Balwyn Access Plan

June 2013

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Executive Summary

The Access Plan and Parking Precinct Plan build upon the Balwyn Structure Plan by providing strategic access insights to support increased access and improved transport choice. The Access Plan and Parking Precinct Plan have been developed considering all modes of transport to and from the Balwyn Activity Area; car parking and car movement being one element of a larger transport network.

Information gathered from the immediate community together with the consultation as part of the long term vision for Boroondara (Our Boroondara, Our City, Our Future) indicate that a stepped change is required to improve conditions for the community and to start to address transport issues that adversely impact health and liveability.

Council policy is set out within Our Boroondara (2008), Creating an Age Friendly Boroondara 2009-2014, the Boroondara Integrated Transport Strategy (2006) and the Balwyn Structure Plan. These indicate a clear Council direction to better support alternative modes of travel and to encourage people to use their cars less.

The Access Plan has a clear view to improve healthier community transport choices that impact less on the immediate and wider community.

Background

Transport provides freedom and access to places and people. Good transport solutions that maximise mobility for all is vital for our cities. Bad transport solutions can significantly impact on our cities with compounding externalities that impact on liveability.

Policy, best practice and research clearly indicates that high car use is problematic for Melbourne and the Balwyn community. Transport options and choice have a significant cost in terms of liveability and the economy. Negative health impacts of a high car use environment include sedentary lifestyles, poor air quality, social impacts, road crashes and noise.

Transport options and choices have a significant cost in terms of liveability, health and the economy. Implications of a high car use environment include congestion, road crashes, morbidity and death from air pollution, sedentary lifestyles and social isolation. The car has also re-shaped urban space reducing the availability of community space and space for more sustainable modes.

Air pollution and road crashes in particular fall disproportionately on the young and older community which represents approximately 56% of the community in Balwyn. Trends indicate a significant need for improving accessibility for the young, elderly and disabled in the Balwyn community.

Encouraging active lifestyles and active ageing is a notable challenge given the local environment predominantly prioritises the car. Older people transitioning out of car use will require safe amenity that maintains health and social participation.

Car ownership continues to increase within the community, although a very large proportion (50%) of smaller households in Balwyn do not own a car. The community demonstrates a marginal change in transport choice based on 2006 Census data. Despite increasing traffic and perceived externalities (noise, congestion and pollution) together with significant support for improving walking, cycling and public transport, there continues to be strong support for increased car parking which in turn will support increased car use and traffic.

Walking is the most important mode for those who visit the Balwyn Activity Area on a daily basis. It is evident that a very high proportion of those interviewed live within walking distance. However, the car is the dominant mode overall and undoubtedly the most important mode for weekly visitors.

Recommendations

Investigations highlight gaps in provision that would better support healthier and more sustainable modes of travel. The Access Plan focuses on the needs of each respective transport mode and their respective catchment dynamics.

1. Pedestrian Connections - Walking improvements are not considered on a corridor basis between the residential catchment and the Balwyn Activity Area. The Access Plan provides recommendations and a framework for considering improvements in line with defining a Principal Pedestrian Network in collaboration with VicRoads and the Department of Transport.
2. Pedestrians within the Activity Area - The recommendations build upon those outlined in the Balwyn Structure Plan. A new public space is recommended for investigation at the pedestrian heart of the Balwyn Activity Area that integrates access for all. By closing the street off to vehicles, the space can be utilised as a public plaza/square that connects with Whitehourse Road and a laneway environment where people of all ages and backgrounds can meet, sit and engage with others.
3. Bicycle - The Balwyn Activity Area catchment is a good match with the catchment dynamics of bicycle users. The challenge is safety and amenity that encourages bicycle use. Recommendations highlight improvements that aim to encourage cycling as a mode choice. Recommendations include improvements through connections to communities north of the Activity Area and improved links with Mont Albert Road which will become increasingly important as a strategic east-west connection towards the Melbourne Central Business District.
4. Public and Community Transport - The Access Plan highlights a number of recommendations for improving amenity supportive of public transport and continued advocacy for improvements in service durations and frequency. The section includes a future car share scheme with 20% of traders indicating a benefit in introducing the initiative.
5. Community Space - There is limited public space in the Balwyn Activity Area that is not car dominated. Yerrin Street presents an opportunity to create an attractive public space which both celebrates and enhances the Balwyn Activity Area. By closing the street off to vehicles, the space can be utilised as a public plaza/square, designed as an active gathering place where people of all ages and backgrounds can meet, sit and engage with others. The space would serve a variety of daily activities, as well as events and entertainment for the community. There would be a small increase in parking as a result of the initiative. Further investigation is required on this recommendation.

The Balwyn Activity Area will continue to increase in terms of commerce, and as a place to live. Whilst additional residents within the Activity Area will strengthen daily retail catchment, particularly by walking, it will continue to be important to strengthen parking amenity as activity increases. It is critical that development needing a permit accommodates parking needs for all modes and helps to strengthen both car provision and more sustainable and healthier transport behaviour.

Parking recommendations are contained within the Balwyn Parking Precinct Plan.

1. Introduction

The Access Plan and Parking Precinct Plan build upon the Balwyn Structure Plan by providing strategic access insights to support increased access and improved transport choice.

The Access Plan and Parking Precinct Plan have been developed considering all modes of transport to and from the Balwyn Activity Area; car parking and car movement being one element of a larger transport network. The objective of the plans has been to develop outcomes that consider infrastructure interventions that support transport choice and in turn help deliver health, equity and environmental benefits to the wider community.

The plans also examine the spatial and operational challenges that require resolution in order to achieve aspirations defined in the Balwyn Structure Plan (2009).

It is recognised that the study area is known under a number of names including the Balwyn Shops, Balwyn Strip Shopping Centre and Whitehorse Road Shops as made evident during the community consultation; for the purpose of reporting, the study area has been identified as the Balwyn Activity Area as defined by the Department of Planning and Community Development (DPCD).

Vision and purpose

There is currently a limited understanding of transport choice and equitable access to the Balwyn Activity Area. The study aims to provide an integrated and balanced transport consideration that increases transport choice. Importantly, consideration is required with regard to the transport dynamic and supportive amenity of each transport mode together with a range of community mobility needs.

The study intends to provide an informative foundation for design discussions and solutions. The question of quality and safety are considered fundamental in ensuring the support of more sustainable transport modes. The approach aligns with DPCD Activity Area guidelines, Smart Roads (VicRoads) and draft procedures for developing Principal Pedestrian Networks (Department of Transport).

The purpose is to maximise mobility through transport choice and to support further urban design opportunities to improve community liveability.

Objectives

The key objectives are as follows:

- Understand the transport and catchment characteristics of the Balwyn Activity Area.
- Develop an informed access hierarchy/framework that supports greater transport choice and improved urban amenity.
- Inform and identify projects and/or initiatives for implementation and further investigation.
- Identify any areas in which the Boroondara Planning Scheme may need to be strengthened to support the transport needs and choice of the Activity Area and the wider community.

Background

The Balwyn Activity Area focuses around the intersection of Whitehorse Road and Balwyn Road to the north eastern side of the municipality. As defined in the structure plan the core of the Activity Area extends from Bevan Street to the Balwyn Community Centre adjacent to Clyde Street.

Its status as the only Level 1 Neighbourhood Activity Area classifies the centre with a broader community role and trade catchment (Map 8.2 Retail, Commercial and Residential Analysis for

Boroondara Activity Areas Strategy). Over time the Activity Area will continue to enhance its role as a vibrant mixed use centre. The centre is also identified for residential growth as a component of future mixed use developments. Notable activity includes a number of local schools and demographics indicate a notable ageing population within the Balwyn Area. Both young and older community members have particular equity considerations in terms of transport.

The Balwyn Activity Area is located along transport routes of regional significance accommodating bus, tram and traffic movements. There are a number of documents that inform the potential development of the Balwyn Activity Area including the Balwyn Structure Plan, Balwyn Transport and Access Technical Report, Smart Roads (VicRoads), Boroondara Bicycle Strategy and the Boroondara Integrated Transport Strategy.

The project builds upon the Balwyn Structure Plan through providing strategic access insights that seek to support increased access to the Activity Area through supporting improved transport choice. This aligns with the principles of the *Transport Integration Act 2010*; the Act is Victoria's new principal transport statute which came into effect on 1 July 2010. The Act's core focus is integration and sustainability and in ensuring that no one component of the transport system is considered in isolation.

Good and balanced transport solutions align with Council's key directions; Strengthening Communities, Ensuring Liveability and Amenity, Enhancing the Environment, and Providing Facilities and Assets to meet our community's future needs.

The scope of the Access Plan is as follows:

- Review existing transport and land use studies, networks and recommendations.
- Identify the access characteristics, behaviour and catchment of the Activity Area including key origins and destinations.
- Understand the existing convenience, comfort, safety and priority of each respective mode.
- Identify key pedestrian and bike networks/desire lines and measures that support active access to the Activity Area (these need to clearly understand the differing mode dynamics and behaviour).
- Provide improved integration between modes, land use and the wider community.
- Identify gaps, initiatives and management tools supportive of improved and balanced transport choice.
- Discuss findings and potential initiatives with key stakeholders.
- Consult with interest groups and the community.
- Identify spatial requirements and conflicts and outline balanced outcomes when required (including green space, land use, parking and streetscape).
- Outline a balanced access framework and a plan for addressing conflicts and quality shortfalls.

2. Literature Review Summary

The literature review comprised of federal, state and council policy and strategy documents. The literature review is included in Appendix A1.

The common policy and strategic direction is towards a more balanced and sustainable transport system. Most strategies are aimed at encouraging a greater mode share for walking, cycling and public transport and encouraging a reduction in car use. This is achieved by:

- Supporting a single integrated system between transport modes and with land use that considers broad strategic directions including social inclusion, sustainability, efficiency, health and wellbeing, and economic prosperity.
- Developing strategies that support investment in walking, cycling and public transport to increase the attractiveness of these modes.
- Developing strategies that maximise the effectiveness of existing car parking in Activity Areas while encouraging access to Activity Areas by sustainable transport modes.

Council policy is set out within Our Boroondara (2008), Creating an Age Friendly Boroondara 2009-2014, the Boroondara Integrated Transport Strategy (2006) and the Balwyn Structure Plan. These indicate a clear Council direction to better support alternative modes of travel and to encourage people to use their cars less.

3. Structure Plan - Issues and Challenges

From background research and community consultation, key challenges and issues for the Balwyn Structure Plan were identified. The transport related challenges are summarised below:

- There is a need to accommodate at least 1,000 extra people within an estimated 600 dwellings in Balwyn. This combined with the ageing of the current population identifies a key need to provide variety of housing choice, including smaller dwellings, in locations such as the Balwyn Activity Area where walking access to community facilities and public transport can be provided.
- Traffic congestion is acknowledged as a key problem, notably around the intersection of Balwyn Road and Whitehorse Road. With little ability to provide alternative car access through the centre, there is a need to address alternatives to car use.
- There is a need to address the present imbalance and priority given to private vehicles, over the pedestrian and cyclist. More alternative forms of transport should be encouraged, including community transport.
- The provision of car parking is adequate in number, but not in location or accessibility. There is a need to reconfigure the parking arrangements to better utilise existing supply.
- There is a strong desire by the community to promote sustainable and accessible design. This needs to be addressed in the context of heritage and neighbourhood character conservation and existing state policies in relation to sustainability and accessible design.
- There is a desire for better located and coordinated community facilities, including community services within the centre and public transport access to services outside the centre.
- There is a perceived lack of free places for people to sit and gather in the centre. Improved streetscapes and identification of public seating and gathering spaces needs to be addressed.
- The supermarket requires improvements to its internal layout, external access and the frontages to both Whitehorse Road and the rear car park. Some residents suggest that a second supermarket could provide needed competition to the existing supermarket.

- Balwyn Park is well used by sporting and school groups, but it is not well used by the general public for informal recreation. Access into the park and the layout of the park needs to be addressed to integrate it into the centre and enrich it as a key community asset in Balwyn.

Key recommendations in the Balwyn Structure Plan include:

- Changes to the car parks to the rear of the core retail area where achievable. This will require reconfiguring the car parking spaces, redesigning and implementing changes to street furniture, landscape, vehicle routes, servicing arrangements and reducing barriers to pedestrian movement.
- Improvements to existing controlled intersections including a review of the proposed Tram 109 changes. Draft proposals for the Tram 109 project seek to re-site some of the tram stops in Balwyn and to remove one of the stops.
- Investigate possible changes to Whitehorse Road that acknowledge the informal crossing of the road in the 'heart' of the shopping precinct.
- Continued maintenance of the good quality paths.
- Investigate ways to activate the less well travelled routes where appropriate, through land use and built form changes.
- Improve movement and choice of direction through improvements to the pedestrian network linking the laneways and car parking, which are located either side of the retail core along Whitehorse Road.
- Maintain and improve the relatively well connected street network.

4. Background Data Summary

The following section summarises background statistical data gathered as part of the study inclusive of census data, traffic data and crash data. A more in depth overview of background data is contained within Appendix A2.

Journey to Work

The Balwyn Journey To Work (2001 to 2006 Census) shows that absolute use of the car for journey to work has remained the same, however as a proportion this has declined by 2% with a 2% increase in train and tram journeys. Since the 2006 Census, the Department of Transport has reported annual increases of 10% on trains, 2-4% on trams and 7% on buses. From the 2006 Census data, 1,420 (41%) employees in the Balwyn Precinct live within the municipality of Boroondara. This is the highest proportion of all the largest Activity Areas in the municipality.

Car Ownership

Car ownership has increased between 2001 and 2006 and on average almost everyone between the ages of 17-74 years has a car in Balwyn and Balwyn North. There is a direct correlation between car ownership and car use and notably habitual car use where even small journeys are all made by car.

2011 Census data indicates yet a further increase in car ownership in the area, however, areas along Whitehorse Road have seen a decline in car ownership suggesting a relationship with Tram 109 services.

When comparing car ownership per household on a regional level (2006 Census), the Balwyn area has a notably high level of car ownership.

Traffic Speeds

The surveys indicate a problem along Yarrbat Avenue and Gordon Street where speeds often exceed the speed limit with 15% of all vehicles travelling at 57 km/h or greater. Statistics indicate that pedestrians have little chance of surviving impacts at these speeds.

Crash Data

Crash data for the Balwyn Activity Area and surrounds continue to show that crashes fall disproportionately on elderly pedestrians and bicycle users (VicRoads - 5 year crash data 2006-2010). Bicycle crashes are a consistent concern along Whitehorse Road and Mont Albert Road and occur primarily at intersection locations. Pedestrian incidents are focused along Whitehorse Road between Iramoo Street and Balwyn Road.

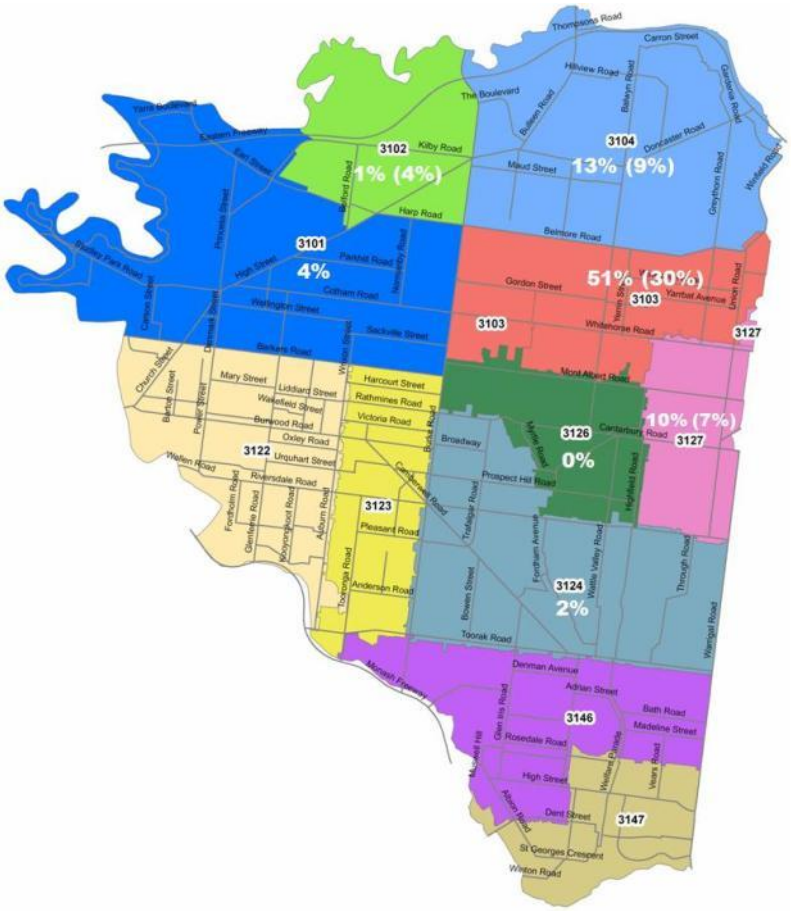
Crash statistics were analysed to provide insights surrounding the introduction of the 40 km/h zone along Whitehorse Road in 2004. Data was analysed for 5 year periods pre and post the introduction of the 40km/h zone.

Crashes have halved in the Activity Area along Whitehorse Road since the introduction of the 40 km/h zone. There has been a significant reduction in car crashes as a result of the reduced traffic speed with significant benefits at intersections. The reduced speed has not provided the same benefit for pedestrians. Mid block pedestrian crashes have increased since the introduction of the 40 km/h zone suggesting increased risk taking and/or frustration in trying to cross the road.

5. Surveys

Surveys were analysed to understand exiting transport behaviour and perceptions. These comprised of consumer questionnaire surveys, trader questionnaire surveys, pedestrian and bicycle counts and traffic count data.

The data was examined early in the study prior to the development of recommendations and site observations.



Consumer Survey - Day Time 2011

A survey sample of 200 respondents was gathered during a weekday (9am-5pm), Friday (3pm-5.30pm) and Saturday (9am - 3pm). Demographic characteristics of the survey respondents were as follows:

- 76% female and 24% male
- 76% of those interviewed were over the age of 50
- 77% indicated that they were a local resident, 4% indicated that they worked nearby and 20% indicated that they were visitors.

In comparison with the local demography (Census 2006 -

Balwyn), the female proportion was significantly over represented, and only 37% of the local demographic is over 50.

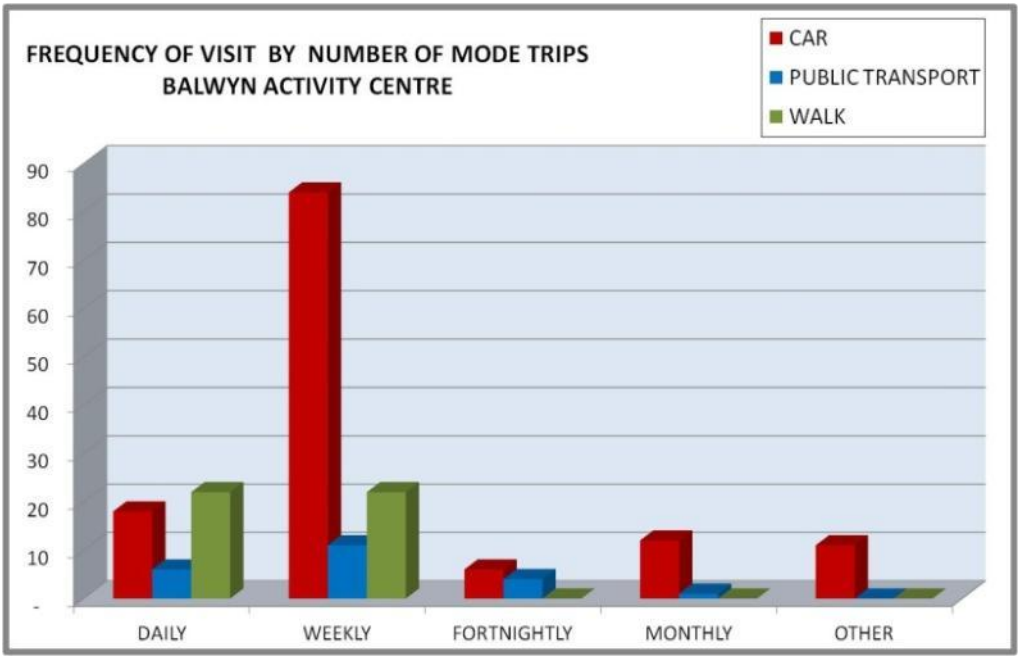
Respondents indicated that they use the following means of accessing the Activity Area:

- 66% by car
- 22% as a pedestrian
- 11% by public transport.

Transport insights include:

- Very few car drivers indicated that they would use healthier or more sustainable transport modes. 49% indicated nothing would encourage them, 21% indicated they prefer to drive.
- 66% of respondents indicated that they owned a car, 6% of respondents indicated that they owned a bicycle and a car and 1% indicated that they only owned a bicycle.
- 51% of respondents lived within postcode area 3103, a large part of which is within a kilometre of the Activity Area.
- 24% of respondents visit on a daily basis and walking is the dominant mode for daily visitors.
- 60% of respondents visit on a weekly basis and the car is the dominant mode for weekly visitors.
- 72% of respondents indicated that they stay an hour or less in the Balwyn Activity Area.

Comments received from consumers included the need for more trees, the need to create a park and improved maintenance including problems with dirty seats. Traffic noise and congestion was a common issue amongst respondents, although the same respondents also indicate that parking was a problem.



Consumer Survey - Evening at Balwyn Theatre - 2011

A survey sample of 50 respondents was gathered outside the Balwyn Theatre on a Friday evening between 5.30pm and 9pm.

Demographic characteristics of the survey respondents were as follows:

- 94% female and 6% male
- a fairly even distribution of ages, 30-30 year olds represented the greatest proportion at 28%

- 36% indicated that they were local residents.

Respondents indicated that they use the following means of accessing the area adjacent to the Balwyn Theatre:

- 68% by car
- 21% as a pedestrian
- 6% by public transport
- 4% by motorbike.

Transport insights include:

- 11% indicated that improving parking would make them visit more frequently
- 67% of respondents stay 2 or more hours.

Comments with regard to transport/traffic include:

- Tram speeds are too high at 60 km/h.
- Traffic can be a huge disaster.
- Stop left turns out of Yerrin Street and block Weir Street off to improve traffic movement.
- Need greater traffic control, some motorists are too fast and others are desperate to find a parking spot.
- Put up a small multi-storey car park for cinema goers.
- There is always some parking chaos going on.
- Parking always scares me.

Trader Questionnaire Survey - 2011

Questionnaire surveys of traders/businesses were undertaken in August 2011 to establish the travel characteristics of staff including parking demand and location of staff parking occurring within the precinct.

Employees predominantly arrived to work by car (83%). Only 14% of those who drove indicated that they had no other transport option.

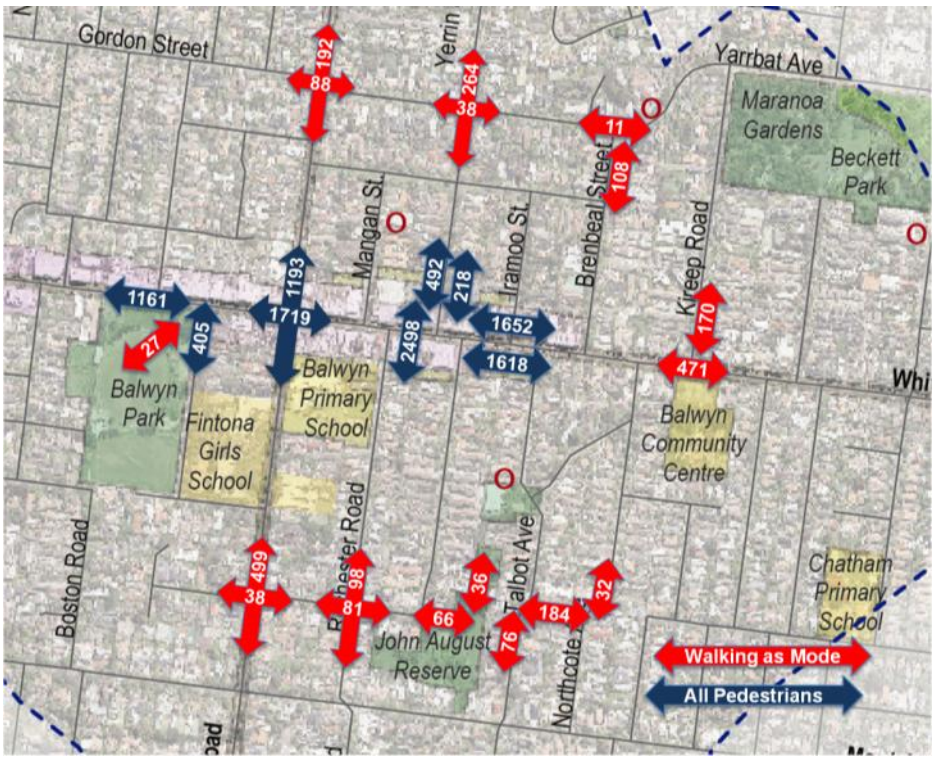
Awareness of car share businesses is relatively high with 20% indicating that they would be in support of such a program for Balwyn.

Traders would like to see improvements in public transport including improved/clearer tram stops and bus connections with rail services. Improvements in bicycle infrastructure including bike paths that are not on main roads and improved bicycle parking were also suggested. Increased long term parking for employees was also highlighted by a number of traders.

Pedestrian Counts

Pedestrian counts were undertaken to obtain a representation of movements within the Activity Area.

The pedestrian counts are also required in developing a Principal Pedestrian Network.



The pedestrian counts illustrated represent 9 hours of data during the period 8am-5pm. The highest counts collected occurred along Whitehorse Road in the vicinity of Yerrin Street, over 600 pedestrians an hour at the peak walk east-west during the daytime. Over 400 pedestrians an hour also use the Whitehorse Road pedestrian crossing at Yerrin Street, an average demand of almost seven a minute can result in a build up of pedestrians waiting to cross Whitehorse Road.

Summary

A brief summary of key points raised in the surveys include:

- Most surveyed respondents were local residents, female, over 50 years and stayed for less than an hour at the Balwyn Activity Area.
- Over half of respondents lived in the immediate postcode 3103.
- Walking is the most important mode for daily visitors and also an important mode for weekly visitors.
- The car is the dominant mode for those who visit on a weekly basis.
- Trader responses indicated a high level of transport choice and most choose to drive.
- 20% of traders indicated support of car share in the area.
- Pedestrian volumes are notably high around Yerrin Street.
- Traffic, speed, noise and parking often cited as problematic.
- More trees and green/public space are needed.
- Pedestrian crossings are too slow to react and too quick for the elderly to cross.

6. Liveability, Health and Transport

Transport provides freedom and access to places and people. Good transport solutions that maximise mobility for all is vital for our cities. Bad transport solutions can significantly impact on our cities with compounding externalities that impact on liveability. Liveability is essentially a measure of quality of life and our transport choices and urban streetscapes have a significant impact. Liveability refers to the subset of sustainability impacts that directly affect people in a community, such as economic development, affordability, public health, social equity and pollution exposure (Victoria Transport Planning Institute, 2011).

This section provides insight with regard to the relationship between our transport choices and our health and liveability. Appendix A3 highlights greater in depth research.

Air Quality

Research in the United States indicates that "motor vehicle air pollution probably causes a similar order of magnitude of premature deaths as traffic crashes" (Murray, 1996. Global Burden of Disease and Injury; Litman, 2011. Evaluating Public Transport Health Benefits). Although ambient air quality is considered relatively good in Australia, urban air pollution is a significant cause of death and illness in the community contributing close to 3000 deaths in 2003 (Begg S, Vos T, Barker B, Stevenson C, Stanley L, Lopez A. 2003. The burden of disease and injury in Australia). Two-thirds of these deaths were attributable to long-term exposure to air pollutants, with the elderly most affected (Australian Government, 2011. State of the Environment). By comparison, the 2003 road toll in Australia was 1,633 fatalities (Australian Bureau of Statistics). Traffic is the main source of emissions in Australian cities (Department of Transport and Regional Services, 2005. Health impacts of Transport Emissions in Australia: Economic Cost).

Social

The way we travel has a relationship with our social connections and mental wellbeing. A recent report by the Grattan Institute draws together research that clearly identifies a negative correlation with traffic volume, speed, and car commuting (Grattan Institute, 2012. Social Cities). In New York, 44% of people living on busy streets respond by going out less (New York Streets Renaissance, 2006). In Basel, Switzerland, people who live on faster streets (50 km/h) are half as likely to be active in the public space (Sauter and Huettenmoser, 2008. Liveable Streets and Social Inclusion). Over 80% of Australian drivers find their commute stressful and frustrating (IBM, 2011. Commuter Pain Survey). Increasing journey times faced by Australia commuters also has a correlation with reduced wellbeing and social activity (Grattan Institute, Melbourne, 2012, Social Cities).

Sedentary Lifestyles

The effect of sedentary lifestyles on heart disease is similar to that of tobacco (World Health Organisation, 2000. Transport, Environment and Health). According to epidemiologists in Monash University, as part of the Diabetes Obesity and Lifestyle Study, by 2025:

- The number of obese Australians will surpass those of a healthy weight.
- Only 28% of adults will be at a healthy weight whilst 34% will be obese.

There are a number of studies from the USA, Australia and Europe that highlight a correlation between the level of car use and obesity (Institute for European Environmental Policy, 2007. Unfit for Purpose). Sustainable transport choices are healthier transport choices. Travel allows the community to build in regular incidental physical activity. The National Physical Activity Guidelines for Australians recommend that people of all ages accumulate at least 30 minutes (1 hour for children) of moderate intensity physical activity on most, or preferably all, days of the week (Australian Institute of Health and Welfare, 1999. An Active Way to Better Health). Over one half of Australian adults are

also insufficiently active for health gain (Australian Institute of Health and Welfare, 2000. National Physical Activity Survey).

Economic Cost

The cost of congestion, in Melbourne alone, is predicted to double from $3.0 billion in 2005 to $6.1 billion in 2020; based on travel time and uncertainty, vehicle operating costs and air quality (Bureau of Transport and Regional Economics, 2007. Estimating Urban Traffic and Congestion Cost Trends for Australian Cities). "In the absence of improved congestion management, it will be challenging to avoid escalating urban congestion impacts" (Bureau of Transport and Regional Economics, 2007, Estimating Urban Traffic and Congestion Cost Trends for Australian Cities). The economic impact of sedentary lifestyles is estimated to be approximately $13 billion a year (Australian Local Government Association et al, 2010. An Australian Vision for Active Transport). The estimated cost of obesity in Australia in 2008 was $58.2 billion (Access Economics, 2008. Growing Cost of Obesity).

In Australia in 2000, it was estimated that vehicle related ambient air pollution accounted for between 900 and 4500 morbidity cases (cardio-vascular and respiratory diseases and bronchitis) and between 900 and 2000 early deaths (Department of Transport and Regional Services, 2005, Health Impacts of Transport Emissions in Australia: Economic Cost). The economic cost of morbidity ranges from $0.4 billion to $1.2 billion, while the economic cost of mortality ranges from $1.1 billion to $2.6 billion (Department of Transport and Regional Services, 2005, Health Impacts of Transport Emissions in Australia: Economic Cost).

Crash/Speed Research

Traffic speeds have a strong relationship with the health of the community with lower speeds reducing the impact of resulting crashes and increasing the likelihood of walking and cycling.

The probability of a pedestrian being killed rises by a factor of eight as the impact speed of the car increases from 30 km/h to 50 km/h (Ashton SJ, Mackay GM, 1979). An impact speed of 55 km/h in a pedestrian accident is fatal with almost 100 percent probability (Pasanen, 1992). Studies have shown that about approximately 50% of all fatal pedestrian crashes occur without braking (Mclean, et al., 1994).

Speed also influences active travel choice. When road speeds are high, perceived risk is high and people are less likely to walk or cycle (Gerrard 2008; Safe Speed). The most effective measure for reducing pedestrian road traffic crash deaths and serious injuries is speed reduction (World Health Organization (WHO) 2008). A study of six towns in England reported improvements in liveability after the implementation of 32 km/h zones (Babtie Group 2001).

Good for Business - Research

There is an increasing awareness that improved walking, bike use and public transport is good for business. Studies indicate that well planned non-motorised improvements can increase customers and business (Hass-Klau C, 1993. Impact of Pedestrianisation and Traffic Calming on Retailing. A review of the evidence from Germany and the UK). In Bloor Street, Toronto, a survey was undertaken to establish the relative importance of parking to business activity. The results highlighted that patrons that arrived by foot and on bicycle visited most often and spent the most money (Clean Air Parnership, 2007. Bike Lanes, On-Street Parking and Business. Toronto, Canada).

Evidence based studies are also growing in Australia, with figures that indicate that motorists are at times a minority and that pedestrians and public transport users in particular often spend more time and visit Activity Areas more often resulting in greater spend (Tolley R., 2011. Good for Business). This challenges the notion that cars are the most important factor for business and retail. In Balwyn, surveys indicate that pedestrians visit more frequently and walking is the dominant mode for daily visitors at the Balwyn Activity Area (Balwyn Activity Area Customer Survey, 2011).

Summary

The research clearly indicates that high car use is problematic for Melbourne and the Balwyn community. Transport options and choice can have a significant cost in terms of liveability and the economy. The research highlights that road crashes are only a small component of the overall picture. Negative health impacts of a high car use environment include sedentary lifestyles, poor air quality, social impacts and noise. Combined with congestion, high car use can have a significant cost on productivity and the economy. There is also evidence that supporting more sustainable modes of access can be good for business and this in turn can free up car parking for those who truly have no choice.

Air pollution and road crashes in particular fall disproportionately on the young and older community which represents approximately 56% of the community in Balwyn. Trends indicate a significant need for accessible and safe access for the young, elderly and disabled.

Traffic speeds have a strong relationship with the health of the community with lower speeds reducing the impact of resulting crashes and increasing the likelihood of walking and cycling. A surprising benefactor to the 40 km/h zone along Whitehorse Road has been for those travelling by car where crash casualties at intersections have halved.

There is a growing awareness of the relationship between mode choice and the level of incidental physical activity and this correlates with obesity which in itself is a pre-curser to numerous other illnesses. The benefits to personal health and wellbeing of encouraging walking, cycling and public transport are evident and becoming more documented.

Encouraging active lifestyles and active ageing is a notable challenge given the local environment predominantly prioritises the car. Older people transitioning out of car use will require safe amenity that maintains health and social participation.

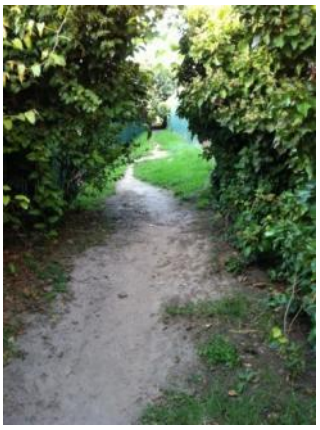
7. Site Observations

Site observations were undertaken over several months with regular visits undertaken to gather information as the study progressed. These highlight opportunities for improvement and provide a foundation for developing access recommendations.

Balwyn is a typical strip shopping centre inclusive of high traffic and parking environments and limited or basic amenity for pedestrians, bicycles and public transport. Pedestrian environments are narrow and compete with street furniture, trader furniture and parked motorcycles. Pedestrian numbers were observed as notably high. There is no public space of note with the exception of Balwyn Park; however this does not sit well with the hub of pedestrian activity surrounding Yerrin Street. Low floor trams (Tram 109) are frequent and highly used with often a dozen passengers alighting and boarding each time a tram stops in both directions. Trams stops are not DDA compliant and safety fencing at tram stop locations are a hindrance to alighting passengers. Traffic noise, air pollution and slow moving traffic dominate the majority of the road reserve.

The following table provides insights and examples at a number of locations within and surrounding the Balwyn Activity Area.

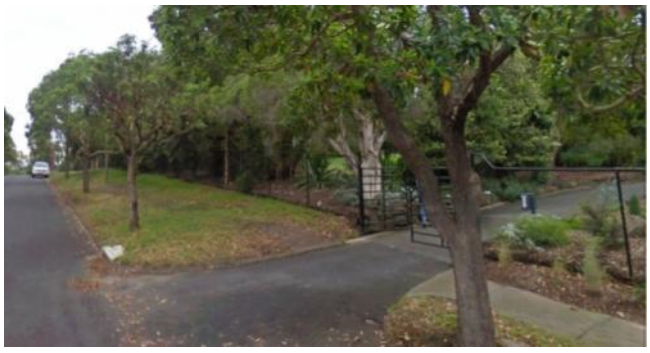
	EXISTING CONDITION	OPPORTUNITY
	Entry point to Balwyn Park is poor at Cherry Road	Raised side road crossing that caters for desired walking line. Adjustment would be required to drainage. To be designed as an entry component of the Balwyn Park Masterplan.
	Path to John August Reserve from Whitehorse Road lacks continuity. Landscaping breaks the link to the mid of the Library building.	Remove existing landscaping, provide continuity to path, and should space permit, provide smaller area of landscaping to compensate.
	Whilst Tram 109 operates low floor trams, this continues to be a notable challenge for the elderly community. Full DDA required by 2032.	Continue to pursue and advocate for Tram 109 improvements inclusive of DDA compliant stops.

	EXISTING CONDITION	OPPORTUNITY
 	High use of northern side of Evergreen Avenue by pedestrians, however no path provision.	Footpath to northern side of Evergreen Avenue.
 	Link between John August Reserve and Whitehorse Road has poor surveillance, almost no lighting and is overgrown at locations. Pedestrian counts indicate very low use.	Path connection between Whitehorse Road and Mont Albert Road through John August reserve with signage and low level lighting. As pedestrian levels are low, this could be a shared path connection from Mont Albert Road to Whitehorse Road.
 	Access link along this route from Talbot Avenue and Conway Crescent is almost impossible to find as it uses a link via The Evergreen Centre.	The Evergreen Centre is on Council land. There may be an opportunity to improve connectivity.
	Current parking and footpath arrangement at Brenbeal Street adjacent Whitehorse Road does not adequately protect the footpath area and passing pedestrians.	Provide kerbing to ensure that cars do not encroach path area.

	EXISTING CONDITION	OPPORTUNITY
	The two stage crossing (white striped median) of Whitehorse is well used despite nearby pedestrian crossings. The median space provides little protection and is not easily perceived by motorists.	A solid median reserve would better define the Activity Area, potentially further slow traffic and improve crossing amenity for pedestrians. Preliminary Tram 109 proposals would further widen the median in such a way that trees could be considered.
 	Bicycle access and provision in Balwyn is limited. At times bicycle parking around the library was insufficient and less desirable bicycle parking was observed.	Investigate local bicycle connections. Provision of bicycle parking at key destinations, particularly improvements at the library.
	Balwyn Road bicycle lanes were recently completed south of Whitehouse Road. The corridor is designated a Priority Bicycle Route. Parking is problematic for the newly installed bicycle lanes.	Indented parking bays and/or parking restrictions
	Tactile paving at a number of crossing points are in poor condition. Issues are evident at the Balwyn Road/Whitehorse Road intersection and crossing adjacent Yerrin Street.	Replace areas of poor tactile paving.

	EXISTING CONDITION	OPPORTUNITY
	Along Yarrbat Avenue, traffic volumes were observed with frequent regularity at significant speeds. Combined with visibility challenges including topography and trees, the roundabout intersection presented difficulty for pedestrians.	Investigate improvement to pedestrian crossing locations leading into the Activity Area.
	At locations, that should support links with the Activity Area, pram ramps (dropped kerbing) are not included. Locations include: - Mont Albert Road/ Knutsford Street - Mont Albert Road/ Boston Road	Provide pram ramps and a potential two stage crossing arrangement at Mont Albert Road.
	Side road crossing in general are extremely busy and a poor provision for pedestrians. Bluestone can be problematic for older individuals. When cars are waiting pram ramps on either side of the intersection do not align. Bins, bollards and cables obstruct pedestrians. No pedestrian priority and poor amenity in general.	Introduce raised side road crossings and remove obstacles (note cable trip at Weir Street as shown in picture).
	Much of the seating is only in the heart of the Activity Area and some of this is in poor condition. Almost no seating is provided supporting access to the Activity Area.	Replace seats that are in poor condition with new. (completed during the study) Provide seating along key pedestrian corridors.

	EXISTING CONDITION	OPPORTUNITY
	The Yerrin Street and Whitehorse Road intersection area is the busiest pedestrian area and perhaps the centre of activity. Pedestrian provision is poor across the board. Unfortunately high vehicle turning movements are also problematic at this location and reflected by crash statistics.	Options include: 1) Raised side road crossing and removal of obstructions. 2) A new public space and closure of a short section of Yerrin Street.
	Pedestrian and public space along Whitehorse Road is narrow with a low level of comfort. Issues are evident in terms of width, trader use, pedestrians waiting to cross the road, parked motorbikes.	Options include: 1) Enforce footpath widths based on standards. 2) Extend kerbing at isolated locations. 3) Seek public space off Whitehorse Road as in Yerrin Street.
	Missing bicycle lanes along Mont Albert Road. Continuity of lanes broken although sufficient space exists.	Narrow right turn arrangement and ample pedestrian refuge to accommodate continuity of lanes.
	No taxi rank is evident around the heart of the centre.	Investigate a taxi arrangement and call service to the heart of the Activity Area adjacent the supermarket.

	EXISTING CONDITION	OPPORTUNITY
	Community bus sign is difficult to see and parking is not safeguarded. No seating is immediately adjacent for people to wait, although the location is under shelter.	Investigate the opportunity to co-locate with a taxi bay and call location, potentially on Mangan Street.
	Exit from alley to car park to southern side of Whitehorse Road between Rochester Road and Weir Street has poor visibility for pedestrians and drivers.	Extend kerbing and include high visibility fencing or bollards together with surface markings to increase pedestrian and driver awareness.
	Kireep Road adjacent Maranoa Gardens is missing a section of path. Observations indicate notable demand.	Complete approximately 80 metres of path.
	Path connection with Prowse Avenue is uneven.	Improve connection. Opportunity as part of the Balwyn Park Masterplan.

There are notable pedestrian improvements that can be made including increasing pedestrian priority along key routes and completion of gaps. Given a much older population that is reluctant to reduce car use, regular seating and maintenance of existing seating, and wayfinding signage would also help foster and encourage greater pedestrian movement and access.

Safer bicycle connections are required within the Activity Area and the wider bicycle network. There is also an opportunity to provide better facilities at Canterbury Station; this is within easy cycling distance from the Activity Area and the immediate community.

Tram access can be improved; this would rely on initiatives outlined under the Tram 109 project that would also serve to shelter right turning vehicles and improve conditions for people crossing Whitehorse Road.

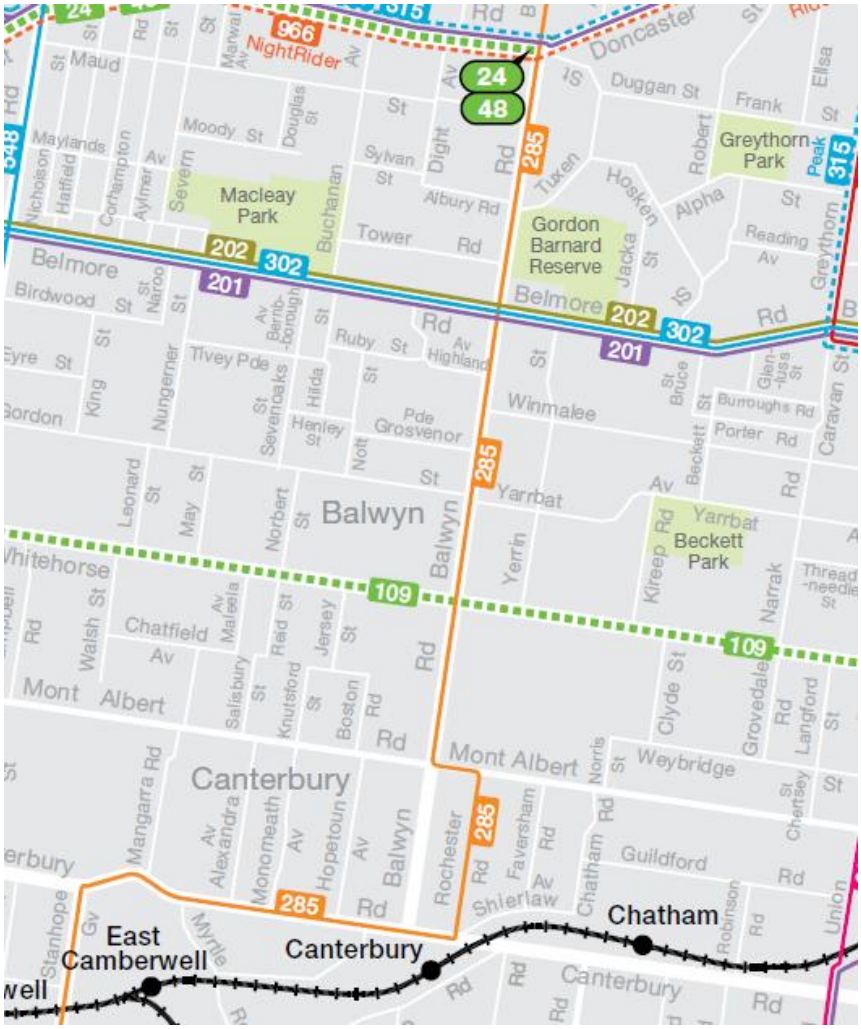
Improvements are required to better integrate and accommodate community bus services, taxi services and a potential future car share arrangement that allows the community to access vehicles without necessarily owning a car.

8. Existing Transport Networks

Existing strategic transport networks are summarised in this section. These include transport services and strategic networks that guide infrastructure decisions.

Public Transport Services

The following diagram illustrates the relevant public transport services in Balwyn.



Balwyn is serviced by the route 109 tram connecting Box Hill to Port Melbourne via Kew Junction and the city. The tram has a frequency of between 5 and 20 minutes throughout the whole day. The punctuality and reliability of the 109 service is slightly higher than the average for trams across Melbourne.

Only bus 285 connects with the Activity Area at the intersection of Balwyn Road and Whitehorse Road. Route 285 extends between Doncaster and Camberwell via Balwyn Road. Services run Monday to Friday at hourly intervals during the off-peak. The first service arrives at Whitehorse Road at 7:11am and the last service arrives at Whitehorse Road at 5:48pm.

There are limited interchange opportunities with the rail network in the Balwyn study area with an infrequent bus connection (285) connecting with Canterbury Railway Station.

Canterbury Railway Station is approximately a 15 minute walk from the Balwyn Activity Area and less than a 5 minute bicycle ride.

Pedestrian Network

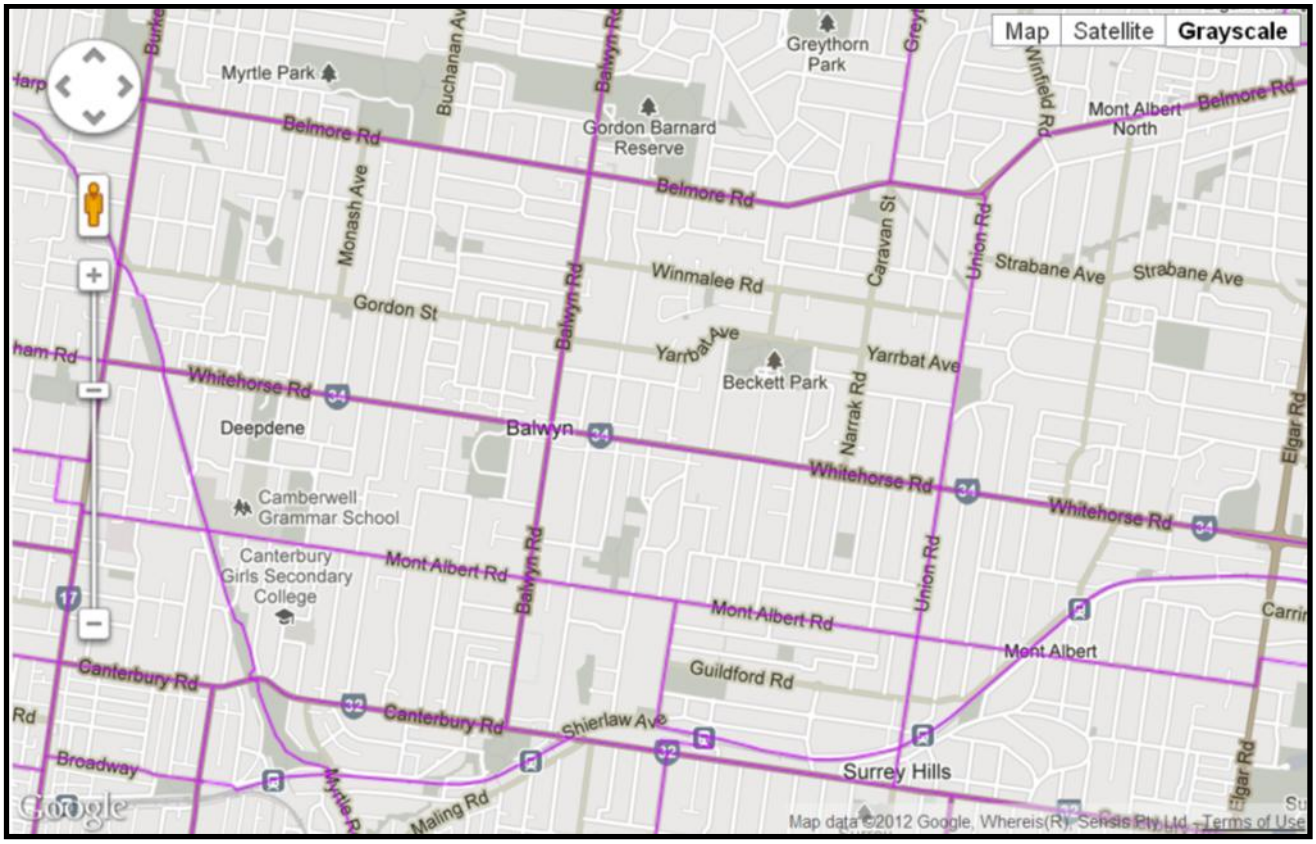
There is no existing pedestrian network outlined at this time. The core of the Balwyn Activity Area along Whitehorse Road is designated "pedestrian priority" under the VicRoads SmartRoads network. However, this is a traffic dominated environment with narrow footpath amenity, limited public space and no pedestrian priority as such with the exception of a daytime 40km/h speed zone.

Principal Bicycle Network

The Principal Bicycle Network (PBN) published by VicRoads 2012 is illustrated below. The network comprises of both a general network and a high priority tier called Bicycle Priority Routes (BPR). The priority tier is not differentiated on the VicRoads web page at this time. It is understood that Bawlyn

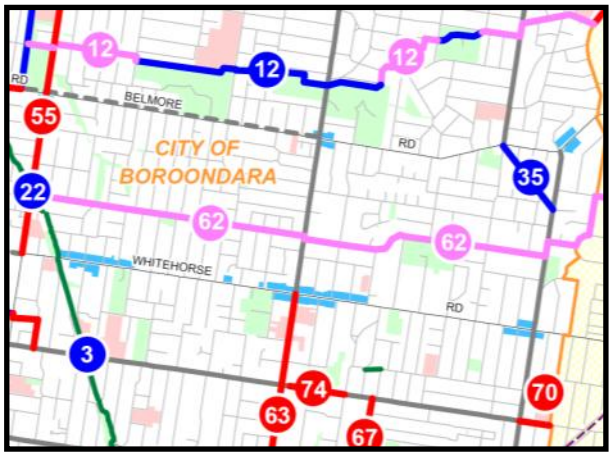
Road and Mont Albert Road are both BPRs; provision on these corridors generally stops short of intersections.

It should be noted that many road links illustrated provide limited or no provision along often 60 km/h roads. This does not present an equitable provision for the majority of the community and will do little to encourage bicycle participation without either a significant reduction in road speed or a high level of segregation. Under Tram 109 improvements, preliminary designs for accessible stops along Whitehorse Road result in the removal of bicycle provision.



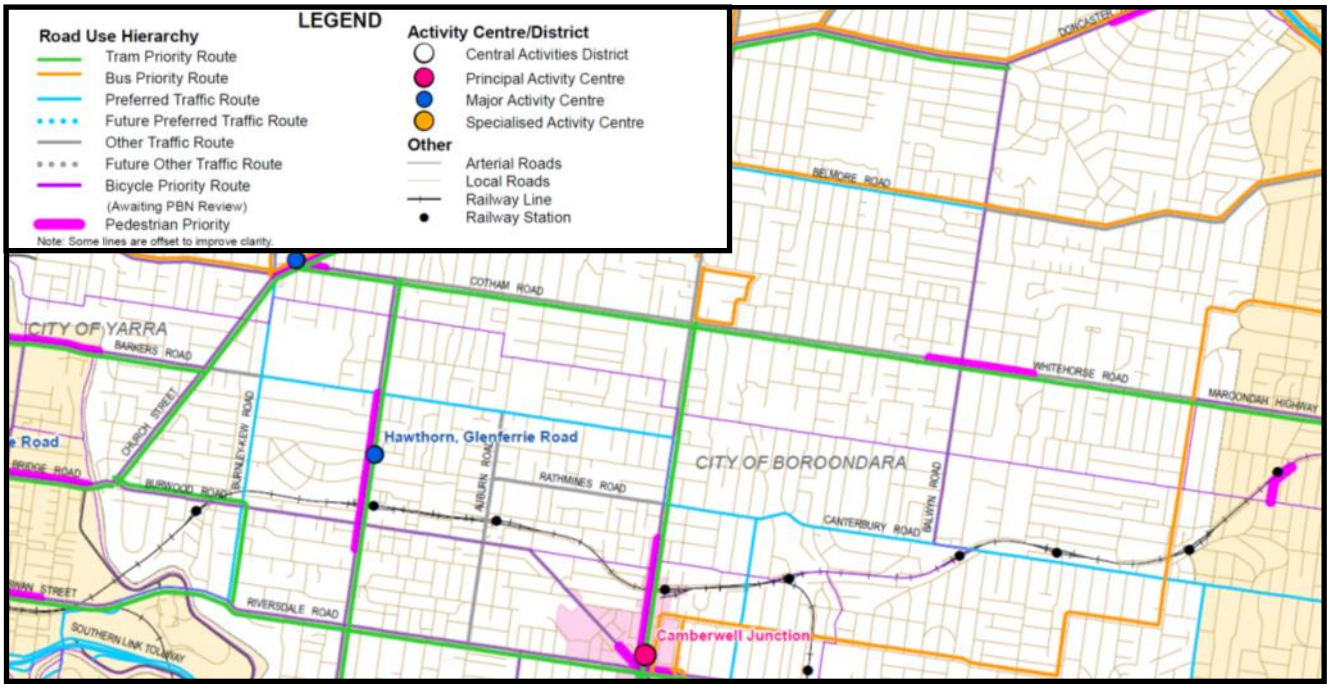
Local Bicycle Networks

The Boroondara Bicycle Strategy (2008) includes much of the Principal Bicycle Network together with a number of local connections.



SmartRoads

VicRoads is responsible for developing SmartRoads. These plans identify the priority of different transport modes on the road at different times of the day. The plans are developed through consultation with local councils, government agencies and relevant stakeholders. The goal of the operating plan is to make Melbourne's road network work better for everyone regardless of their mode of travel.



Traffic Management

Clearways - Clearways are in place along Whitehorse Road between 7am-9am city bound, and 4:30pm-6:30pm outbound.

One Way - One Way operations are in place between 7am-9am along Rochester Road and Weir Street and left turns are banned from Whitehorse Road along Talbot Avenue during the same hours.

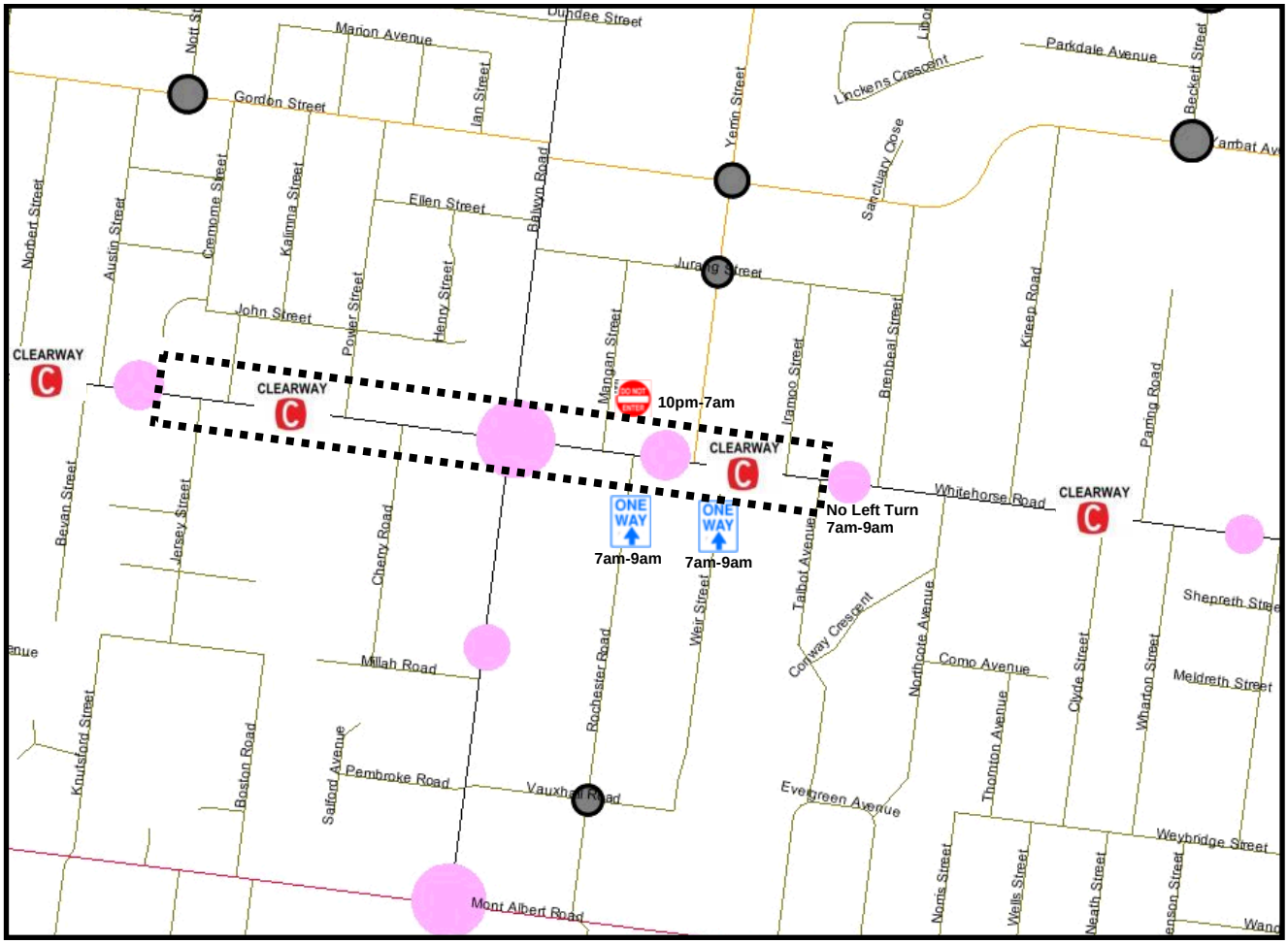
Closure/No Entry - No entry from Mangan Street to the car park at the rear of the supermarket (Safeway) is sign posted from 10pm-7am. The restriction is installed by Safeways supermarket.

Roundabout (Grey/Black Circle) - There are several roundabouts that intersect with the Gordon Street/Yarrbat Avenue corridor and along Yerrin Street.

Signalised Intersections (Large Pink Circle) - These primarily exist along Balwyn Road and Whitehorse Road to manage traffic demands at intersection locations and to facilitate pedestrians crossing.

Pedestrian Operated Signals (Small Pink Circles) - These primarily exist along Balwyn Road and Whitehorse Road to facilitate pedestrians crossing.

40 km/h Zone (Dotted Box) - Operational 8am - 10pm 7 days a week (introduced 7 February 2004).



Summary and Network Gaps

Transport modes already have differing levels of recognition and some priority is defined whilst other modes are ill considered. A summary of the gaps are as follows:

- Pedestrian Network - No network is defined, however the core area of the Activity Area is recognised as a Pedestrian Priority area under Smart Roads.
- Bicycle Network - Principal Bicycle Networks are recognised in the area however connectivity consideration is required with the Activity Area.
- Tram Network - Tram 109 has a fixed alignment along Whitehorse Road and recognised as a Tram Priority Route under SmartRoads. Dialogue is required in terms of how future DDA compliant stops will be integrated with the pedestrian, bicycle and traffic realm.
- Bus Network - No bus priority routes in the vicinity under SmartRoads. Network priority not required, however, service frequency and weekend improvements required for bus 285.
- Belmore Road and Canterbury Road are recognised as preferred east-west through traffic routes in the area as recognised under SmartRoads.

The following sections outline further analysis and research that include the development of the Principal Pedestrian Network, the Bicycle Network and the integration of DDA compliant tram stops.

9. Analysis and Research

The surveys and background data collection identified issues, challenges and opportunities together with gaps in analysis or research required to complete the Access Plan. The following section completes the gaps in analysis and research.

Principal Pedestrian Network

The reason for developing a Principal Pedestrian Network (PPN) is to identify the priority walking connections with a destination. Once a PPN is determined it can assist and influence the allocation of funding, infrastructure provision and discussions surrounding road user priorities. The overarching objective is to support and encourage walking as a viable transport option for regular and essential daily trips including trips to and from work and shops.

The Department of Transport has defined a methodology that models walking to key destinations which aim to identify strategic walking routes (PPN) for improvement. The aim of this process is to identify the PPN by determining the pedestrian corridors that are of the greatest strategic significance through understanding their importance in terms of connecting the community.

The process of defining a PPN involves GIS modelling, pedestrian surveys and site observations. The GIS modelling involves the designation of the primary destinations and secondary destinations and the walkable catchment along the shortest routes which are then mapped to zones that represent the surrounding residential population. The zones are determined using 2006 Census data mesh blocks with each zone given a population based on the number of residents. Each pedestrian path is weighted by the number of potential walking trips.

Primary Destination

For Balwyn, the shopping strip along Whitehorse Road (between Balwyn Road and Iramoo Street) has been chosen as the primary destination. This has been chosen as the primary destination as it represents the most intense area of retail and pedestrian activity along the Whitehorse Road retail strip servicing the surrounding Balwyn residential area.

Secondary Destinations

Destination	Type	Population
Balwyn High School	School	1940
Camberwell Grammar School	School	1311
Camberwell Girls Grammar School	School	768
Canterbury Girls Secondary College	School	985
Strathcona Baptist Girls Grammar School	School	783

Models and Calibration

A number of models were tested and calibrated against pedestrian counts surrounding the Activity Area. Counts were taken outside the car park areas in order to ensure that the pedestrian numbers which counted walking into the Activity Area were not distorted by those driving and walking a short distance.

The model below is considered representative based on the pedestrian counts undertaken in early 2011. The model illustrates the routes weighted by population and highlights the corridors that best serve pedestrian access for the surrounding community to the Activity Area. All paths are used in the vicinity, but some see significantly higher footfall due to the connectivity of streets providing the most

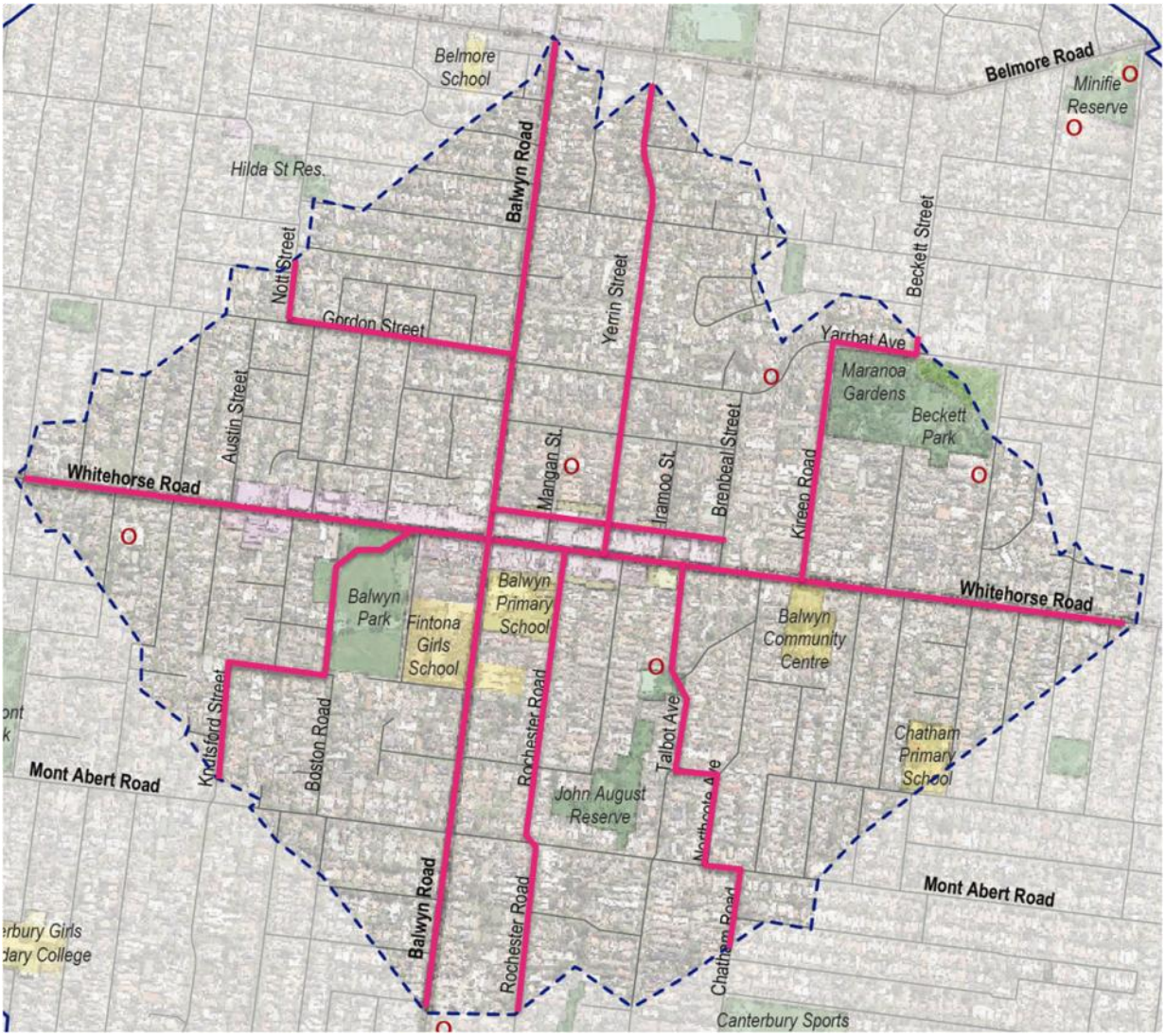
direct and accessible routes. Accordingly, to see best value in terms of pedestrian infrastructure improvements, these corridors should be designated Principal Pedestrian Networks and targeted for priority measures within a framework that considers all modes of access.

Sensitivity to and Expanding Activity Area

Development suggests that the Activity Area is expanding, particularly to the west beyond Balwyn Park. The expansion of the Activity Area would likely result in a change in focus. At present this is around Yerrin Street. However a new focal point may develop around the Balwyn Theatre if the currently approved mixed use supermarket/residential/office development is constructed in the vicinity of the theatre.

Principal Pedestrian Network

The modelling produced a range of maps; these are illustrated within Appendix A4. The maps were compared against pedestrian counts, side observations and discussed amongst stakeholders before outlining the following PPN:



Seating

Two types of seating arrangements are identified in Balwyn; seats and benches. Seating with arm rests and benches need to be compliant with dimensions within AS1428.2 to ensure they are DDA compliant.

There is no hard and fast rule when it comes to the spacing of seating along streets. The City of Melbourne Council's street furniture plan within the CBD outlines the placement of seating at each mid block point with a maximum distance between seats of no more than 200 metres.

Without regular seating, significant numbers of people with mobility difficulties may be excluded from the pedestrian environment. In order to make the Balwyn Activity Area a more inclusive and accessible environment, it is recommended that a 200-300 metre spacing of seating is providing along principal pedestrian access routes to the Activity Area as defined by the modelling and discussions with key stakeholders.

DDA compliant tram stop integration

The Federal Government set a benchmark that all public transport in Australia is DDA (*Disability Discrimination Act 1992*) compliant by 2012. Due to the cost and difficulties, dispensation until 2032 under the *Human Rights and Equal Opportunities Commission Act 1999* has been granted. However, interim benchmarks are in place for the tram network, 25% by 2007 and 55% by 2012 (Currie, 2006).

The emphasis should be on developing a DDA compliant tram stop that best meets the needs of the Balwyn Activity Area.

Yerrin Street Public Space

There is limited public space and green infrastructure along Whitehorse Road (Balwyn Structure Plan). The challenge is to identify opportunities for improving the public realm. The following were considered:

- Removal of clearways at the heart of the Activity Area with the aim of introducing wide pedestrian footpaths that could also integrate to form a kerb extension tram stop. Whitehorse Road capacity is primarily constrained by the Balwyn Road junction. A reduction in parking would be required and clearways removed. This initiative is not supported by VicRoads.
- Creation of a public area at a side road location. Yerrin Street experiences significant pedestrian movements and also safety concerns in terms of turning traffic.

Further investigations were undertaken to inform a Yerrin Street closure immediately adjacent to Whitehorse Road. The following images present the general concept in plan.

Existing Access (Map source Nearmap)

Proposed Access (Map source: Nearmap)

An opportunity to introduce an attractive community space at Yerrin Street has the following benefits:

- Reducing conflict risks between pedestrians and traffic through reconfiguring car park access arrangements away from the busiest pedestrian environment.
- A small number of additional parking bays (a net increase) across Yerrin Street and a few additional bays may be available along Whitehorse Road.
- A new community facility in terms of a small park, event and/or market area for the community.
- There may be a reduction in through traffic, particularly along Yerrin Street.
- The close right turn movements between Weir Street and Yerrin Street are removed and the number of complex turning movements simplified. Tram 109 improvements could include median tram stop arrangements that could include a protective arrangement for right turning vehicles.

Surveys undertaken indicate that pedestrian activity at Yerrin Street between the car park and Whitehorse Road is high with almost 2,800 pedestrian movements over a Friday (6am-7pm) and close to 300 pedestrians during the peak hour despite wet conditions during the day of the survey. Peak hour flows are higher again on a Saturday with 400 pedestrians an hour surveyed and limited counts on a Thursday indicate over 600 pedestrians an hour.

Traffic levels are also notably high at the Yerrin Street/Whitehorse Road intersection with close to 3,700 vehicles using the southern end of Yerrin Street; 1,650 vehicles travel between Whitehorse Road and the car parking area, the remaining 2,050 vehicles are through vehicles that include vehicles that originate from the local residential area.

With a public space to the southern end of Yerrin Street, it is considered that:

- Traffic that currently accesses the car parks from north will continue to do so via Yerrin Street.
- Traffic that currently accesses the car parks from the south from Whitehorse Road would do so via the southern end of Mangan Street and Iramoo Street. These intersections would operate at levels commensurate to the existing Yerrin Street intersection.
- Local residential traffic exiting to Whitehorse Road would divert via Balwyn Road, Iramoo Street, Mangan Street and Brenbeal Street.
- Yerrin Street through traffic would divert to more suitable through routes such as Balwyn Road, some diversion would occur via Mangan Street, Jurang Street, Iramoo Street and Brenbeal Street.

Further investigations / consultations will be required in terms of developing the concept inclusive of further traffic investigations.

Pedestrian Friendly Roundabout Design

Roundabouts are recognised as a safe and efficient intersection control for motor vehicles. Their impact on the safety of pedestrians and cyclists is less clear. Various techniques can be employed to provide a safer environment for pedestrians crossing the road at a roundabout intersection. It is important to consider the provision of zebra crossings and signalised crossings at roundabouts to support pedestrians.

In built up areas various examples provide pedestrian crossings at the hold line or within 6 metres of the hold line to minimise the distance pedestrian must deviate to cross the road safely.

An example of pedestrian friendly configurations with the pedestrian crossing at the hold line are the Cecil Street/Coventry Street and Cecil Street/York Street roundabouts in South Melbourne. The Monash Accident Research Centre was commissioned by the City of Port Phillip in August 2005 to conduct research into the impact of the Cecil Street/Coventry Street roundabout on pedestrian safety and convenience. The review made the following key finding, *"Based on evaluation of the parameters mean speed and speeds above critical values, pedestrian compliance, pedestrian crossing time and pedestrian perception of the site, the new pedestrian facilities installed at the Cecil St/Coventry St roundabout appear to have had a positive effect on safety and convenience for pedestrians. The creation of a more pedestrian-friendly area that raises the profile of pedestrians and likely to encourage walking, also supports the key principles of the Council's Sustainable Transport Framework."* (MARC - Evaluation of Alternate Roundabout Treatment, August 2005)

Source: Google Maps

Whilst the improvements to these roundabouts were approved by VicRoads, further proposals are also subject to VicRoads assessment and approval.

Car Share

Car share is essentially a membership based pay as you go car service. It is a new market that provides an extension to the public transport system. For those who don't use a car on a daily basis it provides the benefits of car mobility when it is needed, without the need to own a car. This is a paradigm shift as it breaks the habitual use of a car and results in the choice of more sustainable modes more often.

There are also a range of benefits including:

- Reducing household expenditures resulting in more affordable living.
- A fleet of cars accessible to businesses.
- Transport choices that benefit the environment and the health of the community.
- Reduced land take for parking and potentially more community space.
- Greater mobility for those who do not own a car.

Car share companies and their respective government partners have collated compelling evidence gathered through car share user surveys. The surveys have gathered information on changes in travel behavior including the level of household car ownership. In the City of Melbourne, a single car share removes 7.8 private vehicles from circulation; in the City of Sydney this was found to be marginally higher. At isolated car share locations, the number has been up to 14 private cars removed from circulation.

In Washington DC, car share members increased their use of public transport by 46%, cycling by 10% and walking by 25% (Millard-Ball, A. Murray, G. Schuire, J. Fox, C. 2005, Car-sharing: Where and How it Succeeds, Transportation Research Board, Washington).

10. Plan Development

The objective of the plan is to develop outcomes that consider infrastructure interventions and priorities that support transport choice and in turn help deliver health, equity and environmental benefits to the wider community. Policy, best practice and research clearly indicates that high car use is problematic for Melbourne and the Balwyn community. Transport options and choice have a significant cost in terms of liveability, health and the economy.

Walking is the most important mode for those who visit the Balwyn Activity Area on a daily basis. It is evident that a very high proportion of those interviewed live within walking distance. However, the car is the dominant mode overall and the most important mode for weekly visitors.

The question in terms of developing the plan is how do we support increased transport choice and encourage a greater proportion of the community to walk, cycle and use public transport? This has to be answered in a strategic manner, where can we achieve best value improvements that maximises the support for walking, cycling and public transport use.

Defining strategic networks is the beginning. Networks are both regional and local and often depend on the catchment dynamics of each respective mode of transport. There are a number of networks that have a regional strategic significance and these have been defined by VicRoads. There are other networks that have required input by Council including the Principal Pedestrian Network and local bicycle routes that connect the community and connect with regional bicycle links.

Issues and opportunities associated with each priority network become a priority for improvement. How these networks are configured and designed becomes increasingly important the closer they relate to the Balwyn Activity Area. Some networks also have multiple priorities, for example Whitehorse Road has a pedestrian priority (VicRoads and PPN), tram priority (VicRoads), bicycle priority (PBN) and whilst not a preferred traffic route, the corridor has a traffic function which is inclusive of clearways. How these conflicting uses are managed can be fundamental to capacity and performance but also to health and liveability.

Pedestrian Access

Walking is a notable existing mode share. Of those surveyed, approximately 22% of those who accessed the Activity Area did so by walking. Importantly, over half of those shopping at the Balwyn Activity Area are within walking distance. Improving walking conditions is the most important mode of transport for local residents.

The topography of the area and the lack of regular rest opportunities serve as a notable barrier to those with mobility difficulties and this further restricts a healthy level of activity. The level of traffic and speed is also a notable challenge along main and residential streets. The majority of pedestrian road crashes fall disproportionally on older residents.

The City of Boroondara is ranked second highest of the 16 municipalities in the Melbourne south-east metropolitan area for pedestrian fatalities. This is also a reflection of more of the community wanting to walk and being adversely affected by traffic levels and speeds.

The opportunities for improving pedestrian access include:

- Define priority networks that best support walking access for the community and provide priority in terms of infrastructure that support pedestrian amenity.
- Regular seating, together with shade opportunities in the summer.
- Reducing traffic speeds and improved priority along residential streets.
- Complete missing links and better prioritise pedestrian movements.
- Highlight walking times and health benefits on signage to the Activity Area at key locations.

Bicycle Access

No respondents from the Consumer Questionnaire Survey used a bicycle to access the Activity Area, although bicycles are regularly observed parked along Whitehorse Road. Approximately 6% of respondents indicated that they owned a bicycle which is dramatically below the Melbourne average of approximately 52% (Australian Bureau Statistics 2009).

The Housing Preference Survey (draft 2011) indicated that in terms of change, bike tracks/facilities and public transport were ranked higher than parking in Kew East, Hawthorn East, Glen Iris, Balwyn, and Deepdene.

Given the catchment distances of many who access the Balwyn Activity Area, the bicycle is a well suited mode, although the topography is a challenge. However, given the likely uptake of electric bicycles, topography should not be a significant issue.

Opportunities for improving bicycle access include:

- Connections with bicycle routes that have a regional significance.
- Reducing traffic speeds along residential streets.
- Introducing on-road/shared bicycle connections within reduced speed environments in a manner that informs motorists of a shared bicycle corridor.
- Accommodating bicycles with respect to future accessible tram stop requirements.

Public Transport Access

In an open ended question, Balwyn residents indicated that public transport was a way in which their neighbourhood had changed for the better; this was notably higher than that indicated for other Boroondara wards (Housing Preference Survey - draft 2011). In choosing to live in a suburb, good access to public transport was ranked only second to the price of a property in selecting a suburb in the City of Boroondara. This ranked higher than the price of a property in Balwyn although slightly lower to the proximity of shops and Activity Areas.

Questionnaire surveys within the Balwyn Activity Area highlighted that despite the catchment for the centre being relatively local, 11% indicated that they used public transport.

Opportunities for improving public transport acces include:

- Tram 109 improvements including DDA compliance will increasingly be required in lieu of the ageing community and this will assist residents to retain a level of mobility without a car.
- Integration of seating and shade opportunities with public transport opportunities.
- Increased bus service frequency inclusive of weekend operation.
- Improved walking routes that support access to public transport opportunities.

Car Access

Car access provides access opportunities for many in the community but traffic is also the greatest concern in terms of health and safety. There should be a focus on optimising access by car rather than maximising access by car.

91% of respondents in the Housing Preference Survey (draft 2011) indicated low traffic area as of medium to high importance (rated slightly more important in Balwyn and Balwyn North).

Traffic speeds of 50 km/h and 60 km/h are not conducive to a pedestrian/bike environment as the rate of survival in a crash is remarkably low at these traffic speeds. A number of residential streets experience unsuitable road speeds. It is also evident from the analysis that reducing road speeds significantly improves road safety for motorists. Further concern is raised in terms of vehicle

emissions with studies showing a similar order of fatalities to road crashes that again fall disproportionately on the elderly.

Opportunities to manage car access are as follows:

- Manage demand for car use and parking through improving and encouraging access by other modes. This will improve amenity for those who have no choice but to drive.
- Improved management of road speeds in residential streets.
- Anticipate growth in shared parking needs as the retail/commercial offer increases.
- Reduce the need to own a car through a car share program which reduce car use and parking demand.

Community/Green Space

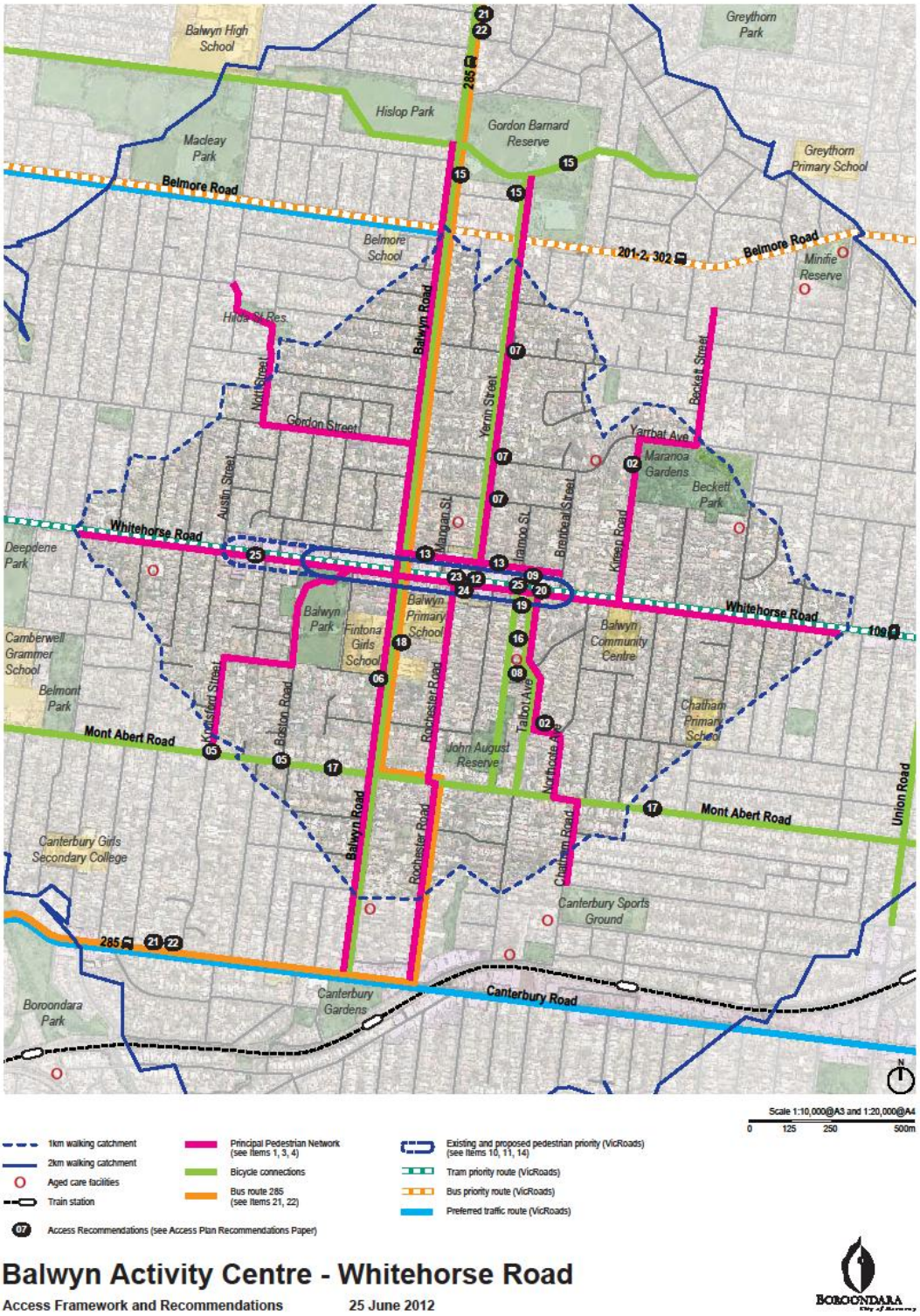
There is limited public space that is designated for people and pedestrians in the Activity Area. Footpaths provide poor amenity and comfort for a shopping/commercial area and there is limited opportunity to get away from the heavy traffic environment.

There are opportunities to improve public space by:

- Removing/rationalising street clutter along pedestrian environments that are limited.
- Reallocating road space at side roads for use by the community.

11. Access Framework

The framework is a key component of the Access Plan and provides a vision and foundation for improving access and providing an improved balance between all modes of transport. The framework is used to prioritise modes, identify improvement measures and prioritise infrastructure spending. This aims for good liveability outcomes and in particular healthy more active mode choices.



12. Community Consultation Summary

Council endorsed three papers for community consultation, a Context Paper (CP), an Access Plan (AP) Recommendations Paper, and a Parking Precinct Plan (PPP) Recommendations Paper.

The AP highlights 25 recommendations with the objective to improve community transport choice. The PPP highlights 8 recommendations associated with accommodating the future parking needs of all transport modes. Underlying the recommendations are local, regional and international research that provides a context for policy and transport challenges.

Community Questionnaire Survey

The engagement included a mail out to over 2,000 addresses. The mail out included a questionnaire, letter and direction to the project web page for further information with particular reference to the summary papers. The full analysis can be found in Appendix A5.

A total of 120 questionnaires were received. The majority of respondents (63 percent) were aged between 50-84 years, with the largest response received from the 70-84 age group (26 responses). Only 11 responses were received within all age groups 34 and under.

Overall, respondents felt it was most important to ensure that developers contribute to the improvements to all modes of access and to better manage traffic and safety in partnership with adjacent schools, and that it was least important to revise car parking rates and develop a cash in lieu mechanism for parking that cannot be built on site.

The following table provides a summary of the response from the community:

Recommendations	**Very and important combined**	**Summary**
#1 Better encourage, support, protect and reward those who adopt healthier and more sustainable transport choices that impact less on the community.	86 (80%)	Highly supported
#2 Ensure that developers contribute to improvements to all modes of access.	96 (91%)	Highly supported. Community expects Council to be strong with developers in ensuring good transport/access outcomes.
#3 Designate principal pedestrian routes for improvement in safety, information and amenity (including regular seating) to the activity centre and schools.	91 (84%)	Highly supported. Feedback also highlights a need for a special Balwyn 'travelsmart' style initiative that is locally branded and driven. Several responses have indicated the development of a "Walk" brochure.
#4 Create a community space at Yerrin Street and extend parking across the Yerrin Street road reserve.	49 (49%)	Overall 49% indicated very important and important with a high level of respondents indicating not important. However, for residents that live within the north-east quadrant, 91% indicated this as very important or important. Additional clarity was requested regarding

		this item. Investigation and a design is required for consultation in order to allow clarity about what can be achieved.
#5 Better manage traffic and safety in partnership with adjacent schools.	89 (85%)	Highly supported (89%). Issues at Mont Albert Road, Rochester Road, Balwyn Road, Cherry Road and Millah Road particularly noted. One way operation suggested on Cherry Road. Improved enforcement of parking regulations required. Behaviour change and safer routes to school required.
#6 Improved bicycle connections to the north and south of the activity centre.	67 (64%)	High levels of support, particularly given that 63% of respondents were aged 50-84.
#7 Improved community bus and taxi facilities integrated at the heart of the activity centre.	81 (74%)	Highly supported.
#8 Seating at all public transport stops that support access to the activity centre.	88 (80%)	Highly supported and key locations also need to be targeted with shelter/shade. Tram stops at Kireep Road in particular.
#9 Continue to advocate for improvements to bus 285 and tram 109 accessibility.	91 (83%)	Highly supported.
#10 Increased parking durations west of Balwyn Road at Cherry Road and behind service station at Balwyn Road.	61 (56%)	Some support with a high response indicating not important. Suggested 3 hour parking only to 90 degree parking on park side, incorporated into the Parking Precinct Plan. Concern was raised about park and ride with tram activities.
#11 Permit rear activation of laneways through allowing the opportunity for offsite parking provision/contributions.	51 (50%)	The recommendation relates to allowing businesses to open frontages to the laneway. Only half (50%) of respondents indicated very important/important, a high response indicating not important. Given the lack of support for cash in lieu (#13) the activation of laneways are limited.
#12 Support the parking needs of all modes on street and within development (bicycle, car, taxi, motorbike, car share, public transport).	79 (73%)	Highly supported (73%). Feedback supports both Access Plan and Parking Precinct Plan measures.
#13 Car parking rates to be revised and cash in lieu mechanism developed for parking that cannot be built on site.	43 (47%)	Revised parking rates and cash in lieu supported the least (47%). Comments received clearly articulate that developers need to contain their parking on site. A relatively high proportion, 10%, did not understand the recommendation. A cash in lieu mechanism will be required to accommodate future shared parking needs.

Stakeholders

Meetings were held with VicRoads, the Department of Transport, Boroondara Bicycle User Group and the Community Disability Advisory Committee. Feedback was also received from Bicycle Network Victoria. The plans were well supported by all stakeholders.

A dialogue with VicRoads in terms of some of the recommendations will need to continue in terms of completing network fit assessments to ensure that any reallocation of time and space on the transport network is a balanced and robust outcome. Key items include DDA compliant tram stops, improvements in bicycle infrastructure, the possible closure of Yerrin Street to create a community space and any new crossings in line with the Principal Pedestrian Network.

Walk Rest Talk Community Focus Groups

Community Planning undertook a series of workshops with elderly residents from the Balwyn area as part of the 'Walk Rest Talk' initiative. The initiative focuses on improving and encouraging walking in Balwyn.

The focus groups gathered information on a number of mobility access considerations including:

- Providing seating at all public transport stops and shelters at key stops.
- Investigating changes to seating material (steel seats often too hot and cold and do not dry quickly).
- Reviewing waiting/crossing times at pedestrian lights (waiting too long and crossing too short);
- Installing more zebra and road crossings (including two-stage crossings).
- Investigating fast driver behaviour that limits safe crossing on Gordon Street, Balwyn Road and Talbot Avenue.
- Installing a pedestrian crossing on Whitehorse Road at Kireep Road to integrate with the tram stop for the residents of the Maranoa Retirement Village.

SWAT - Pedestrian/Disability and Access

Feedback from the volunteer convenor of the Scooter Wheelchair Access Team (SWAT) included:

- Trader furniture and some street furniture is problematic and obstructive.
- Footpath is often too narrow to allow scooters and prams to pass.
- DDA compliance at trams lacking, however interim improvements can be made through removing street furniture and widening pedestrian crossing pram ramps in order to improve waiting place and access to trams.
- Pram ramps at side road crossings are poorly directed.

Summary of Access Plan Changes

The implications of the feedback from the consultation exercise are discussed below and these result in changes or additions to existing recommendations or new initiatives.

The Access Plan highlights 25 items with respective recommendations. The items listed in section 13 are numbered in line with the Access Plan Recommendation Paper. Based on the comments received the following considerations are made:

- Item 3: Seating Amenity - The steel seating is highlighted as too cold/hot and does not dry quickly. It is recommended that the type of seating be investigated however, it is recognised that this is a broader City of Boroondara wide consideration.

- Item 6: School Pedestrian Environment - To include an investigation into a potential one-way operation of Cherry Road/Millah Road particulary at school pickup/drop off times. Potentially designate drop off zones that consider/maximise the safety of children.
- Item 10: Pedestrian Width Whitehorse Road - Trip hazards to be included as an issue that require resolution.
- Item 11: Side Road Crossings - The recommendation advocates for raised side road crossings, however at locations this may not be plausible and the recommendation should ensure that pram ramps are improved and provide appropriate direction for the vision impaired.
- Item 12: Yerrin Street Public Space - Report to include greater detail in terms of the impact and what can be achieved in terms of public space. This recommendation will require further investigation and consultation as part of any design exercise.
- Item 13 to be removed: Northern Pedestrian Laneway - With a relatively low level of support and a low level of support for cash-in-lieu for parking contributions, the activation of the laneway will be limited. Item to be removed.
- Item 23: Railings at Tram Stops - Interim arrangements prior to the introduction of full accessible tram stops could better support tram access. Item to include interim improvements including removing street furniture and widening pedestrian crossing pram ramps in order to improve access to trams.
- New Item A: Develop a Balwyn 'travelsmart' style initiative that is locally branded and driven. Several responses have indicated the need to develop a "Walk" brochure and this is also iterated under the Walk Rest Talk project.
- New Item B: Shade/shelter facilities to be investigated for provision at key bus and tram stops. A notable location is at the tram stop near Kireep Road.
- New Item C: Investigate the provision of a new pedestrian crossing adjacent to Kireep Road that integrates with tram stop provisions. This may need a view to potential tram stop changes in line with Tram 109 and will require justification and dialogue with VicRoads.
- New Item D: Traffic speeds require investigation along Gordon Street and Talbot Road in particular. Broader 40 km/h speed limits on residential roads could also be an option for investigation which would benefit pedestrians, bicycle riders and in particular car drivers/passengers.
- New Item E: Investigate Park and Ride activity with tram services with particular reference to Norbert Street and respond in line with Council's Parking Management Policy.
- Item F: Investigate pedestrian signal waiting/crossing times. Reported as waiting times being too long which increases risk taking and crossing times too short which is problematic for older pedestrians.

Other feedback has been incorporated into the Balwyn Parking Precinct Plan. This includes a 3 hour limit for 90 degree parking on Cherry Road and considerations surrounding cash in lieu.

13. Recommendations

This section outlines the recommendations of the Access Plan report. Each recommendation also provides a brief insight in terms of the identified issues and provides a supportive discussion.

The project builds upon the Balwyn Structure Plan by providing strategic access recommendations that aim to support improved transport choice within the Balwyn Activity Area. In line with the *Transport Integration Act 2010*, the Access Plan (AP) was developed in parallel with a Parking Precinct Plan (PPP) to ensure that no transport mode is considered in isolation.

The study examines each respective mode identifying issues and opportunities to enhance connectivity with the Balwyn Activity Area. All modes are considered in terms of amenity, parking and their respective catchment dynamics. The recommendations also identify spatial and operational solutions that enable implementation of objectives set out in the Structure Plan.

Recommendations consider key global, national, state and local research. Parking recommendations are presented in the PPP report.

The AP and PPP have a clear objective to improve healthier transport choices that impact less on the immediate and wider community.

Each respective recommendation is framed by the issue and a discussion. Access recommendations are structured under the following categories:

- **Pedestrian: Community Connections - Items 1 to 9**

  Recommendations identify pedestrian access initiatives to support walking amenity to the Balwyn Activity Area.

- **Pedestrian: Activity Area - Items 10 to 12**

  Recommendations build upon the recommendations outlined in the Balwyn Structure Plan and focus on initiatives within the Balwyn Activity Area.

- **Bicycle - Items 13 to 19**

  Recommendations identify bike access improvements to the Balwyn Activity Area.

- **Public and Community Transport - Items 20 to 25**

  Recommendations identify public transport improvements, some items are ongoing items of advocacy with state authorities.

- **New Recommendations - Items 26 to 30**

  New recommendations following consultation with stakeholders and the community.

Item 1: Principal Pedestrian Network

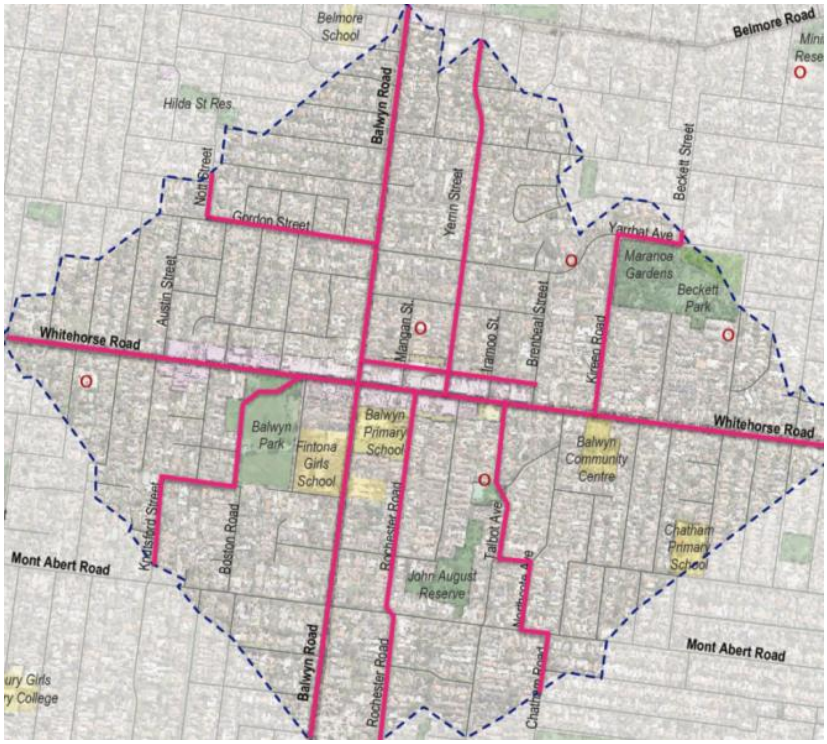
Issue: Walking improvements are not considered on a corridor basis between the residential catchment and the Balwyn Activity Area. The Balwyn Structure Plan recommends pedestrian improvements, but only once a pedestrian has arrived at the Activity Area rather than improvements that enhance walking conditions to the Activity Area. There is currently no recognition of priority walking routes that should be audited and targeted for safety, comfort and accessibility improvements to the Balwyn Activity Area.

Limited daily physical activity is a significant and growing health concern. For example, by 2025 the number of obese Australians will surpass those of a healthy weight; only 28% of adults will be at a healthy weight whilst 34% will be obese (Walls. H, 2011. *Australian Diabetes Obesity and Lifestyle Study*). Impacts include heart disease, obesity, cancer, diabetes and balance/stability/accessibility issues in later life (Australian Local Government Association et al, 2010. *Australian Vision for Active Transport*).

Recommendation 1.1: Audit the Principal Pedestrian Network that supports access to the Balwyn Activity Area. Highlight issues and opportunities to improve pedestrian corridors over a distance of approximately 1 kilometre.

Discussion: Walking is the most important form of access for daily visitors to the Balwyn Activity Area (Consumer Survey 2011). Improvements are required to support those who currently walk and to encourage others to walk, to the Activity Area. Walking is a key trip chain in any public transport journey.

Boroondara has the highest population of people over the age of 80 in Victoria (Australian Bureau of Statistics) and those interviewed at the Balwyn Activity Area are predominantly over 50 years of age (Consumer Survey 2011). Given the demographic, a safe walking environment that supports the older community to remain active and mobile is an important consideration for accessibility to the Balwyn Activity Area.



The benefits of adopting a Principal Pedestrian Network and delivering improvements and further encouraging walking include health and wellbeing, reduced parking and traffic pressures, reduced social isolation, improved air quality and increased surveillance/safety and community interaction.

The Department of Transport has defined a methodology that models walking to key destinations which aim to identify strategic walking routes (Principal Pedestrian Network) for improvement. Modelling has been completed and validated against pedestrian counts for the Balwyn Activity Area identifying strategic walking routes that would best serve the community in walking to the Balwyn Activity Area.

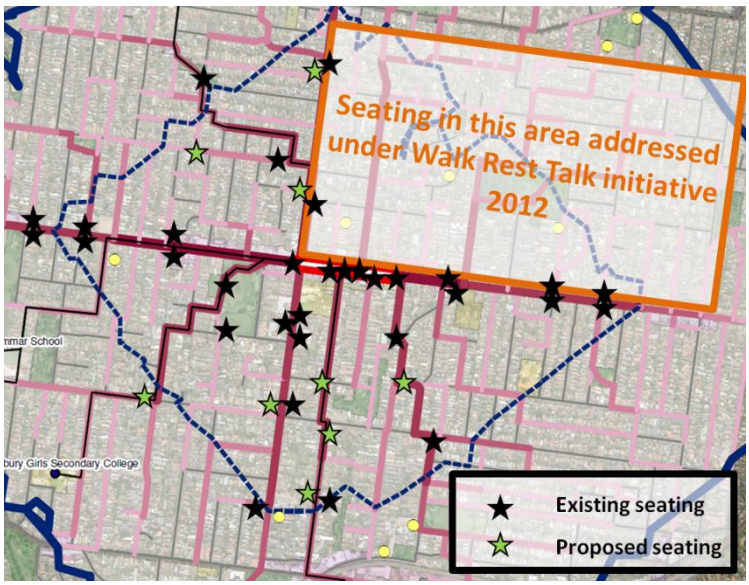
Item 2: Path Links Missing

Issue: Missing footpaths occur at Kireep Road adjacent to Maranoa Gardens and the northern side of Evergreen Avenue.

Recommendation 2.1: Investigate the construction of a new pedestrian path along Kireep Road and Evergreen Avenue.

Discussion: Site inspections, pedestrian counts and the Principal Pedestrian Network modelling highlight pedestrian desire lines that are not supported by pedestrian footpaths. The links highlighted are important to the community in accessing the Balwyn Activity Area. Completing the gaps at Kireep Road adjacent to Maranoa Gardens and the northern side of Evergreen Avenue will provide much needed continuous access routes for pedestrians, wheelchair and scooter users as well as a safer walking environment for people using vision and mobility aides and prams.

Item 3: Seating Amenity



Issue: Seating is focussed within the Activity Area but does not support access to the Activity Area other than seating associated with regular tram stops along Whitehorse Road. Existing steel seating can be both too hot and too cold and detract from the comfort of seat provision.

Recommendation 3.1: Install seating at regular intervals along key pedestrian approaches as guided by the Principal Pedestrian Network to support walking access. Seating to be located to benefit multiple purposes including public transport and parks.

Recommendation 3.2: Investigate an alternative to current steel seating.

Discussion: 51% of those interviewed in the Balwyn Activity Area live relatively close or within the immediate post code area (Consumer Survey 2011). The older community is a significant proportion of those who regularly visit the Activity Area. 76% of those interviewed were over the age of 50. The older community in particular benefit from the certainty of good seating amenity which enables mobility and exercise. At locations seating can be placed to jointly serve pedestrians and public transport.

There is no hard and fast rule when it comes to the spacing of seating along streets. The limited guidance that was found highlighted that a spacing of 200-300 metres may serve a pedestrian access corridor.

Item 4: Wayfinding and Daily Physical Activity

Issue: Car ownership has increased between 2001 and 2006 and Balwyn and Balwyn North demonstrate some of the highest levels of car ownership in Melbourne (Census 2001 & 2006). Surveys undertaken as part of this study indicate that 66% arrived by car despite the catchment for the Activity Area being predominantly the immediate postcode area (Consumer Survey 2011). There is an increasing awareness of the relationship between car use and the overweight and obese (The Institute for European Environmental Policy, 2007. *Unfit for Purpose).* Car use reduces the level of incidental/everyday physical activity required to promote health.

Recommendation 4.1: Develop a wayfinding strategy that supports and encourages walking along the Principal Pedestrian Network.

Recommendation 4.2: Implement wayfinding signs with simple health messages that relate walking to the recommended healthy daily physical activity as a means of access to the Balwyn Activity Area.

Discussion: Inadequate physical activity is a significant societal cost which increases the risk of obesity, cardiovascular disease, low bone density, diabetes and cancer (Australian Local Government Association et al, 2010. *Australian Vision for Active Transport*). The economic impact of sedentary lifestyles is estimated to be approximately $13 billion a year (Australian Local Government Association et al, 2010. *Australian Vision for Active Transport*). In 2008, 3.71 million Australians (17.5%) were estimated to be obese; the estimated cost of obesity in Australia in 2008 was $58.2 billion (Access Economics, 2008; *The Growing Cost of Obesity in 2008*). Encouraging older people with limited mobility to stay active through short walks and properly supported pathways (with seating and signage) will improve the health and wellbeing of the ageing population in this region.

Wayfinding will also allow wheelchair and scooter users to recognise continuous pathways and give them confidence in using these routes knowing that there will not be gaps in footpath amenity.

Indicating a relationship between walking to the Balwyn Activity Area and meeting your daily physical activity provides a powerful behavioural perspective and means to improve liveability.

Item 5: Pram Ramps Missing

Issue: Missing pram ramp at the Mont Albert Road/Knutsford Street intersection and at the Mont Albert Road/Boston Road intersection. These fall along key links to the Balwyn Activity Area.

Recommendation 5.1: Investigate the introduction of pram ramps north/south at the Mont Albert Road/Knutsford Street and at the Mont Albert Road/Boston Road intersections.

Discussion: Pram ramps support access for the young, elderly and people using a range of mobility aides. The locations highlighted are important to the community in terms of direct pedestrian links to the Balwyn Activity Area.

Item 6: School Pedestrian Environment

Issue: There is significant school drop off activity adjacent Fintona Girls School. Vehicles also enter the school grounds crossing the footpath at Balwyn Road. The vehicle exit at the Millah Road/Balwyn Road intersection is substandard and a particular risk to pedestrian safety. There are numerous conflict point that should be rationalised to improve safety.

Recommendation 6.1: Engage and develop a school travel plan to better understand access initiatives that would better support healthier access.

Recommendation 6.2: Investigate improvements to conflicts at the Millah Road/Balwyn Road/school exit.

Recommendation 6.3: Investigate the introduction of raised side road crossings at the intersection of Balwyn Road and Millah Road and at the intersection of Cherry Road and Whitehorse Road to raise the profile of pedestrians.

Recommendation 6.4: Audit and improve routes to school particularly those that align with the Principal Pedestrian Network.

Recommendation 6.5: Investigate one-way operation of Cherry Road/Millah Road, a reduced speed environment and designated pickup/drop off areas.

Discussion: Children who actively commute to school have higher levels of physical activity and improved cardiovascular fitness compared with children who do not walk or cycle to school (Davison et al 2008*; Children's active commuting to school: current knowledge and future directions*). Children and young people who are physically active are more likely to be active adults, resulting in health benefits across the life course (Trost et al 2002.

Correlates of adults' participation in physical activity; Kjonniksen et al 2008. *Tracking of leisure-time physical activity during adolescence and young adulthood*).

Item 7: Yerrin Street Roundabouts

Issue: There are three roundabouts along Yerrin Street that help to moderate traffic speeds, however they do not provide ease of use for pedestrians. The arrangement is not conducive to supporting a key pedestrian link and it is evident from observations that older pedestrians in particular find the current arrangement uncomfortable.

Recommendation 7.1: Investigate raised treatments at roundabouts along Yerrin Street.

Discussion: Yerrin Street is a key pedestrian corridor for the community north of the Balwyn Activity Area. Pedestrian counts and modelling identify a desired link with the heart of the Activity Area. The presence and comfort of pedestrians requires support in order to encourage a suitable environment to encourage walking and bike use for all members of the community with the Activity Area. Elderly pedestrian access in particular would have much to gain with a more suitable roundabout configuration.

Raised treatments would allow pedestrian priority, reduce traffic speeds and allow elderly pedestrians in particular more time to cross without the need to negotiate pram ramps.

Item 8: Evergreen Pedestrian Link

Issue: Wayfinding and access is difficult between Talbot Avenue and John August Reserve.

Recommendation 8.1: Improve the legibility of the connection through the Evergreen Centre connecting communities directly with John August Reserve.

Discussion: Fine grained pedestrian networks provide ease of access and direct pedestrian connections, particularly to shops, services and green space. Balwyn Welfare Association has indicated an intention to renovate, demolish and construct facilities at The Evergreen Centre. The Evergreen Centre is used by senior groups who have identified an interest in improved walking amenity to and around this facility.

Item 9: Protection of path from parking vehicles

Issue: Pedestrians are not adequately protected along Brenbeal Street adjacent to Whitehorse Road from parked vehicles with the footpath consistently obstructed.

Recommendation 9.1: Consider treatments to prevent cars from encroaching the footpath at Brenbeal Street and better protect pedestrians through either, a raised and widened footpath and a kerb line or the introduction of bollards.

Discussion: Walking is the most important form of access for daily visitors to the Balwyn Activity Area whilst weekly visitors are most likely to drive (Consumer Survey 2011). The protection of often limited pedestrian space is essential and this becomes particularly important for prams, wheelchairs, scooters and people with vision impairment. Wheel stops have been traditionally used, however these also cause problems for elderly pedestrians who don't see or anticipate the wheel stops.

Item 10: Pedestrian Width and Amenity Whitehorse Road

Issue: Footpaths provide poor amenity and comfort for a shopping/commercial area. Trader stands and tables, electricity/lighting poles, carriageway width, street furniture, parked motorbikes and road signs all have an impact on the available width for pedestrians. Trader stands along the building line are problematic for the partially sighted and contravene our local law on street furniture and are not DDA compliant. Actual width for the movement of pedestrians is frequently reduced to inadequate minimum footpath standards. This becomes particularly problematic for people with a disability and is frequently highlighted by the community.

Recommendation 10.1: Audit, remove or relocate unnecessary street clutter along Whitehorse Road footpaths including bollards, signage, seating, fencing and bins to reduce pinch points and improve pedestrian widths.

Recommendation 10.2: Discuss trader stands and furniture with trader association with a particular focus on pedestrian comfort and disabled access.

Recommendation 10.3: As part of any future Whitehorse Road footpath resurfacing or urban upgrade, investigate the delineation (change in surface or flush markers) of pedestrian movement space and areas for street furniture and trading zones to inform areas to be kept clear, encourage self monitoring and reduce the level of enforcement required.

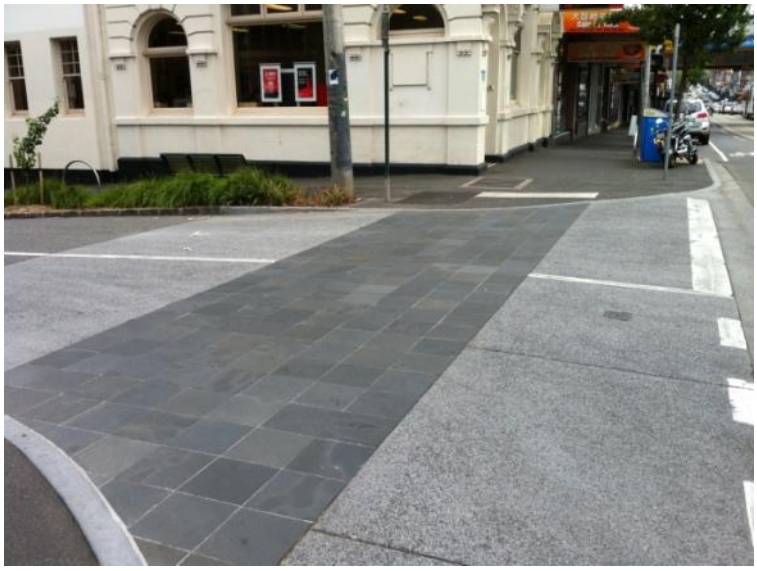
Recommendation 10.4: Advocate a Tram 109 improvement that is considerate of the Pedestrian Priority (SmartRoads) of the Balwyn Activity Area and improves crossing amenity where pedestrian demand is very high (adjacent Yerrin Street); see Recommendation 24.1.

Discussion: Standards indicate a desired clear width of 2.4 metres (or higher based on demand) in commercial or shopping areas (Austroads, 2009. *Guide to Road Design Part 6A*). Whitehorse Road attracts significant pedestrian footfall; an average of 450 pedestrians an hour with peaks of over 600 pedestrians an hour walk east-west in the vicinity of Yerrin Street during the daytime (8am-5pm).

Item 11: Side Road Crossings

Issue: Side road crossings are narrow, lack tactile indicators and the movement of pedestrians is obstructed by street furniture. Elderly pedestrians must negotiate uneven surfacing when vehicles are stopped at the intersection.

Recommendation 11.1: Design raised side road crossings along Whitehorse Road and Balwyn Road that improve the amenity and presence of pedestrians with sufficient depth to provide an at-grade path even when vehicles are waiting at intersections.



Discussion: Walking is the most important form of access for daily visitors to the Balwyn Activity Area whilst weekly visitors are most likely to drive (Consumer Survey 2011). All visitors become pedestrians once they have arrived at the Balwyn Activity Area.

Pedestrian movements at many crossings are significantly higher than car movements and their amenity should be improved accordingly. A side road crossing design that elevates the presence of pedestrians, considers the path of pedestrians when vehicles are waiting to turn, and provides a smooth level crossing opportunity, would greatly benefit old and young. This would significantly improve accessibility for wheelchair and scooter users. The raised crossings would also help define a community heart rather than a place for traffic. Raised side road crossings are also recommended under the Balwyn Structure Plan (Strategy 45).

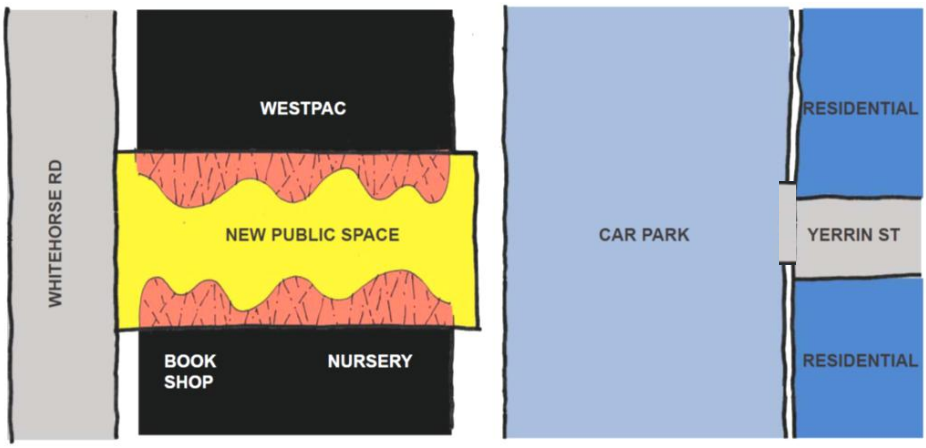
Item 12: Yerrin Street Public Space

Issue: Limited green Infrastructure and public space along Whitehorse Road (Balwyn Structure Plan). Conflicting high pedestrian and car turning volumes at Yerrin Street. Kerbing, uneven paving and street furniture are not supportive of older pedestrians particularly with cars waiting to exit Yerrin Street.

Recommendation 12.1: Investigate a Yerrin Street Public Space that could integrate with tram, community bus and pedestrian crossing facilities where possible.

Discussion: Yerrin Street presents an opportunity to create an attractive public space which both celebrates and enhances Balwyn Shopping Centre. By closing the street off to vehicles, the space can be utilised as a public plaza, designed as an active gathering place where people of all ages and backgrounds can meet, sit and engage with others. The space would serve a variety of activities, as well as events and entertainment for the community.

Surveys undertaken indicate that pedestrian activity at Yerrin Street between the car park and Whitehorse Road is high with 2,800 daily (Friday - wet conditions) pedestrian movements. Notable peak hour pedestrian counts were captured on a Thursday, Friday and Saturday with 300, 400 and 600 pedestrians an hour respectively.



Traffic levels are also notably high at the Yerrin Street/ Whitehorse Road intersection with close to 3,700 vehicles using the southern end of Yerrin Street; 1,650 vehicles travel between Whitehorse Road and the car parking areas, the remaining 2,050 vehicles are through vehicles that include vehicles that originate from the local residential area.

With a public space to the southern end of Yerrin Street, it is considered that traffic that currently accesses the car parks from north will continue to do so via Yerrin Street; traffic that currently accesses the car parks from the south from Whitehorse Road would do so via the southern end of Mangan Street and Iramoo Street; local residential traffic exiting to Whitehorse Road would divert via Balwyn Road, Iramoo Street, Mangan Street and Brenbeal Street; and Yerrin Street through traffic would divert to more suitable routes such as Balwyn Road. Some diversion would also occur via Mangan Street, Iramoo Street and Brenbeal Street.

Further investigations / consultations will be required in terms of developing the concept inclusive of further traffic investigations.

Item 13 Removed: Northern Pedestrian Laneway

Item is removed as a recommendation following a low level of support at consultation.

Item 14: 40 km/h Zone and Pedestrian Priority (Smart Roads)

Issue: There is expected to be an increase in pedestrian activity on the western side of the Balwyn Activity Area that is not currently recognised by Smart Roads (VicRoads). The hierarchy provides a rational for infrastructure decisions along Whitehorse Road and would not consider the extent of pedestrian activity as far as the Balwyn Cinema and the new supermarket. The Pedestrian Priority area currently ends at Power Street.

Recommendation 14.1: Advocate for an extension of the Pedestrian Priority area to Austin Street under SmartRoads (VicRoads) and a corresponding extension of the 40 km/h zone.

Discussion: With the development of a new supermarket to the western side of the Activity Area, commerce and pedestrian activity will extend as far as the Balwyn Cinema and Bevan Street.

Item 15: Northern Bike Connection

Issue: Lack of equitable bicycle infrastructure suitable for all ages and abilities that connect schools, the Balwyn Activity Area and recreational/green space.

Recommendation 15.1: Improve bicycle connections to the north connecting with Gordon Barnard Reserve and adjacent communities via Balwyn Road and Yerrin Street.

Recommendation 15.2: Advocate for the completion of the missing bicycle provision through the Balwyn Road/Belmore Road intersection.

Recommendation 15.3: Investigate crossing improvements at Belmore Road in line with Yerrin Street.

Discussion: 64% of those interviewed in the Balwyn Activity Area customer survey reside in Balwyn and Balwyn North. This provides the opportunity for many to walk or use a bicycle. Significant student populations are located at Balwyn High School and Fintona Girls School.

Bicycle connectivity to the north of the Balwyn Activity Area can be greatly enhanced to provide greater choice of access for residents including improved opportunities for physical activity.

Issue 16: Southern Bicycle Connection

Issue: Poor connectivity between the Mont Albert Road bicycle link and the Balwyn Activity Area. Bicycle provision may be lost along Whitehorse Road due to Tram 109 draft proposals.

Recommendation 16.1: Investigate a southern link between the Balwyn Activity Area and the Mont Albert Road bicycle corridor. Investigate the following two suggested options:

- ***Option 1: An off-road link via John August Reserve that links to Balwyn Library, this route has extremely low pedestrian use.***
- ***Option 2: An on-road link via Talbot Avenue that includes an expansion of the Evergreen park area with a bicycle bypass. This would also serve to slow speeds along Talbot Avenue.***

Discussion: Improved connectivity with bicycle provisions along Mont Albert Road would support access to the Activity Area. Whilst Balwyn Road provides bicycle lanes for more confident bicycle riders, there is a need to accommodate a connection to the heart of the Activity Area for less confident riders.

Item 17: Mont Albert Road Bicycle Link

Issue: There is a concentration of bicycle crashes along Mont Albert Road at intersection locations and a missing bicycle link between Rochester Road and Balwyn Road.

Recommendation 17.1: Investigate missing components of the Mont Albert Road bicycle corridor between Rochester Road and Balwyn Road.

Recommendation 17.2: Increase the presence and improve the perceived/actual safety of bicycle users along Mont Albert Road.

Recommendation 17.3: Investigate clearway arrangements that better protect bicycle lanes and bicycle users at peak travel times along a strategic bicycle commuter route.

Discussion: With draft Tram 109 proposals indicating that space will be removed for bicycles along Whitehorse Road, improvements are required to accommodate access to the Activity Area by alternative bicycle corridors.

The perceived/actual safety improvements are required along the Mont Albert Road corridor to reduce crashes and raise the profile of bicycles. Mont Albert Road is a Priority Bicycle Route and therefore should be allocated the necessary road space to complete the missing link through the Rochester Road and Balwyn Road intersections.

Item 18: Parking on Balwyn Road

Issue: VicRoads have recently introduced bicycle lanes south of Whitehorse Road along Balwyn Road. However, the use of the road by cyclists is impacted on by parked vehicles. The north/south connection provided by Balwyn Road is a strategically significant priority bicycle route. Parked vehicle are particularly problematic during school start and finish times.

Recommendation 18.1: Investigate additional indented parking provision along Balwyn Road between Whitehorse Road and Vauxhall Road to safeguard newly installed bicycle lanes from parking.

Discussion: Balwyn Road is a significant north/south connection that intersects with Mont Albert Road which is to be enhanced as a strategic east/west connection with the Melbourne CBD. Balwyn Road also provides a connection between Mont Albert Road and the Activity Area. The importance of this link is further highlighted by plans to remove space for bicycles under the draft Tram 109 proposals.

Item 19: Bicycle Parking at Library

Issue: Site observations highlight that an increase in bicycle parking is required at the Balwyn Library. Due to the lack of bicycle parking, bicycles are parked against street furniture and pedestrians are at times obstructed. These obstruct acces for wheelchair and scooter users and can present an unpredicable barrier for people with vision impairment.

Recommendation 19.1: Increase bicycle parking at Balwyn Library in a manner that does not obstruct pedestrians, should there be unsuitable space on the footpath, a parking bay should be retrofitted to accommodate up to 10 bicycles.

Discussion: Trip end bicycle parking facilities align with Council policy and strategies to support access by healthier and more sustainable transport modes.

Item 20: Community Bus and Taxi Hub

Issue: Community bus services are not supported by kerb side infrastructure and passengers lack basic amenity. Community buses do not wait for patrons. Discussions with relevant officers within Council have highlighted that shelter and seating arrangements are often discussed as issues with bus drivers (Officer Workshop 2011). The Balwyn Road taxi rank is not well used and does not support the core of the Balwyn Activity Area.

Recommendation 20.1: Investigate a Community Bus and Taxi hub inclusive of DDA compliance and a taxi call service at the core of the Activity Area.

Discussion: Amenity such as seating, shade/shelter and a taxi call forward service would support an increasing proportion of the aged community and those

with mobility impairments together with community services from outside the municipality that wish to access retail and service opportunities in Balwyn.

In line with a Yerrin Street Public Space (Recommendation 12.1) there is an opportunity to integrate an attractive facility that better serves the community adjacent to Whitehorse Road.

Item 21: Bus Route 285: Bus Stop Amenity

Issue: Bus services have no, or limited, kerb side infrastructure that aid the community to access and wait for a scheduled service. Whilst some degree of amenity is provided at selected locations, there is little consistency with stops lacking basic hard standing areas and seating.

Recommendation 21.1: Investigate amenity supportive of bus route 285 between Camberwell Junction and Doncaster Park and Ride to assist bus access, provide DDA compliance and improve user comfort. This would serve both the Balwyn and Camberwell Activity Areas.

Discussion: Amenity is required to support the needs of bus patrons who wait for services. The comfort of all bus patrons, in particular the disabled and elderly, can be greatly improved. Amenity should include hard standing areas, tactile paving, seating, information and preferably shade/shelter given road dust and noise together with winter/summer conditions. The Victorian Council of Social Service (VCOSS) and the Council on the Ageing (COTA) Victoria co-hosted a forum in collaboration with the Department of Transport to discuss bus accessibility; this recommendation is in line with the findings of the forum. At locations seating can be placed to jointly serve pedestrians and public transport in line with Recommendation 3.

Item 22: Bus 285 Service

Issue: Bus 285 operates a limited hourly service during weekdays only. Balwyn and Balwyn North have a significant gap in public transport service, particularly over the weekend and this limits transport choice for residents accessing the Balwyn Activity Area, the Camberwell Activity Area and Canterbury Train Station.

Recommendation 22.1: Advocate for improved bus 285 operations that provide increased transport choice for accessing the Balwyn Activity Area and the Camberwell Junction Activity Area.

Discussion: Bus 285 serves an area with limited transport choice and equity for the young and old is a particular issue. The consumer survey highlights that the majority of the catchment area for the Balwyn Activity Area is within post code area 3103 and 3104, the area served by bus 285.

Transport choice from Balwyn North to the Balwyn Activity Area is extremely poor by any standard. The bus review recommended an improved service covering increased hours of operation and weekend services; however, these have not been realised.

Item 23: Railings at Tram Stops

Issue: Railings currently hinder and slow access and egress at tram stop locations at Balwyn Road and at Yerrin Street. After alighting a tram, pedestrians are required to walk along the road to access the gap in the railings. The railings serve little purpose except for those close to the pedestrian crossings.

Recommendation 23.1: Investigate the removal of pedestrian railings that hinder tram boarding and alighting adjacent to Yerrin Street and Balwyn Road.

Recommendation 23.2: Widen pram ramps at pedestrian crossings to allow improved access to tram services.

Discussion: The removal of the railings would allow patrons to move more easily between the tram and the footpath and help quicken services through more convenient boarding and alighting. Feedback received through consultation indicated that increased pram ramps at adjacent pedestrian crossings would assist tram boarding.

Item 24: Tram 109 Proposals

Issue: The draft Tram 109 proposal highlight a Central Platform Stop (CPS) that further reduces an already limited footpath width within the Balwyn Activity Area. Proposals also move the tram stop and the pedestrian crossing at Yerrin Street away from the core area of pedestrian activity.

The isolated application of a single Kerb-Access Platform that would better integrate and improve the pedestrian and urban amenity at the heart of the Balwyn Activity Area has not been investigated.

Recommendation 24.1: Advocate for the review of draft Tram 109 proposals in order to deliver an improved strategic fit with an area designated for Pedestrian Priority and Tram Priority.

Discussion: A relocated tram stop and pedestrian crossing is likely to raise safety issues with significant pedestrian activity surrounding the current Yerrin Street stop and pedestrian crossing. Whitehorse Road attracts significant pedestrian footfall; at peak time over 600 pedestrians an hour walk east-west in the vicinity of Yerrin Street. The pedestrian crossing adjacent Yerrin Street is a key pedestrian desire line with over 400 pedestrians an hour (7 a minute) crossing the street.

The Balwyn Activity Area is designated a Pedestrian Priority area and Tram Priority Route under SmartRoads.

Item 25: Car Share Initiative for Balwyn

Issue: Car ownership is amongst the highest in the state and results in high car use and lower levels of more sustainable and healthier transport modes.

Recommendation 25.1: Investigate car share in the Balwyn Activity Area.

Recommendation 25.2: Investigate car share that can accommodate wheelchair users.

Discussion: Evidence from car share user surveys both in Australia and internationally highlights compelling benefits. Benefits include

- Increased mobility for those who do not own a car.
- An alternative to the community buying more cars.
- Households reducing their level of car ownership and expenditure.
- Increased levels of active transport (walking and cycling) and public transport use.
- Reduced parking pressures with each car share removing on average of 8 cars from circulation.
- Car share users choose more active transport choices more often which result in greater incidental physical activity within the community.

In Balwyn there are a high number of small households without cars (50%). Car share would support residents to remain car free and provide an amenity that would help reduce car ownership. Given that 19% of the community in Boroondara is reportedly disabled (ABS 2009), investigating the provision of a car that can accommodate wheelchair users will provide an important resource for the community. However, conventional car share vehicles would need to be established prior to discussions surrounding custom vehicle types.

Item 26: Balwyn TravelSmart

Issue: There is a relatively high level of car use in accessing the Balwyn Activity Centre despite evidence that many have alternative transport choices and most originate within the immediate post code area.

Recommendation 26.1: Develop a "TravelSmart" style initiative for the Balwyn Activity Centre.

Discussion: The Balwyn Structure Plan provides direction in terms of encouraging people to use cars less for local trips. This can be done through infrastructure improvements but also through changing travel behaviour and in particular habitual car use.

Employees predominantly arrived by car (83%), however, only 14% of those who had driven indicated that they had no other transport option.

Consumer surveys indicated that most of those interviewed originated within the immediate post code area.

The benefit of encouraging employees to choose alternatives to the car include increased daily physical activity, reduced parking and traffic pressures and reduced emissions.

Item 27: Shade and Shelter

Issue: The lack of shade and shelter for tram passengers waiting to board at the tram stop near Northcote Avenue and Kireep Road provides a poor level of amenity, particularly for nearby elderly residents.

Recommendation 27.1: Introduce a shelter at the tram stop near Northcote Avenue.

Discussion: Shade and shelter greatly improves the comfort and convenience of public transport passengers from the elements, particularly the sun. This supports transport choice and encourages the community to travel in a more sustainable and healthier manner.

Item 28: Crossing Whitehorse Road

Issue: Whitehorse Road experiences high traffic volumes and pedestrian severance of the retail/commercial strip is significant despite the introduced 40 km/h speed limit. Improvements are required to pedestrian crossings and the mid carriageway refuge to help better support pedestrians, reduce risk taking by pedestrians and better inform motorists of the presence of pedestrians.

Recommendation 28.1: Widen pedestrian crossing at Yerrin Street to better manage the space required for waiting pedestrians.

Recommendation 28.2: Review signal crossing timing with VicRoads.

Recommendation 28.3: Investigate improvements to mid carriageway pedestrian refuge road markings with VicRoads.

Recommendation 28.4: Investigate a signalised pedestrian crossing that integrates with the tram stop between Northcote Avenue and Kireep Road.

Discussion: Pedestrians will continue to cross Whitehorse Road along their desired path. Since the introduction of the 40 km/h speed limit, vehicle crashes have halved, however pedestrian crashes have remained the same. Pedestrians will continue to make mistakes and safe amenity that assists pedestrians to cross requires improvement.

The tram stop at Northcote Avenue/Kireep Road is not supported with a pedestrian crossing; the road is 60 km/h at this location and this tram stop is frequently used by residents at the Maranoa Retirement Village.

Consultation highlighted frustration with long wait times at pedestrian crossings and short crossing times deterring use of signalised intersections. Site observations highlighted that the central refuge (line marking) that exists along much of Whitehorse Road is in poor condition and could be improved.

High pedestrian flows at Yerrin Street increase the time required for pedestrians to cross the road. Over 400 pedestrians an hour use the Yerrin Street pedestrian crossing, an average demand of almost seven a minute which results in a build up of pedestrians waiting to cross.

Item 29 - Residential Road Speed

Issue: Consultation highlighted perceived road speeds are high along Talbot Avenue, Gordon Street and Yarrbat Avenue. Speed influences active travel choice. When road speeds are high, perceived risk is high and people are less likely to walk or cycle (Gerrard 2008; Safe Speed).

Recommendation 29.1: Investigate reducing residential road speeds to 40 km/h surrounding the Balwyn Activity Centre.

Recommendation 29.2: Investigate potential traffic management measures to Talbot Avenue, Gordon Street and Yarrbat Avenue.

Recommendation 29.3: Increase enforcement along Gordon Street and Yarrbat Avenue.

Discussion: Talbot Avenue is a relatively narrow street with parked vehicles to both sides of the carriageway resulting in a 3.5 metre lane. Talbot Avenue also supports a notable pedestrian desire line and a potential on-road link for bicycle users with Mont Albert Road.

Investigations highlighted 85%ile speeds along Gordon Street and Yarrbat Avenue that are around 57 km/h; 15% of vehicles surveyed would further exceed 57 km/h. Crash data does not highlight a pattern of pedestrian crashes but does highlight a pattern of vehicle crashes,

Item 30: Investigate Park and Ride Activity

Issue: Park and Ride activity associated with Tram 109 has been reported as an issue that increases residential parking pressures.

Recommendation 30.1: Investigate Park and Ride activity associated with Tram 109

Discussion: Increased residential parking pressures due to park and ride activities associated with Tram 109 were raised with particular reference to Norbert Street. Investigations will require a response in line with Council's Parking Management Policy. Parking surveys undertaken during the development of the Balwyn PPP indicated available on street parking capacity.

14. Implementation

The Access Plan recommendations provide a range of initiatives that vary in terms of resource requirements, funding and benefit. It should be noted that recommendations will require approval, funding and delivery by a number of stakeholders including State and Local Governments together with public transport operators.

The following table identifies the considered priorities, possible timeframes for implementation and high level cost for consideration. The following bands adopted as part of this assessment are outlined below.

Timeframe

- Short: 1-3 years
- Medium: 3-7 years
- Long: 7+ years.

Cost to Council and/or State Stakeholders

- Low: Up to $50,000
- Medium: Between $50,000 and $100,000
- Intermediate: Between $100,000 and $500,000
- Expensive: Above $500,000.

Recommendation	Priority	Timeframe	Cost	Key Stakeholders
Recommendation 1.1: Audit the Principal Pedestrian Network that supports access to the Balwyn Activity Area. Highlight issues and opportunities to improve pedestrian corridors over a distance of approximately 1 kilometre.	High	Short	Intermediate	VicRoads Council
Recommendation 2.1: Investigate the construction of a new pedestrian path along Kireep Road and Evergreen Avenue.	High	Short	Medium	Council
Recommendation 3.1: Install seating at regular intervals along key pedestrian approaches as guided by the Principal Pedestrian Network to support walking access. Seating to be located to benefit multiple purposes including public transport and parks.	High	Short	Low	Council
Recommendation 3.2: Investigate an alternative to current steel seating.	High	Short	Low	Council

Recommendation	Priority	Timeframe	Cost	Key Stakeholders
Recommendation 4.1: Develop a wayfinding strategy that supports and encourages walking along the Principal Pedestrian Network.	High	Short	Medium	Council
Recommendation 4.2: Implement wayfinding signs with simple health messages that relate recommended healthy daily physical activity with walking as a means of access to the Balwyn Activity Area.	High	Short	Low	Council
Recommendation 5.1: Investigate the introduction of pram ramps north/south at the Mont Albert Road/Knutsford Street and at the Mont Albert Road/Boston Road intersections.	High	Short	Low	Council
Recommendation 6.1: Engage and develop a school travel plan to better understand access initiatives that would better support healthier access.	Medium	Medium	Low	Council Schools
Recommendation 6.2: Investigate improvements to conflicts at the Millah Road/Balwyn Road/school exit.	High	Medium	Low	Council Schools
Recommendation 6.3: Investigate the introduction of raised side road crossings at the intersection of Balwyn Road and Millah Road and at the intersection of Cherry Road and Whitehorse Road to raise the profile of pedestrians.	High	Medium	Low	Council VicRoads Schools
Recommendation 6.4: Audit and improve routes to school particularly those that align with the Principal Pedestrian Network.	High	Short	Medium	Council Schools
Recommendation 6.5: Investigate one-way operation of Cherry Road/Millah Road, a reduced speed environment and designated pickup/drop off areas.	Medium	Medium	Low	Council Schools
Recommendation 7.1: Investigate raised treatments at roundabouts along Yerrin Street.	Medium	Medium	Medium	Council VicRoads
Recommendation 8.1: Improve the legibility of the connection through the Evergreen Centre connecting communities directly with John August Reserve.	Medium	Medium	Medium	Council

Recommendation	Priority	Timeframe	Cost	Key Stakeholders
Recommendation 9.1: Consider treatments to prevent cars from encroaching the footpath at Brenbeal Street and better protect pedestrians through either, a raised and widened footpath and a kerb line or, introduce bollards.	High	Short	Low	Council
Recommendation 10.1: Audit, remove or relocate unnecessary street clutter along Whitehorse Road Footpaths including bollards, signage, seating, fencing, bins etc to reduce pinch points and improve pedestrian widths.	High	Short	Low	Council Traders
Recommendation 10.2: Discuss trader stands and furniture with trader association with a particular focus on pedestrian comfort and disabled access.	High	Short	Low	Council Traders
Recommendation 10.3: As part of any future Whitehorse Road footpath resurfacing or urban upgrade, investigate the delineation (change in surfacing or flush markers) of pedestrian movement space and areas for street furniture and trading zones to inform areas to be kept clear, encourage self monitoring and reduce the level of enforcement required.	Low	Short-Medium	Medium	Council Traders
Recommendation 10.4: Advocate a Tram 109 improvement that is considerate of the Pedestrian Priority (SmartRoads) of the Balwyn Activity Area and improves crossing amenity where pedestrian demand is very high (adjacent Yerrin Street); see Recommendation 24.1.	High	Short to Long	Intermediate	Council Traders VicRoads
Recommendation 11.1: Design raised side road crossings along Whitehorse Road and Balwyn Road that improve the amenity and presence of pedestrians with sufficient depth to provide an at-grade path even when vehicles are waiting at intersections. Relocate/remove obstructive street furniture.	High	Short	Low	Council Traders VicRoads

Recommendation	Priority	Timeframe	Cost	Key Stakeholders
Recommendation 12.1: Investigate a Yerrin Street Public Space that could integrate with tram, community bus and pedestrian crossing facilities where possible.	High	Short	Intermediate	Council Traders VicRoads
Recommendation 14.1: Advocate for an extension of the Pedestrian Priority area to Austin Street under SmartRoads (VicRoads) and a corresponding extension of the 40 km/h zone.	High	Short	Low	Council VicRoads
Recommendation 15.1: Improve bicycle connections to the north connecting with Gordon Barnard Reserve and adjacent communities via Balwyn Road and Yerrin Street.	High	Short	Intermediate	Council VicRoads
Recommendation 15.2: Advocate for the completion of the missing bicycle provision through the Balwyn Road/Belmore Road intersection.	High	Medium	Medium	Council VicRoads
Recommendation 15.3: As part of the Yerrin Street link, investigate crossing requirements at Belmore Road that integrate with Recommendation 13.1 and thereafter would integrate with Recommendations 7.1 and 12.1.	High	Medium	Medium to intermediate	Council VicRoads
Recommendation 16.1: Introduce a southern link between the Balwyn Activity Area and the Mont Albert Road bicycle corridor. Investigate the following two suggested options: • Option 1: An off-road link via John August Reserve that links to Balwyn Library, this route has extremely low pedestrian use. • Option 2: An on-road link via Talbot Avenue that includes an expansion of the Evergreen park area with a bicycle bypass. This would also serve to slow speeds along Talbot Avenue.	Medium	Medium	Medium	Council
Recommendation 17.1: Complete missing components of the Mont Albert Road bicycle corridor between Rochester Road and Balwyn Road,	High	Short	Intermediate	Council VicRoads

Recommendation	Priority	Timeframe	Cost	Key Stakeholders
Recommendation 17.2: Increase the presence and improve the perceived/actual safety of bicycle users along Mont Albert Road,	High	Short-medium	Intermediate	Council VicRoads
Recommendation 17.3: Investigate clearway arrangements that better protect bicycle lanes and bicycle users at peak travel times along Mont Albert Road.	Medium	Medium	Low	Council VicRoads
Recommendation 18.1: Investigate additional indented parking provision along Balwyn Road between Whitehorse Road and Vauxhall Road to safeguard newly installed bicycle lanes from parking.	Medium	Medium	Medium	Council VicRoads
Recommendation 19.1: Increase bicycle parking at Balwyn Library in a manner that does not obstruct pedestrians, should there be unsuitable space on the footpath, a parking bay should be retrofitted to accommodate up to 10 bicycles.	Medium	Short	Low	Council
Recommendation 20.1: Investigate a Community Bus and Taxi hub inclusive of DDA compliance and a taxi call service at the core of the Activity Area.	High	Short	Low	Council VicRoads
Recommendation 21.1: Investigate amenity supportive of bus route 285 between Camberwell Junction and Doncaster Park and Ride to assist bus access, provide DDA compliance and improve user comfort. This would serve both Balwyn and Camberwell Activity Areas.	High	Short	Low	Council
Recommendation 22.1: Advocate for improved bus 285 operations that provide increased transport choice for accessing the Balwyn Activity Area and the Camberwell Junction Activity Area.	High	Short-Long	Intermediate	Council PTV
Recommendation 23.1: Investigate the removal of pedestrian railings that hinder tram boarding and alighting adjacent Yerrin Street and Balwyn Road.	High	Short	Low	Council VicRoads Yarra Trams
Recommendation 23.2: Widen pram ramps at pedestrian crossing to allow improved access to tram services.	High	Short	Low	Council VicRoads

Recommendation	Priority	Timeframe	Cost	Key Stakeholders
Recommendation 24.1: Advocate for the review of draft Tram 109 proposals in order to deliver an improved strategic fit with an area designated for Pedestrian Priority and Tram Priority (see also Item 12.1).	High	Short-Long	Intermediate	Council VicRoads PTV
Recommendation 25.1: Investigate car share in the Balwyn Activity Area.	High	Short	Low	Council Car share operator
Recommendation 25.2: Investigate car share that can accommodate wheelchair users.	Low	Long	Low	Council
Recommendation 26.1: Develop a "travelsmart" style initiative for the Balwyn Activity Centre.	Medium	Medium	Medium	Council
Recommendation 27.1: Introduce a shelter at the tram stop near Northcote Avenue.	Medium	Short	Low	Council Yarra Trams
Recommendation 28.1: Widen pedestrian crossing at Yerrin Street to better manage the space required for waiting pedestrians and to reduce crossing times.	High	Short	Medium	Council VicRoads
Recommendation 28.2: Review signal crossing timing with VicRoads.	High	Short	Low	Council VicRoads
Recommendation 28.3: Re-define mid carriageway pedestrian refuge with new road markings.	High	Short	Medium	Council VicRoads
Recommendation 28.4: Investigate a signalised pedestrian crossing that integrates with the tram stop between Northcote Avenue and Kireep Road. Consideration will need to be given to the proximity of the signalised crossing at Talbot Avenue.	High	Medium	High	Council VicRoads
Recommendation 29.1: Investigate reducing residential road speeds to 40 km/h surrounding the Balwyn Activity Centre.	High	Short	Low	Council VicRoads
Recommendation 29.2: Investigate potential traffic management measures to Talbot Avenue, Gordon Street and Yarrbat Avenue.	High	Short	Intermediate	Council VicRoads
Recommendation 29.3: Increase enforcement along Gordon Street and Yarrbat Avenue.	High	Short	Low	Council Police
Recommendation 30.1: Investigate Park and Ride activity associated with Tram 109	Medium	Medium	Low	Council

Appendices

A1 Appendix - Literature Review

The following provides a short summary of background documents.

State/Federal

Integrated Transport Act 2010

The *Transport Integration Act 2010* (the Act) is Victoria's new principal transport statute which came into effect on the 1st July 2010. The Act's core focus is integration and sustainability and ensuring that no one component of the transport system is considered in isolation.

The federal, state and municipal background documents reviewed present a common policy direction towards a more balanced and sustainable transport system. This is achieved by:

- Supporting a single integrated system between transport modes and with land use that considers broad strategic directions including social inclusion, sustainability, efficiency, health and wellbeing, and economic prosperity.
- Developing strategies that support investment in walking, cycling and public transport to increase the attractiveness of these modes.
- Developing strategies that maximise the effectiveness of car parking in Activity Areas while encouraging access to Activity Areas by sustainable transport modes.
- Minimising barriers to access so that the transport system is available to as many persons who wish to use it.

With respect to the study, the study sets out to ensure that no one component of the transport system is considered in isolation and that transport choice and accessibility supports the Activity Area.

Melbourne 2030 - Camberwell Junction is recognised as one of Melbourne's Principal Activity Areas. The State Government has announced a review of Melbourne 2030 in 2011.

Melbourne @ 5 Million 2008 - Melbourne @ 5 Million is an update of Melbourne 2030 adopted by the State Government of Victoria in 2008. It was prepared in consultation with the Department of Transport to ensure that the future shape of Melbourne and Victoria is well serviced by an integrated and modern transport system. The document has also been used as a basis for initiatives and projects outlined in the Victorian Transport Plan.

Victorian Transport Plan - The new Victorian Public Transport Development Authority under the new Coalition government is to review the projects outlined under the Victorian Transport Plan. The Victorian Transport Plan identified six priorities including:

- Taking practical steps for a sustainable future – Moving towards a sustainable and lower emissions transport system to help Victorians preserve their environment.
- Moving around Melbourne – Linking communities by closing gaps, reducing congestion and improving safety on the road network.

The Victorian Transport Plan recommended actions to be taken which include:

- Greater priority to trams and buses on shared roads to improve service performance.
- Building a connected network of on and off-road bicycle and walking paths to encourage safer cycling and walking as a transport mode.
- Using the Metropolitan Bus Service Reviews.

Victorian Cycling Strategy 2009 - The Victorian Cycling Strategy (VCS) is a key part of the Victorian Transport Plan (VTP) and specifically addresses the issues of policy, safety and cycling infrastructure in metropolitan areas and regional centres.

Pedestrian Access Strategy 2010 - The Pedestrian Access Strategy sets out the Victorian Government's vision for a more pedestrian-friendly transport system for Victorians. The aim of the Strategy is to encourage more people to walk in Victoria, especially for short trips. It builds upon the Victorian Transport Plan and the Victorian Cycling Strategy to promote sustainable transport across the State.

Road Use Hierarchy - Regional Network Operating Plan (VicRoads) - VicRoads is responsible for developing the SmartRoads Network Operating Plans. These plans identify the priority of different transport modes on the each road at different times of the day. The plans are developed through consultation with local councils, government agencies and relevant stakeholders. The goal of the operating plan is to make Melbourne's road network work better for everyone regardless of their mode of travel.

Principal Bicycle Network and Priority Bicycle Routes - The Principal Bicycle Network (PBN) is a strategic bicycle network planning tool containing route alignments to help the State Government plan for the construction of parts of Melbourne's bicycle network.

The Bicycle Priority Routes (BPRs) are one of the transport priority routes within the SmartRoads Road User Hierarchy, and as such are part of the State's strategic operational management tool for the on-road transport network. Particular sections or alignments of the PBN may also receive the additional designation of BPR if they meet the agreed 6-step criteria for assignment.

Municipality

Our Boroondara (2008) - Our Boroondara was developed through extensive community consultation throughout the City of Boroondara and established a community vision for the future of the area. Four vision themes outline the community's vision for the future. These are:

- Community wellbeing
- Managing a sustainable environment
- Planning a well designed and sustainable city
- Connecting our city.

The transport related outcomes sought by the community to achieve the vision include a safe, accessible, connected and sustainable transport system. This includes better public transport services, walking and cycling facilities and improved traffic management. A reduction in car dependency through the provision of more environmentally sustainable transport options is an important component of the "Connecting our City" theme.

Creating an Age Friendly Boroondara 2009-2014 - According to the 2006 ABS census, ageing well is an issue relevant to approximately 30,000 older adults in the municipality of Boroondara (Creating an Age Friendly Boroondara 2009 – 2014). "Active ageing is the process of optimising opportunities for health, participation and security in order to enhance quality of life as people age" (WHO, 2002). Key issues that arose through consultation as part of the study included:

- Transport is an important factor to support social connections, independence and ageing in place.
- It is important to develop accessible transport, including a range of alternative transport options.

Improving safety for those who choose to walk, use a bicycle or public transport can help to deliver improved liveability and age friendly environments.

2011 Housing Preferences Survey - The survey included a number of transport related questions and options. In choosing current dwelling/suburbs, 90% of participants indicated a space for car parking as of medium to high importance in choosing their dwelling. 91% indicated low traffic areas as of medium to high importance (rated slightly more important in Balwyn and Balwyn North). This highlights a common challenge in conflicting attitudes between high car parking provision and reducing traffic.

74.4% of participants indicated good access to public transport as highly important in choosing their suburb.

As an open question, survey respondents were asked what aspects of their neighbourhood are changing for the better and for the worse. In Balwyn, 3% of residents indicted that bike tracks and facilities had changed for the better. Balwyn residents were more likely than average to indicate public transport had changed for the better (6.5%). In terms of how the suburb had changed for the worse, three of the top four issues identified as changing for the worse were traffic related - 19% indicated traffic management, 6.8% indicated parking and 3.9% indicated noise and pollution.

In terms of change, an "evolution" in public transport was ranked notably high in North Balwyn (7.1%), and an evolution in bike tracks/facilities and public transport were ranked higher than parking in Kew East, Hawthorn East, Glen Iris, Balwyn, and Deepdene.

Boroondara Integrated Transport Strategy 2006 - The strategy aim is "to define transport and travel issues for Boroondara and provide a five year plan (within a long-term framework) for improving travel and access". The defined vision in the strategy focuses on providing residents with better access to sustainable transport modes (walking, cycling, public transport) and is as follows.

"To provide improved travel and access within, to and from Boroondara. In particular to provide improved public transport, walking and cycling provision and manage private car travel more effectively, as part of overall Council goals to pursue social, environmental and economic well-being and to protect and improve the built and natural environment."

Boroondara Bicycle Strategy 2008 - The strategy provides a plan to drive the development, improvement and expansion of Boroondara's bicycle network. The overall goal of the strategy 'is to increase the number of cyclists using Boroondara's bicycle network and facilities'. The strategy includes the development of bicycle connections surrounding the Balwyn Activity Area.

Boroondara Road Safety Strategy 2007-2012 - The strategy is a five year plan to improve road safety and reduce the number of road crash fatalities and injuries within the City. The study highlights pedestrian and bike safety concerns. Pedestrian concerns also impact significantly on public transport users as walking is a significant component of the trip chain.

- On average, one person is killed every three months from a road crash in Boroondara.
- 45% of those killed are pedestrians, and the majority are over 75 years of age.
- Boroondara is ranked second highest of the 16 municipalities in the Melbourne south-east metropolitan area for pedestrian fatalities and serious injuries, and highest for cyclist fatalities and serious injuries.

Boroondara Parking Management Policy 2008 - The Parking Management Plan sets out a vision for Boroondara to 'have a balanced distribution of parking infrastructure throughout the municipality within 10 years'. The plan provides overarching principles and goals, objectives and strategic initiatives intended to guide future actions related to parking to maximise its effectiveness, whether it be to provide access to commercial areas or to maintain an appropriate level of residential amenity.

In order to meet this object the document outlines a series of strategies to manage car parking to achieve the following vision:

> *"Within 10 years, the City of Boroondara will have an equitable and balanced distribution of parking infrastructure throughout the municipality achieved via a consultative approach with the affected community. Parking management policies are effective in reducing the trend of motor vehicle use and ownership and help to share the cost of parking infrastructure equitably. This provides all users (including the elderly, disabled, workers, shoppers, children, students, traders, residents and visitors) with safe and appropriate access to parking in Boroondara whilst enabling adequate road access for pedestrians, cyclists, emergency vehicles, buses and street maintenance and delivery vehicles."*

Residential Parking Permit Policy (2011) - The purpose of the document is to facilitate reasonable vehicle access for residents and visitors. Resident parking permits are issued to residents who reside within streets that have a time limited restriction and/or a permit zone. The maximum number of residential parking permits that can be issued per household is 3, including a maximum of 2 visitors permits.

Owners and occupiers living within multi unit developments are eligible to apply for one residential parking permit where:

- The planning approval of the units pre-dates August 2001.
- The units have been built since August 2001 in accordance with a planning permit which does not contain a note stating that the units will not be eligible to participate in Council's Resident Parking Permit Scheme.

Local

Balwyn Structure Plan (2009) - The plan identifies public transport routes together with infrastructure improvements immediately within the Activity Area. In order to promote sustainable transport objectives a key guiding principle outlined is to:

- Encourage people to use cars less for local trips by providing and improving direct, convenient and high quality pedestrian access throughout the centre.
- Recognise that there will be a continued need to accommodate vehicle access to and through the centre. Such a strategy should consider the functional use of existing roads and car park areas by addressing the interface between vehicle, bicycle and pedestrian movements. It should also acknowledge the role of Whitehorse Road as part of the Principal Public Transport Network.

Transport and Access Technical Report (2006) - Balwyn Activity Area Structure Plan - The study included a comprehensive review of existing traffic and transport conditions and indicated the following:

- Provide consistently good facilities for pedestrians that are direct, convenient and safe.
- Improve connections with car parks.
- Public transport provision is currently very good.
- The perceived shortfall in parking was for the most part untrue.

A2 Appendix - Background Data

The following section summarises background statistical data gathered as part of the study inclusive of census data, traffic data and crash data. The data is illustrated in a manner in which trends or concerns become evident and these provide a foundation to the study.

Journey to Work

Balwyn Journey To Work (2001 to 2006 Census) - Absolute use of the car for journey to work has remained the same, however as a proportion this has declined by 2% with a 2% increase in train and tram journeys. Since the 2006 Census, the Department of Transport has reported annual increases of 10% on trains, 2-4% on trams and 7% on buses.

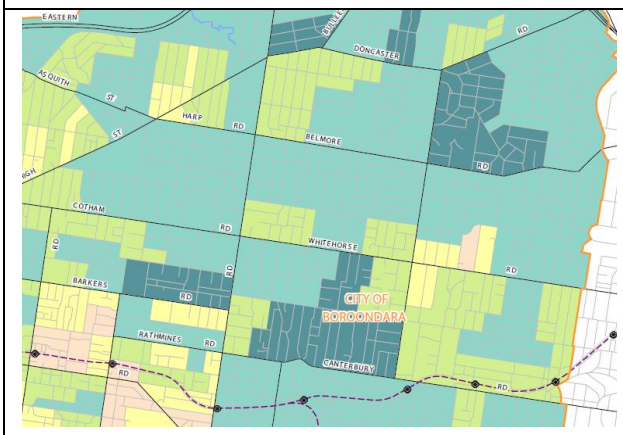
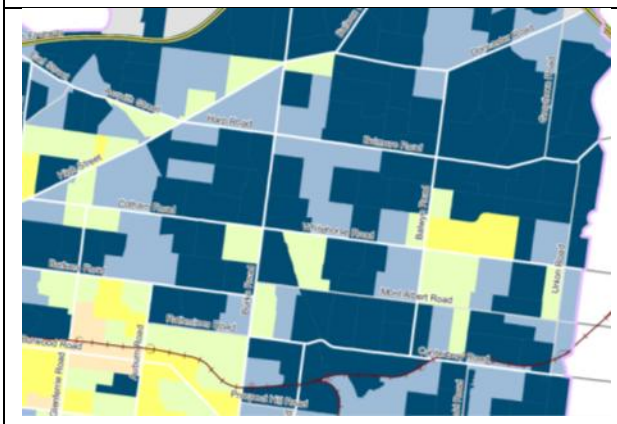
Travel to work (includes multi-mode journeys)							
	2006			**2001**			Change 2001 to 2006
Enumerated data	Balwyn %	Boroondara %	Melbourne Statistical Division %	Balwyn %	Boroondara %	Melbourne Statistical Division %	Comments
Train	6.0	10.8	8.5	4.9	9.6	7.7	**Over 1% increase**
Bus	2.7	1.7	1.2	2.4	1.6	1.3	Slight increase
Tram or Ferry	4.9	4.5	2.0	4.1	4.3	2.0	**0.8% increase**
Taxi	0.1	0.2	0.2	0.3	0.2	0.2	Notable decline
Car - as driver	58.6	54.8	61.1	60.8	56.6	61.7	**2% decline**
Car - as passenger	4.1	3.5	4.7	4.0	3.6	5.1	Less than 1.1 car occupancy rate
Truck	0.4	0.3	0.9	0.4	0.4	1.1	
Motorbike	0.4	0.4	0.4	0.3	0.3	0.4	Increasing
Bicycle	0.8	1.5	1.1	0.7	1.1	0.8	Slight increase
Walked only	2.0	3.1	3.1	1.9	2.4	2.4	Slight increase
Other	1.1	1.1	0.9	0.5	0.7	0.8	
Worked at home	5.9	5.7	3.7	5.9	5.9	3.9	
Did not go to work	11.4	10.8	10.1	10.9	11.0	10.2	
Not stated	1.6	1.6	1.9	3.1	2.3	2.3	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

From the 2006 Census data, 1,420 (41%) employers in the Balwyn Precinct live within the municipality of Boroondara. This is the highest proportion amongst the largest Activity Areas in the municipality.

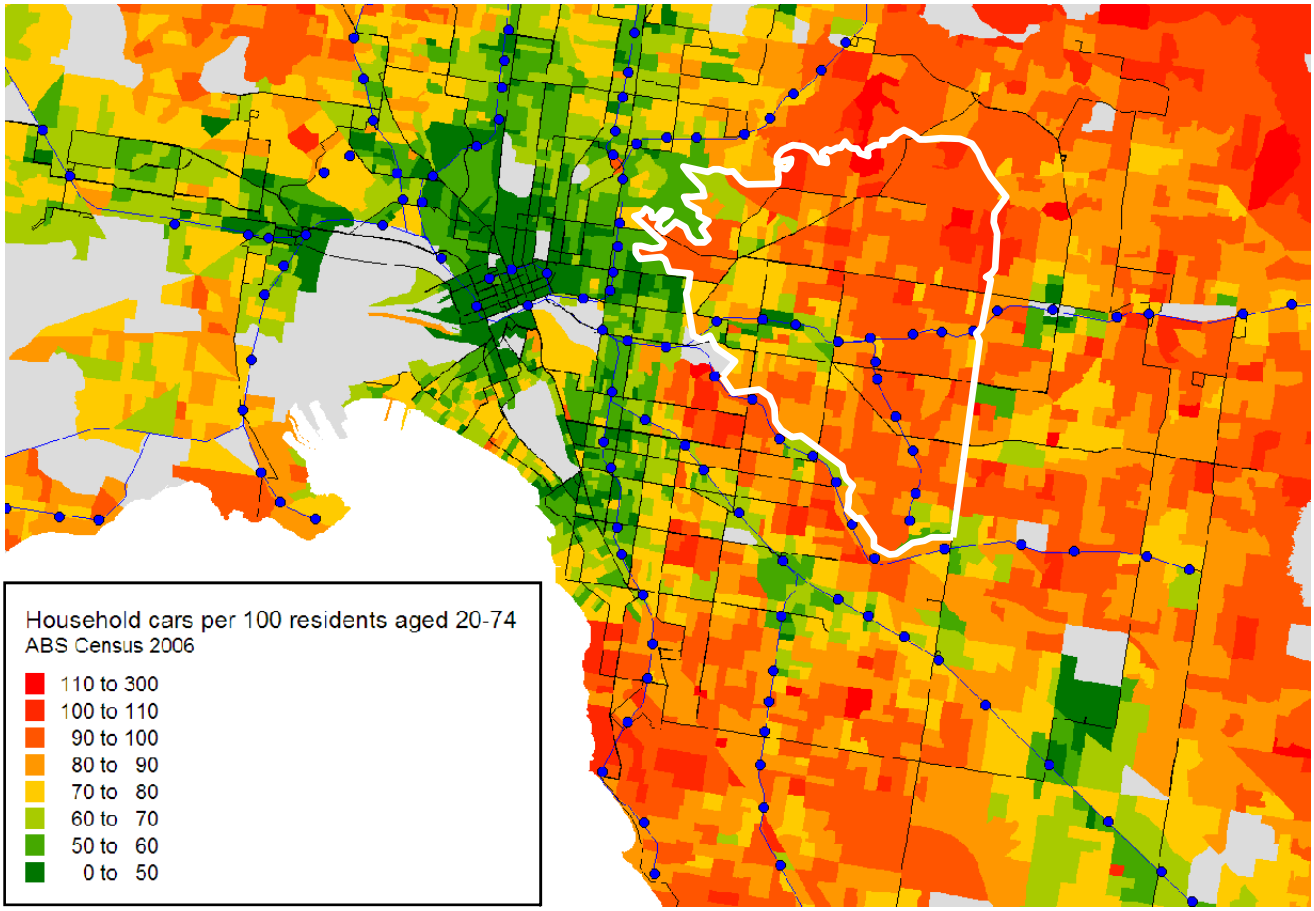
Car Ownership

Car ownership has increased between 2001 and 2006 and almost everyone between 17-74 years old has a car in Balwyn and Balwyn North. There is a direct correlation between car ownership and car use and notably habitual car use where even small journeys are all made by car.

The level of car ownership has notably increased around the Balwyn Activity Area. The number of residential areas that have greater than 1.75 cars per household has increased significantly.

2001 Census Data	**Notes/Key**
	Extract from the Boroondara Bicycle Strategy 2008 (Arup). A small number of areas with greater than 1.75 cars per household. Car Ownership per household > 1.75 1.5 to 1.75 1.25 to 1.5 1 to 1.25 < 1
2006 Census Data	**Notes/Key**
	Car ownership in Balwyn and surround, has seen a notable increase between 2001 and 2006 Census Data with a significant increase in households with greater than 1.75 cars per houshold. Average vehicles per occupied private dwelling No private dwelling (open space) <1 1 - 1.25 1.25 - 1.5 1.5 - 1.75 >1.75
2011 Census Data	**Notes/Key**
	Whilst there is greater area covered in dark blue (areas with graeter than 1.75 cars per household) when compared with 2006 data, there are areas along Whitehorse Road that have seen a decline in car ownership suggesting a relationship with tram 109 services. Average vehicles per occupied private dwelling No private dwelling (open space) <1 1 - 1.25 1.25 - 1.5 1.5 - 1.75 >1.75

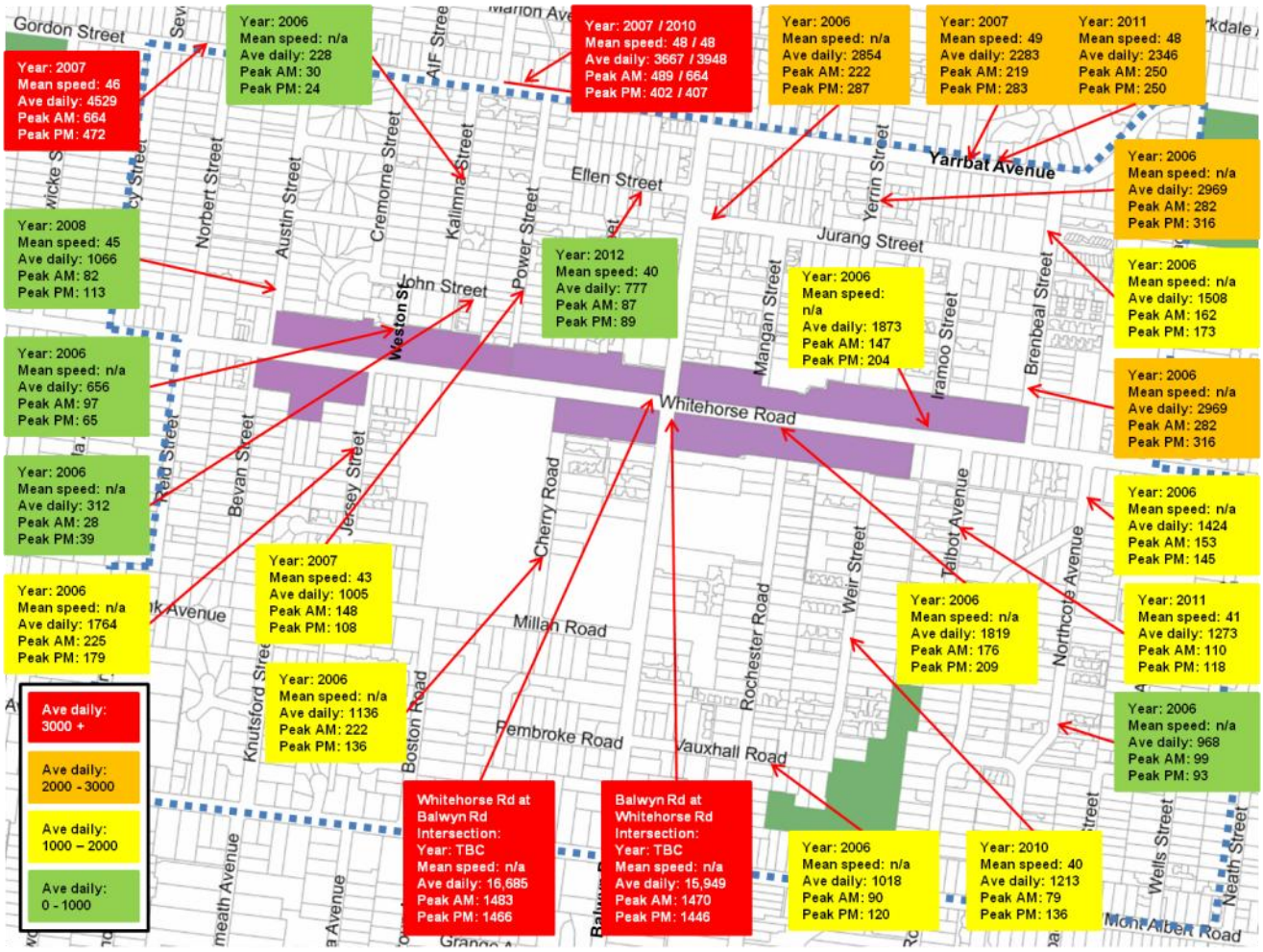
When comparing car ownership per household on a regional level (2006 Census) the Balwyn area sees a notably high level of car ownership. The patterns illustrated below demonstrate a strong relationship with rail stations.



Bus Association's policy manager, Chris Loader

Traffic Counts and Speeds

Council holds a database of past traffic count information. The following diagram illustrates a summary and traffic volumes are coloured in relation to the daily traffic volume.



Council holds a database of past traffic speed surveys (in km/h). The following diagram illustrates a summary including:

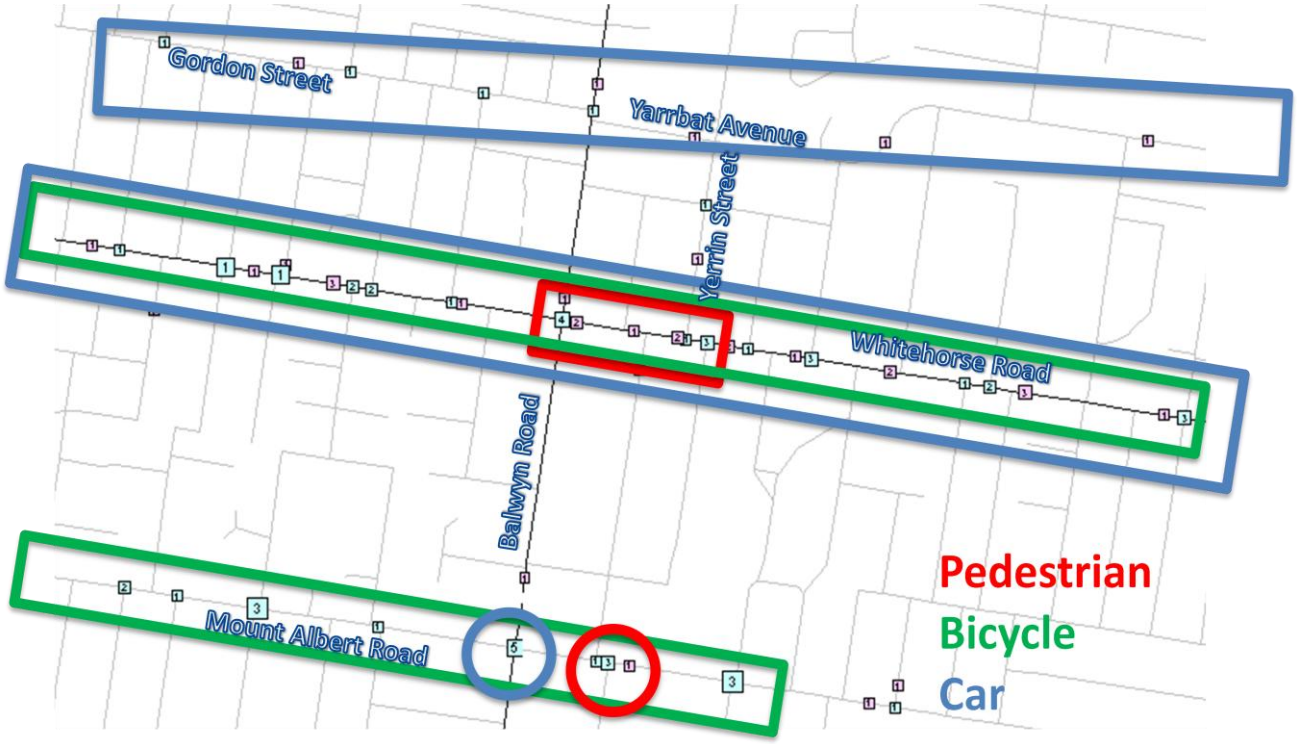
- Year of Survey.
- Mean (average) traffic speed.
- 85% percentile speed.

Crash Data

The localised crash analysis examined:

- The most recent available crash data 2006-2010.
- 5 year periods pre and post the introduction of the 40km/h zone.

Crash data for the Balwyn Activity Area and surrounds continue to show that crashes fall disproportionately on the elderly pedestrians and bicycle users (VicRoads - 5 year crash data 2006-2010). Bicycle crashes are a consistent concern along Whitehorse Road and Mont Albert Road and occur primarily at intersection locations. Pedestrian incidents are focused between Iramoo Street and Balwyn Road.



VicRoads Crash Data 2006-2010.

Crash statistics were also analysed to provide insights surrounding the introduction of the 40 km/h zone along Whitehorse Road in 2004. Data was analysed for 5 year periods pre and post the introduction of the 40km/h zone.

Crashes have halved in the Activity Area along Whitehorse Road since the introduction of the 40 km/h zone. There has been a significant reduction in car crashes as a result of the new traffic speed with significant benefits at intersections. The reduced speed has not provided the same benefit for pedestrians. Mid block pedestrian crashes have increased since the introduction of the 40 km/h zone suggesting increased risk taking and/or frustration in trying to cross the road.

Total Crashes (Whitehorse Rd – Austin St to Talbot Ave)				
1999-2003			2004-2008	
Intersection		Midblock	Intersection	Midblock
All	32	10	16	8
	Total - 42		Total - 24	
Ped	9	4	4	5
	Total - 13		Total - 9	
Ped Fatal	1	0	0	0
	Total - 1		Total – 0	
Ped Severe	3	0	3	2
	Total - 3		Total - 5	

A3 Appendix - Liveability, Health and Transport

Access to a car is an important component of modern life that provides significant personal and economic mobility advantages. The extent of car use and the impact that this has on health and mobility should be a major concern to the community and in particular the elderly and young. Our transport options and choices have a significant cost in terms of liveability and the economy. The following section explores the extent of the impact, these are both broad and multifaceted. Negative health impacts of a high car use environment include poor air quality, social impacts, sedentary lifestyles, road crashes and noise.

Liveability refers to the subset of sustainability impacts that directly affect people in a community, such as economic development, affordability, public health, social equity and pollution exposure (VTPI, 2011).

Benefits of Car Use

The benefits of a car are well understood together with the extent and freedom that they provide personal mobility without the need for physical exertion. Benefits include:

- Economic - access to greater retail and service options rather than local services that result in greater competition between retail centres and therefore lower prices for consumers.
- Labour mobility - potentially increased job opportunities throughout a greater area and access to work centres that have a lack of alternative access choices.
- Flexibility and time saved - Direct paths can be chosen throughout the road networks rather than relying on fixed public transport corridors that can also result in time saved subject to road conditions.
- Recreation and Leisure - Access to locations particularly within regional areas that would be difficult to reach, particularly for family groups.
- Mobility for those with physical mobility challenges - Greater access for individuals with a wide range of impairments including greater mobility and social inclusion amongst the elderly community.
- Business Mobility - access for business operators that provides commercial support, in particular delivery of goods and services to market.

Increasing Car Use

Continued car growth is problematic given that road and parking is finite resulting in congested urban environment and further competition for land use. The following points provide insight in terms of continued growth in car ownership and car use:

- Census data indicates a continued increase in car ownership per household in Boroondara, however there are many areas that has seen a decline in car ownership (Census 2001, 2006 and 2011).
- Increasing Car registrations; Victoria experienced an increase of approximately 12% in motor vehicles between 2005 and 2010 (ABS), an average growth of 2.4% a year despite the economic down turn and a number of significant oil spikes.
- Car numbers on the state's roads have increased by 100,000 a year (Clay Lucas, The Age, 21/4/11 from Yarra Trams report)
- Qualitative research has indicated a strong social and cultural attachment to the car by retirees in Victoria (McKenzie and Steen (2002).

- The challenge is further heightened by the increasing population. It is predicted that there will be an additional 1 million people in Melbourne by 2036. This would have significant implications for Melbourne's transport network, including; 3.2 million extra car trips per day, 400,000 extra public transport trips per day and 200,000 extra walking and cycling trips per day (State Government of Victoria 2008).

Air Quality

Research in the United States indicates that "motor vehicle air pollution probably causes a similar order of magnitude of premature deaths as traffic crashes" (Murray, 1996. Global Burden of Disease and Injury; Litman, 2011. Evaluating Public Transport Health Benefits). Although ambient air quality is considered relatively good in Australia, urban air pollution is a significant cause of death and illness in the community contributing close to 3000 deaths in 2003 (Begg S, Vos T, Barker B, Stevenson C, Stanley L, Lopez A. 2003. The burden of disease and injury in Australia). Two-thirds of these deaths were attributable to long-term exposure to air pollutants, with the elderly most affected (Australian Government, 2011. State of the Environment). By comparison, the 2003 road toll in Australia was 1,633 fatalities (Australian Bureau of Statistics). Traffic is the main source of emissions in Australian cities (Department of Transport and Regional Services, 2005. Health impacts of Transport Emissions in Australia: Economic Cost).

Additional references include:

- Motor vehicle air pollution probably causes a similar order of magnitude of premature deaths as traffic crashes, although air pollution deaths tend to involve older people, while traffic crashes are more likely to harm people during the prime of life (Murray 1996; "Health and Safety," Litman 2010).
- "Air pollution is recognised by the government as the second-biggest public health threat, after smoking. It costs the UK an estimated £20bn a year - that's more than twice the amount estimated for obesity, which gets far more publicity" (BBC 27 June 2012).
- "Car pollution is creating asthma-like symptoms in otherwise healthy children, and potentially affecting their lung growth, according to a report that suggests Australia's air-quality standards should be upgraded." (The Age 22 July 2012 - Australian Child Health and Air Pollution Study commissioned by National Environment Protection Council).
- Car commuters are exposed to the highest pollutant levels for the four BTEX pollutants (benzene, toluene, ethylbenzene and xylenes). Train commuters recorded the lowest exposure to pollutant levels for all four BTEX pollutants and nitrogen dioxide, and these levels were significantly lower than that for car commuters. Commuting by bus recorded the highest levels for nitrogen dioxide. Walking and cycling commuters had significantly lower levels of exposure to benzene compared with car commuters and significantly lower levels of nitrogen dioxide than bus commuters. (Health Promotion Journal of Australia 2004. Comparison of air pollution exposure for five commuting modes in Sydney – car, train, bus, bicycle and walking).

Social Impact

The way we travel has a relationship with our social connections and mental wellbeing. A recent report by the Grattan Institute draws together research that clearly identifies a negative correlation with traffic volume, speed, and car commuting (Grattan Institute, 2012. Social Cities). In New York, 44% of people living on busy streets respond by going out less (New York Streets Renaissance, 2006). In Basel, Switzerland, people who live on faster streets (50 km/h) are half as likely to be active in the public space (Sauter and Huettenmoser, 2008. Liveable Streets and Social Inclusion). Over 80% of Australian drivers find their commute stressful and frustrating (IBM, 2011. Commuter Pain Survey). Increasing journey times faced by Australia commuters has a correlation with reduced wellbeing and social activity (Grattan Institute, Melbourne, 2012, Social Cities).

Sedentary Lifestyles

The effect of sedentary lifestyles on heart disease is similar to that of tobacco (World Health Organisation, 2000. Transport, Environment and Health). According to epidemiologists in Monash University, as part of the Diabetes Obesity and Lifestyle Study, by 2025:

- The number of obese Australians will surpass those of a healthy weight.
- Only 28% of adults will be at a healthy weight whilst 34% will be obese.

There are a number of studies from the USA, Australia and Europe that highlight a correlation between the level of car use and obesity (Institute for European Environmental Policy, 2007. Unfit for Purpose). A study in the UK highlighted that if a typical British adult were to walk an hour more per week, the equivalent difference in walking between a typical driver and a non-driver, this would counteract a weight increase of 2 stone over a decade. It would also counteract a longer-term slide into obesity (Institute for European Environmental Policy, 2007. Unfit for Purpose). The Victorian Integrated Survey of Travel and Activity (VISTA) data indicates that people, who used public transport on a particular day, also spent an average 41 minutes walking and/or cycling as part of their daily travel. This is five times more physical activity than those who only use private transport (Bus Association Victoria, 2010. Public Transport Use a Ticket to Health).

Active transport and public transport promote health by providing opportunities for exercise, reducing fatal accidents, increasing social contacts and reducing air pollution. Regular exercise protects against chronic diseases associated with obesity such as diabetes, cardio-vascular disease. It also stimulates engagement in community activities and the public realm. (WHO, 2003. Social Determinants of Health - The Solid Facts).

Sustainable transport choices are healthier transport choices. Travel allows the community to build in regular incidental physical activity. The National Physical Activity Guidelines for Australians recommend that people of all ages accumulate at least 30 minutes (1 hour for children) of moderate intensity physical activity on most, preferably all, days of the week (Australian Institute of Health and Welfare, 1999. An Active Way to Better Health). Over one-half of Australian adults are insufficiently active for health gain (Australian Institute of Health and Welfare, 2000. National Physical Activity Survey).

Economic Cost

The cost of congestion, in Melbourne alone, is predicted to double from $3.0 billion in 2005 to $6.1 billion in 2020, based on travel time and uncertainty, vehicle operating costs and air quality (Bureau of Transport and Regional Economics, 2007. Estimating Urban Traffic and Congestion Cost Trends for Australian Cities). "In the absence of improved congestion management, it will be challenging to avoid escalating urban congestion impacts" (Bureau of Transport and Regional Economics, 2007, Estimating Urban Traffic and Congestion Cost Trends for Australian Cities). The economic impact of sedentary lifestyles is estimated to be approximately $13 billion a year (Australian Local Government Association et al, 2010. An Australian Vision for Active Transport). The estimated cost of obesity in Australia in 2008 was $58.2 billion (Access Economics, 2008. Growing Cost of Obesity). In Australia in 2000 it was estimated that vehicle-related ambient air pollution accounted for between 900 and 4500 morbidity cases (cardio-vascular and respiratory diseases and bronchitis) and between 900 and 2000 early deaths (Department of Transport and Regional Services, 2005, Health impacts of transport emissions in Australia: Economic cost). The economic cost of morbidity ranges from $0.4 billion to $1.2 billion, while the economic cost of mortality ranges from $1.1 billion to $2.6 billion (Department of Transport and Regional Services, 2005. Health impacts of transport emissions in Australia: Economic cost)

Travel To School and Child Health

Children who actively commute to school have higher levels of physical activity and improved cardiovascular fitness compared with children who do not walk or cycle to school (Davison et al 2008). Children and young people who are physically active are more likely to be active adults, resulting in health benefits across the life course (Trost et al 2002; Kjonniksen et al 2008).

A three year evaluation study is analysing results from 1,412 primary school aged children from Prep to year 6 across 19 Primary Schools in Victoria. “Our study found that only 26 per cent of the years 3 to 6 primary school aged children walked to school in the past five days.” “Children who walked to school demonstrated a greater awareness of, and familiarity with, their local environment. They drew detailed elements of green space such as parks, trees, grass, flowers, sporting ovals and children playing football, people riding bikes, walking their dog and playgrounds.”

“In contrast, children who travelled to school by car tended to depict abstract, isolated images of their neighbourhood environment with the car and the road as the central theme. They drew images of traffic lights, road signs, school crossings, local schools, office buildings, shopping centres, and fast food outlets. They also drew their own street and a lot of empty blank spaces” Professor Masters said.

The Boroondara Integrated Transport Strategy indicated that Balwyn High School was the only school where more than 25% of students lived more than 1kilometre away.

Good for Business

There is an increasing awareness that improved walking, bike use and public transport is good for business. Studies indicate that well-planned non-motorised improvements can increase customers and business (Hass-Klau C, 1993. Impact of pedestrianisation and traffic calming on retailing. A review of the evidence from Germany and the UK). In Bloor Street, Toronto, a survey was undertaken to establish the relative importance of parking to business activity. The results highlighted those patrons that arrived by foot and on bicycle visited most often and spent the most money (Clean Air Parnership, 2007. Bike Lanes, On-Street Parking and Business. Toronto, Canada).

Evidence based studies are also growing in Australia, with clear figures that indicate that motorists are at times a minority and that pedestrians and public transport users in particular often spend more time and visit Activity Areas more often resulting in greater spend (Tolley R., 2011. Good for Business). This can challenge the notion that cars are the most important factor for business and retail. Tolley indicates that we should ask the question, how much business is lost due to poor walking streetscapes that are dominated by traffic, noise and pollution. In Balwyn, surveys indicate that pedestrians visit more frequently and walking is the dominant mode for daily visitors at the Balwyn Activity Area (Balwyn Activity Area Customer Survey, 2011).

Crash/Speed Research

A literature review revealed that:

- Studies have shown that about approximately 50% of all fatal pedestrian crashes occur without braking (Mclean, et al., 1994).
- All available empirical evidence supports the argument strongly: an impact speed of 55 km/h in a pedestrian accident is fatal with almost 100 percent probability, while at an impact speed of 30 km/h, the risk of being killed is reduced to less than 10 percent (Pasanen, 1992).
- The probability of a pedestrian being killed rises by a factor of eight as the impact speed of the car increases from 30 km/h to 50 km/h (Ashton SJ, Mackay GM, 1979).
- Research indicates that speeds of around 30 km/h result in a pedestrian fatality rate of 5%, the fatality rate increases to 45% at 50 km/h (Ben Hamilton-Baillie, 2004, Journal of Urban Technology, 11:1, p.54).

- In South Australia, the speed limit around some schools has been set to 25 km/h in recognition of pedestrian vulnerability. In some suburbs around Melbourne and Sydney, a 40 km/h speed limit has also been applied. (J Archer, N Fotheringham, M Symmons & B Corben (2008), The impact of lowered speed limits in urban and metropolitan areas, Monash University Accident Research Centre, p.13).
- In Stockholm, Sweden, a 30 km/h speed limit on all residential streets in the city area was introduced in early 2007. This represents an important move toward safer speeds on pedestrian streets. Initial indications of the effectiveness of the Swedish 30 km/h speed limit suggest that average speeds and traffic flow remain relatively unaffected while the maximum speed has decreased notably. (J Archer, N Fotheringham, M Symmons & B Corben (2008), The impact of lowered speed limits in urban and metropolitan areas, Monash University Accident Research Centre, p.13).
- Speed influences active travel choice. When road speeds are high, perceived risk is high and people are less likely to walk or cycle (Gerrard 2008; Safe Speed).
- The most effective measure for reducing pedestrian road traffic crash deaths and serious injuries is speed reduction (World Health Organization (WHO) 2008).
- A study of 6 towns in England reported improvements in liveability after the implementation of 32 km/h zones (Babtie Group 2001).

A4 Appendix - Principal Pedestrian Network

A5 Appendix - Community Consultation