primarily be local in nature, with the exception of primary distributors such as Mounts Bay Road/Stirling Highway and Mitchell Freeway which are under the authority of Main Roads WA.

It should be noted that the ROM defines a specific traffic demand scenario, driven by assumed conditions and land-use build-out. Therefore, changes in transport mode choice, traffic demand flows or build-out timeframes can significantly impact the requirement for significant road improvements. This suggests that the transport network must be continuously monitored to ensure that upgrades are completed in a timely manner, consistent with local and regional needs.

Active traffic management along roads with heavy traffic such as Thomas Street would assist in the management of congestion and ensure that traffic runs smoothly. A feasibility study can determine whether there is enough traffic traveling through the Subiaco area to warrant the need for active traffic management.

The city has many of the attributes required to make car sharing viable. Car sharing can form a vital part of an integrated transport package that includes public transport, walking and cycling. Further consultation with the relevant stakeholders should be conducted to determine the feasibility of a car sharing service in Subiaco along with a trial run to gauge user interest.

It is also recommended that the laneway upgrades stated in the Laneway Report 2013 be implemented as it contains detailed recommendations on the improvements to a number of laneways.

#### 7.10.4.1 Actions

- > Continue to develop and implement a variety of traffic management and street design measures, aimed at improving the amenity, comfort and safety of streets for all road users.
- > Develop and implement TransPriority measures.
- > Design and plan for road duplications as defined by the 2031 Regional Operations Model (ROM). The will include the identification of sections of road currently identified by the 2031 ROM as requiring upgrade or duplication, as well as sections of road that are expected to require upgrade or duplication as a result of the ITS assessment.
- > Monitor road and traffic conditions and perform upgrades when appropriate.
- > Conduct a feasibility study on the advantages and disadvantages of active traffic management in the context of the City of Subiaco.
- > Consult with relevant authorities, car sharing vendors and the general public in regards to the implementation of a car sharing service in the City of Subiaco.
- > In regards to car sharing, conduct an initial trial with a small fleet of cars in key destinations to gather data on usage rates. To maximise the potential of this service, it should be conducted alongside the driverless cars trials
- > Participate in driverless car trials when the technology is available, and integrate this with the proposed car sharing service.
- > Continue support and implementation of the Infrastructure Five Year Capital Works Program.
- > Implement the actions in the Laneway Report 2013.
- > When planning regular road closures for events on Rokeby Road, consider the impact on buses and the future light rail. Closing Rokeby Road will require a significant detour for bus route 97, as buses cannot use nearby narrow streets. It will also affect the future light rail route.

#### 7.10.5 Managing Parking

Subiaco operates as a significant strategic centre for both the local community and a wider catchment that extends into the outer suburbs. For this reason there will always be an important place for private vehicles, as these represent the only viable transport mode for a large proportion of this population. High quality parking will be required to accommodate this demand, as well as that of other visitors, residents and commuters.

However, a higher provision of car parking will result in an increase in demand for private vehicle modes, potentially beyond the capacity of the road network to support it. Car parking management methodologies will need to be introduced to maintain a level of supply and demand which can be sustained by the local road network.

The public parking supply can be segregated to provide parking for a range of needs. The two broadest categories for non-residential parking consist of commuter and retail parking. These have overlapping but separate demand profiles and should be managed in different ways.

Retail and entertainment parking should be provided centrally, close to destination areas and easily accessible from the development. Parking is ideally supplied on street or in decked car parking with a demand responsive parking fee that promotes turnover.

Commuter parking tends to be of lesser value to the Centre and should be supplied on the periphery of the City in large-scale parking structures priced to support all-day parking.

Other specialised parking categories are also important and should be included in the on- and off-site parking supply. This includes:

- > Disabled parking, demand for which will increase markedly over the next 20 years and should represent 2-3% of the overall non-residential supply;
- > Loading bays adjacent to retail and entertainment or mixed-use developments which do not include onsite provision for service/delivery;
- > Bus stops along service routes;
- > Taxi stands in areas with high demand;
- > Other types of very short-stay parking (ATM, post boxes, emergency service zones, etc.)



### **7.10.5.1 Commuter Parking**

#### *Location*

Commuter parking is proposed to be provided on the periphery of the city in large-scale parking structures priced to support all-day parking. Commuters tend to arrive during the roadway peak and have a significant impact on traffic operations. Removing this demographic from the main activity improves pedestrian and cycling safety, public transport efficiency and intersection operation. Commuters are also willing to walk longer distances, particularly if the pedestrian environment is attractive.

Short-stay visitor parking is proposed to be located relatively close to intensive development, preferably sleeved or in basement/podium areas to maintain pedestrian-scale activity. Access to short-stay parking should be designed to limit the impact on activated pedestrian zones.

#### *Quantum*

The necessary quantum of parking is heavily dependent on the land use, internal synergies and available alternative transport modes. A detailed needs assessment and Parking Management Strategy are a necessary part of future-proofing the City Centre and surrounds.

#### *Access*

Access to car parking is supported directly via the primary approach routes including Hay Street, Rokeby Road and Roberts Road. This limits the impact on the minor road network. Where capacity constraints exist, the use of minor roads abutting primary access corridors may limit the effects of queuing and intersection operational impacts.

#### *Price*

The existing network of car parking in the city is operated by a variety of different organisations. Therefore, parking pricing varies significantly. Ideally, pricing of on-street and off-street facilities would reflect demand and supply limitations, and be related to quantum and proximity to destination. The average price for parking is around \$13 per day, though this is likely to increase in popular areas if demand-sensitive pricing is introduced.

### **7.10.5.2 Residential Parking**

#### *Parking Rates*

Residential traffic is generally not considered to impact significantly on the Activity Centre road network due to its prevailing contra-flow direction. However, Subiaco's location in the regional context means that a high volume of regional traffic travels through Subiaco from the western suburbs, avoiding the Mitchell Freeway and heading into West Perth, UWA/QEIIIMC and the Perth CBD. Therefore, residential traffic generated in the Activity Centre may have a significant effect on local intersections.

To address this impact, it is proposed that residential parking rate be regulated with a maximum provision for multiple and group dwellings within the Activity Centre. This would assist in supporting a sustainable transport environment by reducing private vehicle mode share of residents.

#### *Unbundled Parking*

The cost of parking for residential and commercial units is usually passed on to the occupants indirectly through the rent or purchase price (bundled) rather than through a separate transaction. This means that tenants or owners are not able to purchase additional parking if required or given the opportunity to save money by reducing their parking demand. Giving the tenants or owners the opportunity to rent or sell the parking spaces separately may also reduce the total amount of parking required for a development. The unbundling of parking can be introduced in several different ways:

- > Facility managers can unbundle parking when renting building space;
- > Developers can make some or all parking optional when selling buildings;
- > Renters can be offered a discount on their rent for not using some or all of their allocated parking spaces;
- > Parking costs can be listed as a separate line item in the lease agreement to show tenants the cost and enable them to negotiate reductions.

Providing tenants or owners with the opportunity of unbundled parking is also likely to create a market for available parking spaces. It should be noted that if an unbundled parking policy is introduced, it is important to consider the cost of alternative parking in the nearby area. If there is a supply of free or low-cost parking nearby, there may be an incentive for tenants or owners to find other places to park their cars to avoid the parking charge, potentially resulting in spill over effects.

Previous studies have suggested that a multi deck car park would be able to satisfy the future parking requirements of the Subiaco area. The most suitable locations were determined to be either one of the two sites located on Churchill Avenue or Forrest Street. The Churchill Site would provide the maximum amount of parking available while the Forrest Street site is better suited in terms of a town planning and urban design point of view. In any location, a multi-deck car park would require further analysis and consultation to determine its feasibility.

#### **7.10.5.3 Visitor Parking**

Currently, visitor parking within the Subiaco City Centre is provided in a mix of free, timed and paid parking. Outside the City Centre, parking is predominantly free and provided in on-street and off-street parking facilities. As a general rule, it is recommended for all inner-city off-street parking to gradually transition to paid parking without time restriction. Pricing regimes should be designed to support the type of parking desired, with on-street bays priced higher than off-street and time-restricted to enforce turnover.

##### *Location*

Visitor parking is primarily provided on-street, with some off-street car parking near retail centres. This type of provision should continue into the future, with a gradual progression to multi-deck sleeved or basement/podium parking integrated into development.

##### *Quantum*

The necessary quantum of parking is heavily dependent on the land use, internal synergies and available alternative transport modes. A detailed needs assessment and Parking Management Strategy are a necessary part of future-proofing the City Centre and surrounds.

#### **7.10.5.4 Maximum Parking Rates**

The constraints associated with road capacity and commercial sustainability for public parking support the modification of the existing standard parking minimum rates, as set out in Local Government Policy, to a simplified set of parking maximums. It is envisioned that land uses would be categorised according to simple criteria: Retail, Office, Showroom, and Residential. Any other non-standard uses would be assessed with respect to the goals of the City and Department of Planning.

Nominal (example) maximum parking rates are proposed in the Department of Transport Activity Centres Parking Discussion Paper and provide a benchmark for development as follows:

- > Retail: 4-5 bays per 100sq.m.
- > Office: 1-2 bays per 100sq.m.
- > Showroom: 2 bays per 100sq.m.
- > Residential: 1 bay per unit (multiple or group dwellings).

These rates have generally been found to be attainable for dense Activity Centre development.

#### **7.10.5.5 Parking Pricing**

Parking infrastructure is expensive to construct and maintain. Where unrestrained parking demand rates significantly exceed the supply rate, the market price for hourly or daily parking can support the construction of public car parking on commercial grounds. However, market pricing of parking will have a significant impact on demand, with effects felt at relatively low rates. While there may be localised hotspots where parking is in sufficient demand to justify cost recovery pricing, it is likely that the majority of public parking will be unable to pay for itself through fees. This suggests that alternative funding methodologies will be necessary.

It should also be noted that parking compliance is essential to the successful implementation of the parking management regime.

#### **7.10.5.6 Cash-in-Lieu of Parking**

Cash-in-lieu of parking is a mechanism by which developers contribute towards public parking and/or sustainable transport initiatives. This mechanism would allow public infrastructure to be funded by development, without the requirements for a Development Contributions Scheme.

The use of cash-in-lieu is recommended to assist in the development of sufficient public parking, and also to maintain a limit on parking supply to prevent adverse impacts to the road network. The foundation of any cash-in-lieu scheme is the Parking Management Strategy which details the planned growth of parking infrastructure over time and gives developers certainty regarding future supply.

By this mechanism, public parking construction can be funded directly by development, even in the absence of a Development Contributions Plan arrangement, leaving parking fees to fund maintenance of infrastructure, rather than recover the costs of capital works. To facilitate the take-up of cash-in-lieu opportunities, the offer needs to be attractive to developers. One alternative that has been recommended is to introduce a *mandatory* cash-in-lieu policy. This makes cash-in-lieu a requirement of development, rather than an incentive. Such a scheme has been proposed for the Midland Activity Centre, and has been instigated in locations such as Merrylands in NSW.

To maximise developer buy-in and ensure a streamlined process, it is important to ensure that there is an effective record-keeping process to manage cash-in-lieu contributions. This system would track payments by developers, current land and construction costs, infrastructure works and planning. Maintaining a transparent process of cash-in-lieu through which developers can see direct value will assist in achieving both mandatory and voluntary contributions.

#### **7.10.5.7 Paid Parking**

There is the potential for fine-grained control of parking demand on a precinct or road specific basis, using pricing signals to regulate parking usage. Ideally, parking rates would vary as required and set to a level which generates a vacancy on each block. A good example of this mechanism is provided by the SF Park system currently being trialled in San Francisco.

#### **7.10.5.8 Enforcement**

Due to the increased attractiveness of parking within the activity centre, the enforcement of parking restrictions both within the Subiaco Activity Centre and in the periphery is essential to a successful outcome of the parking strategy.

#### **7.10.5.9 Wayfinding and Signage**

Signage directing to locations of car parks and on street parking should be more detailed. Car park should take advantage of parking management technologies which provide information on the number of empty bay available. Additionally signage should be clear straight forwards and easily understood.

#### **7.10.5.10 Multi Deck Car Parking**

From the previous section, the possibility of a multi deck car parking has been considered at several location throughout the Subiaco area. The multi deck car park has a number of advantages and disadvantages and it is therefore recommended that further investigation on the requirement and commercial viability of multi deck car parking be conducted in dense redevelopment areas; particularly where there may be a high degree of internal land use synergy.

#### **7.10.5.11 Actions**

- > Review the need for minimum car parking requirements in areas that are within walking or cycling distance of a public transport node and consider establishing maximum requirements.
- > Investigate options for multi deck car parking facilities.
- > Improve wayfinding and signage for available parking locations within the City of Subiaco.
- > Implement and review the Subiaco Parking Strategy 2012-2016, and ensure that the new Parking Strategy reflects the aims of the ITS.
- > Develop a plan to determine how cash in lieu funds are spent, so that the majority of funds go towards non-private car transport to facilitate a mode shift from the car to sustainable transport.

## 7.11 Summary of Strategic Actions and Targets

The preceding ITS outlines the need for a range of environmental, health, social, cultural, economic, urban design, built form and engineering initiatives. These initiatives are categorised by transport mode and function and compiled into a series of recommendations which are included in the Executive Summary at the start of this document.

The ITS attempts to address the vast range of needs of the city's current transport system, recognising the significant growth projected within the city. Through discussion of the gaps in information and infrastructure the goals of an integrated transport system are outlined. With prioritised recommendations and general principles considered for future implementation.

The issues identified through this process are considered important for the safe, effective function of the city transport environment. However, there is a substantial volume of work to be done in planning, policy and infrastructure which needs to be prioritised and implemented.

### 7.11.1 Recommendations and Actions

The following recommendations draw from the goals established in the ITS and provide a set of measurable actions that the city will need to implement in order to achieve an integrated transport network throughout the municipality. This detailed action plan is intended to inform an implementation program which prioritises required actions for the city as well as external agencies such as Main Roads WA, Department of Transport, Department of Planning and Public Transport Authority.

Prioritisation has been based on a simple Multi-Criteria Analysis, with criteria and weighting listed below.

- > Environment (20%).
- > Social inclusion (25%).
- > Economy (15%).
- > Amenity (25%).
- > Health and wellness (15%).

There is some interrelationship between time frame and priority, with short-term projects that fit within the ITS review time horizon given precedence over longer-term, more speculative projects.

### 7.11.2 Costing

The tables below outline the estimated costs associated with each action. Note that these values do not fully represent the indicative costs of each action and have been provided to formulate an estimated budget. Additional sources of funding may be required for large-scale projects as the funding outlined by the Strategic Financial Plan is likely to be insufficient.

**Table 7-1 Managing Travel Demand**

Reference	Action	How does it manage travel demand?	Responsibility	Priority	Estimated Costs
1.1	Encourage schools to participate in Cycle to School Day and Walk to School Day.	Encourages students to walk and cycle to school instead of drive.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$20,000 (combined with actions 1.2, 1.3, 1.4, 1.5)
1.2	Encourage schools to participate in bike education.	Bike education teaches students how to safely ride to school.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$20,000 (combined with actions 1.1, 1.3, 1.4, 1.5)
1.3	Update and distribute the TravelSmart Map.	The TravelSmart Map shows all the cycling, walking and public transport routes, and major destinations, in Subiaco.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$20,000 (combined with actions 1.1, 1.2, 1.4, 1.5)
1.4	Hold an annual Bike to Work Breakfast during Bike Week.	Promotes cycling to work, school, and university.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$20,000 (combined with actions 1.1, 1.2, 1.3, 1.5)
1.5	Continue to promote the use of public transport by regularly providing information on new, improved and existing services.	Encourages travel behaviour change.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	\$20,000 (combined with actions 1.1, 1.2, 1.3, 1.4)
1.6	Increase density and land use mix to encourage more people and destinations to be located within the public transport catchment.	Encourages travel behaviour change.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	
1.7	Apply for selection by the State Government to participate in the Your Move program when it is offered to local governments.	Encourages long term travel behaviour change for residents and reduces demand for vehicle use.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Sport and Recreation</li> <li>Department of Transport</li> </ul>	Medium	\$125,000 (50% of the total cost for year 1)
1.8	Encourage organisations to participate in the TravelSmart Workplace program coordinated by the Department of Transport.	The TravelSmart Workplace program encourages staff and visitors to use sustainable transport to get to work, and during work. This program can include the development of travel plans for larger organisations.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$5k p.a. (advertising and internal TravelSmart funding)
1.9	Ensure that the managing travel demand recommendations align with Outcome Two of the City of Subiaco's DAIP.	Outcome 2 of the City of Subiaco's DAIP states that <i>'People with disabilities have the same opportunities as other people to access the buildings and other facilities of the relevant public authority'</i> .	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	
1.10	Promote the safe use of roads for drivers, cyclists and pedestrians.	Encourages safe road user behaviour.	<ul style="list-style-type: none"> <li>Department of Transport</li> <li>City of Subiaco</li> </ul>	Medium	



**Table 7-2 Improving Walking and Cycling**

Reference	Action	How does it encourage walking and cycling?	Responsibility	Priority	Estimated Costs
2.1	Apply for annual funding from the Department of Transport Bicycle Network Grants to implement the recommendations from the bike plan.	PBN grants fund 50% of the cost of cycling infrastructure.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	
2.2	Support pedestrian and cyclist improvements to Rokeby Road in conjunction with the objectives of the public realm plan.	Improves pedestrian and cycling facilities along Rokeby Road.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	
2.3	Implement the recommendations of the Draft Subiaco Bike Plan.	The Draft Subiaco Bike Plan will complete the gaps and improve the connectivity of the bicycle network in Subiaco.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	
2.4	Support the Department of Transport's plans to construct cycling facilities in conjunction with the widening of Thomas Street.	Cycling facilities on Thomas Street will increase the accessibility for both pedestrians and cyclists on a vehicle dominated road.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	
2.5	Investigate the development of a central end of trip facility located in the Town Centre. As part of this action, undertake an End of Trip Facility Study to generate an inventory of private and public end of trip facilities in the city.	Many staff do not have access to workplace end of trip facilities. A central end of trip facility will allow these staff to walk or ride to work.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	\$40k study
2.6	Review the policies that require end of trip facilities to be included in the design of new buildings.	End of trip facilities in new buildings enable staff and visitors to walk or ride to work.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	
2.7	Provide incentives to commercial and retail properties to retrofit end of trip facilities in existing buildings.	Incentives will encourage businesses to retrofit end of trip facilities in existing buildings, to enable staff and visitors to walk or ride to work.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	\$40k study
2.8	Ensure that improving walking and cycling recommendations align with Outcome Two of the City of Subiaco's DAIP.	Outcome 2 of the City of Subiaco's DAIP states that <i>'People with disabilities have the same opportunities as other people to access the buildings and other facilities of the relevant public authority'</i> .	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	
2.9	Use the Department of Transport walkability audit tool to audit footpaths in high demand areas, key public transport stops and	Creates a supportive walking environment using four principles: access, aesthetics, safety and security, and comfort.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	\$10k study

	around community facilities and major destinations to identify access and safety issues.				
<b>2.10</b>	Develop a Footpath Policy and reporting system so that footpaths and shared use paths are well maintained and kept clear of hazards and obstructions.	Ensures that the walking environment is comfortable, safe, secure and accessible.	▪ City of Subiaco	Medium	
<b>2.11</b>	Install universally designed wayfinding signage at key locations including town centres, train/bus stations, libraries, community centres and parks.	Ensures that the experience of walking is direct and legible.	▪ City of Subiaco	Medium	\$50k design and signage study \$150k implementation
<b>2.12</b>	As part of applying for a permit to obstruct a road, footpath or verge, applicants should ensure that access for cyclists and pedestrians is maintained. Alternative temporary infrastructure should be equal to the equal to the existing infrastructure and take into account the access needs of people with disabilities.	Ensures the safety and security of walkers and cyclists.	▪ City of Subiaco	Medium	
<b>2.13</b>	Attend a Walk21 conference.	The Walk21 conference encourages professionals to develop policies and initiatives to increase walking and create liveable communities.	▪ City of Subiaco	Medium	\$5k training

**Table 7-3 Improving Public Transport**

Reference	Action	How does it improve public transport?	Responsibility	Priority	Estimated Costs
3.1	Liaise with the State Government and its agencies on the development of a light rail system through Subiaco to service UWA, QEII MC and other major demand generators.	Light rail provides an efficient, fast and direct form of transport, and can move a relatively large volume of people.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	
3.2	In the interim period prior to the light rail, liaise with the State Government and its agencies to provide a bus services along the general light rail route.	<p>Staging of infrastructure improvements to meet changing demand and behaviour over time.</p> <p>Provision of an alternative mode of transport or some form of infrastructure that will move a relatively large number of people.</p> <p>Increases the number of transport options to a significantly large number of people (e.g. to/from major trip generators).</p> <p>Provide a new or improved service or facility to improve access to Subiaco from/ to a point of origin outside the city with a large travel demand.</p> <p>Allows future modifications but requires significant capital investment (e.g. to modify infrastructure).</p>	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$60k feasibility study (combined with actions 3.3,3.4,3.5 and 3.6)
3.3	Liaise with the State Government and stakeholders to implement improvements to the Subiaco Shuttle, including the extension of the shuttle service to Glendalough or Leederville, and extended hours of operation in the evenings.	<p>Provide efficient public transport infrastructure and continuously review services to ensure they meet changing travel demands.</p> <p>Option has been designed to (or by its nature can) accommodate future modifications or expansions.</p> <p>Increases the number of transport options to a significantly large number of people (e.g. to/from major trip generators).</p> <p>Provision of an alternative mode of transport or some form of infrastructure that will move a relatively large number of people.</p>	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	\$60k feasibility study (combined with actions 3.2,3.4,3.5 and 3.6)
3.4	Investigate the feasibility and possible routes for a Subiaco CAT service. This may include a staged roll-out consisting of smaller 'Green Bus' services, or other means.	A CAT service similar to the one implemented in the Perth CBD can support a large number of passengers due to its high frequency service and is relatively popular due to its free service.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$60k feasibility study (combined with actions 3.2,3.3,3.5 and 3.6)
3.5	Investigate the feasibility and possible routes for a small bus service.	If successfully implemented, it will provide easy access to areas within Subiaco.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	\$60k feasibility study (combined with actions

3.6	Liaise with the State Government to increase the capacity and frequency of the train system over time, especially at peak periods.	<p>Provide efficient, fast and direct public transport infrastructure.</p> <p>Provision of an alternative mode of transport or some form of infrastructure that will move a relatively large number of people.</p> <p>Increases the number of transport options to a significantly large number of people (e.g. to/from major trip generators).</p> <p>Provide a new or improved service or facility to improve access to Subiaco from/ to a point of origin outside the City with a large travel demand.</p> <p>Allows future modifications but requires significant capital investment (e.g. to modify infrastructure).</p>	<ul style="list-style-type: none"> <li>Department of Transport</li> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	<p>3.2,3.3,3.4 and 3.6)</p> <p>\$60k feasibility study (combined with actions 3.2,3.3,3.4 and 3.5)</p>
3.7	Liaise with the State Government to implement improvements to bus service frequencies outside peak periods and to facilitate bus priority for high frequency transport routes.	<p>Provide efficient public transport services to major destinations and respond to changing working times and travel demand. Improve infrastructure to support public transport and encourage its use by providing it priority over car traffic.</p> <p>Provision of an alternative mode of transport or some form of infrastructure that can move more people by green modes.</p> <p>Increases the number of transport options available to a greater number of people.</p> <p>Provide a new or improved service or facility to improve access to Subiaco from/ to a point of origin outside the City.</p> <p>Option has been designed to (or by its nature can) accommodate future modifications or expansions.</p> <p>Better management or utilisation of an existing service or facility (making public transport more efficient).</p> <p>Allows future modifications but may require significant capital investment (e.g. to modify infrastructure).</p>	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	
3.8	Support connections between the light rail and nearby resident/employment zones, and between light rail and bus transport.	<p>Increased accessibility and convenience for users which in turn would convert more users.</p> <p>Creates better synergies between the light rail and bus network allowing effortless transitions from one method of transport to another.</p>	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High	\$30k study

3.9	When planning regular road closures for events on Rokeby Rd, consider the impact on buses and the future light rail.	Closing the road on Rokeby Rd will require a significant detour for bus route 97, as buses cannot use nearby narrow streets. It will also affect the future light rail route.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	High
3.10	Ensure that improving public transport recommendations align with Outcome Two of the City of Subiaco's DAIP.	Outcome 2 of the City of Subiaco's DAIP states that <i>'People with disabilities have the same opportunities as other people to access the buildings and other facilities of the relevant public authority'.</i>	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium

**Table 7-4 Managing Vehicular Traffic**

Reference	Action	How do these actions manage vehicular traffic?	Responsibility	Priority	
4.1	Continue to develop and implement a variety of traffic management and street design measures, aimed at improving the amenity, comfort and safety of streets for all road users.	Provide a safe street environment for all users. Better management or utilisation of an existing service or facility- no impact on other users. Option has been designed to (or by its nature can) accommodate future modifications or expansions.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	Medium	
4.2	Develop and implement TransPriority measures.	Allocates road capacity for sustainable transport uses in order to maximise accessibility and mobility, and promotes mode shift away from private vehicle transport. Supports private vehicle transport along primary routes and away from areas of conflict.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Department of Transport</li> </ul>	Medium	
4.3	Design and plan for road modifications as defined by the 2031 Regional Operations Model (ROM). The will include the identification of sections of road currently identified by the 2031 ROM as requiring upgrade or duplication, as well as sections of road that are expected to require upgrade or duplication as a result of the Integrated Transport Strategy assessment.	These road improvements will help ease congestion in areas which are deemed to be at risk of being over capacity. This will ensure that the road network will be able to sufficiently handle the future increase in traffic.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	High	\$100k detailed traffic modelling study \$2M+ p.a. implementation budget
4.4	Monitor road and traffic conditions and perform upgrades when appropriate.	By monitoring the specified intersections that are expected to fail based on the SIDRA analysis, it can be predicted when the road network is unable to handle the traffic volumes thus providing the appropriate amount of time to implement upgrades.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	High	
4.5	Conduct a feasibility study on the advantages and disadvantages of active traffic management in the context of the City of Subiaco.	Active traffic management can help increase peak traffic capacity and minimise disruptions to the road network from events and accidents.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	Medium	\$25k study



4.6	Consult with relevant authorities, car sharing vendors and the general public in regards to the implementation of a car sharing service in the City of Subiaco.	All relevant stakeholders are consulted and any concerns and issues in regards to car sharing can be sorted out.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	\$15k study \$10k p.a. in-kind concession
4.7	In regards to car sharing, conduct an initial trial with a small fleet of cars in key destinations to gather data on usage rates. Promote carpooling as part of this action.	A car sharing service can provide convenient access to a vehicle for those who occasionally drive or only make short trips. To maximise the potential of this service, it should be conducted alongside the driverless car trials.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	Wholly or partially funded by for-profit 3 <sup>rd</sup> party company. May require supplemental funding for study ~\$30k
4.8	Participate in driverless car trials when the technology is available, and integrate this with the proposed car sharing service.	Driverless vehicles have the potential to decrease private vehicle ownership rates.	<ul style="list-style-type: none"> <li>City of Subiaco</li> </ul>	Medium	Wholly or partially funded by for-profit 3 <sup>rd</sup> party company. May require supplemental funding for study ~\$30k
4.9	Continue support and implementation of the Infrastructure Five Year Capital Works Program.	Improves safety for drivers and pedestrians. Improves and maintains the quality of existing roads.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	High	
4.10	Implement the actions in the Laneway Report 2013.	Improves the quality of laneways for both drivers and pedestrians.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	Medium	
4.11	When planning regular road closures for events on Rokeby Road, consider the impact on buses and the future light rail. Closing Rokeby Road will require a significant detour for bus route 97, as buses cannot use nearby narrow streets. It will also affect the future light rail route.	Retains the function of public transport for access to and from events and ensures that public transport modes remain a viable alternative to private vehicles.	<ul style="list-style-type: none"> <li>City of Subiaco</li> <li>Main Roads</li> </ul>	High	

**Table 7-5 Managing Parking**

Reference	Action	How do these actions manage parking?	Responsibility	Priority	
5.1	Review the need for minimum car parking requirements in areas that are within walking or cycling distance of a public transport node. Consider establishing maximum requirements.	This would provide better use of space, and encourages greater use of sustainable transport.	▪ City of Subiaco	Medium	\$50k parking utilisation and demand study
5.2	Investigate options for multi deck car parking facilities.	The possibility of a multi deck car park would provide the area with additional parking spaces. Reduces the need for on street parking, freeing up space for alternate land uses.	▪ City of Subiaco	Medium	\$40k location / needs assessment, should be combined with revision of parking standards
5.3	Improve wayfinding signage for available parking locations within the City of Subiaco.	Better accessibility and wayfinding towards parking areas.	▪ City of Subiaco	High	\$30k study \$200k implementation budget
5.4	Implement and review the Subiaco Parking Strategy 2012-2016, and ensure that the new Parking Strategy reflects the aims of the Integrated Transport Strategy.	Describes the steps and infrastructure requirements to make the transition from existing parking supply and policy frameworks towards a more effective management strategy. Ultimately, by reducing parking supply and increasing pricing, mode shift to sustainable transport is created.	▪ City of Subiaco	High	\$75k implementation review study
5.5	Develop a plan to address the use of cash in lieu funds ensuring that appropriate funding is directed towards non-private car transport to facilitate a mode shift from the car to sustainable transport.	Cash in lieu funds can be used to fund public parking or facilities, infrastructure and services for cyclists, pedestrians and public transport users.	▪ City of Subiaco	Medium	\$20k study

Integrated Transport Strategy 2015-  
2020: Transport Assessment Report

APPENDIX

A

MAIN ROADS WA ROM OUTPUTS

Integrated Transport Strategy 2015-  
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APPENDIX

B

SIDRA ASSESSMENT

## 8 SIDRA Outputs and Mitigation

### 8.1 Harborne Street – Salvado Road (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harborne St S											
1	L	119	2.0	0.136	12.6	LOS B	0.8	5.7	0.41	0.72	44.6
2	T	186	2.0	0.583	7.6	LOS A	4.1	29.0	0.68	0.59	45.7
3	R	160	2.0	0.583	15.5	LOS B	4.1	29.0	0.68	0.84	43.3
Approach		465	2.0	0.583	11.6	LOS B	4.1	29.0	0.61	0.71	44.6
East: Salvado Rd E											
4	L	167	2.0	0.540	24.0	LOS C	2.9	20.5	0.96	0.81	36.1
5	T	107	2.0	0.329	14.9	LOS B	1.7	12.4	0.92	0.71	40.0
6	R	167	2.0	0.626	25.4	LOS C	3.1	21.7	0.99	0.84	35.4
Approach		441	2.0	0.626	22.3	LOS C	3.1	21.7	0.96	0.80	36.7
North: Harborne St N											
7	L	252	2.0	0.288	14.2	LOS B	2.7	18.9	0.63	0.77	43.1
8	T	294	2.0	0.707	9.8	LOS A	7.5	53.6	0.84	0.80	43.3
9	R	188	2.0	0.707	17.6	LOS B	7.5	53.6	0.84	0.93	42.0
Approach		734	2.0	0.707	13.3	LOS B	7.5	53.6	0.77	0.83	42.9
West: Salvado Rd W											
10	L	104	2.0	0.337	23.2	LOS C	1.7	12.1	0.92	0.77	36.6
11	T	90	2.0	0.277	14.7	LOS B	1.4	10.3	0.91	0.70	40.2
12	R	105	2.0	0.462	25.4	LOS C	1.9	13.3	0.97	0.76	35.4
Approach		299	2.0	0.462	21.4	LOS C	1.9	13.3	0.93	0.74	37.2
All Vehicles		1939	2.0	0.707	16.2	LOS B	7.5	53.6	0.80	0.78	40.7

### 8.2 Harborne Street – Salvado Road (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harborne St S											
1	L	97	2.0	0.135	14.0	LOS B	0.7	5.3	0.53	0.73	43.4
2	T	253	2.0	0.637	8.0	LOS A	4.5	31.9	0.75	0.67	45.4
3	R	135	2.0	0.637	15.9	LOS B	4.5	31.9	0.75	0.88	43.4
Approach		485	2.0	0.637	11.4	LOS B	4.5	31.9	0.71	0.74	44.4
East: Salvado Rd E											
4	L	131	2.0	0.363	20.4	LOS C	1.8	12.9	0.90	0.77	38.4
5	T	74	2.0	0.195	11.6	LOS B	1.0	6.9	0.87	0.66	42.7
6	R	192	2.0	0.651	23.3	LOS C	3.1	21.8	0.99	0.86	36.6
Approach		397	2.0	0.651	20.2	LOS C	3.1	21.8	0.94	0.79	38.2
North: Harborne St N											
7	L	140	2.0	0.194	14.8	LOS B	1.4	9.9	0.68	0.76	42.6
8	T	180	2.0	0.493	7.8	LOS A	3.3	23.5	0.79	0.67	45.4
9	R	101	2.0	0.493	15.6	LOS B	3.3	23.5	0.79	0.83	43.6
Approach		421	2.0	0.493	12.0	LOS B	3.3	23.5	0.76	0.74	44.0
West: Salvado Rd W											
10	L	149	2.0	0.413	20.6	LOS C	2.1	14.8	0.91	0.78	38.3
11	T	79	2.0	0.208	11.7	LOS B	1.0	7.4	0.87	0.66	42.7
12	R	101	2.0	0.329	21.1	LOS C	1.4	10.2	0.92	0.76	38.1
Approach		329	2.0	0.413	18.6	LOS B	2.1	14.8	0.90	0.75	39.2
All Vehicles		1632	2.0	0.651	15.1	LOS B	4.5	31.9	0.82	0.75	41.6



### 8.3 Aberdare Road – Smyth Road (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
							Vehicles veh	Distance m			
South: Smyth Rd S											
1	L	328	2.0	0.584	13.1	LOS B	5.6	39.5	0.89	0.95	44.0
3	R	107	2.0	0.584	17.1	LOS B	5.6	39.5	0.89	0.97	41.7
Approach		435	2.0	0.584	14.1	LOS B	5.6	39.5	0.89	0.96	43.4
East: Aberdare Rd E											
4	L	132	2.0	0.866	21.8	LOS C	14.3	101.7	1.00	1.29	37.9
5	T	520	2.0	0.866	20.8	LOS C	14.3	101.7	1.00	1.29	38.0
Approach		652	2.0	0.866	21.0	LOS C	14.3	101.7	1.00	1.29	38.0
West: Aberdare Rd W											
11	T	756	2.0	0.980	10.9	LOS B	36.9	263.0	1.00	0.60	44.9
12	R	593	2.0	0.980	15.8	LOS B	36.9	263.0	1.00	0.60	43.0
Approach		1349	2.0	0.980	13.1	LOS B	36.9	263.0	1.00	0.60	44.0
All Vehicles		2436	2.0	0.980	15.4	LOS B	36.9	263.0	0.98	0.85	42.1

### 8.4 Aberdare Road – Smyth Road (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
							Vehicles veh	Distance m			
South: Smyth Rd S											
1	L	348	2.0	0.845	40.5	LOS D	13.2	93.8	1.00	1.43	28.3
3	R	45	2.0	0.845	44.4	LOS D	13.2	93.8	1.00	1.43	27.7
Approach		393	2.0	0.845	40.9	LOS D	13.2	93.8	1.00	1.43	28.2
East: Aberdare Rd E											
4	L	81	2.0	0.833	12.1	LOS B	12.4	88.1	0.82	0.83	45.7
5	T	921	2.0	0.833	11.1	LOS B	12.4	88.1	0.82	0.81	46.0
Approach		1002	2.0	0.833	11.2	LOS B	12.4	88.1	0.82	0.81	45.9
West: Aberdare Rd W											
11	T	367	2.0	0.421	6.3	LOS A	3.1	22.1	0.22	0.47	49.8
12	R	254	2.0	0.421	11.2	LOS B	3.1	22.1	0.22	0.74	46.0
Approach		621	2.0	0.421	8.3	LOS A	3.1	22.1	0.22	0.58	48.2
All Vehicles		2016	2.0	0.845	16.1	LOS B	13.2	93.8	0.67	0.86	41.5

### 8.5 Bagot Road/Kings Park Road – Thomas Street (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
							Vehicles veh	Distance m			
South East: Kings Park Rd E											
21	L	1171	2.0	0.611	7.7	X	X	X	X	0.60	49.6
22	T	154	2.0	0.281	29.4	LOS C	3.4	24.3	0.60	0.65	33.2
23	R	499	2.0	1.514	1019.0	LOS F	179.4	1277.0	1.00	2.84	2.1
Approach		1824	2.0	1.514	286.2	LOS F	179.4	1277.0	0.32	1.22	6.8
North East: Thomas St N											
24	L	406	2.0	1.552	1062.0	LOS F	310.6	2211.6	1.00	3.27	2.0
25	T	1326	2.0	1.552	1068.0	LOS F	320.7	2283.4	1.00	4.00	2.0
Approach		1732	2.0	1.552	1066.6	LOS F	320.7	2283.4	1.00	3.83	2.0
West: Bagot Rd W											
10	L	204	2.0	1.073	70.0	LOS E	22.5	160.0	1.00	0.85	20.6
11	T	125	2.0	1.073	67.5	LOS E	22.5	160.0	1.00	0.85	20.8
12	R	479	2.0	1.551	1087.7	LOS F	179.5	1278.1	1.00	2.87	2.0
Approach		808	2.0	1.551	672.9	LOS F	179.5	1278.1	1.00	2.05	3.1
South West: Thomas St S											
30	L	320	2.0	0.752	40.0	LOS D	38.0	270.4	0.88	0.91	29.6

31	T	1035	2.0	0.752	33.5	LOS C	40.0	284.7	0.89	0.81	29.7
32	R	633	2.0	1.469	595.1	LOS F	129.0	918.8	1.00	2.15	3.5
Approach		1988	2.0	1.469	213.3	LOS F	129.0	918.8	0.92	1.25	8.8
All Vehicles		6352	2.0	1.552	525.4	LOS F	320.7	2283.4	0.78	2.05	3.9

## 8.6 Bagot Road/Kings Park Road – Thomas Street (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South East: Kings Park Rd E											
21	L	689	2.0	0.359	7.7	X	X	X	X	0.60	49.7
22	T	253	2.0	0.273	37.7	LOS D	9.6	68.4	0.71	0.70	29.1
23	R	195	2.0	1.000 <sup>3</sup>	82.4	LOS F	14.8	105.2	1.00	0.82	18.4
Approach		1137	2.0	1.000	27.2	LOS C	14.8	105.2	0.33	0.66	34.4
North East: Thomas St N											
24	L	308	2.0	1.085	230.8	LOS F	78.5	558.7	1.00	1.54	8.3
25	T	828	2.0	1.085	240.5	LOS F	88.8	632.3	1.00	1.80	7.8
Approach		1136	2.0	1.085	237.9	LOS F	88.8	632.3	1.00	1.73	7.9
West: Bagot Rd W											
10	L	187	2.0	0.990	65.1	LOS E	20.6	146.9	0.98	0.85	21.6
11	T	119	2.0	0.990	62.6	LOS E	20.6	146.9	0.98	0.85	21.8
12	R	359	2.0	1.075	250.5	LOS F	56.2	400.3	1.00	1.47	7.7
Approach		665	2.0	1.075	164.8	LOS F	56.2	400.3	0.99	1.19	10.9
South West: Thomas St S											
30	L	294	2.0	0.726	35.0	LOS C	39.0	277.8	0.82	0.92	31.8
31	T	1194	2.0	0.726	27.3	LOS C	40.7	289.9	0.82	0.76	32.5
32	R	759	2.0	1.099	195.3	LOS F	76.1	541.6	0.99	1.33	9.6
Approach		2247	2.0	1.099	85.1	LOS F	76.1	541.6	0.88	0.97	17.9
All Vehicles		5185	2.0	1.099	116.1	LOS F	88.8	632.3	0.80	1.10	14.3

## 8.7 Bagot Road/Kings Park Road – Thomas Street Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South East: Kings Park Rd E											
21	L	697	2.0	1.027	148.1	LOS F	45.8	326.3	1.00	1.19	12.0
22	T	628	2.0	1.352	564.9	LOS F	15.2	108.1	1.00	0.20	19.4
23	R	499	2.0	1.090	249.1	LOS F	73.1	520.3	1.00	1.43	7.7
Approach		1824	2.0	1.352	319.3	LOS F	142.6	1015.7	1.00	0.92	10.3
North East: Thomas St N											
24	L	406	2.0	1.160	362.5	LOS F	111.9	796.6	1.00	1.81	5.5
25	T	1326	2.0	1.160	376.7	LOS F	116.3	827.9	1.00	2.26	5.2
Approach		1732	2.0	1.160	373.4	LOS F	116.3	827.9	1.00	2.15	5.3
West: Bagot Rd W											
10	L	204	2.0	0.943	103.7	LOS F	31.5	224.0	1.00	1.09	15.6
11	T	125	2.0	0.943	101.4	LOS F	31.5	224.0	1.00	1.09	15.7
12	R	479	2.0	1.022	223.1	LOS F	52.8	375.7	1.00	1.24	8.6
Approach		808	2.0	1.022	174.1	LOS F	52.8	375.7	1.00	1.18	10.5
South West: Thomas St S											
30	L	320	2.0	0.735	41.8	LOS D	39.3	280.1	0.86	0.93	28.9
31	T	1035	2.0	0.735	34.4	LOS C	41.5	295.3	0.87	0.80	29.3
32	R	633	2.0	0.978	103.6	LOS F	36.1	257.3	1.00	1.03	15.8
Approach		1988	2.0	0.978	57.6	LOS E	41.5	295.3	0.91	0.90	23.0
All Vehicles		6352	2.0	1.352	233.7	LOS F	142.6	1015.7	0.97	1.28	9.5

## 8.8 Bagot Road/Kings Park Road – Thomas Street Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Kings Park Rd E											
21	L	689	2.0	0.677	42.7	LOS D	20.6	146.8	0.77	0.80	27.8
22	T	88	2.0	0.239	63.7	LOS E	5.8	41.2	0.89	0.75	21.9
23	R	360	2.0	0.521	70.6	LOS E	12.6	89.9	0.95	0.82	20.5
Approach		1137	2.0	0.677	53.2	LOS D	20.6	146.8	0.83	0.80	24.6
North East: Thomas St N											
24	L	308	2.0	0.749	48.7	LOS D	22.5	160.0	0.97	0.91	26.0
25	T	828	2.0	0.749	56.9	LOS E	26.0	185.1	0.98	0.86	22.5
Approach		1136	2.0	0.749	54.7	LOS D	26.0	185.1	0.98	0.87	23.3
West: Bagot Rd W											
10	L	187	2.0	0.650	65.0	LOS E	12.6	89.6	0.92	0.81	21.5
11	T	119	2.0	0.621	64.0	LOS E	15.7	111.5	0.94	0.81	21.6
12	R	359	2.0	0.621	69.1	LOS E	17.6	125.1	0.95	0.84	21.0
Approach		665	2.0	0.650	67.0	LOS E	17.6	125.1	0.94	0.82	21.3
South West: Thomas St S											
30	L	294	2.0	0.809	44.2	LOS D	46.7	332.8	0.92	0.92	28.2
31	T	1194	2.0	0.809	36.5	LOS D	48.3	344.0	0.92	0.85	28.4
32	R	759	2.0	1.324	440.6	LOS F	132.0	939.8	1.00	1.85	4.7
Approach		2247	2.0	1.324	174.0	LOS F	132.0	939.8	0.95	1.20	10.4
All Vehicles		5185	2.0	1.324	107.7	LOS F	132.0	939.8	0.93	0.99	15.1

## 8.9 Hamilton Street– Roberts Road (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hamilton St S											
3	R	548	2.0	4.292	5975.5	LOS F	537.0	3823.4	1.00	13.41	0.3
Approach		548	2.0	4.292	5975.5	LOS F	537.0	3823.4	1.00	13.41	0.3
North: Hamilton St N											
7	L	394	2.0	0.980	77.6	LOS F	20.8	147.8	0.99	2.84	18.0
Approach		394	2.0	0.980	77.6	LOS F	20.8	147.8	0.99	2.84	18.0
West: Roberts Rd W											
10	L	344	2.0	0.188	5.6	X	X	X	X	0.53	44.1
11	T	980	2.0	0.400	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
12	R	532	2.0	0.400	7.3	LOS A	0.0	0.0	0.00	0.78	42.5
Approach		1856	2.0	0.400	3.2	NA	0.0	0.0	0.00	0.32	46.5
All Vehicles		2798	2.0	4.292	1183.3	NA	537.0	3823.4	0.34	3.24	1.7

## 8.10 Hamilton Street– Roberts Road (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hamilton St S											
3	R	485	2.0	3.058	3748.1	LOS F	416.9	2968.4	1.00	14.18	0.5
Approach		485	2.0	3.058	3748.1	LOS F	416.9	2968.4	1.00	14.18	0.5
North: Hamilton St N											
7	L	465	2.0	1.366	693.5	LOS F	163.8	1166.5	1.00	11.11	2.9
Approach		465	2.0	1.366	693.5	LOS F	163.8	1166.5	1.00	11.11	2.9
West: Roberts Rd W											
10	L	406	2.0	0.222	5.7	X	X	X	X	0.53	44.1
11	T	1071	2.0	0.378	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
12	R	366	2.0	0.378	7.3	LOS A	0.0	0.0	0.00	0.86	42.5
Approach		1843	2.0	0.378	2.7	NA	0.0	0.0	0.00	0.29	47.0
All Vehicles		2793	2.0	3.058	768.1	NA	416.9	2968.4	0.34	4.50	2.6

## 8.11 Hamilton Street – Roberts Road Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hamilton St S											
3	R	548	2.0	0.833	29.3	LOS C	8.0	57.0	0.97	1.03	29.3
Approach		548	2.0	0.833	29.3	LOS C	8.0	57.0	0.97	1.03	29.3
North: Hamilton St N											
7	L	394	2.0	0.879	31.4	LOS C	10.7	76.4	1.00	1.23	28.7
Approach		394	2.0	0.879	31.4	LOS C	10.7	76.4	1.00	1.23	28.7
West: Roberts Rd W											
10	L	344	2.0	0.188	5.6	X	X	X	X	0.53	44.1
11	T	980	2.0	0.842	16.6	LOS B	17.3	122.8	0.94	1.04	33.8
12	R	532	2.0	0.842	23.5	LOS C	16.8	119.3	0.94	1.04	32.4
Approach		1856	2.0	0.842	16.5	LOS B	17.3	122.8	0.76	0.95	34.9
All Vehicles		2798	2.0	0.879	21.1	LOS C	17.3	122.8	0.84	1.00	32.6

## 8.12 Hamilton Street– Roberts Road Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hamilton St S											
3	R	485	2.0	0.748	29.2	LOS C	8.4	59.8	0.95	0.91	29.3
Approach		485	2.0	0.748	29.2	LOS C	8.4	59.8	0.95	0.91	29.3
North: Hamilton St N											
7	L	465	2.0	0.822	26.6	LOS C	12.9	91.9	0.94	1.04	30.7
Approach		465	2.0	0.822	26.6	LOS C	12.9	91.9	0.94	1.04	30.7
West: Roberts Rd W											
10	L	406	2.0	0.222	5.7	X	X	X	X	0.53	44.1
11	T	1071	2.0	0.727	11.2	LOS B	14.6	104.2	0.83	0.77	37.2
12	R	366	2.0	0.727	18.0	LOS B	14.3	102.0	0.83	0.90	35.7
Approach		1843	2.0	0.727	11.3	LOS B	14.6	104.2	0.65	0.75	38.2
All Vehicles		2793	2.0	0.822	17.0	LOS B	14.6	104.2	0.75	0.82	34.9

## 8.13 Coghlan Road – Barker Road (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Coghlan Rd S											
1	L	150	2.0	0.239	9.5	LOS A	1.6	11.1	0.55	0.34	47.3
2	T	109	2.0	0.239	1.3	LOS A	1.6	11.1	0.55	0.00	48.7
3	R	137	2.0	0.239	9.6	LOS A	1.6	11.1	0.55	0.73	47.3
Approach		396	2.0	0.239	7.3	NA	1.6	11.1	0.55	0.38	47.7
East: Barker Rd E											
4	L	146	2.0	1.114	247.6	LOS F	95.6	680.7	1.00	4.71	7.7
5	T	248	2.0	1.114	247.2	LOS F	95.6	680.7	1.00	4.29	7.7
6	R	179	2.0	1.114	247.6	LOS F	95.6	680.7	1.00	3.81	7.7
Approach		573	2.0	1.114	247.4	LOS F	95.6	680.7	1.00	4.25	7.7
North: Coghlan Rd N											
7	L	143	2.0	0.245	9.8	LOS A	1.6	11.4	0.59	0.30	47.1
8	T	92	2.0	0.245	1.6	LOS A	1.6	11.4	0.59	0.00	48.0
9	R	156	2.0	0.245	9.8	LOS A	1.6	11.4	0.59	0.74	47.1
Approach		391	2.0	0.245	7.9	NA	1.6	11.4	0.59	0.41	47.3
West: Barker Rd W											
10	L	193	2.0	1.044	134.7	LOS F	63.8	454.5	1.00	3.24	12.9
11	T	244	2.0	1.044	134.3	LOS F	63.8	454.5	1.00	3.08	12.9
12	R	158	2.0	1.044	134.6	LOS F	63.8	454.5	1.00	2.81	12.9
Approach		595	2.0	1.044	134.5	LOS F	63.8	454.5	1.00	3.06	12.9

All Vehicles	1955	2.0	1.114	116.5	NA	95.6	680.7	0.83	2.33	14.3
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## 8.14 Coghlan Road – Barker Road (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed	
		veh/h	%	v/c	sec	Vehicles	Distance		per veh	km/h	
South: Coghlan Rd S											
1	L	151	2.0	0.230	9.1	LOS A	1.5	10.4	0.44	0.43	47.8
2	T	148	2.0	0.230	0.8	LOS A	1.5	10.4	0.44	0.00	50.8
3	R	106	2.0	0.230	9.1	LOS A	1.5	10.4	0.44	0.70	47.8
Approach		405	2.0	0.230	6.1	NA	1.5	10.4	0.44	0.35	48.8
East: Barker Rd E											
4	L	71	2.0	0.550	19.5	LOS C	3.5	24.6	0.44	0.89	39.7
5	T	115	2.0	0.550	19.2	LOS C	3.5	24.6	0.44	1.10	39.9
6	R	112	2.0	0.550	19.5	LOS C	3.5	24.6	0.44	1.09	39.7
Approach		298	2.0	0.550	19.4	LOS C	3.5	24.6	0.44	1.05	39.8
North: Coghlan Rd N											
7	L	91	2.0	0.196	9.9	LOS A	1.2	8.7	0.57	0.32	47.2
8	T	81	2.0	0.196	1.7	LOS A	1.2	8.7	0.57	0.00	48.3
9	R	130	2.0	0.196	10.0	LOS A	1.2	8.7	0.57	0.75	47.2
Approach		302	2.0	0.196	7.7	NA	1.2	8.7	0.57	0.42	47.5
West: Barker Rd W											
10	L	207	2.0	0.679	18.9	LOS C	6.7	47.7	0.53	1.01	40.3
11	T	149	2.0	0.679	18.5	LOS C	6.7	47.7	0.53	1.17	40.5
12	R	132	2.0	0.679	18.9	LOS C	6.7	47.7	0.53	1.15	40.3
Approach		488	2.0	0.679	18.8	LOS C	6.7	47.7	0.53	1.10	40.4
All Vehicles		1493	2.0	0.679	13.2	NA	6.7	47.7	0.50	0.75	43.6

## 8.15 Coghlan Road – Barker Road Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed	
		veh/h	%	v/c	sec	Vehicles	Distance		per veh	km/h	
South: Coghlan Rd S											
1	L	150	2.0	0.510	12.5	LOS B	3.9	27.9	0.79	0.92	44.6
2	T	109	2.0	0.510	11.6	LOS B	3.9	27.9	0.79	0.89	44.9
3	R	137	2.0	0.510	16.0	LOS B	3.9	27.9	0.79	0.96	42.4
Approach		396	2.0	0.510	13.5	LOS B	3.9	27.9	0.79	0.92	43.9
East: Barker Rd E											
4	L	146	2.0	0.609	11.5	LOS B	5.3	37.6	0.74	0.86	45.7
5	T	248	2.0	0.609	10.6	LOS B	5.3	37.6	0.74	0.83	46.0
6	R	179	2.0	0.609	15.0	LOS B	5.3	37.6	0.74	0.91	43.3
Approach		573	2.0	0.609	12.2	LOS B	5.3	37.6	0.74	0.86	45.0
North: Coghlan Rd N											
7	L	143	2.0	0.491	11.8	LOS B	3.7	26.1	0.77	0.88	45.2
8	T	92	2.0	0.491	10.9	LOS B	3.7	26.1	0.77	0.85	45.5
9	R	156	2.0	0.491	15.3	LOS B	3.7	26.1	0.77	0.92	42.9
Approach		391	2.0	0.491	13.0	LOS B	3.7	26.1	0.77	0.89	44.3
West: Barker Rd W											
10	L	193	2.0	0.679	14.0	LOS B	7.5	53.5	0.86	0.95	43.4
11	T	244	2.0	0.679	13.2	LOS B	7.5	53.5	0.86	0.94	43.6
12	R	158	2.0	0.679	17.6	LOS B	7.5	53.5	0.86	0.98	41.3
Approach		595	2.0	0.679	14.6	LOS B	7.5	53.5	0.86	0.95	42.9
All Vehicles		1955	2.0	0.679	13.4	LOS B	7.5	53.5	0.79	0.91	44.0



## 8.16 Coghlan Road – Barker Road Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Coghlan Rd S											
1	L	151	2.0	0.419	9.7	LOS A	2.6	18.4	0.59	0.74	47.1
2	T	148	2.0	0.419	8.8	LOS A	2.6	18.4	0.59	0.69	47.1
3	R	106	2.0	0.419	13.2	LOS B	2.6	18.4	0.59	0.82	44.7
Approach		405	2.0	0.419	10.3	LOS B	2.6	18.4	0.59	0.74	46.4
East: Barker Rd E											
4	L	71	2.0	0.302	9.3	LOS A	1.6	11.7	0.51	0.71	47.4
5	T	115	2.0	0.302	8.3	LOS A	1.6	11.7	0.51	0.65	47.5
6	R	112	2.0	0.302	12.8	LOS B	1.6	11.7	0.51	0.80	45.1
Approach		298	2.0	0.302	10.2	LOS B	1.6	11.7	0.51	0.72	46.5
North: Coghlan Rd N											
7	L	91	2.0	0.326	9.7	LOS A	1.9	13.7	0.59	0.73	47.0
8	T	81	2.0	0.326	8.8	LOS A	1.9	13.7	0.59	0.69	47.0
9	R	130	2.0	0.326	13.2	LOS B	1.9	13.7	0.59	0.81	44.7
Approach		302	2.0	0.326	10.9	LOS B	1.9	13.7	0.59	0.75	45.9
West: Barker Rd W											
10	L	207	2.0	0.527	10.8	LOS B	4.1	29.4	0.71	0.79	46.3
11	T	149	2.0	0.527	9.9	LOS A	4.1	29.4	0.71	0.76	46.4
12	R	132	2.0	0.527	14.4	LOS B	4.1	29.4	0.71	0.85	43.8
Approach		488	2.0	0.527	11.5	LOS B	4.1	29.4	0.71	0.80	45.6
All Vehicles		1493	2.0	0.527	10.8	LOS B	4.1	29.4	0.61	0.76	46.1

## 8.17 Railway Street/Railway Parade – Thomas Street (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South East: Railway St E											
21	L	366	2.0	0.666	57.4	LOS E	23.3	166.1	0.94	0.86	23.2
22	T	206	2.0	0.369	44.1	LOS D	11.8	83.8	0.84	0.70	25.6
23	R	89	2.0	1.040	189.4	LOS F	11.0	78.3	1.00	1.30	9.8
Approach		661	2.0	1.040	71.0	LOS E	23.3	166.1	0.91	0.87	20.0
North East: Loftus St N											
24	L	459	2.0	0.502	9.9	LOS A	6.3	44.9	0.26	0.67	47.2
25	T	3230	2.0	1.339	669.8	LOS F	302.6	2154.2	1.00	3.21	3.1
26	R	187	2.0	1.000 <sup>3</sup>	46.1	LOS D	8.1	57.4	1.00	0.82	26.6
Approach		3876	2.0	1.339	561.5	LOS F	302.6	2154.2	0.91	2.79	3.6
North West: Railway Pde W											
27	L	368	2.0	1.173	410.3	LOS F	96.8	689.1	1.00	1.90	4.9
28	T	611	2.0	1.321	622.9	LOS F	96.8	689.1	1.00	0.29	4.9
29	R	80	2.0	1.000 <sup>3</sup>	76.7	LOS E	5.7	40.8	0.98	0.78	19.5
Approach		1059	2.0	1.321	507.8	LOS F	146.1	1040.4	1.00	0.89	5.5
South West: Thomas St S											
30	L	495	2.0	1.034	177.1	LOS F	81.6	581.0	1.00	1.32	10.2
31	T	1710	2.0	1.034	162.7	LOS F	105.1	748.2	1.00	1.52	10.7
32	R	317	2.0	1.107	220.2	LOS F	21.7	154.8	1.00	1.36	8.6
Approach		2522	2.0	1.107	172.7	LOS F	105.1	748.2	1.00	1.46	10.3
All Vehicles		8118	2.0	1.339	393.8	LOS F	302.6	2154.2	0.95	1.97	5.3

## 8.18 Railway Street/Railway Parade – Thomas St (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South East: Railway St E											
21	L	250	2.0	0.569	62.3	LOS E	16.1	114.7	0.94	0.83	22.1
22	T	233	2.0	0.523	53.3	LOS D	14.8	105.4	0.92	0.78	22.9
23	R	99	2.0	1.014	156.0	LOS F	10.9	77.9	1.00	1.25	11.5
Approach		582	2.0	1.014	74.6	LOS E	16.1	114.7	0.94	0.88	19.3
North East: Loftus St N											
24	L	288	2.0	0.298	9.3	LOS A	3.2	22.5	0.21	0.66	47.9
25	T	1557	2.0	0.565	20.3	LOS C	21.3	151.7	0.77	0.68	36.5
26	R	146	2.0	1.000 <sup>3</sup>	67.5	LOS E	8.0	57.1	1.00	0.88	21.2
Approach		1991	2.0	1.000	22.2	LOS C	21.3	151.7	0.70	0.69	35.8
North West: Railway Pde W											
27	L	338	2.0	1.259	563.0	LOS F	85.2	606.5	1.00	1.97	3.6
28	T	307	2.0	1.130	329.2	LOS F	56.0	398.4	1.00	1.86	5.9
29	R	80	2.0	1.000 <sup>3</sup>	77.0	LOS E	5.7	40.8	0.98	0.78	19.4
Approach		725	2.0	1.259	410.3	LOS F	85.2	606.5	1.00	1.79	4.9
South West: Thomas St S											
30	L	654	2.0	1.219	478.6	LOS F	242.2	1724.4	1.00	2.23	4.2
31	T	2792	2.0	1.219	466.0	LOS F	291.5	2075.3	1.00	2.66	4.3
32	R	317	2.0	1.108	221.0	LOS F	21.8	155.0	1.00	1.36	8.5
Approach		3763	2.0	1.219	447.5	LOS F	291.5	2075.3	1.00	2.48	4.5
All Vehicles		7061	2.0	1.259	293.0	LOS F	291.5	2075.3	0.91	1.77	6.6

## 8.19 Aberdare Road – Thomas Street/Winthrop Avenue (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Winthrop Ave S											
1	L	192	2.0	0.105	9.4	X	X	X	X	0.65	54.6
2	T	958	2.0	0.982	113.2	LOS F	50.0	356.1	1.00	1.28	14.8
Approach		1150	2.0	0.982	95.9	LOS F	50.0	356.1	0.83	1.18	17.0
North: Thomas St N											
8	T	1430	2.0	0.425	3.1	LOS A	10.2	72.8	0.22	0.28	61.6
9	R	1057	2.0	0.995	106.2	LOS F	117.4	835.9	1.00	1.13	16.0
Approach		2487	2.0	0.995	46.9	LOS D	117.4	835.9	0.55	0.64	27.7
West: Aberdare Rd W											
10	L	598	2.0	0.300	9.5	X	X	X	X	0.65	54.6
12	R	162	2.0	0.948	109.5	LOS F	7.2	51.2	1.00	1.04	15.6
Approach		760	2.0	0.948	30.8	LOS C	7.2	51.2	0.21	0.73	36.1
All Vehicles		4397	2.0	0.995	57.0	LOS E	117.4	835.9	0.57	0.80	24.7

## 8.20 Aberdare Road – Thomas St/Winthrop Avenue (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Winthrop Ave S											
1	L	135	2.0	0.074	9.4	X	X	X	X	0.65	54.6
2	T	1141	2.0	0.847	34.1	LOS C	23.9	170.3	0.99	1.00	32.2
Approach		1276	2.0	0.847	31.5	LOS C	23.9	170.3	0.89	0.96	33.7
North: Thomas St N											
8	T	657	2.0	0.220	3.7	LOS A	3.4	24.4	0.29	0.32	60.4
9	R	539	2.0	0.841	41.4	LOS D	22.5	160.3	0.99	0.96	30.0
Approach		1196	2.0	0.841	20.7	LOS C	22.5	160.3	0.60	0.61	41.4
West: Aberdare Rd W											
10	L	912	2.0	0.458	9.5	X	X	X	X	0.65	54.5
12	R	132	2.0	0.481	50.0	LOS D	2.7	19.0	1.00	0.75	26.9
Approach		1044	2.0	0.481	14.6	LOS B	2.7	19.0	0.13	0.66	48.5
All Vehicles		3516	2.0	0.847	22.8	LOS C	23.9	170.3	0.56	0.75	39.9

## 8.21 Aberdare Road – Thomas Street/Winthrop Avenue Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Winthrop Ave S											
1	L	192	2.0	0.228	16.2	LOS B	3.5	25.1	0.54	0.73	45.4
2	T	958	2.0	0.829	35.2	LOS D	19.8	141.2	1.00	0.98	31.6
Approach		1150	2.0	0.829	32.0	LOS C	19.8	141.2	0.92	0.94	33.3
North: Thomas St N											
8	T	1430	2.0	0.833	11.8	LOS B	32.7	232.6	0.73	0.73	47.9
9	R	1057	2.0	0.833	37.5	LOS D	25.3	180.4	0.96	0.96	31.9
Approach		2487	2.0	0.833	22.7	LOS C	32.7	232.6	0.83	0.83	39.4
West: Aberdare Rd W											
10	L	598	2.0	0.300	7.6	X	X	X	X	0.60	49.7
12	R	162	2.0	0.590	47.1	LOS D	3.2	22.8	0.97	0.77	27.4
Approach		760	2.0	0.590	16.1	LOS B	3.2	22.8	0.21	0.64	42.1
All Vehicles		4397	2.0	0.833	24.0	LOS C	32.7	232.6	0.74	0.82	38.1

## 8.22 Aberdare Road – Thomas Street/Winthrop Avenue Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Winthrop Ave S											
1	L	135	2.0	0.118	11.0	LOS B	1.1	7.6	0.37	0.69	50.8
2	T	1141	2.0	0.741	19.5	LOS B	15.3	108.9	0.91	0.85	41.1
Approach		1276	2.0	0.741	18.6	LOS B	15.3	108.9	0.86	0.83	41.9
North: Thomas St N											
8	T	657	2.0	0.488	5.6	LOS A	8.8	62.3	0.49	0.49	56.9
9	R	539	2.0	0.736	36.0	LOS D	8.2	58.4	0.99	0.90	32.4
Approach		1196	2.0	0.736	19.3	LOS B	8.8	62.3	0.72	0.68	42.3
West: Aberdare Rd W											
10	L	912	2.0	0.458	7.7	X	X	X	X	0.60	49.7
12	R	132	2.0	0.360	34.7	LOS C	1.8	12.8	0.90	0.74	32.1
Approach		1044	2.0	0.458	11.1	LOS B	1.8	12.8	0.11	0.62	46.4

All Vehicles	3516	2.0	0.741	16.6	LOS B	15.3	108.9	0.59	0.72	43.3
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### 8.23 Winthrop Avenue – Monash Avenue (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Vehicles					Distance				
		veh/h		%	v/c		veh	m		per veh	km/h
South: Winthrop Ave S											
1	L	190	2.0	0.883	35.8	LOS D	17.9	127.4	1.00	1.14	31.5
2	T	974	2.0	0.883	27.4	LOS C	18.1	129.2	1.00	1.14	32.1
Approach		1164	2.0	0.883	28.8	LOS C	18.1	129.2	1.00	1.14	32.0
North: Winthrop Ave N											
8	T	1303	2.0	0.529	5.3	LOS A	8.7	62.2	0.58	0.52	49.9
9	R	289	2.0	0.877	38.7	LOS D	8.8	62.8	1.00	1.11	29.2
Approach		1592	2.0	0.877	11.4	LOS B	8.8	62.8	0.66	0.63	44.2
West: Monash Ave W											
10	L	177	2.0	0.375	18.5	LOS B	2.8	20.1	0.68	0.77	39.8
12	R	156	2.0	0.710	33.9	LOS C	4.2	29.6	1.00	0.88	31.2
Approach		333	2.0	0.710	25.7	LOS C	4.2	29.6	0.83	0.82	35.2
All Vehicles		3089	2.0	0.883	19.5	LOS B	18.1	129.2	0.81	0.84	37.7

### 8.24 Winthrop Avenue – Monash Avenue (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Winthrop Ave S											
1	L	130	2.0	0.900	38.7	LOS D	18.1	129.2	1.00	1.19	30.4
2	T	989	2.0	0.900	30.4	LOS C	18.3	130.4	1.00	1.19	30.8
Approach		1119	2.0	0.900	31.4	LOS C	18.3	130.4	1.00	1.19	30.8
North: Winthrop Ave N											
8	T	704	2.0	0.327	6.4	LOS A	4.7	33.3	0.57	0.49	48.7
9	R	85	2.0	0.387	31.5	LOS C	2.1	14.8	0.96	0.76	32.3
Approach		789	2.0	0.387	9.1	LOS A	4.7	33.3	0.62	0.52	46.1
West: Monash Ave W											
10	L	287	2.0	0.594	18.6	LOS B	4.8	34.0	0.70	0.79	39.7
12	R	309	2.0	0.844	35.4	LOS D	8.9	63.6	1.00	1.04	30.6
Approach		596	2.0	0.844	27.3	LOS C	8.9	63.6	0.86	0.92	34.4
All Vehicles		2504	2.0	0.900	23.4	LOS C	18.3	130.4	0.85	0.91	35.4

### 8.25 Hackett Drive – Mounts Bay Road (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV Deg.	Satn	Average Delay	Level of Service	95% Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hackett Dr S											
1	L	307	2.0	1.000 <sup>3</sup>	46.6	LOS D	13.8	97.9	1.00	0.85	26.5
3	R	1854	2.0	1.266	563.9	LOS F	242.0	1723.2	1.00	2.30	3.7
Approach		2161	2.0	1.266	490.5	LOS F	242.0	1723.2	1.00	2.10	4.2
East: Mounts Bay Rd E											
4	L	1216	2.0	1.000 <sup>3</sup>	12.7	LOS B	29.9	212.7	0.70	0.82	44.4
5	T	1562	2.0	1.217	472.3	LOS F	187.1	1332.2	1.00	2.52	4.3
Approach		2778	2.0	1.217	271.1	LOS F	187.1	1332.2	0.87	1.78	7.1
West: Mounts Bay Rd W											
11	T	2148	2.0	1.097	252.9	LOS F	186.6	1328.5	1.00	1.79	7.4
12	R	404	2.0	1.111	255.0	LOS F	27.5	195.5	1.00	1.47	7.5
Approach		2552	2.0	1.111	253.3	LOS F	186.6	1328.5	1.00	1.74	7.4
All Vehicles		7491	2.0	1.266	328.3	LOS F	242.0	1723.2	0.95	1.86	6.0

## 8.26 Hackett Drive – Mounts Bay Road (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hackett Dr S											
1	L	336	2.0	1.000 <sup>3</sup>	42.6	LOS D	13.8	97.9	1.00	0.86	27.9
3	R	1795	2.0	1.149	356.1	LOS F	179.3	1276.7	1.00	1.83	5.6
Approach		2131	2.0	1.149	306.6	LOS F	179.3	1276.7	1.00	1.68	6.4
East: Mounts Bay Rd E											
4	L	943	2.0	0.821	11.3	LOS B	19.1	136.0	0.43	0.73	45.8
5	T	1278	2.0	1.132	325.5	LOS F	119.5	851.1	1.00	2.23	6.0
Approach		2221	2.0	1.132	192.1	LOS F	119.5	851.1	0.76	1.60	9.5
West: Mounts Bay Rd W											
11	T	1483	2.0	0.783	33.2	LOS C	44.2	314.7	0.89	0.82	29.9
12	R	468	2.0	1.073	196.5	LOS F	27.5	195.8	1.00	1.41	9.4
Approach		1951	2.0	1.073	72.4	LOS E	44.2	314.7	0.92	0.96	19.6
All Vehicles		6303	2.0	1.149	193.8	LOS F	179.3	1276.7	0.89	1.43	9.5

## 8.27 Hackett Drive – Mounts Bay Road Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hackett Dr S											
1	L	794	2.0	0.434	7.7	X	X	X	X	0.60	49.7
3	R	1367	2.0	0.894	79.2	LOS E	38.3	272.7	1.00	0.98	19.1
Approach		2161	2.0	0.894	52.9	LOS D	38.3	272.7	0.63	0.84	24.7
East: Mounts Bay Rd E											
4	L	1821	2.0	0.995	13.2	X	X	X	X	0.52	43.6
5	T	957	2.0	0.818	69.4	LOS E	24.8	176.3	1.00	0.93	20.0
Approach		2778	2.0	0.995	32.6	LOS C	24.8	176.3	0.34	0.66	30.7
West: Mounts Bay Rd W											
11	T	1211	2.0	0.325	13.1	LOS B	13.6	96.6	0.48	0.43	42.6
12	R	1341	2.0	0.998	38.0	LOS D	28.3	201.3	1.00	0.91	29.6
Approach		2552	2.0	0.998	26.2	LOS C	28.3	201.3	0.75	0.68	34.6
All Vehicles		7491	2.0	0.998	36.3	LOS D	38.3	272.7	0.57	0.72	29.7

## 8.28 Hackett Drive – Mounts Bay Road Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hackett Dr S											
1	L	763	2.0	0.417	7.7	X	X	X	X	0.60	49.7
3	R	1368	2.0	0.736	48.1	LOS D	25.4	181.0	0.94	0.86	26.1
Approach		2131	2.0	0.736	33.6	LOS C	25.4	181.0	0.61	0.77	31.5
East: Mounts Bay Rd E											
4	L	943	2.0	0.515	7.7	X	X	X	X	0.60	49.7
5	T	1278	2.0	0.799	49.9	LOS D	26.2	186.6	0.99	0.92	24.3
Approach		2221	2.0	0.799	32.0	LOS C	26.2	186.6	0.57	0.78	31.1
West: Mounts Bay Rd W											
11	T	1381	2.0	0.420	16.7	LOS B	16.2	115.4	0.61	0.54	39.5
12	R	570	2.0	0.778	38.3	LOS D	10.3	73.5	1.00	0.88	29.5
Approach		1951	2.0	0.778	23.0	LOS C	16.2	115.4	0.72	0.64	35.9
All Vehicles		6303	2.0	0.799	29.8	LOS C	26.2	186.6	0.63	0.73	32.6



## 8.29 Rokeby Road – Barker Road (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rokeby Rd S											
1	L	88	2.0	0.214	6.0	LOS A	1.3	9.3	0.53	0.27	35.5
2	T	97	2.0	0.214	1.5	LOS A	1.3	9.3	0.53	0.00	36.0
3	R	150	2.0	0.214	5.9	LOS A	1.3	9.3	0.53	0.65	35.5
Approach		335	2.0	0.214	4.6	NA	1.3	9.3	0.53	0.36	35.6
East: Barker Rd E											
4	L	187	2.0	0.420	9.4	LOS A	0.8	5.5	0.42	0.87	34.2
5	T	176	2.0	1.003	93.7	LOS F	25.6	182.0	1.00	3.83	14.0
6	R	193	2.0	1.003	93.9	LOS F	25.6	182.0	1.00	3.45	14.0
Approach		556	2.0	1.003	65.4	LOS F	25.6	182.0	0.81	2.70	17.5
North: Rokeby Rd N											
7	L	210	2.0	0.263	5.3	LOS A	1.7	12.1	0.46	0.31	35.7
8	T	131	2.0	0.263	0.8	LOS A	1.7	12.1	0.46	0.00	36.5
9	R	123	2.0	0.263	5.2	LOS A	1.7	12.1	0.46	0.57	35.7
Approach		464	2.0	0.263	4.0	NA	1.7	12.1	0.46	0.29	35.9
West: Barker Rd W											
10	L	151	2.0	0.320	8.7	LOS A	0.5	3.6	0.38	0.82	34.6
11	T	235	2.0	0.932	45.9	LOS E	14.0	99.6	0.96	2.49	21.2
12	R	146	2.0	0.932	46.2	LOS E	14.0	99.6	0.96	2.37	21.2
Approach		532	2.0	0.932	35.4	LOS E	14.0	99.6	0.79	1.98	23.8
All Vehicles		1887	2.0	1.003	31.1	NA	25.6	182.0	0.67	1.49	24.7

## 8.30 Rokeby Road – Barker Road (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV Deg. Satn %	Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rokeby Rd S											
1	L	122	2.0	0.238	5.8	LOS A	1.5	10.8	0.52	0.27	35.5
2	T	125	2.0	0.238	1.3	LOS A	1.5	10.8	0.52	0.00	36.0
3	R	145	2.0	0.238	5.7	LOS A	1.5	10.8	0.52	0.64	35.5
Approach		392	2.0	0.238	4.3	NA	1.5	10.8	0.52	0.32	35.7
East: Barker Rd E											
4	L	78	2.0	0.195	8.8	LOS A	0.3	2.1	0.31	0.88	34.4
5	T	144	2.0	1.217	443.3	LOS F	74.6	531.1	1.00	7.29	4.0
6	R	147	2.0	1.217	443.6	LOS F	74.6	531.1	1.00	6.86	4.0
Approach		369	2.0	1.217	351.6	LOS F	74.6	531.1	0.85	5.77	5.0
North: Rokeby Rd N											
7	L	205	2.0	0.281	5.6	LOS A	1.8	13.1	0.54	0.26	35.4
8	T	94	2.0	0.281	1.1	LOS A	1.8	13.1	0.54	0.00	35.9
9	R	172	2.0	0.281	5.6	LOS A	1.8	13.1	0.54	0.61	35.4
Approach		471	2.0	0.281	4.7	NA	1.8	13.1	0.54	0.33	35.5
West: Barker Rd W											
10	L	119	2.0	0.260	8.6	LOS A	0.4	2.9	0.30	0.87	34.5
11	T	138	2.0	0.491	18.1	LOS C	2.3	16.6	0.76	1.15	30.0
12	R	63	2.0	0.491	18.4	LOS C	2.3	16.6	0.76	1.15	29.9
Approach		320	2.0	0.491	14.6	LOS B	2.3	16.6	0.59	1.05	31.5
All Vehicles		1552	2.0	1.217	89.1	NA	74.6	531.1	0.62	1.77	14.3

### 8.31 Rokeby Road – Barker Road Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Rokeby Rd S											
1	L	88	2.0	0.233	15.3	LOS B	1.3	9.3	0.85	0.74	30.7
2	T	97	2.0	0.722	14.4	LOS B	3.8	27.2	0.96	0.91	29.4
3	R	150	2.0	0.722	19.3	LOS B	3.8	27.2	0.98	0.97	29.1
Approach		335	2.0	0.722	16.8	LOS B	3.8	27.2	0.94	0.89	29.6
East: Barker Rd E											
4	L	187	2.0	0.520	13.0	LOS B	4.4	31.4	0.83	0.80	32.1
5	T	176	2.0	0.520	8.5	LOS A	4.4	31.4	0.83	0.70	32.5
6	R	193	2.0	0.646	17.3	LOS B	2.9	20.4	0.92	0.88	29.7
Approach		556	2.0	0.646	13.1	LOS B	4.4	31.4	0.86	0.80	31.3
North: Rokeby Rd N											
7	L	210	2.0	0.479	16.1	LOS B	2.9	20.5	0.91	0.78	30.2
8	T	131	2.0	0.708	14.1	LOS B	4.1	29.0	0.97	0.94	29.6
9	R	123	2.0	0.708	18.3	LOS B	4.1	29.0	0.97	0.96	29.6
Approach		464	2.0	0.708	16.1	LOS B	4.1	29.0	0.94	0.87	29.9
West: Barker Rd W											
10	L	151	2.0	0.552	13.1	LOS B	4.8	33.9	0.84	0.81	32.2
11	T	235	2.0	0.552	8.6	LOS A	4.8	33.9	0.84	0.71	32.5
12	R	146	2.0	0.482	15.9	LOS B	2.0	14.0	0.88	0.76	30.3
Approach		532	2.0	0.552	11.9	LOS B	4.8	33.9	0.85	0.75	31.8
All Vehicles		1887	2.0	0.722	14.1	LOS B	4.8	33.9	0.89	0.82	30.8

### 8.32 Rokeby Road – Barker Road Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Rokeby Rd S											
1	L	122	2.0	0.661	14.6	LOS B	6.5	46.6	0.82	0.87	31.2
2	T	125	2.0	0.661	10.1	LOS B	6.5	46.6	0.82	0.76	31.6
3	R	145	2.0	0.661	14.6	LOS B	6.5	46.6	0.82	0.86	31.2
Approach		392	2.0	0.661	13.2	LOS B	6.5	46.6	0.82	0.83	31.3
East: Barker Rd E											
4	L	78	2.0	0.514	20.1	LOS C	4.0	28.8	0.92	0.80	29.0
5	T	144	2.0	0.514	15.6	LOS B	4.0	28.8	0.92	0.75	29.1
6	R	147	2.0	0.642	25.2	LOS C	3.1	22.1	1.00	0.87	26.5
Approach		369	2.0	0.642	20.4	LOS C	4.0	28.8	0.95	0.81	28.0
North: Rokeby Rd N											
7	L	205	2.0	0.741	16.9	LOS B	8.9	63.5	0.87	0.94	30.0
8	T	94	2.0	0.741	12.4	LOS B	8.9	63.5	0.87	0.87	30.3
9	R	172	2.0	0.741	16.8	LOS B	8.9	63.5	0.87	0.94	30.0
Approach		471	2.0	0.741	16.0	LOS B	8.9	63.5	0.87	0.93	30.1
West: Barker Rd W											
10	L	119	2.0	0.601	20.8	LOS C	4.9	34.7	0.95	0.84	28.6
11	T	138	2.0	0.601	16.3	LOS B	4.9	34.7	0.95	0.81	28.7
12	R	63	2.0	0.250	23.2	LOS C	1.2	8.6	0.94	0.73	27.3
Approach		320	2.0	0.601	19.3	LOS B	4.9	34.7	0.94	0.81	28.4
All Vehicles		1552	2.0	0.741	17.0	LOS B	8.9	63.5	0.89	0.85	29.5

### 8.33 Haydn Bunton Drive – Salvado Road/Railway Parade (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Haydn Bunton Dr S											
1	L	106	2.0	0.116	15.4	LOS B	1.4	9.8	0.56	0.74	42.1
3	R	419	2.0	0.880	37.6	LOS D	13.0	92.3	1.00	1.08	29.5
Approach		525	2.0	0.880	33.1	LOS C	13.0	92.3	0.91	1.01	31.4
East: Railway Pde E											
4	L	967	2.0	0.828	21.2	LOS C	22.7	161.5	0.83	0.94	37.9
5	T	416	2.0	0.828	24.7	LOS C	22.7	161.5	1.00	1.02	33.8
Approach		1383	2.0	0.828	22.2	LOS C	22.7	161.5	0.88	0.96	36.6
West: Salvado Rd W											
11	T	330	2.0	0.343	8.2	LOS A	4.9	35.1	0.64	0.55	46.5
12	R	193	2.0	0.439	32.0	LOS C	2.4	16.9	0.97	0.77	31.9
Approach		523	2.0	0.439	17.0	LOS B	4.9	35.1	0.76	0.63	39.8
All Vehicles		2431	2.0	0.880	23.4	LOS C	22.7	161.5	0.86	0.90	35.9

### 8.34 Haydn Bunton Drive – Salvado Road/Railway Parade (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Haydn Bunton Dr S											
1	L	127	2.0	0.095	11.2	LOS B	1.2	8.9	0.31	0.71	45.9
3	R	846	2.0	0.829	26.9	LOS C	27.5	195.8	0.89	0.93	34.5
Approach		973	2.0	0.829	24.9	LOS C	27.5	195.8	0.81	0.90	35.7
East: Railway Pde E											
4	L	248	2.0	0.851	45.2	LOS D	12.5	88.8	1.00	1.03	27.0
5	T	232	2.0	0.851	39.9	LOS D	12.5	88.8	1.00	1.01	27.0
Approach		480	2.0	0.851	42.7	LOS D	12.5	88.8	1.00	1.02	27.0
West: Salvado Rd W											
11	T	386	2.0	0.376	22.8	LOS C	5.6	39.7	0.86	0.70	35.1
12	R	61	2.0	0.376	42.9	LOS D	5.4	38.6	0.98	0.75	27.6
Approach		447	2.0	0.376	25.5	LOS C	5.6	39.7	0.87	0.71	33.8
All Vehicles		1900	2.0	0.851	29.5	LOS C	27.5	195.8	0.87	0.89	32.6

### 8.35 Hamilton Street/Kerr Street – Railway Parade (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hamilton St S											
1	L	537	0.0	1.498	926.2	LOS F	230.9	1616.2	1.00	12.10	2.3
Approach		537	0.0	1.498	926.2	LOS F	230.9	1616.2	1.00	12.10	2.3
East: Railway Pde E											
4	L	446	0.0	0.552	8.2	LOS A	0.0	0.0	0.00	0.85	49.0
5	T	600	2.0	0.552	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1046	1.1	0.552	3.5	NA	0.0	0.0	0.00	0.36	54.7
North: Kerr St N											
7	L	566	0.0	0.946	41.1	LOS E	20.9	146.0	0.95	2.25	28.9
Approach		566	0.0	0.946	41.1	LOS E	20.9	146.0	0.95	2.25	28.9
West: Railway Pde W											
10	L	210	0.0	0.346	8.2	LOS A	0.0	0.0	0.00	0.90	49.0
11	T	448	2.0	0.346	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		658	1.4	0.346	2.6	NA	0.0	0.0	0.00	0.29	56.0
All Vehicles		2807	0.7	1.498	187.4	NA	230.9	1616.2	0.38	2.97	9.8

### 8.36 Hamilton Street/Kerr Street – Railway Parade (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Hamilton St S											
1	L	737	0.0	1.121	248.6	LOS F	118.9	832.0	1.00	6.66	7.7
Approach		737	0.0	1.121	248.6	LOS F	118.9	832.0	1.00	6.66	7.7
East: Railway Pde E											
4	L	291	0.0	0.337	8.2	LOS A	0.0	0.0	0.00	0.84	49.0
5	T	348	2.0	0.337	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		639	1.1	0.337	3.7	NA	0.0	0.0	0.00	0.38	54.4
North: Kerr St N											
7	L	426	0.0	0.824	27.4	LOS D	8.2	57.7	0.88	1.49	35.2
Approach		426	0.0	0.824	27.4	LOS D	8.2	57.7	0.88	1.49	35.2
West: Railway Pde W											
10	L	276	0.0	0.409	8.2	LOS A	0.0	0.0	0.00	0.88	49.0
11	T	501	2.0	0.409	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		777	1.3	0.409	2.9	NA	0.0	0.0	0.00	0.31	55.6
All Vehicles		2579	0.7	1.121	77.4	NA	118.9	832.0	0.43	2.34	19.3

### 8.37 Hamilton Street/Kerr Street – Railway Parade Mitigation (2031 AM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Hamilton St S											
1	L	537	0.0	0.289	7.6	X	X	X	X	0.60	49.7
Approach		537	0.0	0.289	7.6	NA	0.0	0.0	0.00	0.60	49.7
East: Railway Pde E											
4	L	446	0.0	0.552	8.2	LOS A	0.0	0.0	0.00	0.85	49.0
5	T	600	2.0	0.552	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1046	1.1	0.552	3.5	NA	0.0	0.0	0.00	0.36	54.7
North: Kerr St N											
7	L	566	0.0	0.305	7.6	X	X	X	X	0.60	49.7
Approach		566	0.0	0.305	7.6	NA	0.0	0.0	0.00	0.60	49.7
West: Railway Pde W											
10	L	210	0.0	0.346	8.2	LOS A	0.0	0.0	0.00	0.90	49.0
11	T	448	2.0	0.346	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		658	1.4	0.346	2.6	NA	0.0	0.0	0.00	0.29	56.0
All Vehicles		2807	0.7	0.552	4.9	NA	0.0	0.0	0.00	0.44	52.9

### 8.38 Hamilton Street/Kerr Street– Railway Parade Mitigation (2031 PM Peak)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		Vehicles	Distance		per veh	km/h
South: Hamilton St S											
1	L	737	0.0	0.397	7.6	X	X	X	X	0.60	49.7
Approach		737	0.0	0.397	7.6	NA	0.0	0.0	0.00	0.60	49.7
East: Railway Pde E											
4	L	291	0.0	0.337	8.2	LOS A	0.0	0.0	0.00	0.84	49.0
5	T	348	2.0	0.337	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		639	1.1	0.337	3.7	NA	0.0	0.0	0.00	0.38	54.4
North: Kerr St N											
7	L	426	0.0	0.229	7.6	X	X	X	X	0.60	49.8
Approach		426	0.0	0.229	7.6	NA	0.0	0.0	0.00	0.60	49.8
West: Railway Pde W											
10	L	276	0.0	0.409	8.2	LOS A	0.0	0.0	0.00	0.88	49.0
11	T	501	2.0	0.409	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		777	1.3	0.409	2.9	NA	0.0	0.0	0.00	0.31	55.6
All Vehicles		2579	0.7	0.409	5.2	NA	0.0	0.0	0.00	0.46	52.5

## About Cardno

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

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