Hawkesbury Mobility Plan 2010

Bike Plan and

Pedestrian Access and Mobility Plan (P.A.M.P.)

Adopted 11 May 2010

Hawkesbury City Council

GTAconsultants

Hawkesbury Mobility Plan 2010

Bike Plan and

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1. Introduction

1.1 Background

The Hawkesbury City Council area spans approximately 2,800 square kilometres, has a population just over 60,000 and is located approximately 60 kilometres north-west of the Greater Sydney metropolitan area. This area consists of a number of towns and villages, along with several rivers and more than 70 percent of its area as National Park, making it an area that is vast and inviting to interact with.

Hawkesbury City Council is committed to providing a safe and effective transport network for its community, including consideration of pedestrian and cyclist mobility. A comprehensive plan is required to guide Council in the ongoing development and improvement of pedestrian and cyclist facilities to meet the needs of the community. As such, GTA Consultants was commissioned by Hawkesbury City Council to prepare a mobility plan to address the mobility needs of pedestrians and cyclists across the LGA. The desired outcome of the mobility plan is to:

"identify a cohesive strategy for linking residents, particularly residents living in localities with high proportions of vulnerable road users, to the major commercial centres of the city by means of safe and accessible pathways and cycleways".

The mobility plan is to consist of a Pedestrian Access and Mobility Plan (PAMP) and a Bike Plan. Undertaking both studies simultaneously and collating into the one document allows consistency and integration of the two user group networks, ultimately providing a more consolidated transport network.

1.2 Study Objectives

The Hawkesbury Mobility Plan, comprising a PAMP and Bike Plan, seeks to address the mobility needs of the community. The study objectives as outlined in the project brief are as follows:

- Facilitate improvements in the level of pedestrian accessibility and priority, particularly in areas of higher pedestrian concentration.
- Ensure the use and safe operation of special access vehicles are incorporated into the plan, particularly origin/destination of trips.
- Ensure the use and safe operation of bicycles are incorporated into the plan for all classes of bike users.
- Identify opportunities for infrastructure synergies between all classes of pedestrian and bicycle users, including recreational paths and pedestrian linkages.
- Reduce pedestrian access severance and enhance safe and convenient crossing opportunities on major roads.
- Identify and resolve pedestrian and bicycle crash clusters.
- Facilitate improvements in the level of personal mobility and safety for pedestrians with disabilities and older persons through the provision of pedestrian infrastructure and facilities which cater to the needs of all pedestrians.
- Provide links with other transport services to achieve an integrated land use and transport network of facilities that comply with best practise and relevant technical standards.
- Link existing vulnerable road user plans in a coordinated manner.
- Ensure that pedestrian facilities remain appropriate and relevant to the surrounding land use and pedestrian user groups.

- Further address Council's obligations under the Commonwealth Disability Discrimination Act (1996).
- Develop a prioritised capital works program, including costings, which may be realistically delivered with consideration of the funding allocation and constraints.
- Identify linkages to and between Planning Instruments (e.g. Local Environment Plans (LEPs) and Development Control Plans (DCPs).

The key outcome of the PAMP is the identification of key pedestrian routes which form a coherent pedestrian network in areas of high pedestrian concentration, such as retail and service centres, schools and workplaces. Specific objectives of the PAMP component are as follows:

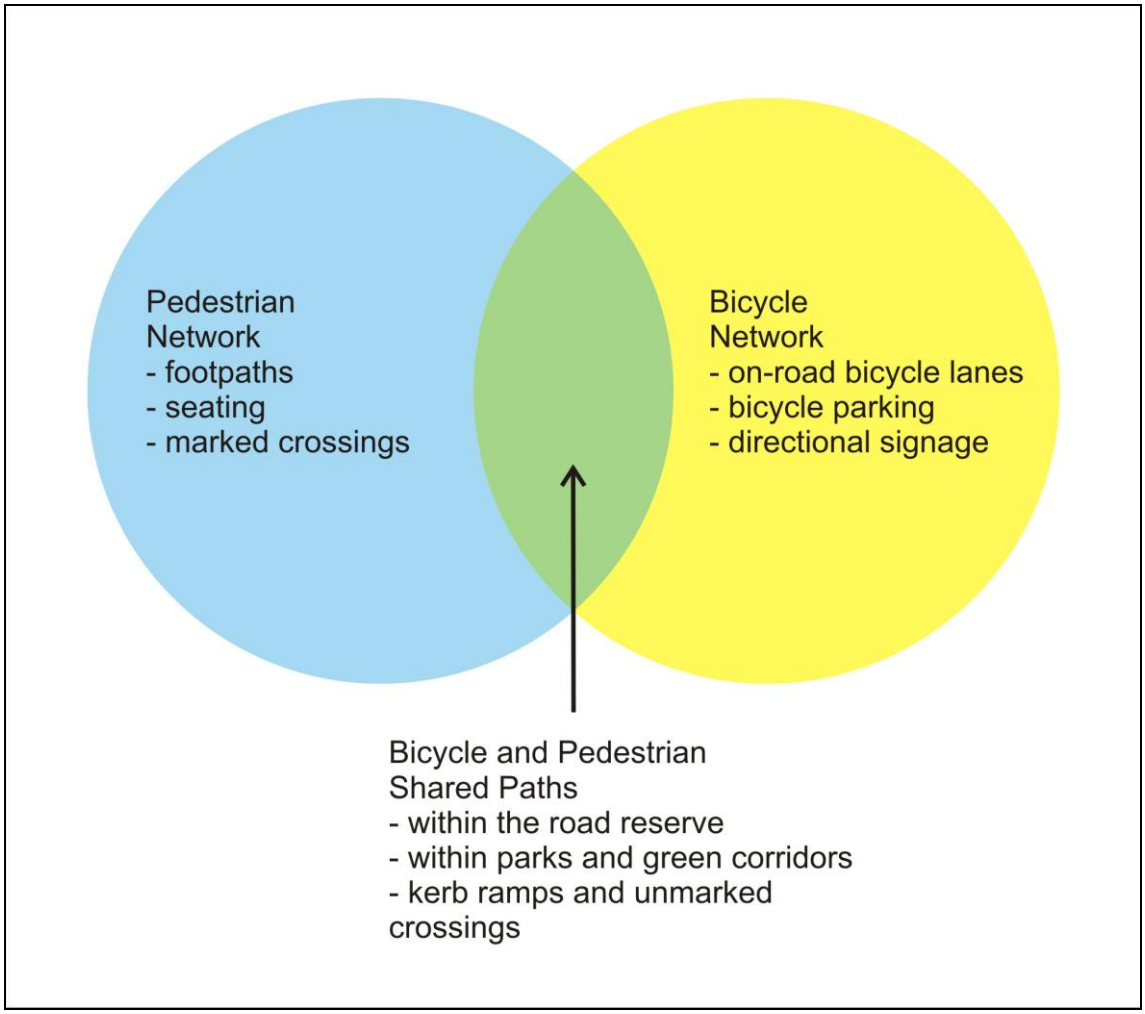
- Integrate consistent and continuous pedestrian networks into the land use and transport system, to facilitate and encourage more walking.
- Linkage of pedestrian concentrations to pedestrian networks to facilitate and encourage safe and convenient accessibility and mobility for pedestrians.
- Identify clusters and patterns of pedestrian crashes to highlight areas that restrict safe and convenient accessibility and mobility for pedestrians.
- Development and integration of pedestrian routes that form part of a connected pedestrian network.

The key outcome of the Bike Plan review and development is the identification of bicycle routes that are convenient, connected, coherent and serve major generators and attractors such as shopping centres, recreational facilities, schools parks and workplaces. Specific objectives of the Bike Plan component are as follows:

- Integrate consistent and continuous cycling networks into the land use and transport system, to facilitate and encourage more cycling.
- Development and integration of intra and inter-regional cycling routes, that form part of a connected cycling network.
- Identify a combination of on-road and off-road routes to meet the needs of users.
- Seek synergies between bike and pedestrian networks - addressing the potential for shared pathways or other alternatives where possible.
- Identify other cycling facilities that may be required for storage or security of bicycles.

The outcome from development of the PAMP and bicycle networks simultaneously will be a mix of facilities that are provided for pedestrians or bicycles only, or that accommodate both road users. This is demonstrated in Figure 1.1.

Figure 1.1: Integration of Pedestrian and Bicycle Networks



2. Strategic Context

2.1 Global Issues

Cycling and walking have been defined as "Healthy and Active Transport". Public transport is also considered an active transport mode as it invariably involves a component of walking to and from bus stops and rail stations. There is substantive evidence that healthy and active transport provides a strong and effective policy response to key global public policy issues, including:

- Public Health
  Physical inactivity is one of the major causes of ill health in Australia. Half the Australian adult population are insufficiently active to protect against sedentary lifestyle disease, such as diabetes. It is well-documented that regular physical activity, such as cycling and walking, significantly reduces the incidence and fatality rate from cardiovascular disease.
- Congestion
  Private automobile use is considered the major cause of congestion in Sydney. The Bureau of Transport and Regional Economics found that the cost of congestion in Sydney for 2005 was $3.5 billion and estimated to rise to $7.8 billion by 2020. Cycling (or walking and taking public transport) is an effective method of reducing unnecessary car use.
- Climate Change
  Motorised transport is a significant and growing source of greenhouse gas emissions. As a zero emission form of transport, cycling is increasingly seen both in Australia and internationally as a way of reducing greenhouse gas emissions. The Commonwealth Carbon Pollution Reduction Scheme, due for implementation in 2010 will include transport. This increases the importance of providing carbon free forms of transport, to lower the cost to the community of responding to climate change.
- Peak Oil and Petrol Prices
  Since 2004, world oil prices have increased significantly and hit record levels in 2008. The rise in petrol prices strongly relates to the increase in bicycle sales, both in Australia and in the United States. Strategic transport modelling emphasises strong sensitivities to increases in petrol prices with shifts to public transport, walking and cycling. The provision of cycling infrastructure and encouragement programs, in combination with public transport improvements offers a very effective method of increasing the resilience to higher fuel prices.

Further detail on each of these global policy issues is included in Appendix A.

Investment in physical, social and organisational infrastructure to support healthy and active transport can deliver positive benefit:cost ratios for each of these global policy issues individually, especially when considering externalities. The real benefit of investment in infrastructure for healthy and active transport, however, lies in recognition of the cross-disciplinary benefits.

2.2 National Policy Context

In Australia recently the focus on climate change associated with congestion and pollution together with the promotion of local accessibility and of personal health has been continuously highlighted. An increase in walking and cycling can be a central factor in offering an environmentally sustainable and health promoting local transport option. Over the years moves to highlight the role for cycling have been taken in a series of key strategic Government policy documents and guidelines as follows:

- National Cycling Strategy 2005-2010.
- RTA Action for Bikes 2010 (currently being revised).
- Austroads Guide to Traffic Management (previously Austroads Part 13 – Pedestrians and Austroads Part 14 – Bicycles).
- RTA (NSW) Bicycle Guidelines (2003).
- Planning Guidelines for Walking and Cycling (Department of Planning, 2004).

There are also a number of other state planning documents which reference the NSW Governments' commitment to planning for cycling, walking and public transport and encouraging active living. These are as follows:

- NSW State Plan, including Chapter 3 – Better Transport and Chapter 7 – Urban Environment and Lifestyle. This document outlines goals for increasing the number of people participating in sporting activities (target increase of 10% by 2016) and increasing walking and cycling (target bicycle mode share for all trips in Greater Sydney of 5% by 2016).
- North West Sub Regional Strategy. This document identifies Penrith as the Regional Centre for the North West Sub Region, with Windsor and Richmond identified as Town Centres and North Richmond as a Village. Rural Neighbourhood Centres include Pitt Town, Wilberforce and Glossodia. This document includes the action to influence travel choices to encourage more sustainable travel, including improving local and regional walking and cycling networks.

2.3 Benefits and Barriers

The Hawkesbury Mobility Plan provides Council with a proactive policy to increase the level of cycling and walking as important sustainable transport modes to benefit the health and economic wellbeing of the community. Facilities for walking and cycling within a community also provide recreational activities and experiences for visitors. The Hawkesbury Mobility Plan aims to build strategically on the positive characteristics of walking and cycling while considering the barriers to greater participation.

General Community Benefits

- Walking requires no specific equipment and is particularly suited for trips up to 1km.
- The bicycle is ideal for convenient, door to door travel. It starts instantly, it is easy to park and impervious to traffic congestion. It is particularly suited for trips up to 5km.
- Cycling and walking travel times are predictable and reliable.
- Construction of a workable bicycle network is relatively cheap, and bicycle infrastructure as well as footpaths and walking facilities can be easily (and cost effectively) included with road upgrades and maintenance works.
- Bicycle traffic does not pollute, does not emit greenhouse gases, is not noisy and is a practical way of reducing dependency on oil. Walking is also a quiet and pollution-free way of travelling shorter distances.
- Bicycles take up very little space, either when being ridden or when parked.
- Bicycle and pedestrian traffic has a humanising effect on neighbourhoods.
- Good walking facilities at public transport interchanges encourage the usage of public transport.
- Good walking facilities within and in the vicinity of retail and commercial areas are good for supporting local business.
- Walking travel is affordable and accessible to almost all the community.
- Walking and cycling is good for staying in shape and is relaxing.
- Bicycle travel is affordable and accessible to all able-bodied people.

Physical Barriers to Walking and Cycling

- Fragmented cycling and footpath networks with a lack of continuity and connectivity.
- Limited number of safe and convenient opportunities to cross major roads.
- Lack of end-of-trip and parking facilities (cycling).
- Poor integration with general road transport system - high speed and high volume roads along popular trip desire lines, threatening behaviour of motorists.
- Unsafe routes or pinch points.
- Terrain and weather.
- Narrow and poorly maintained roads, shoulders and footpaths.
- Lack of footpaths in some residential areas.
- Inadequate facilities for access by mobility impaired pedestrians.

Perceived or Subjective Barriers to Walking and Cycling

- Actual and perceived lack of personal safety and security, particularly after dark.
- Lack of confidence and cycling experience.
- Insufficient knowledge of available network facilities and alternative back-street routes.
- Perception of walking and cycling as a physical activity (too hard, too hot, too hilly, too dangerous, too difficult etc).
- Lack of 'how to' knowledge on cycling as an activity, eg where to ride, what to wear, what type of bike suits, equipment issues, navigation issues.
- Perceived unsafe road layouts.

Specific Barriers to Walking and Cycling in Hawkesbury

- Major roadways (e.g. Windsor Road, Hawkesbury Valley Way, Macquarie Street).
- Railway line.
- Waterways, particularly the Hawkesbury River.
- Limited number of safe and convenient opportunities to cross these physical barriers.
- RAAF Base Richmond – no public access through the site.

While some of these barriers are beyond intervention, the majority can be managed or addressed by individuals, communities and governments. The actions outlined in the Mobility Plan seek to address these issues and create an environment with minimal barriers to walking.

2.4 Council Policies and Plans

This section provides an overview of the pedestrian and walking issues as referenced in the various planning instruments in Hawkesbury City Council, including:

- Hawkesbury Sub Regional Bike Plan 1997.
- Hawkesbury Community Strategic Plan 2010-2030.
- Hawkesbury Local Environmental Plan 1989.

2.4.1 Hawkesbury Sub Regional Bike Plan 1997

In 1997 the Hawkesbury City Council Sub-Regional Bike Plan was released. This document summarised previous work undertaken in relation to cycling in the study area. It reviewed the previous 1986 Bike Plan and provided a number of observations and recommendations in relation to promotion of cycling in the Hawkesbury area. The Bike Plan identified a number of priority capital works to be undertaken to improve the wider bicycle network. These included:

Macquarie Street

- It was recommended that Macquarie Street between Hawkesbury Valley Way and George Street be added to the sub regional network. Although Macquarie Street had bicycle / car parking lanes marked they did not meet the Austroads Standard. It was also recommended that Macquarie Street through the Windsor CBD (Bridge Road to Hawkesbury Valley Way) was not included as this section of Macquarie Street was narrow.
- An alternate route through this section could be provided via Cox Street which is parallel to Macquarie Street.

Freemans Reach Road

- Although Freemans Reach Road provides a direct connection between Freemans Reach and Windsor, due to the constricted width and inability to provide the recommended bicycle lane width, it was recommended that this road not be included on the sub regional network.

Bells Line of Road / Kurrajong Road / Hawkesbury Valley Way (formally known as Richmond Road) (State Route 40)

- It was recommended that sealed shoulders be provided on each side of the road west of North Richmond. The width was dependent on the vehicle speed on the adjacent section of road.
- A shared path from Colo High School to Redbank Road and a pedestrian refuge adjacent to the school.
- Through Richmond, Francis Street was recommended as an alternative route through the town. Francis Street was recommended to be re-linemarked to provide 3.5m wide bicycle / car parking lanes on each side and 2.9m wide traffic lanes to achieve a lower traffic speed. Pedestrian refuges were also recommended every 400m along Francis Street.
- To provide an alternative route along Hawkesbury Valley Way between Moses Street to Macquarie Street, Brabyn Street was recommended. A number of pedestrian refuges were also proposed to improve safety for cyclists and pedestrians. Any future upgrading was recommended to include "stand-up bicycle lanes for cyclists as per Austroads guidelines".

Terrace Road / Kurmond Road

- Wide sealed shoulders of 1.5m to 1.8m were recommended to be provided to link Glossodia and Freemans Reach to Richmond and Windsor. It was also recommended that linemarking be improved.

Terrace Road / Kurmond Road

- It was recommended that this road connect up to routes in the Hawkesbury LGA and to Springwood via Hawkesbury Road across the Yarramundi Bridge.

Londonderry Road

- The section south of Vines Drive to the LGA's southern border at The Driftway was recommended to provide sealed shoulders on each side.

The Driftway

- The Driftway shoulders were identified as inadequate width and it was recommended that they be widened to conform to Austroads standards.

Dight Street / Percival Street

- The contra flow bicycle lane on the eastern side of Percival Street was identified as "inherently hazardous" and it was recommended that additional width be provided on Percival Street to allow shoulders on both sides. Dight Street was also recommended to provide sealed shoulders on both sides.

Rifle Range Road

- It was recommended that marked bicycle lanes be provided along the entire length of Rifle Range Road. This was envisaged to have involved some linemarking and minor shoulder works.

Windsor Road / Mulgrave Road

- It was recommended that the shared path connecting South Creek and Pitt Town Road be extended to Mulgrave Road. It was also recommended that the shoulders on Mulgrave Road be widened to accord with Austroads guidelines.

Pitt Town Road

- Sealed shoulders were recommended between Windsor Road and Pitt Town.

Lowland Bicycle Route

- A connection of local roads was recommended to provide a recreational cycle trail. A number of directional signs were also recommended to be provided.

Pitt Town Bottoms Road

- A recreational route utilising this road along with minor improvements to the road surface was recommended.

Connections over Rivers / Creeks

A number of connections were identified as hazardous to cyclists. These include:

- Windsor Bridge (Bridge Street) over Hawkesbury River.
- Fitzroy Bridge (Windsor Road) over South Creek.
- Buttsworth Creek (Wilberforce Road).

Local Links

A number of local links were also recommended in relation to specific local roads.

Bicycle Parking

A number of locations were identified where bicycle parking should be provided to assist with the increase in bicycle usage across the LGA.

Behaviour Strategy

The sub regional bike plan identified a number of initiative aimed at improving the behaviour of cyclists, motorists and students.

2.4.2 Hawkesbury Community Strategic Plan 2010-2030

The Hawkesbury Community Strategic Plan 2010-2030 includes a section entitled "Linking the Hawkesbury" which is headed by a vision statement for the Hawkesbury to be "a community which is provided with facilities and services efficiently linked by well maintained roads and accessible and integrated transport and communication systems which also connect surrounding regions". Each section of the Plan sets out a series of directions, strategies, goals, measures and milestones which are to assist Council and the community in achieving its vision, as follows:

- Directions provide a further expansion of the intent of the Vision Statement.
- Strategies identify how Council will aim to deliver what has been requested.
- Goals identify targets that must be achieved in order to reach the vision.
- Measures outline key performance guides to ensure that the vision is being achieved.
- Milestones describe the short-term (i.e. 4 years) deliverables for Council to undertake to deliver the strategies identified.

One of the strategies for "Linking the Hawkesbury" is for the implementation of the bicycle and pedestrian mobility plan. The milestones for "Linking the Hawkesbury" are outlined below:

- Work with neighbouring councils to lobby and implement transport services (2009-2012).
- Develop roads strategy, hierarchy plan and prepare and implement Asset Management System (2009-2012).
- **Implement Mobility Plan including Pedestrian Access and Bike Plan (2009-2012).**
- Lobby and facilitate provision of effective telecommunication network in the Hawkesbury (2009-2012).

More information can be found in the Hawkesbury Community Strategic Plan 2010-2030 report which is available from the Hawkesbury City Council.

2.4.3 Hawkesbury Local Environmental Plan 1989

The Hawkesbury LEP provides a framework for planning and development in the LGA.

The aims and objectives of this plan the provision of a mechanism for the management, orderly and economic development and conservation of land within the City of Hawkesbury and the provision of appropriate land in area, location and quality for living, working and recreational activities and agricultural production.

There are no specific details relating to provision of pedestrian or cycleway facilities within the LEP. However, it is noted that one of the objectives of the Zone 3(a) Business General and Zone 3(b) Business Special zones, which are allocated for all business-related land uses, is to minimise conflicts between pedestrians and vehicular movement within the zone.

3. Characteristics of Hawkesbury

3.1 Geography and Topography

The Hawkesbury Local Government Area (LGA) is located on the north-western edge of Greater Sydney. Bordering LGAs include Blue Mountains to the west, Penrith and Blacktown to the south and Baulkham Hills to the east. The LGA includes the regional commercial and retail centres of Windsor and Richmond.

The area is dominated by the Hawkesbury River and associated tributaries. As a result, the topography of the surrounding residential and commercial areas is generally flat and the Hawkesbury area experiences regular flooding events often resulting in considerable disruption to commerce and damage to agriculture and property. There are a number of existing river crossing points which act as pinch points and natural boundaries to movement between residential and commercial areas.

3.2 Population

According to the 2006 Census, the population in Hawkesbury is currently in the order of 63,000 people. It is a relatively young area, with approximately 20% of the population aged 14 years or younger. Nearly 90% of all residents are Australian citizens and 81% of all residents were born in Australia. The average weekly household income is slightly higher than the Australian Average ($1,146 compared with $1,027). Unemployment was lower than the national average (4.1% compared with 5.2%).

Census data from 2006 indicates that within the postcodes 2753, 2754 and 2756 (those that encompass the major towns within the Hawkesbury LGA) a total of 6% of households do not own a vehicle, while 29% of households own one vehicle and 58% own two or more vehicles. This equates to an average car ownership of 1.88 vehicles per household. A comparison of car ownership between the major Hawkesbury townships, the Hawkesbury LGA and other areas in Sydney is shown in Table 3.1.

Table 3.1: Car Ownership based on Census 2006 Data

Area	Do not own vehicle (% Households)	Own one vehicle (% Households)	Own two or more vehicles (% Households)	Average car ownership (vehicles per household)
Hawkesbury LGA (Post Codes 2753, 2754 and 2756 only)	6%	29%	58%	1.88
Hawkesbury LGA	9%	32%	53%	1.55
Outer Western Sydney	8%	34%	55%	1.65
Greater Sydney	13%	39%	44%	1.44

3.3 Journey to Work Data

An assessment of the Census 2006 Journey to Work data has been undertaken for those employed within and those residing in the Hawkesbury LGA. It was found for residents of the Hawkesbury LGA, a total of 1.0% and 3.8% of work trips were made by bicycle and walking only, respectively. For those whose workplace is based within the Hawkesbury LGA, a total of 1.4% and 5.1% of work trips were made by bicycle and walking only, respectively. It is interesting to note that the number of walking and cycling trips to and from work are significantly higher than trips made by bus. The results for all modes are shown in Figure 3.1 and Figure 3.2.

Figure 3.1: Method of Travel to Work – Residing in Hawkesbury LGA

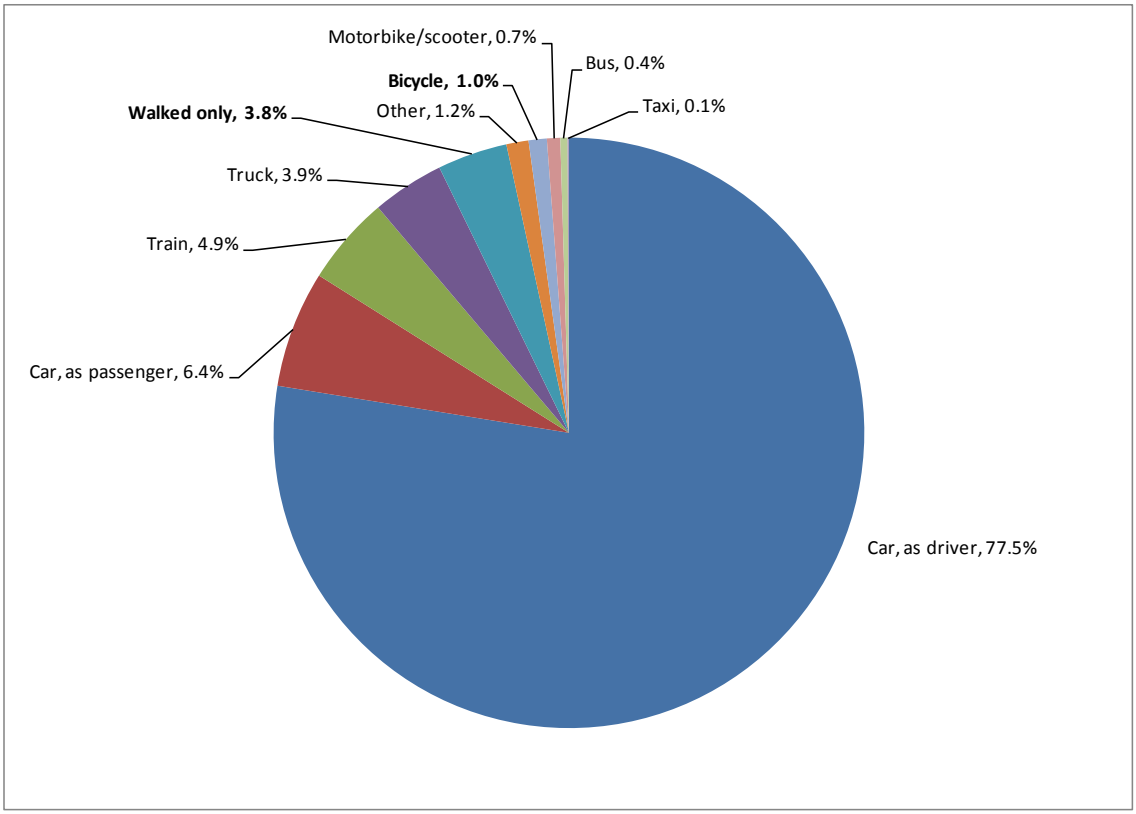
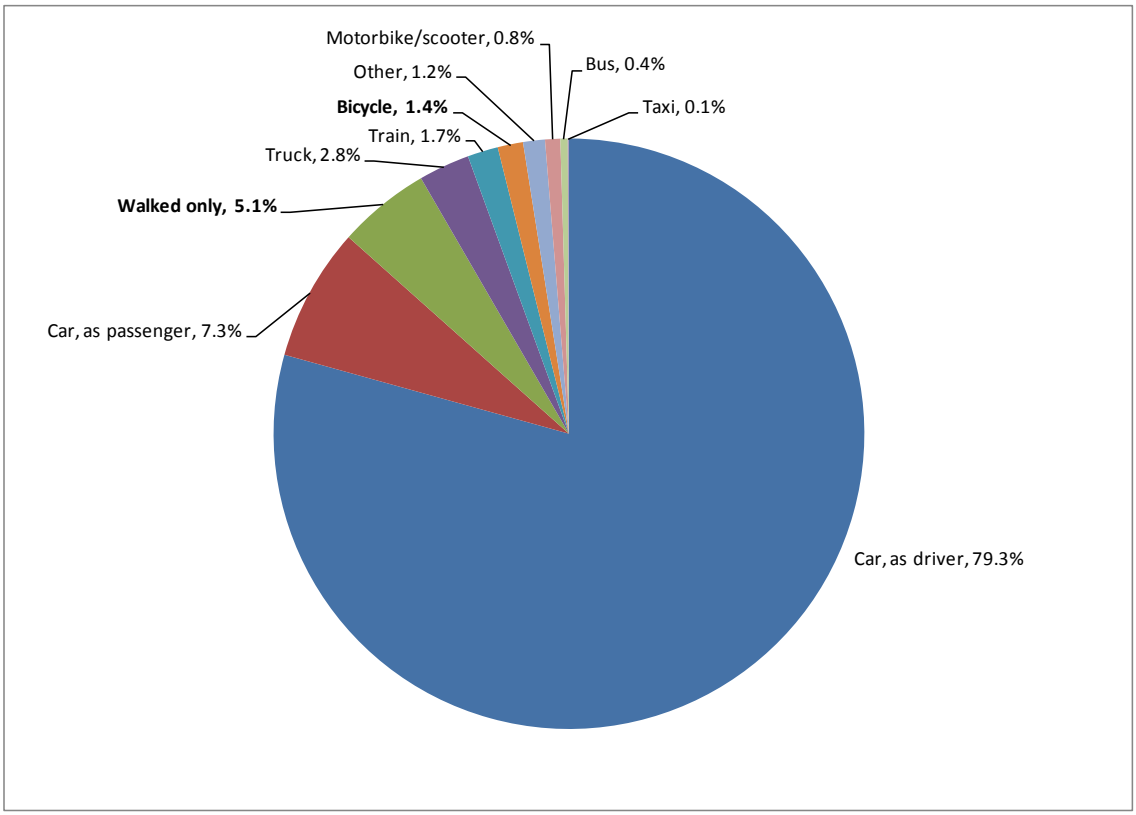


Figure 3.2: Method of Travel to Work – Employed in Hawkesbury LGA



3.4 Trip Attractors and Generators

Trip attractors and generators[1] are important for identifying the places which people will most commonly visit and are useful in determining the major pedestrian desire lines. The main trip attractors for the Hawkesbury LGA and nearby surrounds include the regional centres of Windsor, Richmond and North Richmond, smaller local centres such as South Windsor, railway stations, schools and educational institutions and recreational areas. The main trip generators are the residential land uses, including retirement villages.

Figure 3.3 identifies the main trip attractors and generators for the Hawkesbury LGA.

3.5 Road Network

3.5.1 Road Hierarchy

The functional and administrative classification of roads in NSW is:

- State/Arterial – Predominantly carry through traffic from one region to another, forming principal avenues of communication for urban traffic movements.
- Regional/Sub Arterial – Connect the arterial roads of development and carry traffic directly from one part of a region to another. They may also relieve traffic on arterial roads in some circumstances.
- Collector – Connect the sub arterial roads to the local road system.
- Local – Access roads to properties.

Figure 3.4 shows the road hierarchy within the study area.

3.5.2 Traffic Volumes

A summary of the Annual Average Daily Traffic (AADT) and Average Daily Traffic (ADT) volumes for a number of key roads are summarised in Table 3.2.

1 A Trip Attractor or Generator is defined as an activity, facility or event which attracts or generates the need for travel.

Table 3.2: Traffic Volumes in Hawkesbury LGA

Road	Two-Way Traffic Volume (RTA Roads = AADT*, Local Roads = ADT)
State and Regional Roads (Source: RTA)	
Windsor Road, Windsor	35,802**
Kurrajong Road/ Bells Line of Road (North Richmond Bridge)	27,174
Hawkesbury Valley Way, Windsor	20,890
Blacktown Road, Bligh Park	18,077
Windsor Street, Richmond	12,906
Pitt Town Road, Windsor	11,984
Wilberforce Road, Windsor	10,458
Bells Line of Road, Kurrajong	10,307
Local Roads (Source: Hawkesbury Council)	
Lennox Street, Richmond	7,765
Grose Vale Road, North Richmond	7,683
George Street, Windsor	6,798
March Street, Richmond	6,788
George Street, South Windsor	5,411
Mileham Street, South Windsor	5,384
Bourke Street, East Richmond	5,158
Francis Street, Richmond	4,922
Rifle Range Road, Bligh Park	4,901
The Terrace, Windsor	3,490
Cox Street, South Windsor	708

* Data recorded in axle pairs
** Data recorded in vehicles

Figure 3.3: Hawkesbury LGA Trip Attractors and Generators

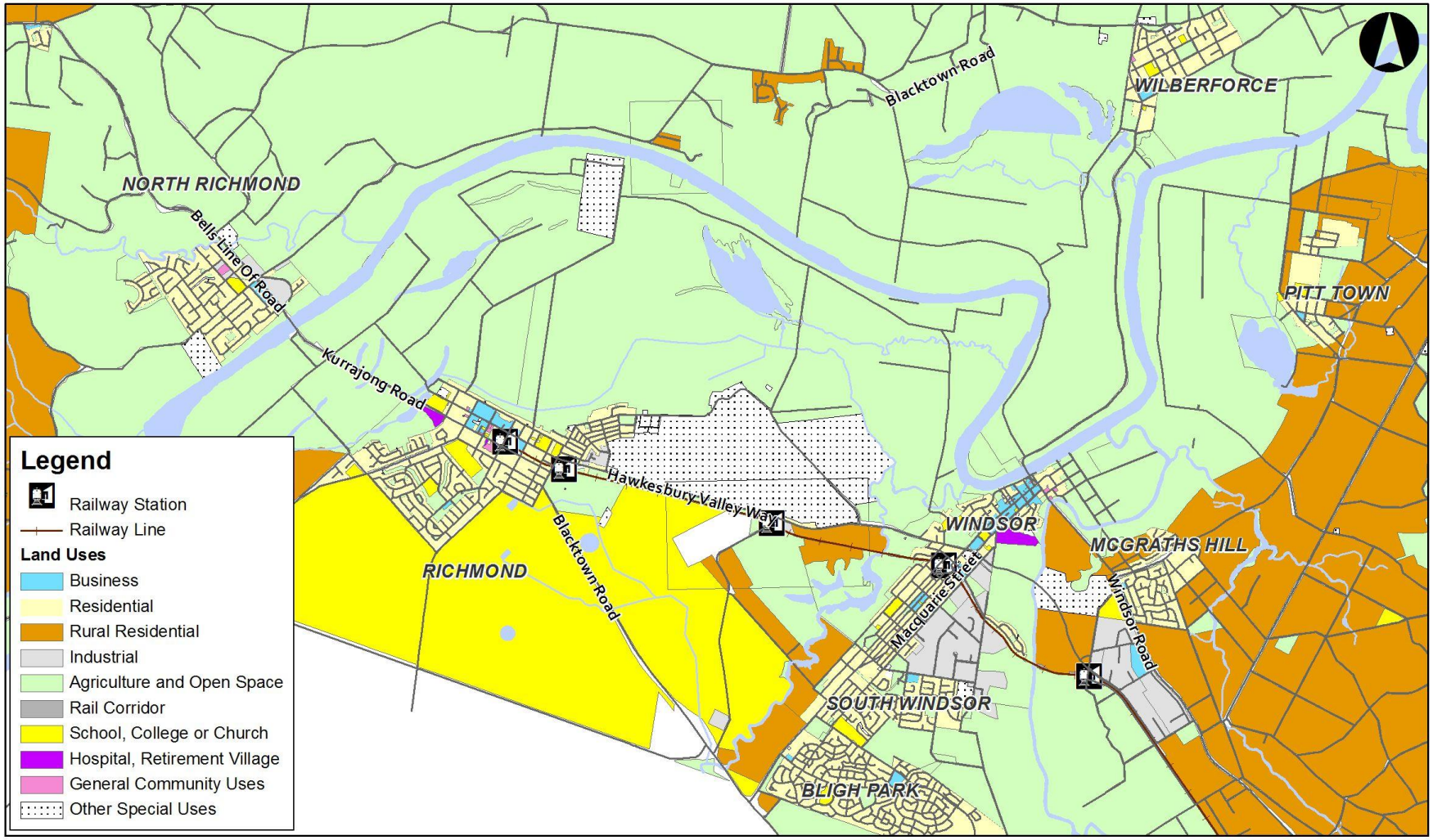
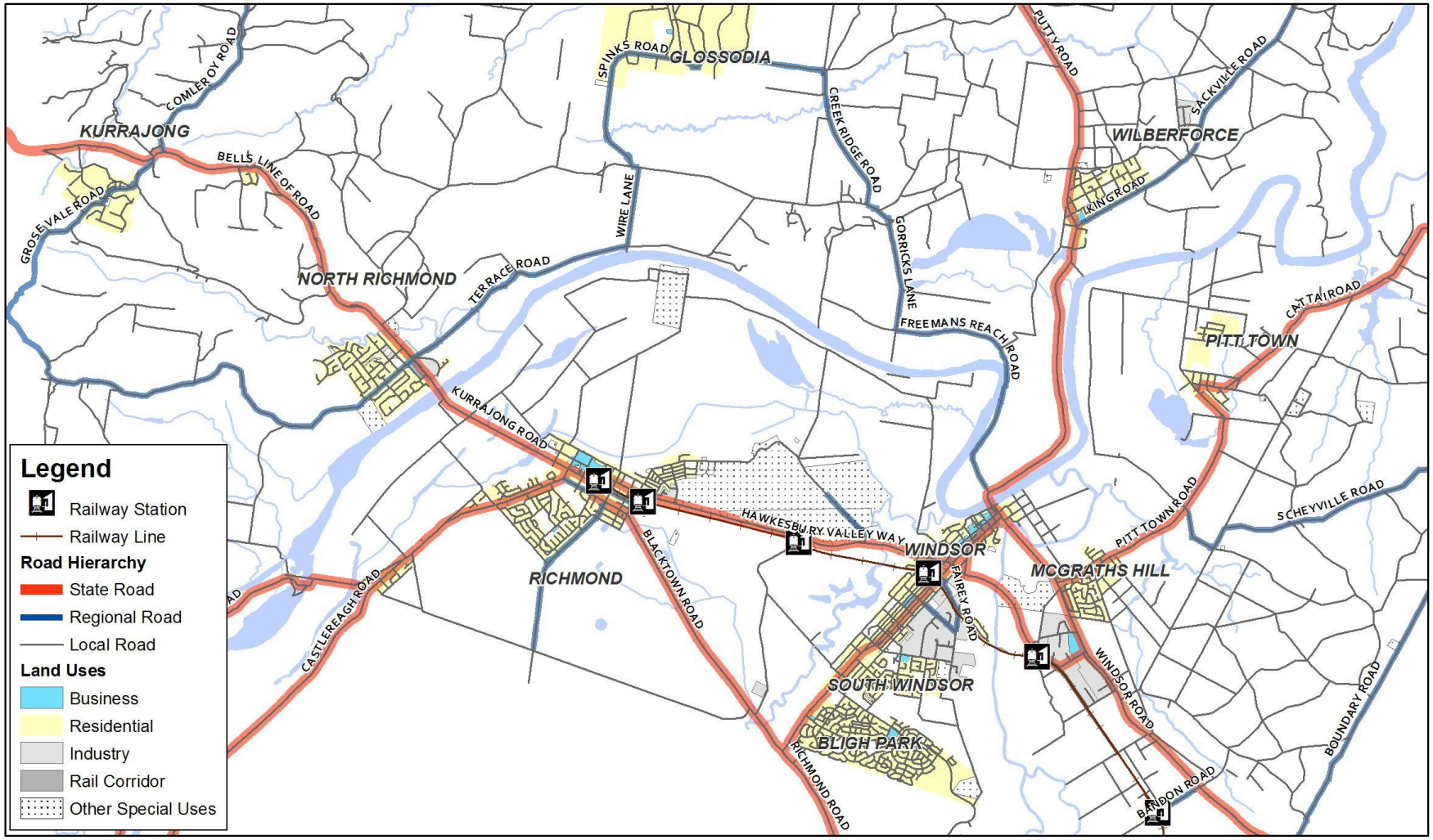


Figure 3.4: Road Hierarchy – Based on NSW Road Classification Review May 2009



3.6 Public Transport

The Hawkesbury LGA is serviced by a public transport network of trains and buses.

3.6.1 Rail

There are a total of five railway stations in the study area all of which provide access to the North Shore and Western line. These are as follows:

- Mulgrave
- Windsor
- Clarendon
- East Richmond
- Richmond.

Windsor, East Richmond and Richmond Stations are all serviced by buses, providing interchange opportunities between public transport modes.

Table 3.3 and Figure 3.5 show the results of barrier counts undertaken in 2007 at each of the railway stations within the Hawkesbury LGA. The data indicates that Richmond is the busiest station, followed by Windsor and East Richmond.

Table 3.3: 2007 Barrier Counts

Station	Total Entering (24 hours)	Total Exiting (24 hours)
Mulgrave	250	250
Windsor	690	690
Clarendon	100	100
East Richmond	420	420
Richmond	940	940

Figure 3.5: 2007 Barrier Counts

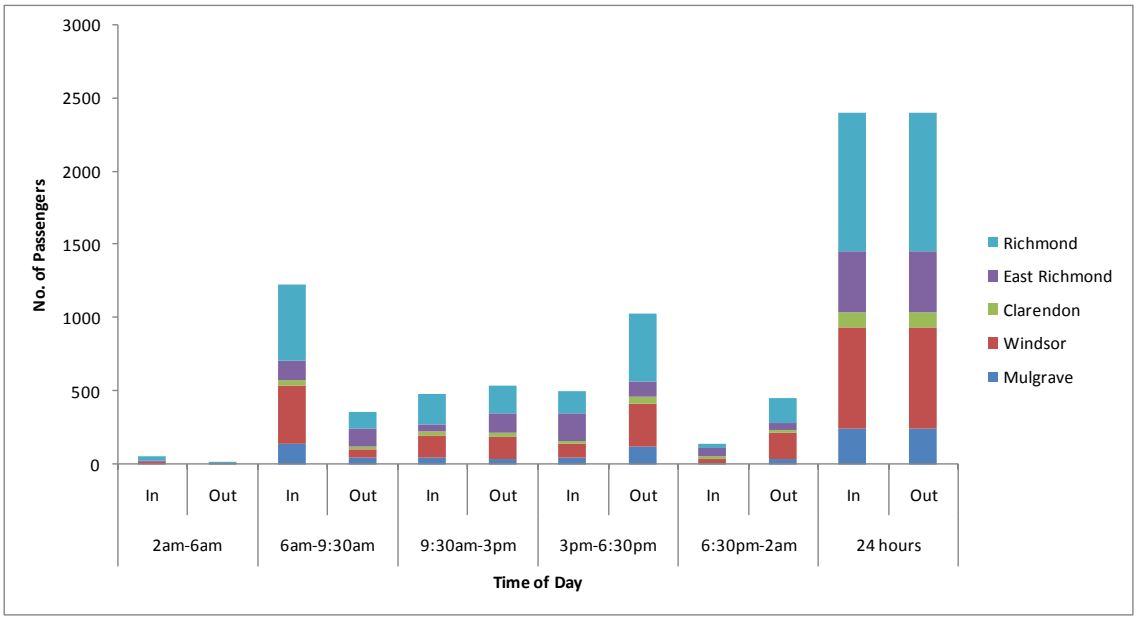


Table 3.4 provides a summary of the existing access facilities at each of the stations.

Table 3.4: Station Facilities

Station	Stairs	Ramp	Lift	Bus Stop	Taxi Rank	Car Park	Wheelchair Accessible Car Space	Bike Racks/ Lockers	Portable Platform to Train Boarding Ramp
Mulgrave	x	1:6	x	x	x	✓	✓	x	✓
Windsor	x	1:6	x	✓	✓	✓	✓	✓	✓
Clarendon	✓	1:6	x	x	x	✓	✓	x	✓
East Richmond	x	1:6	x	✓	x	x	x	✓	✓
Richmond	✓	1:14	x	✓	✓	✓	✓	✓	✓

Source: CityRail website www.cityrail.info/facilities

3.6.2 Windsor Railway Station Upgrade

Windsor Railway Station has recently undergone an upgrade with the development of a transport interchange and a commuter car park. Works are substantially completed as of March 2010, with the upgrade to be fully completed by mid 2010. The project includes a commuter car park with a capacity of 208 spaces, including 10 disabled parking spaces, new bus stops, taxi stand, kiss and ride drop-off zone and bicycle parking facilities. Pedestrian and cycle facilities are being improved as part of the upgrade to ensure appropriate access and egress for pedestrians and cyclists.

3.6.3 Buses

Bus services within the Hawkesbury LGA are operated by Westbus (ComfortDelgroCabcharge which includes HillsBus) and Hawkesbury Valley Bus Services.

A range of bus types currently operate throughout the LGA, with varying levels of accessibility. Easy access buses, or low floor buses, provide the highest level of accessibility for all members of the community, including wheelchair users and parents with prams. As part of the NSW Government's Accessible Transport Action Plan, each of the bus operators has a strategy to replace the older-style buses with easy access buses. However, this will progressively occur over a number of years and will take some time before the entire bus fleets are accessible to mobility impaired users. In 2008 approximately 30% of bus services in both the Sydney Metropolitan and Outer Metropolitan areas were timetabled as accessible.

With regard to bus stops and shelters, there are a range of facilities each with varying levels of compliance with accessibility requirements. Ideally, bus shelters should be provided with a space that allows a wheelchair or pram to be wholly contained under the shelter. There are currently a limited number of such shelters around the Hawkesbury area. It is recommended that all new shelters installed be accessible. In addition to the type of shelter, the bus stop should also include an accessible pedestrian connection into an existing footpath facility.

The existing bus routes within the Hawkesbury LGA are shown in Figure 3.6.

Figure 3.6: Westbus Bus Routes

Source: ComfortDelgroCabcharge
Note: for more detail, see http://www.yourbus.com.au/WestBus-Maps.html

3.7 Walking and Cycling Crash History

Bicycle and pedestrian crashes recorded in the Hawkesbury area for the most recent 5-year period available (January 2003 to December 2007 inclusive) were analysed as part of this study. Figure 3.7 shows the number of crashes for bicycles and pedestrians over the 5-year period. Figure 3.8 shows the location of the recorded pedestrian and cyclist crashes. More detail for Windsor/ South Windsor and Richmond is available in Figure 3.9 and Figure 3.10 respectively.

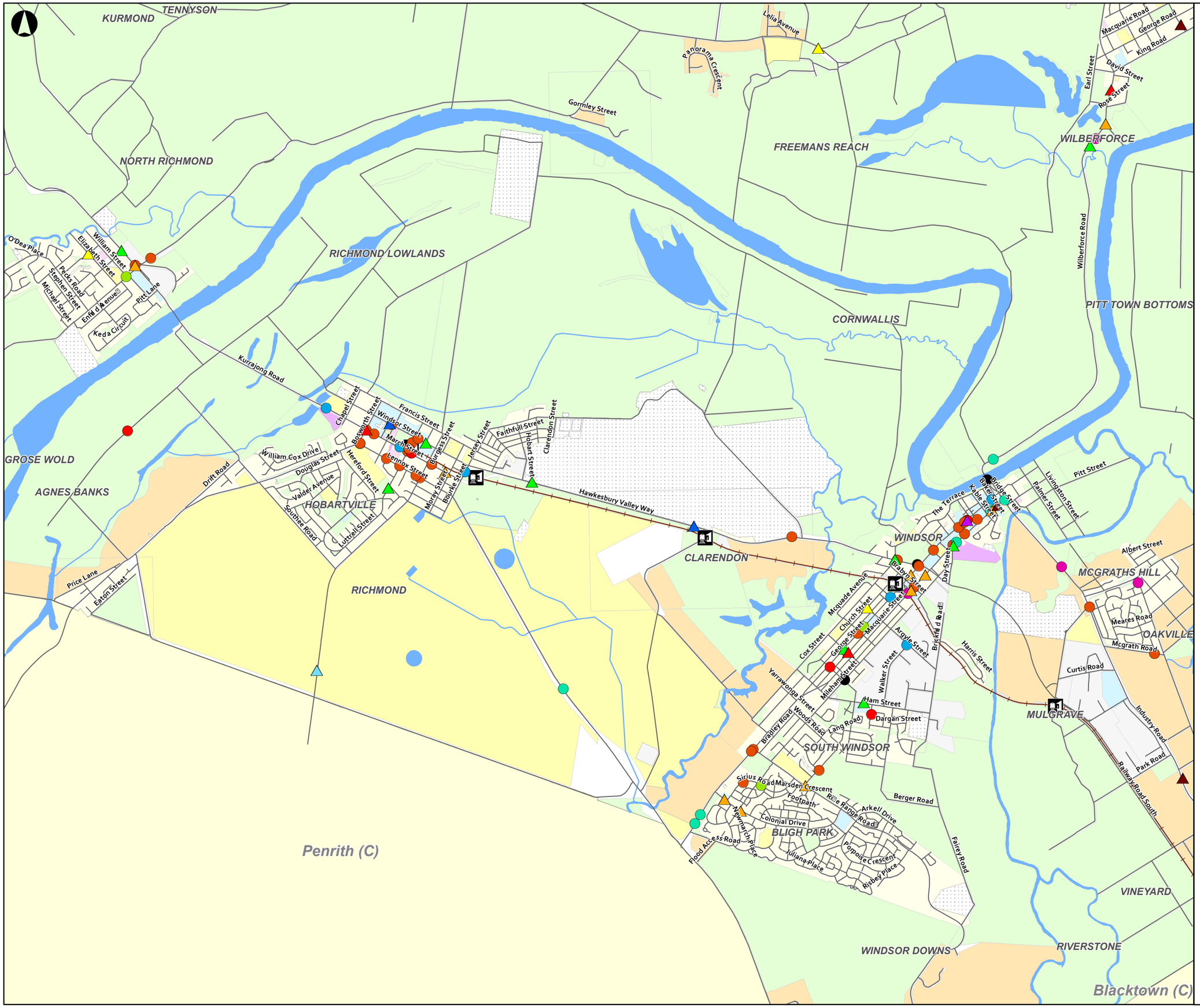
Figure 3.7: Reported Pedestrian and Bicycle Crashes by Year

In the whole of the Local Government area, there were a total of 111 pedestrian and cyclist crashes recorded, including 70 pedestrian crashes, 40 bicycle crashes and one bicycle/pedestrian crash. However, it is noted that pedestrian and bicycle crashes are known to be under-reported and may only be reported if they involve a death or serious injury.

The most commonly recorded pedestrian crash type was the near side pedestrian crash, where a pedestrian is hit by a vehicle as they emerge from the kerb to cross a road. A total of 39 crashes, or 55% of pedestrian crashes, were recorded as near side while a further 13 crashes were associated with other pedestrian crossing movements.

The most commonly recorded cyclist crash types were where a cyclist impact occurred with a vehicle travelling alongside in the same direction, either as a side swipe or turning impact. A total of 15 crashes or 37% of cyclist crashes of this nature were recorded. A further 10 crashes were associated with vehicle impacts with bicycles emerging from a driveway or footpath.

A summary of the crash types is shown in Figure 3.11.



Legend

Pedestrian Accident Type (RUM)

- Near Side
- Emerging
- Far Side
- On Carriageway
- Walking with Traffic
- Facing Traffic
- On Footpath/ Median
- Driveway
- Other

Bicycle Accident Type (RUM)

- Pedestrian
- Adjacent Directions at Intersections
- Opposing Directions
- Same Direction
- Manoeuvring
- Overtaking
- On Path
- Off Path, On Straight
- Off Path, On Curve
- Miscellaneous

Issue	Date	By	Chkd	Appd
A	19-03-10	BL	DC	BDM

Metres

0 500 1,000 2,000

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Client

Hawkesbury City Council

Job Title

Hawkesbury Mobility Plan

Drawing Title

Reported Bicycle and Pedestrian Crashes
January 2003 - December 2007

Scale at A3

1:40,000

Drawing Status

Final

Job No	Drawing No	Issue
HS11250	Figure 3.8	A

Figure 3.9: Reported Bicycle and Pedestrian Crashes – Windsor/ South Windsor

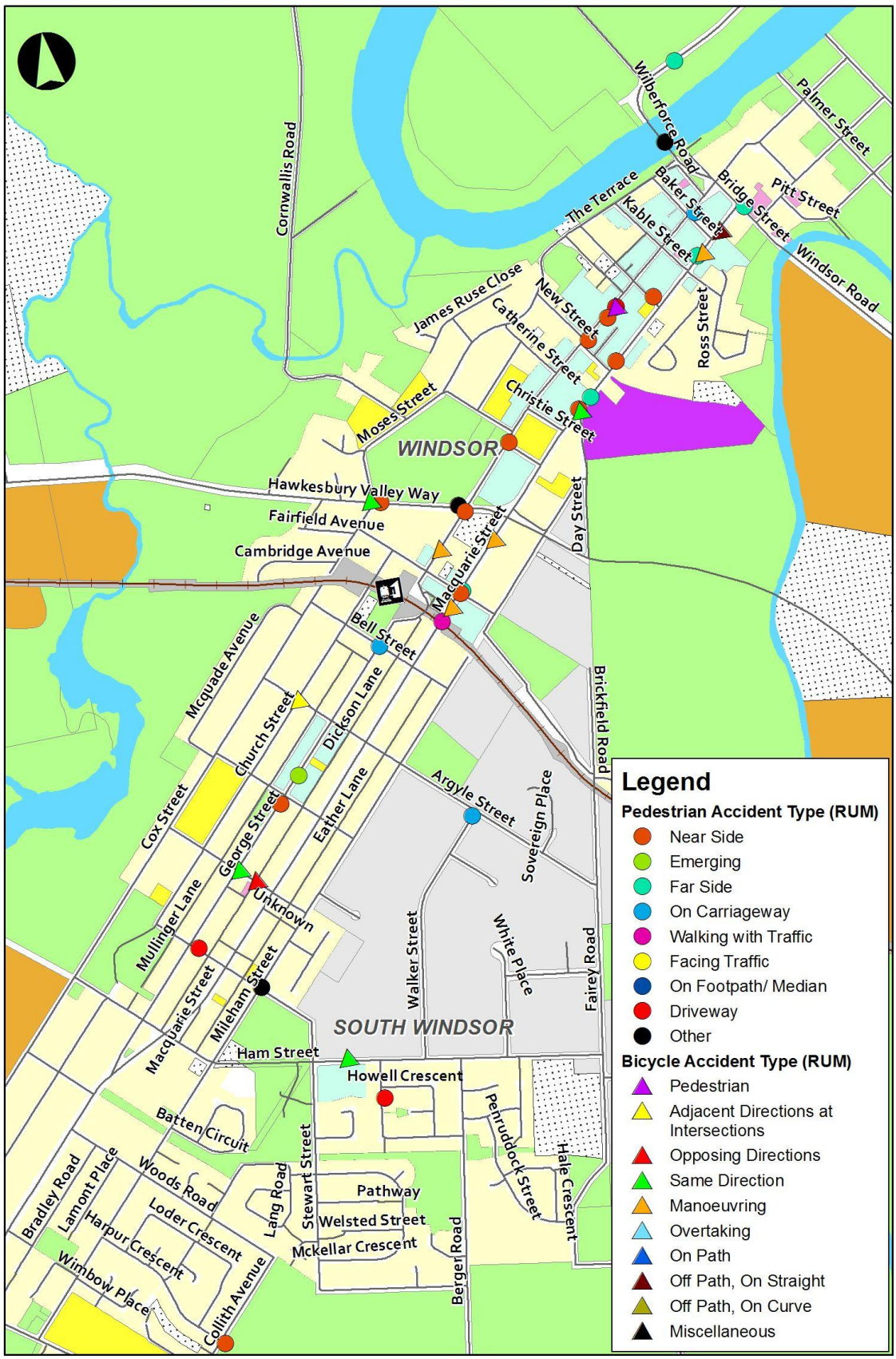


Figure 3.10: Reported Bicycle and Pedestrian Crashes - Richmond

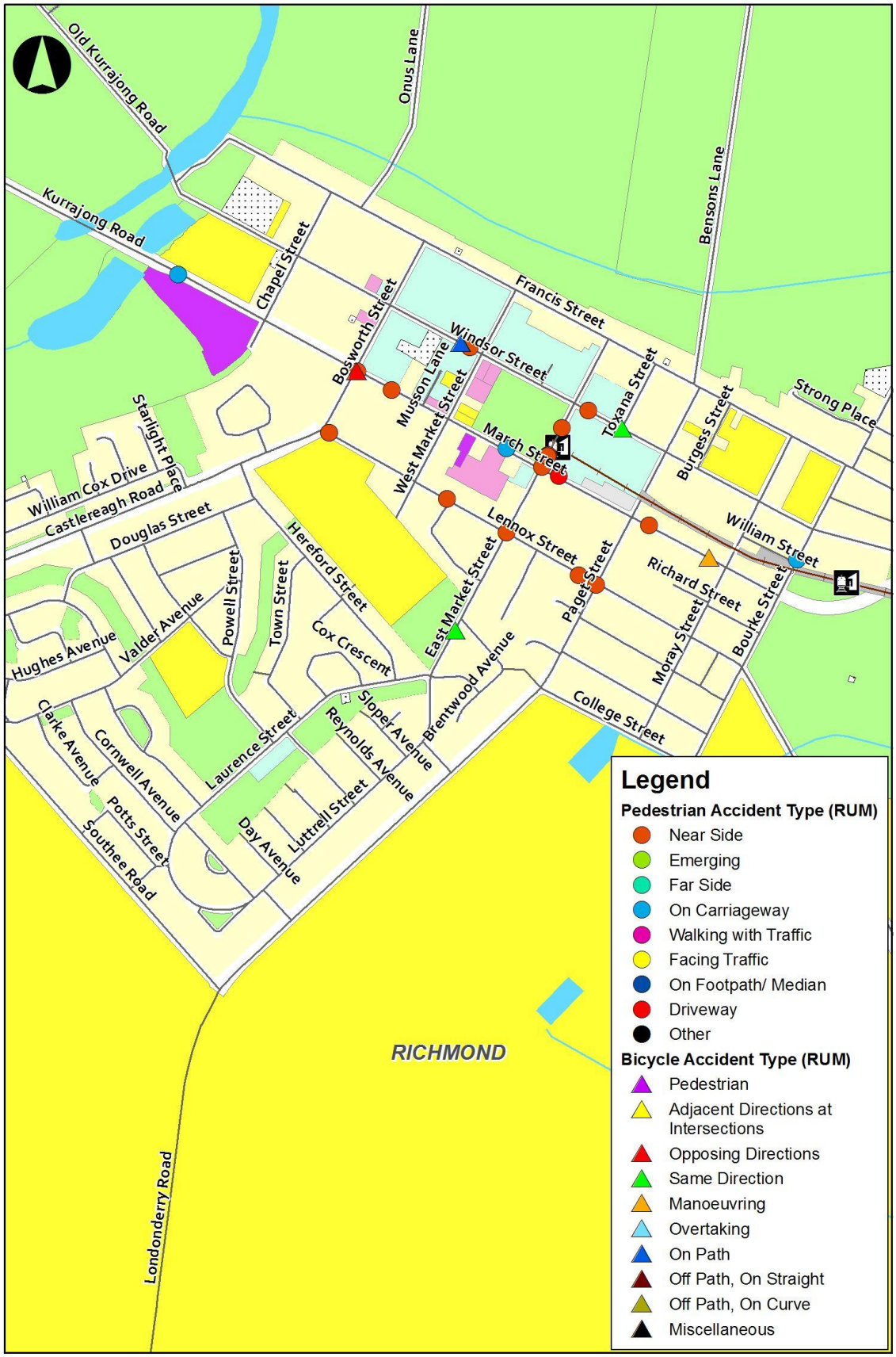
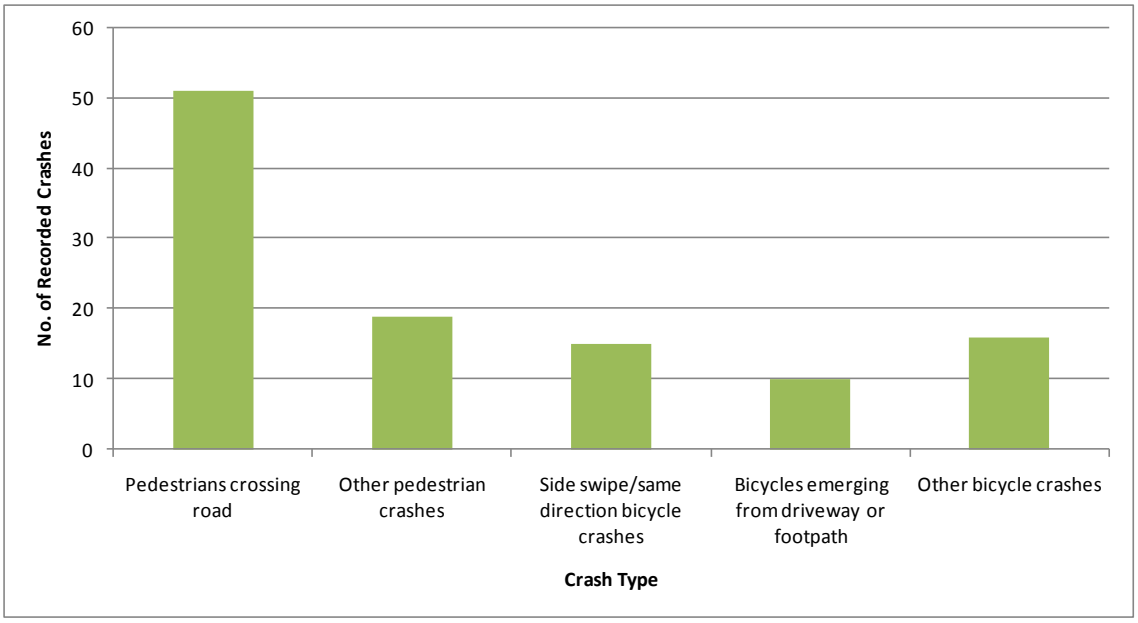


Figure 3.11: Pedestrian and Bicycle Crashes – Crash Type Summary



Although the crashes are generally spread-out throughout the LGA, some identified crash clusters and lengths are as follows:

- 6 crashes involving pedestrians (primarily near side movement type) near Richmond Station on East Market Street and March Street.
- 5 crashes (4 pedestrian, 1 bicycle) on George Street, Windsor, between New Street and Johnston Street. 4 of the 5 crashes were of a near side movement type.
- 3 crashes (2 pedestrian, 1 bicycle) on Macquarie Street, Windsor, at or near Day Street and Hawkesbury Hospital. No trend in movement type was identified.

There were a total of six pedestrian and cyclist fatality crashes within the most recent 5-year period, which were analysed in greater detail. These are summarised below:

- Bligh Park – George Street north of Hawkesbury Valley Way:
  - pedestrian crossing carriageway from the far side of the road
  - early in the evening (6:50pm)
  - street lighting in operation
  - speed noted as a factor.
- McGraths Hill – Windsor Road north of Pitt Town Road:
  - pedestrian walking along carriageway in same direction as traffic
  - late in the evening (10:40pm)
  - dark with no street lighting
  - elderly driver (77 year old female).
- Richmond – Blacktown Road west of The Driftway:
  - pedestrian crossing carriageway from the far side of the road
  - early hours of the morning (2:13am)
  - dark with no street lighting
  - articulated truck involved.

- Richmond – Londonderry Road north of The Driftway:
  - impact occurred while vehicle overtaking another vehicle (not the cyclist)
  - early in the evening (6:20pm)
  - cyclist travelling on incorrect side of carriageway
  - two 16 year old males on bicycle – one killed and one injured in crash.
- South Windsor – George Street north of Campbell Street:
  - pedestrian emerging (from parked vehicle)
  - late afternoon (4:40pm)
  - daylight, fine and dry conditions
  - 3 year-old male crossing the road
  - driver distracted or had vision obscured.
- Windsor – Intersection of Dight Street and George Street:
  - near side accident (pedestrian emerging from kerb)
  - AM peak period (8:55am)
  - unsignalised T-intersection
  - vehicle turning right
  - driver distracted or had vision obscured.

4. Consultation and Data Collection

4.1 High School Walking and Cycling Questionnaire

A walking and cycling questionnaire was distributed to each of the schools located within the Hawkesbury area. A total of 6 schools received a questionnaire with 2 completed responses received. The main findings of the questionnaire are as follows:

- Method of travel to school depended on the location of the school in relation to residential areas.
- Lack of facilities was considered a barrier to increased cycling.
- Parents were preventing their children from cycling to Primary School and the perception of danger continued into High School.
- The two schools both provide bicycle parking.
- The most popular transport modes used by students at the schools surveyed were walking, bus and private vehicle, with cycling ranking low as a transport mode.
- Of those schools that did note issues with the pedestrian facilities at their school, the most common issues noted related to the uneven footpath surfaces, lack of kerb ramps and kerb ramp design.

4.2 Previous Consultation Outcomes

Hawkesbury City Council has undertaken consultation with the community on a range of topics and areas during the preparation of other Council studies; in particular the Hawkesbury Community Strategic Plan. The outcomes of these surveys and workshops have been reviewed and used to inform the Hawkesbury Mobility Plan. A summary of the sources of information and the key findings are outlined below.

4.2.1 Hawkesbury Community Survey – August 2007

A random community survey of 400 residents was undertaken to assess community priorities and their attitude to the Council's performance. The respondents provided input on what is most valued about living in Hawkesbury LGA, what concerns they have about living in the Hawkesbury LGA, the importance and satisfaction of 37 different services and facilities and the importance of ten key objectives for the future development of the Hawkesbury.

The top three qualities that residents valued about living in the Hawkesbury area were the country atmosphere and lifestyle, access to services and facilities and a general love for the beauty of the area.

In terms of their concerns and living in the area, the top six reasons were identified as follows:

1. Lack of services/facilities
2. Council management/operations
3. Increasing development issues
4. Lack of public transport
5. Concern with rates
6. Crime and vandalism.

Of the 37 services and facilities that were ranked in terms of importance and satisfaction, ten were identified as requiring the most attention for improvements in the future. These were as follows:

1. Road condition
2. Storm water management and re-use

3. Reducing energy consumption
4. Generating more local employment opportunities
5. Footpaths and cycleways
6. Improving water quality
7. Improving air quality
8. Maintaining agriculture as a viable industry
9. Hazard reduction burning
10. Provision of mains sewerage.

Of note for the Hawkesbury Mobility is the ranking of footpaths and cycleways in the top five of all Council issues, which indicates that the community is keen to see improvements in this area.

4.2.2 Hawkesbury Community Engagement Strategy Workshops – August 2007

Using the Hawkesbury Community Survey results, a community engagement workshop was held to probe the major issues that arose from the Community Survey. Two workshops were held with a total of 43 residents attending. No issues in relation to pedestrian or cycleways were discussed in these workshops. In relation to spending on large projects, the residents were unable to identify which other area Council should redirect additional funds from if the infrastructure spending were to be increased, instead relying on reducing staffing levels and improving efficiency.

4.2.3 Hawkesbury Mobility Survey – February 2007

Completed in February 2007, the Hawkesbury Mobility Survey was randomly distributed to 1,000 households across the Hawkesbury LGA and an additional 70 surveys were distributed to disability, aged and bicycle user groups. This comprised 4.8% of all occupied households. A response rate of 18.5% was achieved which represented a total of 1% of occupied households across the Hawkesbury LGA.

The mobility survey showed that cycling accounted for 22%, 18% and 12% of all trips to work, school and shopping, respectively. Cycling accounted for 2%, 4% and 4%, respectively.

In relation to the issues identified as needing improvement, street lights was rated #2, footpaths #3, pedestrian crossings #4 and kerb ramps #7. On-road and off-road bicycle paths were rated #11 and #12, respectively.

"The Hawkesbury Mobility Survey asked respondent households to nominate three changes which would improve mobility in their neighbourhood. 39% of respondents listed the need for more footpaths, or the need to maintain them, as an aspect that needed upgrading in their local area to improve physical success and pedestrian or cyclist safety."

Of the physical access mobility issues that were of most concern, "providing footpaths and pathways" was ranked #2," improving safety of footpaths at night" was ranked #4, "extending network of cycle-ways" was ranked #6, "improving accessibility of Windsor/Richmond" was ranked #7, "installing kerb ramps" was ranked #10 and "installing pedestrian crossings" was ranked at #11.

The condition of footpaths and cycle ways was generally seen as staying the same. Footpaths were generally seen as insufficient with more required around urban areas. Wider shoulders and additional bicycle lanes extended to all towns and villages were also identified as an issue.

4.2.4 Hawkesbury Public Transport Survey – 2002

The survey completed in 2002 provided a number of statistics in relation to trains, buses and taxis. Information was provided in relation to the number of people using these modes across Hawkesbury, the purpose of the public transport trip and how often they used public transport, together with why people did not use each mode of transport.

4.3 Project Steering Group Consultation

GTA Consultants attended a number of project meetings with the Hawkesbury Mobility Project Steering Committee. The committee comprised Council employees from its Community Services, Planning, GIS and Engineering departments. In addition, representatives of the Bicycle and Access Mobility Committee were also part of the Project Steering Group and provided input from a mobility impaired and bicycle user perspective. These meetings were held to discuss the project details and allow the Steering Group to comment on interim project deliverables, including the summary of identified issues and the draft pedestrian and bicycle networks.

All comments and feedback received during the Steering Group meetings has been considered in developing the bicycle and pedestrian networks and the schedule of works as appropriate.

4.4 Site Inspections with Hawkesbury Valley Bicycle User Group Representatives

GTA Consultants undertook a site visit on Friday 29 May 2009 with a representative of the Hawkesbury Valley Bicycle User Group (BUG). The purpose of the site visit was to highlight some of the bicycle link opportunities and current issues with the existing bicycle facilities for consideration in developing the proposed bicycle network.

Discussions on site included the following issues and opportunities:

- Bells Line of Road and Old Bells Line of Road:
  - Extend the existing off-road shared path from Kurmond to Kurrajong.
- Rickaby Street link across Rickabys Creek:
  - Potential route combining a new shared path and the road reserve alignment between Racecourse Road to the north and the intersection of Rickaby Street and Cox Street on the south side of the creek.
  - This would require a new bridge to cross the creek.
- Racecourse Road, Clarendon:
  - Potential low traffic volume route between Blacktown Road and Hawkesbury Valley Way/ Clarendon Railway Station.
  - Would connect to the above Rickaby Street link.
- Rifle Range Road and surrounding Bligh Park streets:
  - Lack of intersection treatments, particularly at roundabouts where bike lanes disappear.
- Rifle Range Road connection between Windsor Downs and Bligh Park:
  - Link through Windsor Downs Nature Reserve along the Sanctuary Road alignment.

    - Currently an unsealed link which functions as a fire access trail and is also used by trail bikes.
- George Capper Park:
    - Narrow shared path which is suitable for recreational cyclists only.
    - There is a lack of connectivity at the two path ends (i.e. is an isolated facility).
- Old Kurrajong Road (local connection at North Richmond Bridge):
    - Some issues with maintenance, with overgrown plants and unsealed/rough surface.
- Southee Road and Castlereagh Road intersection:
    - Highlighted as a good intersection treatment (continuation of bicycle lane adjacent to a left turn slip lane).

4.5 Other Submissions

Two written bicycle and pedestrian submissions were received by Hawkesbury Council in 2009. These were considered during the development of the Mobility Plan and are summarised as follows:

- Rotary Club of Richmond:
    - A proposed concrete walking track loop to the north of Francis Street along Onus Lane, Cornwallis Lane and Bensons Lane was suggested, which would be delivered over the next ten years with support from Rotary.
- Pitt Town Progress Association:
    - Request for a pedestrian and bicycle shared path on the western side of Bathurst Street and Punt Road between the river and the shopping centre.

Bicycle route network recommendations were received from the Hawkesbury Valley BUG. These were discussed during the site visit outlined in Section 4.4.

A list of known pedestrian hazards and issues in Windsor and Richmond was also received from a member of the Bicycle and Access Mobility Committee. These have also been considered as part of the development of the pedestrian network and works schedule. This list is included in Appendix B.

4.6 Public Exhibition

The draft Hawkesbury Mobility Plan was placed on public exhibition from 23 December 2009 to 23 February 2010. During this period, a total of six (6) submissions were received from the following respondents:

- Resident of Windsor Country Village
- Hawkesbury Valley BUG
- Richmond High School
- Hawkesbury Council Strategic Planning Team
- Resident of Kurrajong
- UWS Hawkesbury.

The key themes of the comments received included the following:

- Existing footpath and cycleway deficiencies (e.g. condition, width, warning signage requirements).
- New facilities and prioritisation.

- Reinforce links between East Richmond Station and UWS.
- Request for works to routes to LGA connections.
- Consideration of future developments, including provision of footpath and bicycle links.
- Mapping presentation and formatting.

A summary of the issues and comments raised has been provided in Appendix C. The table in Appendix C also includes GTA Consultants' response to each of the comments and the action taken in addressing the comments within the final report.

5. Existing Bicycle Network

5.1 Guidelines for Assessment of Existing Facilities

The existing bicycle route facilities were assessed against the design requirements outlined in the NSW Bicycle Guidelines (RTA, 2003) and the Austroads Part 14 Bicycles. A summary of the key design requirements that the existing facilities were measured against is as follows.

- Bicycle Shoulder Lanes (with parking):
    - Nominal 2.0m parking lane
    - 1.4m minimum bicycle shoulder lane
    - 3.0m minimum traffic lane width
    - Parking and bicycle shoulder lane separated by C4 continuity line
    - Bicycle logos centred within the bicycle shoulder lane and located/repeated at intersections as well as mid-block intervals of not more than 100m.
- Bicycle Shoulder Lanes/Sealed Shoulders (adjacent to unsealed verge on rural roads):
    - Lane width based on the posted speed limit of the road:
        - 60km/h = 1.5m shoulder width
        - 80km/h = 2.0m shoulder width
        - 100km/h = 2.5m shoulder width.
    - Bicycle logos centred within the bicycle shoulder lane and located/repeated at intersections as well as mid-block intervals of not more than 200m.
- Mixed Traffic Bicycle Routes:
    - Edge lines (E1) provided where the width of the travel lanes totals at least 5.6m (the edge lines provide longitudinal delineation for cyclists and vehicles and encourage uniform on-street parking close to the kerb line, and is relevant for travel lane widths up to 3.3m).
    - Where edge lines are provided, bicycle logos should be 1.5m from the edge line (measured to the centre line of the logo).
    - Where no linemarking is provided, bicycle logos should be located in the centre of the notional travel lane.
    - On intersection approaches where the above points do not apply, bicycle logos should be located in the centre of the travel lane.
    - Bicycle logos located/repeated at intersections as well as mid-block intervals of not more than 100m.
- Shared Path:
    - All shared pedestrian and bicycle off-road paths a minimum width of 2.0m (desirable minimum of 2.5m).
    - S4 continuity line provided on paths with restricted visibility and at intersections and S5 continuity line provided in all other situations.
    - Edge lines (E7) provided where the path width is 2.0m or greater.
    - Bicycle and pedestrian logos located/repeated at intersections as well as mid-block intervals of not more than 100m.

Typical bicycle shoulder lane treatments are illustrated in Figure 5.1 and Figure 5.2. Typical mixed traffic road treatments are illustrated in Figure 5.3 and Figure 5.4.

Figure 5.1: Typical bicycle shoulder lane treatment 1

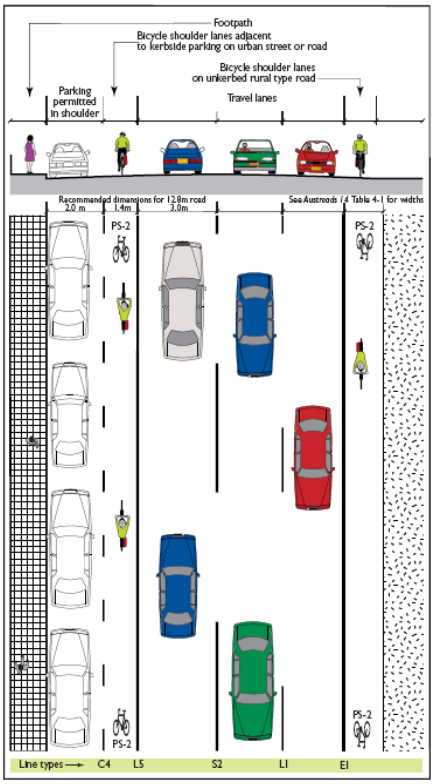


Figure 5.2: Typical bicycle shoulder lane treatment 2

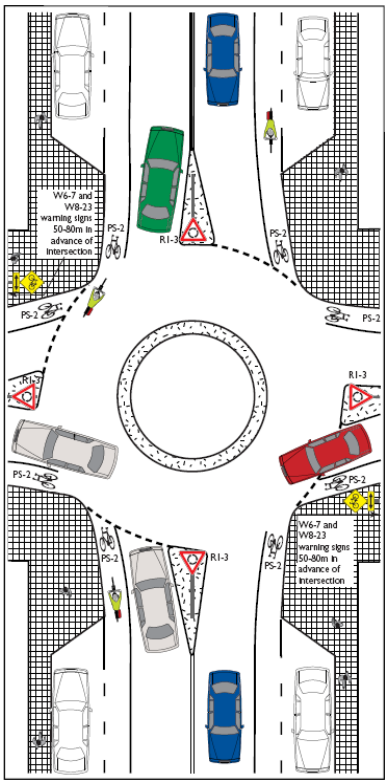


Figure 5.3: Typical mixed traffic bicycle treatment 1

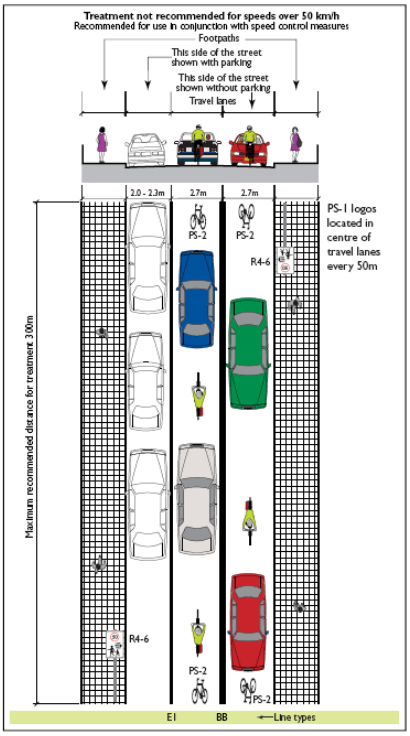
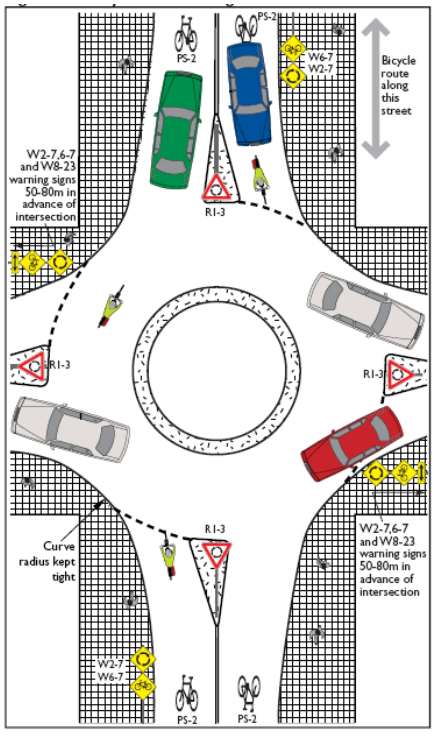


Figure 5.4: Typical mixed traffic bicycle treatment 2



Source: NSW Bicycle Guidelines

5.2 Implementation of 1997 Bike Plan and Summary of Existing Facilities

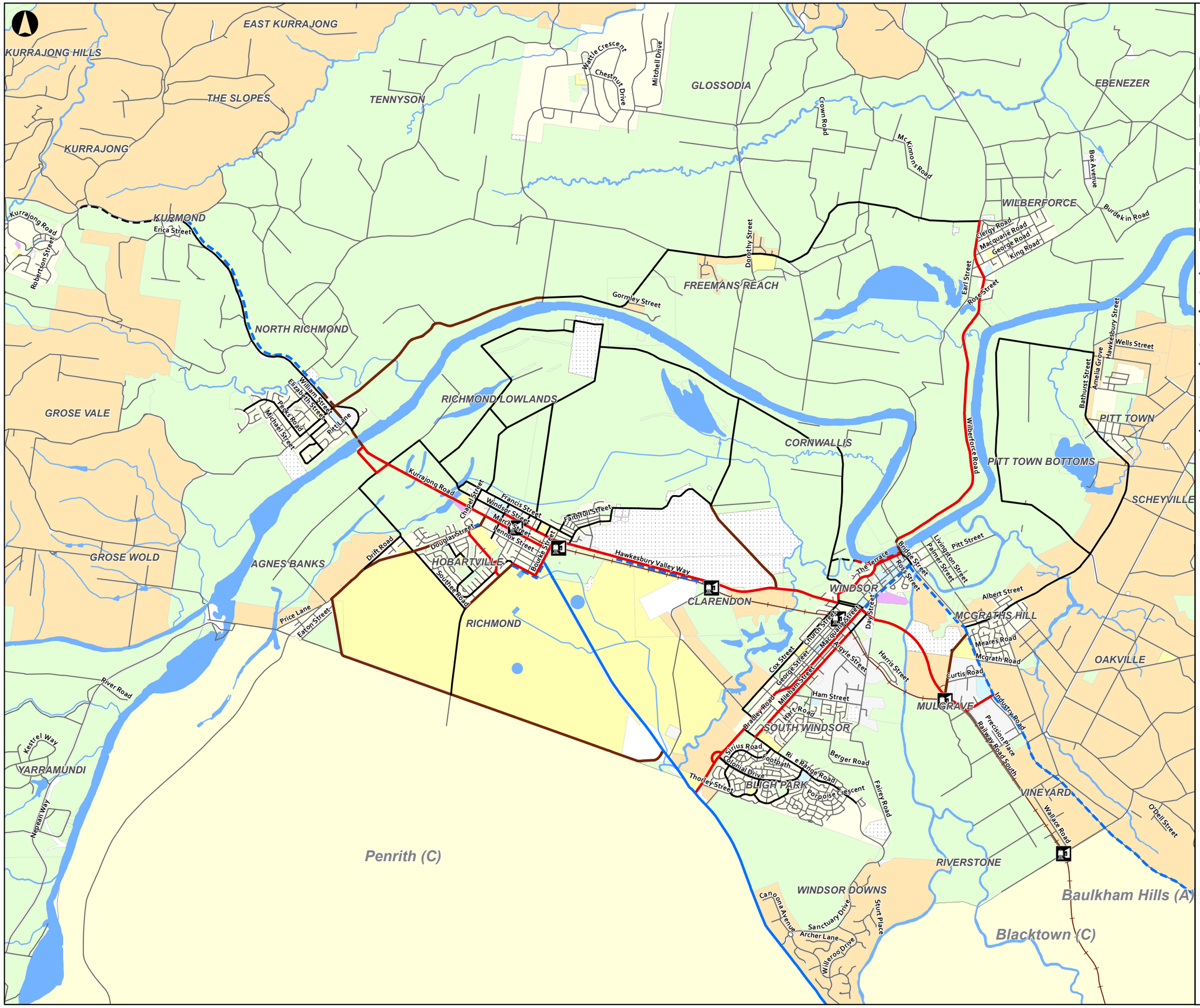
GTA Consultants undertook a review of the works schedule for the 1997 Bike Plan to determine those routes that have been implemented and those that remain as proposed (future) routes. The review also considers whether the proposed routes are still appropriate for inclusion in the latest Bicycle Plan and suggests specific treatment and action for those routes recommended to be retained as part of the bicycle network.

In addition, GTA Consultants undertook site inspections to identify the extent and condition of the existing network as constructed, based on the guidelines outlined in Section 5.1 and current best practice.

The condition assessment for each existing bicycle route facility was noted as one of the following three categories:

- satisfactory
- signage and linemarking improvements required
- inadequate shoulder/ lane/ path width.

The existing implemented routes as well as those proposed as part of the 1997 Bike Plan are shown in Figure 5.5. A summary of the 1997 Bike Plan route assessment is contained in Table 5.1 with the detailed assessment contained in Appendix D.



Legend

Land Uses

- Business
- Residential
- Rural Residential
- Industrial
- Agriculture and Open Space
- Rail Corridor
- School, College or Church
- Hospital, Retirement Village
- General Community Uses
- Other Special Uses

Existing Facilities Status

- Satisfactory On-Road
- Satisfactory Off-Road
- Inadequate Shoulder or Lane Width On-Road
- Inadequate Path Width Off-Road
- Signage and/or Linemarking Improvements Required On-Road
- Signage and/or Linemarking Improvements Required Off-Road
- Future On-Road
- Future Off Road

Issue	Date	By	Chkd	Appd
A	19-03-10	BL	DC	BDM

Metres
0 750 1,500 3,000

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Client
Hawkesbury City Council

Job Title
Hawkesbury Mobility Plan

Drawing Title
Current Status of Proposed 1997 Bicycle Network

Scale at A3
1:60,000

Drawing Status
Final

Job No	Drawing No	Issue
HS11250	Figure 5.5	A

Table 5.1: 1997 Bike Plan Route Assessment

Route No.	Route Description	GTA Consultants Comments
1	Bells Line of Road, Kurrajong Road and Richmond Road – between Kurmond Road, Kurmond, and Macquarie Street, Windsor	Existing shared path facility along Bells Line of Road between Kurmond and North Richmond Discontinuous on-road facilities through North Richmond North Richmond Bridge exists as a squeeze point with a narrow shared path on the south side that is poorly connected to the on-road facilities either side of the bridge On-road lanes existing between North Richmond Bridge and Richmond On-road bicycle shoulder lanes in Richmond but no treatment at intersections On-road lanes existing between Richmond and Windsor, but with varying width, some pinch points and a lack of appropriate intersection treatments
2	Terrace Road and Kurmond Road – between Bells Line of Road, North Richmond and Wilberforce Road, Wilberforce	Bicycle shoulder lanes are marked between Bells Line of Road and Wire Lane, but with varying width and quality No facilities from Wire Lane to Wilberforce Road Bike Plan included shoulder widening works for this route which has largely not been completed
3	Castlereagh Road – between Richmond and Penrith, including March Street and Bosworth Street in Richmond	March Street and Bosworth Street are treated with bicycle shoulder lanes, but need improved treatment of intersections Castlereagh Road between Lennox Street and The Driftway is treated with bicycle lanes in the sealed shoulders. Some improvements are required to the intersection treatments and the quality and width of the shoulders in some locations
4	Londonderry Road – between Richmond and Penrith, including Bourke Street and College Street in Richmond	Existing off-road shared path (2.0m wide) on Bourke Street and College Street Londonderry Road treated with on-road bicycle shoulder lanes, which are narrow in parts. The Bike Plan included shoulder widening works for Londonderry Road which has not been completed
5	Hereford Street connection in Richmond – including Hereford Street, Luttrell Street and Cameron Street	Mixed traffic treatment on low volume local roads currently only provided as wide kerbside lanes, with a lack of intersection treatments. Signage and delineation improvements required.
6	Blacktown Road – south of Richmond, including Windsor Road and Bourke Street	Windsor Road and Bourke Street are future off-road routes which are yet to be completed. Blacktown Road consists of bicycle shoulder lanes with generally satisfactory width and quality. However, intersection treatment is not provided at the intersection with The Driftway.
7	The Driftway – Castlereagh Road to Blacktown Road (south of Richmond)	On-road bicycle shoulder lanes are provided along the length of the route. There are some locations where the pavement is in poor condition and the shoulder lanes are too narrow. Shoulder widening works were proposed in the Bike Plan but have not been completed. Linemarking improvements are required.
8	Dight Street and Percival Street – in the vicinity of the Richmond RAAF Base	Percival Street is treated with a sub-standard two-way bicycle shoulder lane, which was identified in the 1997 Bike Plan for improvement but has not been addressed. Dight Street and Percival Street were both identified for shoulder widening works in the Bike Plan but these works have not been completed.
9	George Street, Macquarie Street and The Terrace – Windsor to South Windsor and Bligh Park	George Street and Macquarie Street between Blacktown Road and Hawkesbury Valley Way are treated with bicycle shoulder lanes, with the southern section generally on sealed shoulders and kerbside lanes with parking towards the northern end. General lack of intersection treatments. Some shoulder widening works required. Pinch point at the railway overpass. Moses Street and The Terrace in Windsor are low traffic routes suitable for on-road mixed traffic treatments. Delineation improvements are required for these two streets.
10	Rifle Range Road – George Street to Sanctuary Drive in Bligh Park	On-road cycleway currently not marked, with proposed linemarking and delineation works not completed. Need to ensure that intersections and LATM treatments have adequate provision for cyclists.

Route No.	Route Description	GTA Consultants Comments
11	Windsor Road and Mulgrave Road	The Parramatta to Windsor cycleway has been completed, which includes a shared path treatment along Windsor Road and a new crossing of South Creek. Mulgrave Road is treated with bicycle shoulder lanes adjacent to the school. Further south, the Bike Plan identified the need for shoulder widening works but these have not been completed.
12	Pitt Town Road – Pitt Town routes to the east of Windsor Road, including Bathurst Street and Pitt Town Bottoms Road	There are currently no existing cycleway facilities on this route. Sealed shoulder works were proposed for Pitt Town Road in the Bike Plan, as well as pavement upgrades to Pitt Town Bottoms Road, but these works have not been completed.
13	Wilberforce Road – Windsor to Wilberforce, including Bridge Street and Windsor Bridge in Windsor	No bicycle treatment has been provided for Bridge Street in Windsor, with a mixed traffic treatment not suitable in this location due to the high vehicle speeds and volumes. The Windsor Bridge is currently a cyclist pinch point. Wilberforce Road is treated with bicycle shoulder lanes. Shoulders are generally in good condition, but improved delineation and signage is required.

5.3 Other Bicycle-Related Issues

Site inspections also identified a list of specific site issues associated with existing and missing bicycle facilities throughout the LGA. These are summarised in Appendix E. The Mobility Plan seeks to address these issues as part of the proposed works outlined in the detailed schedules later on in this report.

5.4 Summary of Existing Network Assessment

The 1997 Bike Plan has not been effective in developing a comprehensive bicycle network for the Hawkesbury LGA. This may have been due to the lack of available Council funds for cycling infrastructure during the 1997-2009 period or similar financial constraints. By not achieving many of the physical aims of the 1997 Bike Plan the key aim of encouraging the community to take up cycling and to cycle more often has been difficult to achieve.

In terms of the physical infrastructure, the existing network generally does not provide high levels of route continuity, with missing or very narrow shoulders, intersection treatments not being provided and a lack of facilities through the town centres. However, observations indicate that there are opportunities to undertake low-cost works to enable the existing infrastructure to better accommodate cyclists both on-road and off-road. Many locations have wide shoulders and adequate pavement width and simply require linemarking, logos and signage to identify these roads as bicycle routes.

The typical treatments observed in the Hawkesbury LGA and potential opportunities for improvement are discussed in the following sections.

5.5 Typical Treatments and Improvement Opportunities

5.5.1 Bicycle Shoulder Lanes

There are bicycle shoulder lanes at several locations in the Hawkesbury LGA; predominantly in the form of a sealed shoulder on a rural-type road without kerb-and-gutter. Whilst there are many locations where the shoulder width is adequate, there are some pinch points along these routes where the shoulders become narrow or disappear, including at locations along Hawkesbury Valley Way, Windsor Road and Kurrajong Road which forms the main east-west spine through the LGA. There are also routes which have narrow or poor quality shoulders along the full length of the route, including The Driftway and Castlereagh Road.

As part of the bicycle shoulder lane facilities, there are generally very few intersection treatments, which affects the route continuity and creates gaps in the cycleway network. It should be noted that cyclists weaving in and out of the traffic stream results in a significant accident potential. Intersection issues exist where bicycle facilities are discontinuous, such as in the vicinity of Clarendon on Hawkesbury Valley Way, or the intersection treatment is the only bicycle facility along a route, such as at the Hawkesbury Valley Way and Macquarie Street intersection.

The use of the "Watch for Bicycles" sign is common on the approaches to intersections where formal bicycle facilities are not provided and a bicycle shoulder lane ends suddenly and cyclists are forced to merge with vehicles. These signs provide some recognition of the need to look for cyclists but there is the opportunity to support these signs with appropriate merge lane arrangements for cyclists or continuation of the bicycle lane where possible.

Opportunities exist for implementation of bicycle shoulder lanes where there are currently wide road shoulders that have been provided to delineate parking lanes and provide a traffic management function. These facilities typically exist on collector roads outside of town centres and in residential areas where on-street car parking is relatively low. These current treatments do not meet the requirements of the NSW Bicycle Design Guidelines but would only require updated signage and logos to make them compliant.

Some typical treatments and issues are shown in Figure 5.6 to Figure 5.11.

Figure 5.6: Percival Street – Inadequate separation of two-way facility from vehicles

Figure 5.7: Bicycle Shoulder Lane

Figure 5.8: Unsatisfactory Intersection Linemarking

Figure 5.9: Satisfactory Intersection Linemarking

Figure 5.10: Satisfactory Intersection Linemarking

Figure 5.11: Discontinued Bicycle Shoulder Lane

5.5.2 Shared Paths

There are some key shared path facilities within the Hawkesbury LGA for both recreational and transport purposes. These include the Ham Common shared path between Richmond and Clarendon, the shared path along the Bells Line of Road between North Richmond and Kurmond and the Parramatta to Windsor off-road cycleway which follows the alignment of Windsor Road.

The key issue with these facilities is that they do not link to one another, particularly the Ham Common facility which does not have appropriate links at either end to enable a connection between Windsor and Richmond. There is an opportunity to expand the shared path network between North Richmond and Windsor to provide a continuous facility between the centres and beyond. This would likely increase the use of the existing shared path facilities.There is also an opportunity to expand the shared path network as part of the development of the Great River Walk facility, which involves provision of a trail which will ultimately extend for 570 kilometres along the length of the Hawkesbury Nepean River, from the estuary at Broken Bay to its source in the Southern Highlands and beyond to Canberra.

Some examples of existing shared path treatments are shown in Figure 5.12 and Figure 5.13.

Figure 5.12: Satisfactory shared path treatment

Figure 5.13: Existing shared path – additional logos and linemarking required

5.5.3 Local Area Traffic Management (LATM)

Within local areas of the Hawkesbury LGA, traffic management devices, such as speed humps, kerb outstands and chicanes exist predominantly to control vehicle speeds. It is important that these physical measures do not act as cyclist pinch points, which have been observed in locations such as Bligh Park.

An example of a bicycle-friendly LATM treatment in Sydney where cyclists have been accommodated within the design of the LATM treatments is shown in Figure 5.14.

Figure 5.14: Cyclist Detour next to Traffic Calming Measure

5.5.4 Mixed Traffic Streets

Mixed traffic treatments are suitable for streets with low traffic volumes and speeds and require little infrastructure except for linemarking and logos as well as some route signage. However, there is a general lack of this type of treatment within the Hawkesbury LGA. An opportunity exists to expand the local cycle network for a relatively low implementation cost. An example of a mixed traffic treatment is shown in Figure 5.15.

Figure 5.15: Mixed Traffic Treatment Example

5.5.5 Laneway and Cul-de-sac Permeability

It is important that throughout the Hawkesbury LGA, permeability[2] for cyclists, as well as pedestrians, is maximised to ensure that walking and cycling are not discouraged within the LGA due to the need to take circuitous routes. In the Hawkesbury LGA there are pedestrian laneways which provide "short cuts" between streets and suburbs, such as in North Richmond, Bligh Park and McGraths Hill. These laneways commonly link to parks, major cross roads and important land uses such as schools or shopping centres.

Use of these laneways is currently being re-evaluated by Council due to community concerns regarding inappropriate use of laneways in some locations.

It is suggested that measures be taken to address the community concerns without closing the laneways, as both pedestrian and cyclist permeability would be affected if the laneways were to be closed. Such measures should aim to encourage use of these facilities, increasing the level of passive surveillance and deterring anti-social activity.

5.6 Major Constraints

It is noted that there are some major constraints to overcome in order to improve the continuity of the cycleway network. The constraints include:

- The crossing of the Hawkesbury River at the North Richmond Bridge and the Windsor Bridge.
- Road underpasses where overhead structures, including the railway line and other bridges, restrict the width of the travel lane and create a cyclist pinch point. The columns of the fixed structures limit the ability for a bicycle shoulder lane to be established.

The mobility plan seeks to identify treatments or alternative route improvements to address these barriers and constraints to local movement and mobility.

5.7 Existing Bicycle Parking

There is long term bicycle parking located at Windsor, East Richmond and Richmond Railway Stations. These facilities are shown in Figure 5.16 to Figure 5.19.

A review of the availability of lockers on www.131500.com.au indicates the following supply and availability (October 2009):

- Windsor (George Street) = 20 lockers, 1 currently available
- East Richmond (Bourke Street) = 14 lockers, 12 currently available
- Richmond (East Market Street) = 20 lockers, 3 currently available.

There is also information on bicycle parking demand at railway stations outlined in the document *Cycling in New South Wales – What the data tells us* which was prepared for the Premier's Council for Active Living (December 2008). The data, collected in 2008, indicated that in addition to the parking at bicycle lockers, there were also bicycles parked at more informal parking locations in the vicinity of the stations, with up to 16 bicycles observed at each station that were secured to rails or other fixed infrastructure, such as fences.

In terms of bicycle parking for other trip attractors, such as shops and parks, there is a general lack of suitable locations for parking of bicycles. In Windsor and Richmond, bicycles were observed being chained to street furniture and awning structures, such as in Figure 5.20 which shows a bicycle attached to a table.

2 Permeability is defined as the degree to which streets allow pedestrians and cyclists to take short cuts and select multiple alternative route options.

In Richmond, there was a set of 12 butterfly-type bicycle rails that were identified on the north side of Richmond Park, shown in Figure 5.21. However, there are a number of issues with this arrangement, where the rails only allow one wheel to be locked which is not ideal and if knocked could result in buckled wheels, while the footing that the bicycle rails are located are obstructing a pedestrian thoroughfare. These issues could indicate why the rails were not being used at the time of the site inspections. Other formal bicycle parking locations include at the front entrance to Market Place Centre in March Street, in the car park at Riverview Shopping Centre and at the Woolworths shopping centre in Kable Street.

Figure 5.16: Windsor Station Bicycle Lockers

Figure 5.17: Richmond Station Bicycle Lockers

Figure 5.18: East Richmond Station Bicycle Lockers

Figure 5.19: East Richmond Station Informal Bicycle Parking

Figure 5.20: Example of Informal Bicycle Parking

Figure 5.21: Richmond Park Bicycle Rails

6. Bicycle Network Development

6.1 Hawkesbury Cyclist User Categories

Bicycle riders have no standard characteristics. The way a destination is accessed by them depends on the type of rider they are. This depends on a number of factors including:

- age
- level of experience
- riding proficiency
- their vehicle (bicycle type)
- fitness
- motivation for travel
- comfortable travel speed.

With reference to the above characteristics, cyclists would typically fall into one of the following key categories:

- A – Vulnerable to traffic (Children between the ages of 10 and 16, the elderly, the hard of hearing, very short trips, slow speeds (less than 15km/h), traffic shy, slower reaction times).
- B – Borderline "fair weather" cyclists (Infrequent adult cyclists, alert but lacking confidence, low to average riding skill, short to medium trips, primarily journey-to-work trips).
- C – Active adults (Speeds between 15 and 30 km/h, alert and 'road aware', average to high level of riding skill and proficiency, all trip purposes.
- D – Sports and fitness (Speeds higher than 30 km/h, prefers 'main road' environments).

In terms of increasing the number of bicycle trips made by the community, the key target group with the greatest potential for change would be the borderline cyclists. These users are likely to own a bicycle but are infrequent users, perhaps cycling with their children for recreational trips on the weekend. Such infrequent adult cyclists are most likely to prefer off-road cycle facilities for major routes, with suitable marked on-road facilities acceptable for low traffic volume roads and local links.

6.2 Bicycle Network Route Function

The proposed cycle network consists of four elements as detailed below:

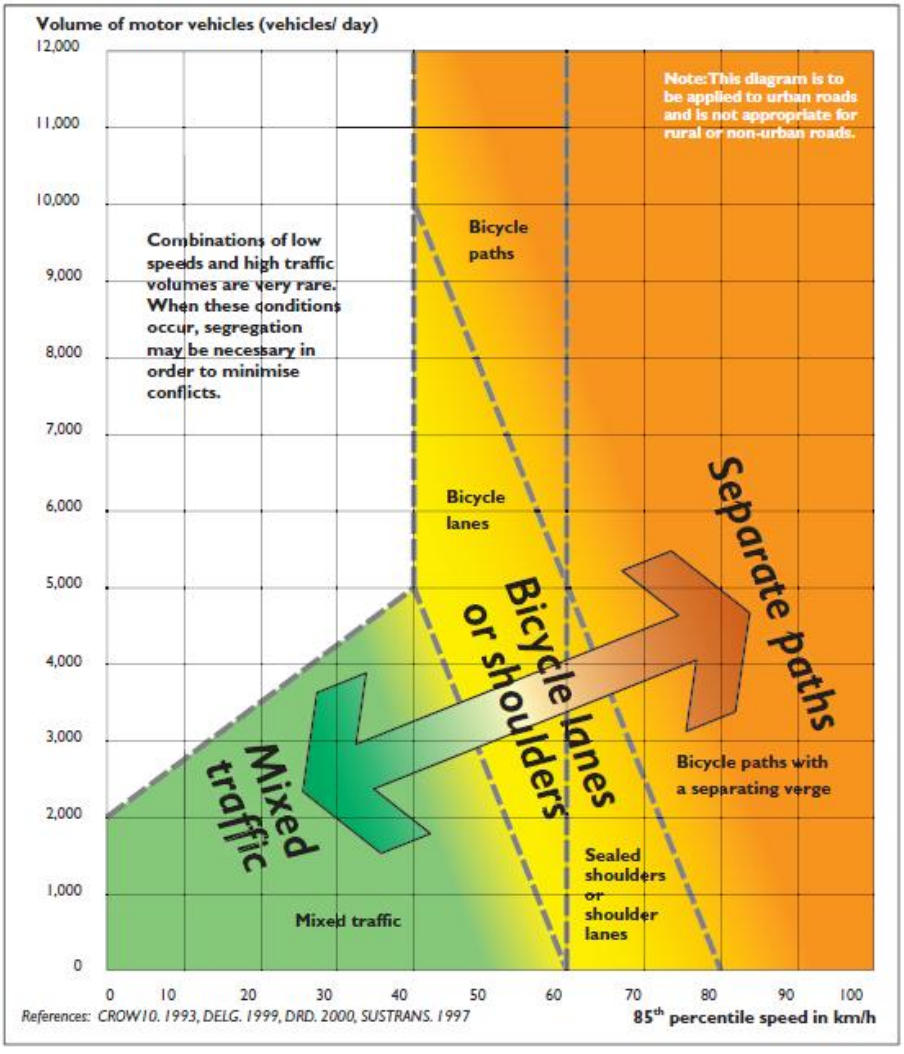
- Regional Routes:
    - High level routes which traverse the Hawkesbury LGA linking the key centres of Windsor, Richmond and North Richmond and the surrounding suburbs of South Windsor and Bligh Park.
    - Connect to the neighbouring Council cycle routes, including those routes that form part of the wider RTA bicycle network.
    - Higher future cyclist volumes anticipated.
- Sub-regional Routes:
    - Connecting routes to link the surrounding village centres of Pitt Town, Wilberforce and Glossodia to the nearest key centre.
    - Provide access to the nearest Regional Route.

- Moderate future cyclist volumes anticipated.

- Local Routes and Links:
  - Provides links between the higher level Regional and Sub-regional network and key places of interest or population such as residential suburbs, schools and sporting fields.
  - Includes some alternative routes to the higher level Regional and Sub-regional network that are generally more scenic and have lower traffic volumes, but are less direct.
  - Includes some on-road tourism/ recreational routes as well as off-road recreational routes which provide a safe and family-friendly environment in the vicinity of parks and reserves.
  - Lower future cyclist volumes anticipated.

Figure 6.1 shows the methods of separation and the appropriate treatment based on road traffic volumes and speeds. It can be seen that separation is important of as a key to providing much needed operating space for bicycles in high speed and high volume environments.

Figure 6.1: Separation of bicycles and motor vehicles according to traffic speed and volume



6.3 Proposed 2010 Bicycle Network

The bicycle network for the Hawkesbury LGA should be based on best-practice cycle planning principles. Specifically, that it connects the main centres and trip attractors throughout the Hawkesbury LGA and provides a strategic network of routes to the neighbouring Councils. A number of criteria were considered to determine the most effective routes to include in the cycle network. These included:

- Develop and reinforce existing links between the key centres and surrounding villages within the Hawkesbury LGA.
- Connect Regional Routes into pre-determined connection points with adjoining LGAs.
- Connect local attractors to the key network through a series of local routes and links.
- Avoid, or provide alternatives to, heavily trafficked and high speed roads which may be unsafe for cyclists – as such, provide separation on high volume/high speed roads while low speed/low traffic roads may be established as a mixed traffic environment.
- Provide for the most direct and/or logical route where possible.
- Make use of existing facilities and those facilities implemented as part of the 1997 Hawkesbury Sub-Regional Bike Plan.
- Consider those routes which were proposed in the 1997 Hawkesbury Sub-Regional Bike Plan but have not yet been implemented.

It should be noted that the proposed cycle network does not imply that all other roads which are not included within the cycle network are not cycle friendly or should not be given attention should a cycle issue arise. Essentially, every street is a cycling street and therefore should be maintained or restructured to be "bicycle friendly" where possible in accordance with current standards. This is particularly important in any road construction and/or reconstruction projects undertaken by the RTA, Council or private developers within the Hawkesbury LGA.

Though bicycle routes are an essential component of a network, it is primarily the route intersections with busy roads which require detailed treatment, to show continuity for through routes and appropriate storage lanes or similar delineation to accommodate turning movements.

6.3.1 Regional Routes

A total of 13 routes have been identified as Regional Routes that would have maximum benefit in increasing the uptake of cycling as a transport mode. The key elements of the priority route network are identified as follows:

- Focus on the city centres of North Richmond, Richmond and Windsor.
- Assist in implementing a radial network from the respective centres.
- Provide good access to railway stations.
- Maximise the length of off-road facilities, particularly on roads with high traffic volumes and speeds, to maximise the safety for cyclists of all ages and abilities.
- Provide routes that are as direct as possible.
- Provide suitable treatment of cyclist movements at intersections, including roundabouts and traffic signals.
- Assist in delivering equitable town centre and public transport access to the local community.
- Promote and support active travel to and from the key town centres and surrounding residential areas.
- Provide links into adjoining LGAs.

The proposed Regional Routes are primarily high-quality off-road facilities with sections of on-road treatment in close proximity to the town centres where vehicle speeds are generally low and pedestrian activity is higher. Each of the routes is described in the following sections, shown in Figure 6.2 and summarised in Table 6.1.

Table 6.1: Proposed Hawkesbury City Council Regional Routes

Route No.	Route Name	Predominant Treatment	Route Description
RR01	Parramatta to Windsor Off-Road Cycleway (Baulkham Hills/Blacktown LGA to Mulgrave)	Off-road shared path	Existing path with satisfactory signage and delineation
RR02	Parramatta to Windsor Off-Road Cycleway (Mulgrave to McGraths Hill)	Off-road shared path	Existing with satisfactory signage and delineation
RR03	Parramatta to Windsor Off-Road Cycleway (McGraths Hill to Windsor)	Off-road shared path	Existing with satisfactory signage and delineation
RR04	Windsor CBD – Macquarie Street	Off-road shared path	Existing path, improved signage and delineation, provision for bicycles at signalised crossings to link into Windsor Town Centre
RR05	Windsor to Mulgrave via Hawkesbury Valley Way	On-road bicycle shoulder lanes (no parking)	Existing wide shoulders, provide signage and delineation
RR06	Windsor CBD – Hawkesbury Valley Way	Off-road shared path	New off-road link across Windsor, provision for bicycles at signalised crossings
RR07	Windsor to Richmond	Combination of off-road shared path and on-road bicycle shoulder lanes	Long term provision of an off-road shared path on the south side of the carriageway along Hawkesbury Valley Way and Windsor Street, on-road link into Richmond Town Centre
RR08	Richmond to North Richmond	Combination of off-road shared path and on-road bicycle shoulder lanes	Existing on-road bicycle shoulder lanes, long term delivery of Kurrajong Road and Bells Line of Road as an off-road shared path
RR09	North Richmond to Kurmond	Off-road shared path	Existing shared path, improve links at southern end into North Richmond
RR10	Kurmond to Kurrajong	Off-road shared path	Proposed off-road extension of existing path which terminates at Kurmond
RR11	Windsor to South Windsor, Bligh Park and Penrith (via The Northern Road)	Combination of off-road shared path and on-road bicycle shoulder lanes	Macquarie Street and George Street, predominantly on-road bicycle shoulder lanes, intersection improvements required and some shoulder widening
RR11a	Windsor to South Windsor via Windsor Railway Station	On-road mixed traffic	On-road link from Windsor Mall along George Street, treatments at intersection and links to station
RR12	Richmond to Bligh Park	On-road bicycle shoulder lanes	Existing bicycle shoulder lanes, some intersection treatments required
RR13	Bligh Park to Windsor Downs and Blacktown LGA	On-road bicycle shoulder lanes	Existing bicycle shoulder lanes, some intersection treatments required

Regional Route 1: Parramatta to Windsor Off-Road Cycleway (Baulkham Hills/Blacktown LGA to Mulgrave)

Regional Route 1 forms part of the Parramatta to Windsor Off-Road Cycleway, which was built as part of the upgrade of Windsor Road and Old Windsor Road, and the Parramatta to Rouse Hill T-way. The facility consists of a 3.0m wide off-road shared path located on the west side of Windsor Road between Boundary Road and Groves Avenue.

Regional Route 2: Parramatta to Windsor Off-Road Cycleway (Mulgrave to McGraths Hill)

Regional Route 2 also forms part of the Parramatta to Windsor Off-Road Cycleway. The facility consists of a 3.0m wide off-road shared path located on the west side of Windsor Road between Groves Avenue and Pitt Town Road.

Regional Route 3: Parramatta to Windsor Off-Road Cycleway (McGraths Hill to Windsor)

Regional Route 3 also forms part of the Parramatta to Windsor Off-Road Cycleway. The facility consists of a 3.0m wide off-road shared path located on the west side of Windsor Road between Pitt Town Road and Macquarie Street.

Regional Route 4: Windsor CBD – Macquarie Street

Regional Route 4 consists of an off-road shared path link on the southwest side of Macquarie Street between Windsor Road and Hawkesbury Valley Way. Local links would be provided in line with the signalised intersections at Ross Street/Kable Street and Day Street to provide access into the Windsor Town Centre. There is currently a shared path installed along this route with a width in the order of 2.0m, with some variations. Required works for this route include treatment of the signalised crossings with bicycle lanterns and general maintenance of the path including tree trimming and edge trimming.

Regional Route 5: Windsor to Mulgrave via Hawkesbury Valley Way

Regional Route 5 consists of on-road bicycle shoulder lanes along the flood evacuation route of Hawkesbury Valley Way and into Mulgrave along Groves Avenue. Hawkesbury Valley Way currently has a shoulder width in the order of 2.0m, which is adequate for a bicycle shoulder lane along a roadway with a speed limit of 70km/h. Required works for this route include logos and signage to formalise the bicycle facility.

Regional Route 6: Windsor CBD – Hawkesbury Valley Way

Regional Route 6 consists of an off-road shared path link on the north side of Hawkesbury Valley Way between Macquarie Street and Cox Street/Moses Street. This route provides links into the north-south routes for travel to the centres of Windsor and South Windsor. Required works along this route include provision of bicycle lanterns at the signalised crossings at the intersections of Macquarie Street/Hawkesbury Valley Way and Hawkesbury Valley Way/George Street, widening of existing footpath and links to existing path in McQuade Park.

Regional Route 7: Windsor to Richmond

Regional Route 7 follows the alignment of Hawkesbury Valley Way, Windsor Street and into the centre of Richmond via Bourke Street and March Street. The route extends from Cox Street/Moses Street in Windsor to East Market Street in Richmond. The objective for this route is to provide a predominantly off-road facility in the long term to cater for a larger range of cyclists, including young children and less confident cyclists.

In the short-term, prior to the construction of an off-road facility, local road alternatives suggested to

support Regional Route 7 include Francis Street (to the north of Richmond) and Dight/Percival Street. In terms of on-road facilities, Bourke Street and March Street have been selected over Windsor Street as they are lower speed and volume roads.

In the vicinity of Richmond, Regional Route 7 connects with local links for travel into the Richmond Town Centre in the north and to the UWS campus and Hobartville in the south.

Required works for the route include provision of a new shared path on the south side of the carriageway of Hawkesbury Valley Way to make use of the Ham Common section of existing shared path, treatment of the bridge pinch point at the Rickabys Creek crossing (ideally long term provision of an additional bridge structure), path widening on Windsor Street and Bourke Street, on-road bicycle lanes in March Street and some crossing facilities.

Regional Route 8: Richmond to North Richmond

Regional Route 8 follows the alignment of March Street, Kurrajong Road and Bells Line of Road. The route extends from East Market Street in Richmond and Terrace Road/Grose Vale Road in North Richmond. As for Regional Route 7, the route consists predominantly of off-road facilities in the long term to cater for a larger range of cyclists, including young children and less confident cyclists.

Local alternatives suggested to support the Regional route include Francis Street and Old Kurrajong Road. Specific pinch points that require treatment are North Richmond Bridge and the private road overpass just east of the North Richmond Bridge.

Required works include treatment of the above pinch points, improved links on the northwest side of North Richmond Bridge into the residential and shopping areas, and widening of existing footpath through North Richmond.

Regional Route 9: North Richmond to Kurmond

Regional Route 9 is an existing off-road path on the northeast side of Bells Line of Road, including crossing treatments at side roads. Required works to improve the off-road facility along this route include widening and delineation of the existing path between Charles Street and Terrace Road.

Regional Route 10: Kurmond to Kurrajong

Regional Route 10 is an extension of the existing off-road path along Regional Route 10, which currently terminates at Kurmond, on the south side of Bells Line of Road and into Kurrajong via Old Bells Line of Road.

Regional Route 11: Windsor to South Windsor, Bligh Park and Penrith (via The Northern Road)

Regional Route 11 follows the alignment of Macquarie Street from Hawkesbury Valley Way in Windsor to the intersection of The Northern Road and Blacktown Road. This route facilitates local links into South Windsor and Bligh Park and also links in the south to The Northern Road, which is the key bicycle link to Penrith. The route consists of predominantly on-road bicycle shoulder lanes with some off-road facilities. Required works for the route include intersection improvements, some shoulder widening and improvements to delineation and signage.

Regional Route 11a: Windsor to South Windsor via Windsor Station

Regional Route 11a follows George Street from Windsor Mall to Macquarie Street in South Windsor and acts as a key link to Windsor Station. The route consists of a predominantly on-road treatment where speeds and volumes are lower than Macquarie Street (i.e. Local Road instead of State Road). Required works for this route include delineation, signage and intersection treatments.

Regional Route 12: Richmond to Bligh Park

Regional Route 12 follows the alignment of Blacktown Road between Bourke Street in Richmond to The Northern Road and facilitates local links into Bligh Park. There is an existing facility of on-road bicycle shoulder lanes, with intersection improvements required.

Regional Route 13: Bligh Park to Windsor Downs and Blacktown LGA

Regional Route 13 follows the alignment of Richmond Road between The Northern Road and the Blacktown LGA boundary at South Creek. The route services the local area of Windsor Downs with links to Regional Route 11 to Windsor and Regional Route 12 to Richmond. There is an existing facility of on-road bicycle shoulder lanes, with intersection improvements required.

6.3.2 Sub-regional Routes

There are three routes that have been identified as Sub-regional Routes with the key role of connecting the outlying population centres of Pitt Town, Wilberforce and Glossodia with the larger centres of Windsor, Richmond and North Richmond. Due to the rural location of these villages, these routes are predominantly on-road using existing sealed shoulders where available. Future ongoing maintenance and repairs to widen and/or seal the road shoulders would be required to provide suitable bicycle facilities. The recommended Sub-regional Routes are shown in Figure 6.2.

6.3.3 Local Routes and Links

Local routes and links connect the higher level 'main road' network to key places of interest such as local centres, schools and sporting fields. They are generally local streets and roads which have had minor engineering improvements made to them to enable bicycle riders to get to trip destinations more easily and with less stress than on the existing road network. Local routes connect local streets to regional routes and extend the network 'web' further out into the municipality. A bicycle route passing through a local street is beneficial to residents because of the humanising influence (socialising as well as passive surveillance) and greater level of citizen supervision from people on bicycles when compared to motor vehicles.

Local route treatments include logos and signage for mixed traffic treatments in low speed/low volume residential streets, shared path routes through parks and green corridors and construction/maintenance and delineation of sealed shoulders on higher speed collector roads.

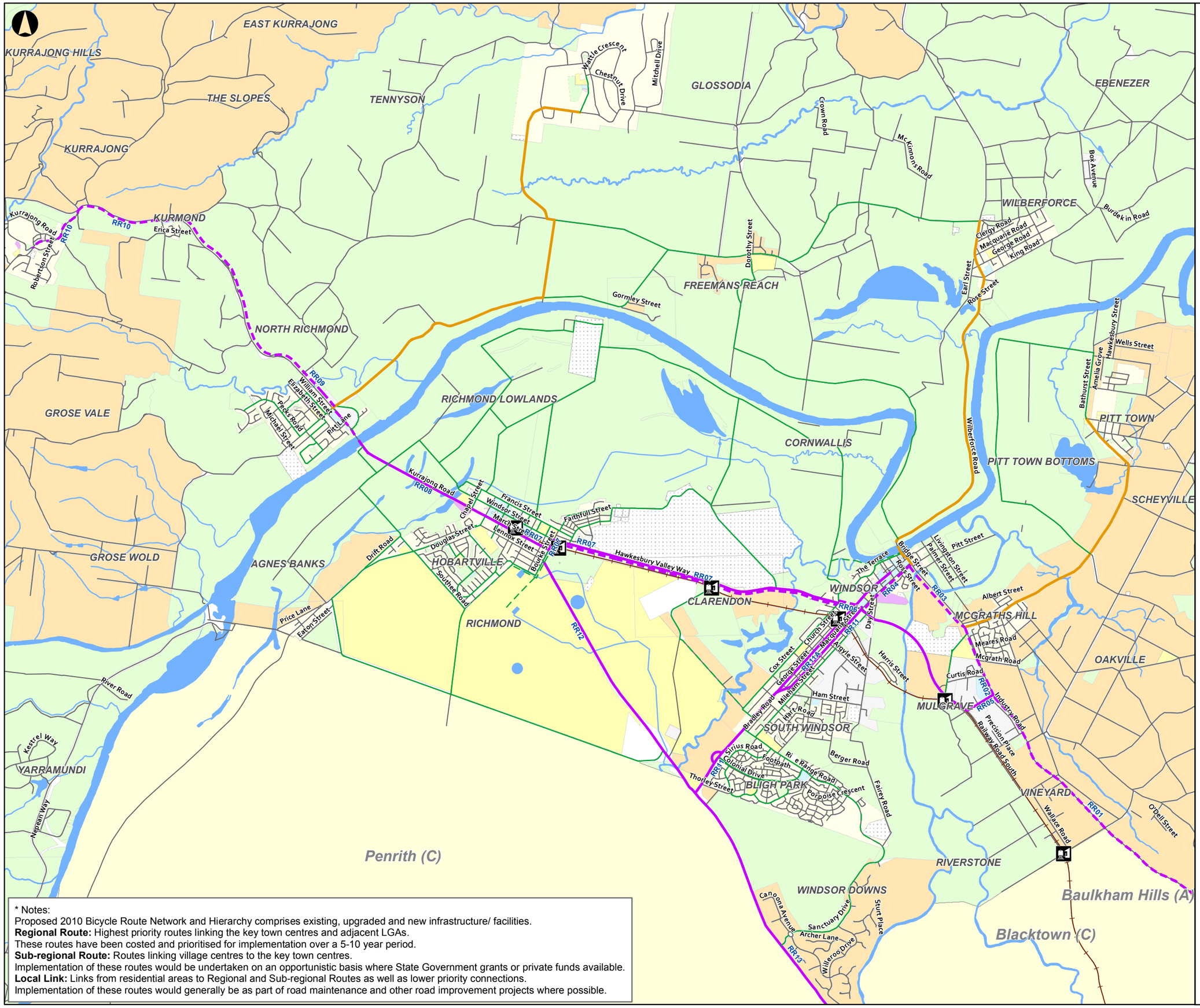
The recommended local bicycle routes and links that build upon the Regional and Sub-regional Route network and/or connect to local trip attractors and generators are shown in Figure 6.2.

6.4 Neighbouring LGA Connections

Existing and possible future connections between Hawkesbury and the surrounding LGAs have been identified in Table 6.2. Many of the future bicycle network connections have been incorporated into the proposed 2010 Bicycle Network as illustrated in Figure 6.2.

Table 6.2: Neighbouring LGA Connections

Neighbouring LGA	Connections
Penrith (Note that Penrith is the Regional Centre for the North West Sub Region)	The Northern Road Existing on-road facility with intermediate logos spaced too far apart. Shoulders provide poor riding surface, with varying and, at times, insufficient width. Shoulder works required. Preferred route between Penrith and Windsor.
	Londonderry Road No existing facility, unsealed road shoulders.
	Castlereagh Road No existing facility, shoulders vary in width.
Baulkham Hills	Parramatta to Windsor Off-Road Cycleway Shared path is completed.
Blacktown	Richmond Road (Blacktown Road) Existing facility of sealed shoulders.
Blue Mountains	Bells Line of Road Currently the formal facility only extends to Kurmond. Route is winding and steep and suitable only for experienced cyclists.
	Springwood Road/ Hawkesbury Road No existing facility, variable road and shoulder quality.



Legend

Land Uses

- Business
- Residential
- Rural Residential
- Industrial
- Agriculture and Open Space
- Rail Corridor
- School, College or Church
- Hospital, Retirement Village
- General Community Uses
- Other Special Uses

Proposed Bicycle Network*

- Regional Route On-Road
- Regional Route Off-Road
- Sub-regional Route On-Road
- Sub-regional Route Off-Road
- Local Link On-Road
- Local Link Off-Road

* Notes:
Proposed 2010 Bicycle Route Network and Hierarchy comprises existing, upgraded and new infrastructure/ facilities.
Regional Route: Highest priority routes linking the key town centres and adjacent LGAs.
These routes have been costed and prioritised for implementation over a 5-10 year period.
Sub-regional Route: Routes linking village centres to the key town centres.
Implementation of these routes would be undertaken on an opportunistic basis where State Government grants or private funds available.
Local Link: Links from residential areas to Regional and Sub-regional Routes as well as lower priority connections.
Implementation of these routes would generally be as part of road maintenance and other road improvement projects where possible.

Issue	Date	By	Chkd	Appd
A	19-03-10	BL	DC	BDM

Metres
0 750 1,500 3,000

GTAconsultants
www.gta.com.au

Client
Hawkesbury City Council

Job Title
Hawkesbury Mobility Plan

Drawing Title
Proposed 2010 Bicycle Route Network and Hierarchy

Scale at A3
1:60,000

Drawing Status
Final

Job No	Drawing No	Issue
HS11250	Figure 6.2	A

6.5 Improving and Expanding Bicycle Parking

6.5.1 Key Characteristics

Bicycle parking (or lack thereof) remains one of the key barriers to cycling even though, in most cases, this is a relatively easy facility to design, fund and implement.

The most important issues to consider with cycle parking are to ensure that:

- The number of spaces provided meets the current demand as a minimum.
- It is located where people want to go.
- It is easily accessible.
- It is secure (whether passive or active).
- It is practical in terms of being able to secure both wheels and frame.

It is also important that a consistent approach be taken to cycle parking to ensure that the types of racks used are practical and suitable for the location where they are to be installed.

6.5.2 Bicycle Parking Types and Standards

In order to conform to Australian Standards (AS2890.3-1993 Part 3: Bicycle Parking Facilities) parking rails must allow the wheels and frame of a bike to be locked to it securely and also provide sufficient support to prevent the bike from falling over. The three classes of bicycle parking are:

i Class 1 facilities provide a high level of security such as enclosed individual lockers.
ii Class 2 facilities provide a medium level of security such as locked compounds with internal bike rails.
iii Class 3 facilities provide a low level of security such as external bicycle rails and racks.

Further details on bicycle parking facilities and their suggested use are in Appendix F.

6.5.3 Bicycle Parking Priority Locations

Good quality cycle parking in prominent locations will raise the profile of cycling in the Hawkesbury LGA and encourage more people to cycle. Hawkesbury Council should determine the specific locations where these future bicycle parking spaces are to be provided. However, to allow for a staged implementation of bicycle parking facilities potential locations have been prioritised.

The highest priority locations are the Windsor, South Windsor and Richmond centres along with the railway stations. Bicycle parking should also be provided at all Council buildings and parks, particularly the Council offices in Windsor.

It is important to have small numbers of cycle parking facilities located over a large number of locations, however not all the facilities need to be installed at once. Table 6.3 lists the priority locations and the types of parking suitable for each location.

Schools and businesses have a responsibility for providing parking for their staff, students and customers. Council has a role to promote cycling in the area and to assist them in developing positive parking programs. A useful reference is the City of Sydney website which includes a page on Cycle Friendly Work Places. This page provides information to assist organisations to determine the optimal number and type of bicycle facilities for a cycle friendly workplace, along with a spreadsheet to help determine the number of bike parking facilities for a workplace.

In terms of new developments, all efforts should be made to ensure that bicycle parking is provided as part of each development with reference to the recommended bicycle parking provisions in the NSW Department of Planning Guidelines for Walking and Cycling.

Table 6.3: Summary of recommended bicycle parking

General Location	Existing Parking Capacity	Future Parking Recommendations			
		No. of Additional Locations (minimum)	Rails	Bicycle Cages with rails	Priority
Retail/Employment					
Windsor Mall and George Street district	-	5	✓	-	1
South Windsor	-	1	✓	-	1
Windsor Street, Richmond	12 rails (not to standard)	3	✓	-	1
North Richmond, Bells Line of Road (south side)	-	1	✓	-	2
Bligh Park	-	1	✓	-	2
Wilberforce	-	1	✓	-	2
Pitt Town	-	1	✓	-	2
Leisure/Recreation					
Playgrounds, tennis courts, sports fields, etc	-	Approx. 20	✓	-	2
Railway Stations					
Windsor	20 lockers	1	✓	✓	1
East Richmond	14 lockers	1	✓	✓	1
Richmond	20 lockers	1	✓	✓	1
Health, Education and Private Business – To be implemented through encouragement from Council					
Primary and Secondary Schools	Various	Schools to implement	✓	✓	1
University of Western Sydney Campus	Some parking on campus	University to implement	✓	✓	1
TAFE NSW Western Sydney Institute	Some parking on campus	TAFE to implement	✓	✓	1
Hawkesbury Hospital	-	Hospital to implement	✓	✓	2
Other businesses	-	Businesses to implement	✓	✓	2

6.6 Cycle Signage Plan

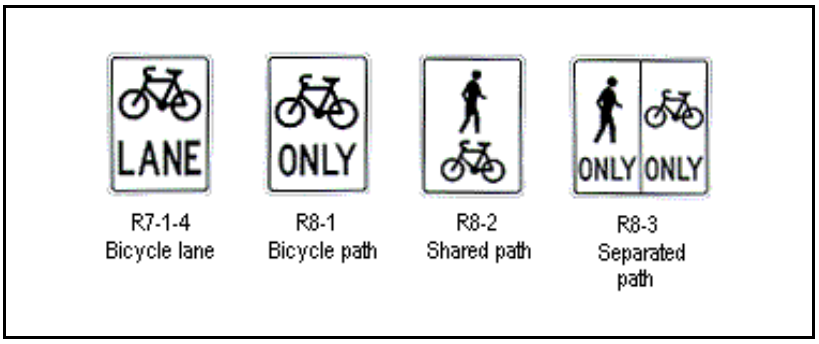
In order for the cycle network to be navigated effectively, a coherent and easy to understand signage system is required, as it is a crucial part of an effective network. Hawkesbury LGA currently has very limited cycle signage, making it very difficult to navigate the routes that are currently available. The signage plan is intended to provide a framework for further development of the cycle signage requirements for the Hawkesbury LGA.

There are three categories of cycle signage used in NSW – regulatory, warning and directional. A particular emphasis is placed on the directional component of the signage requirements as this is regarded as one of the more important components of the signage plan.

6.6.1 Regulatory Signage

Regulatory signs, with the use of linemarking, will generally define the type of bicycle facility provided. The NSW Bicycle Guidelines show the regulatory signs used for bicycle facilities, as well as optional supplementary plates. The four principal signs used are shown in Figure 6.3.

Figure 6.3: Regulatory Signage for Bicycle Facilities



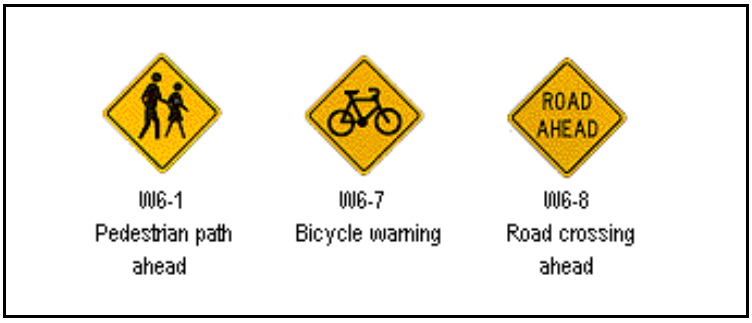
Regulatory signage is always used to define the start of a facility. Defining the end of a facility is generally not necessary, unless the facility is terminated mid-block, or at somewhere other than an intersection.

6.6.2 Warning Signage

Warning signs are diamond-shaped yellow signs and are used to warn cyclists of changed or particularly hazardous conditions. They are also used to warn other road users of bicycle movements. The NSW Bicycle Guidelines offer advice on the use of warning signs, as well as guidance signage and advisory signage.

Some of the most commonly used warning signs for the bicycle network, which may also be used on the general network, are shown in Figure 6.4.

Figure 6.4: Warning Signage Examples



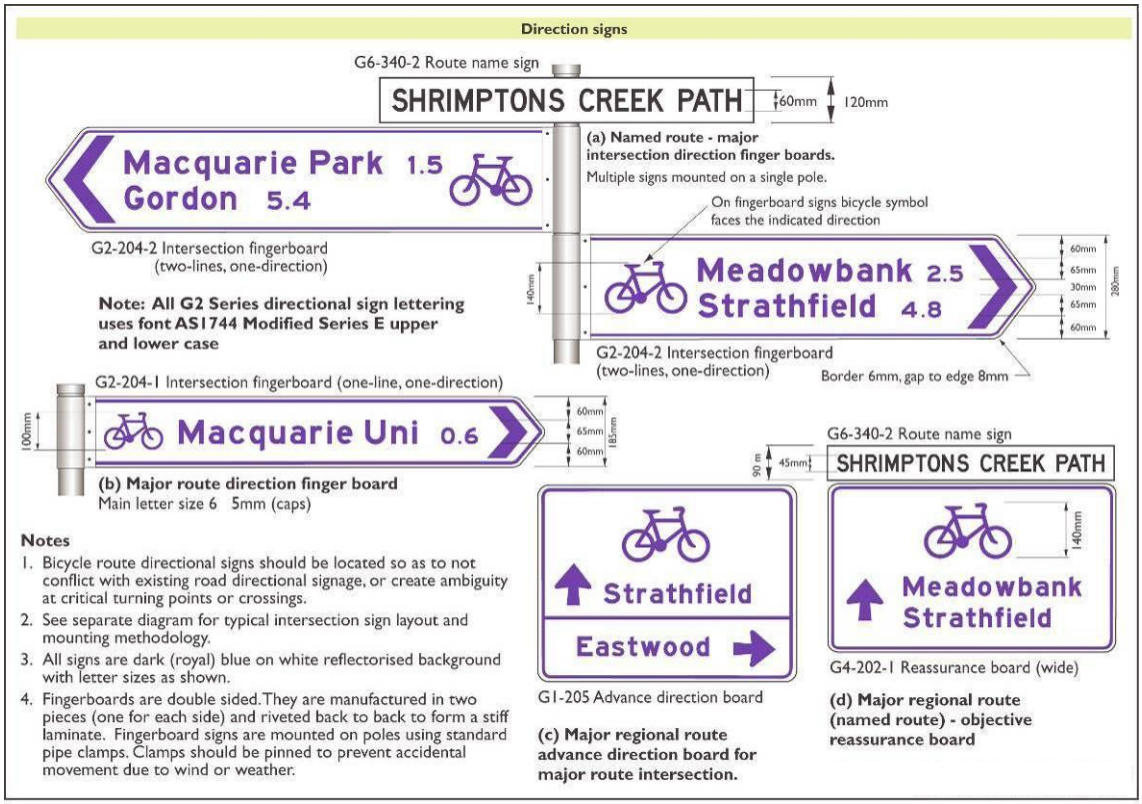
The location for warning signage will be different depending on the site, and should be placed to suit the overall design of the facility. Australian Standard AS1742.9 – Manual of Uniform Traffic Control Devices, Part 9 Bicycles Facilities and Part 2, Traffic Control Devices for General Use provide advice on recommended signage locations.

6.6.3 Directional Signage

A key element of the Signage Plan is the development of the directional signage component. It is important that directional signage is consistent throughout the network, and at all relevant intersections, to direct cyclists. Care should be taken during signage placement to avoid becoming lost in the clutter of other signs, or confusing motorised traffic, particularly for on-road routes.

Examples of typical directional signage are shown in Figure 6.5.

Figure 6.5: Directional Signage Example



Source: NSW Bicycle Guidelines

In order for the Hawkesbury Signage Plan to be most effective, key destinations should be identified and consistently used throughout the signage network including a range of regional, suburban and local destinations.

The sign examples shown above in Figure 6.5 would be suitable for signposting the Regional Routes. In terms of the local routes, signage at the intersections may include local destination signage to sports fields, schools or small shopping centres.

7. PAMP Routes

7.1 Study Area

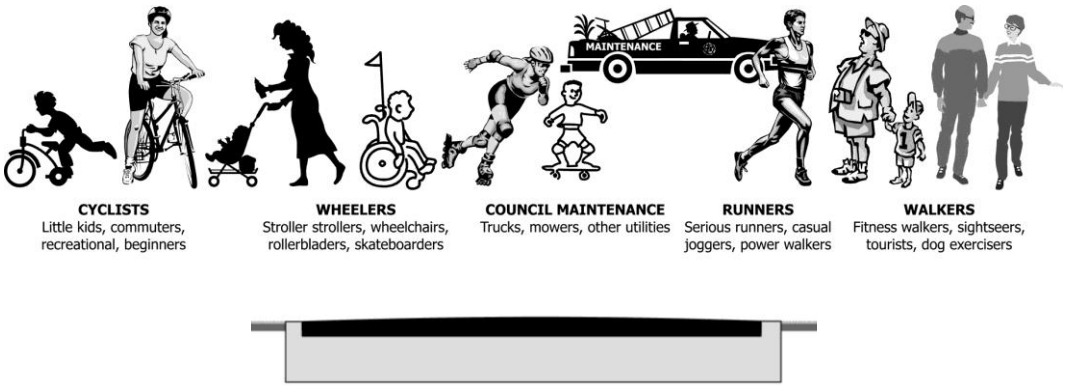
The PAMP component of the Hawkesbury Mobility Plan is focussed on the areas of North Richmond, Richmond, Windsor and South Windsor in accordance with the project brief. Suburbs and townships such as Bligh Park, McGraths Hill, Kurrajong, Glossodia, Pitt Town and Kurmond would be considered at a later date subject to additional funds becoming available.

7.2 Pathway User Categories

In NSW the vast majority of pathways are developed for shared use by pedestrians and cyclists. By nature these pathways attract a wide range of community groups as shown in Figure 7.1 and listed below:

- Commuter cyclists
- Recreational cyclists and families
- Rollerbladers
- Strollers and prams
- Wheelchairs
- Council, RTA, Sydney Water and other service vehicles
- Emergency vehicles
- Families and tourists on foot
- Older people on foot.

Figure 7.1: Pathway User Groups



7.3 Pedestrian Facility User Groups

Taking the above into consideration, the PAMP has been designed to cater for a range of user groups, including more vulnerable users such as mobility and vision impaired pedestrians. Pedestrian planning often considers a number of facility user groups to categorise pedestrians based on their age. These are noted as follows:

- Pre-school (aged 0-4)
- Infants (aged 5-8)
- Primary (aged 9-11)
- Secondary (aged 12-17)
- Young Adults (aged 18-25)

- Adults (aged26-59)
- Elderly (aged 60+).

7.4 Route Selection

The pedestrian routes for the Hawkesbury LGA should be based on best practice pedestrian planning principles. Specifically, that the pedestrian routes connect the main trip attractors and generators throughout the Hawkesbury LGA and meet the needs of the relevant facility user groups.

As mentioned previously, there are a range of trip attractors and generators including regional, district and local centres (commercial, retail), railway stations, schools and educational establishments and recreational areas. Each of these land uses attracts or generates one or more of the various facility user groups. For example, schools and educational establishments attract children and young adults while public transport nodes attract all ages and groups, including seniors. Figure 7.2 shows 400m (5 minutes) walking catchments around North Richmond, Richmond and Windsor on which this PAMP focussed.

7.5 Route Prioritisation Methodology

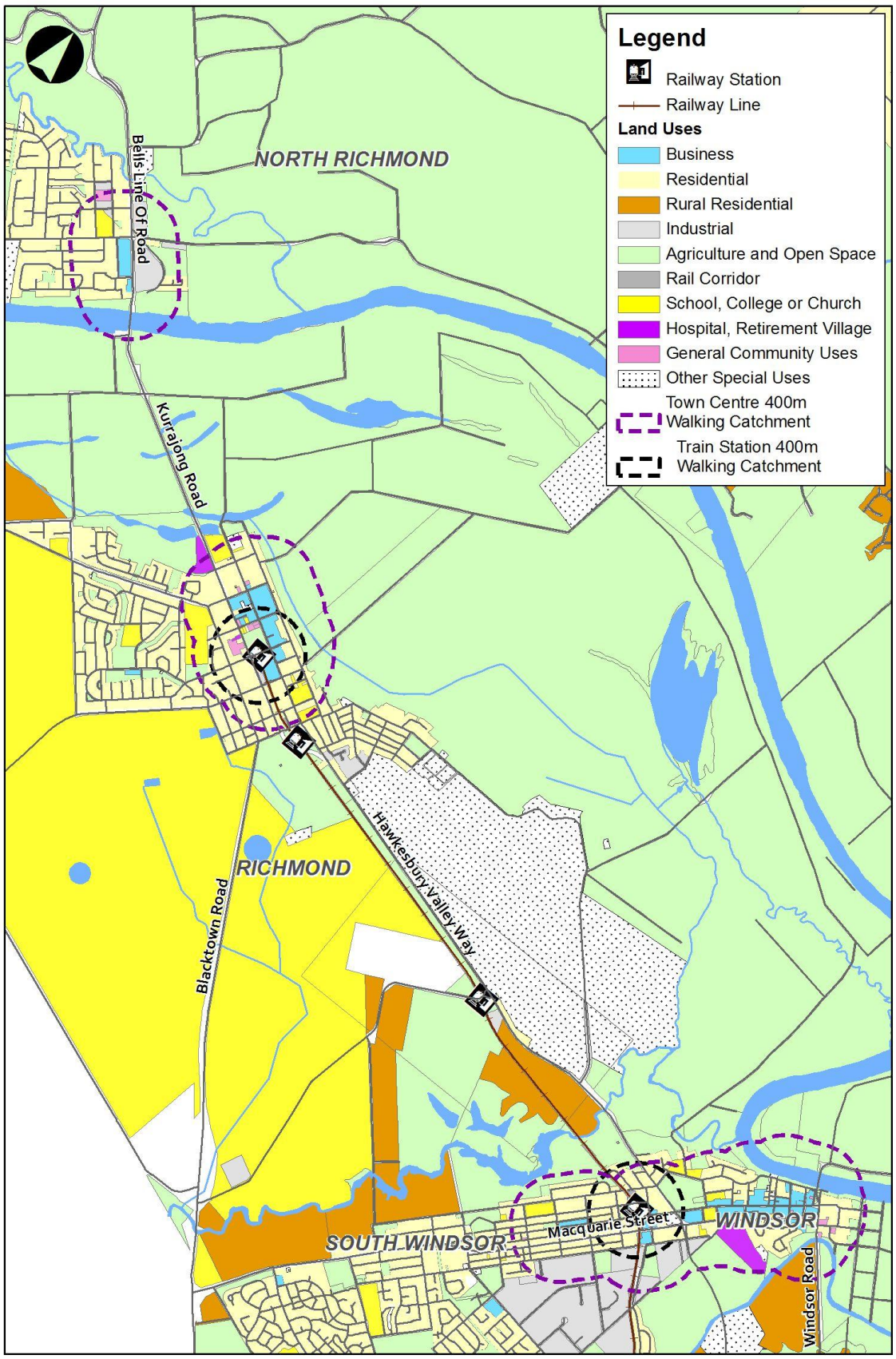
A route priority system, with the categories High, Medium and Low, has been evaluated based on the following factors:

- The proximity to a regional, district and/or local centre.
- The proximity to public transport facilities.
- The number of facility user groups serviced and the relative vulnerability of the user groups.
- Pedestrian accident history relative to other locations within the LGA.
- Anticipated pedestrian volumes.
- Various feedback from the community consultation process.

For example, a high priority route would be a route that services various user groups, particularly vulnerable users such as school children and the elderly, or a route that currently carries a large number of pedestrians and/or has a history of pedestrian crashes.

The proposed route ranking would allow limited funds to be allocated first to the high priority routes and progressively implemented to cover the medium and low priority routes as more funds become available.

Figure 7.2: Pedestrian 400m Walking Catchments (5 minutes walk)



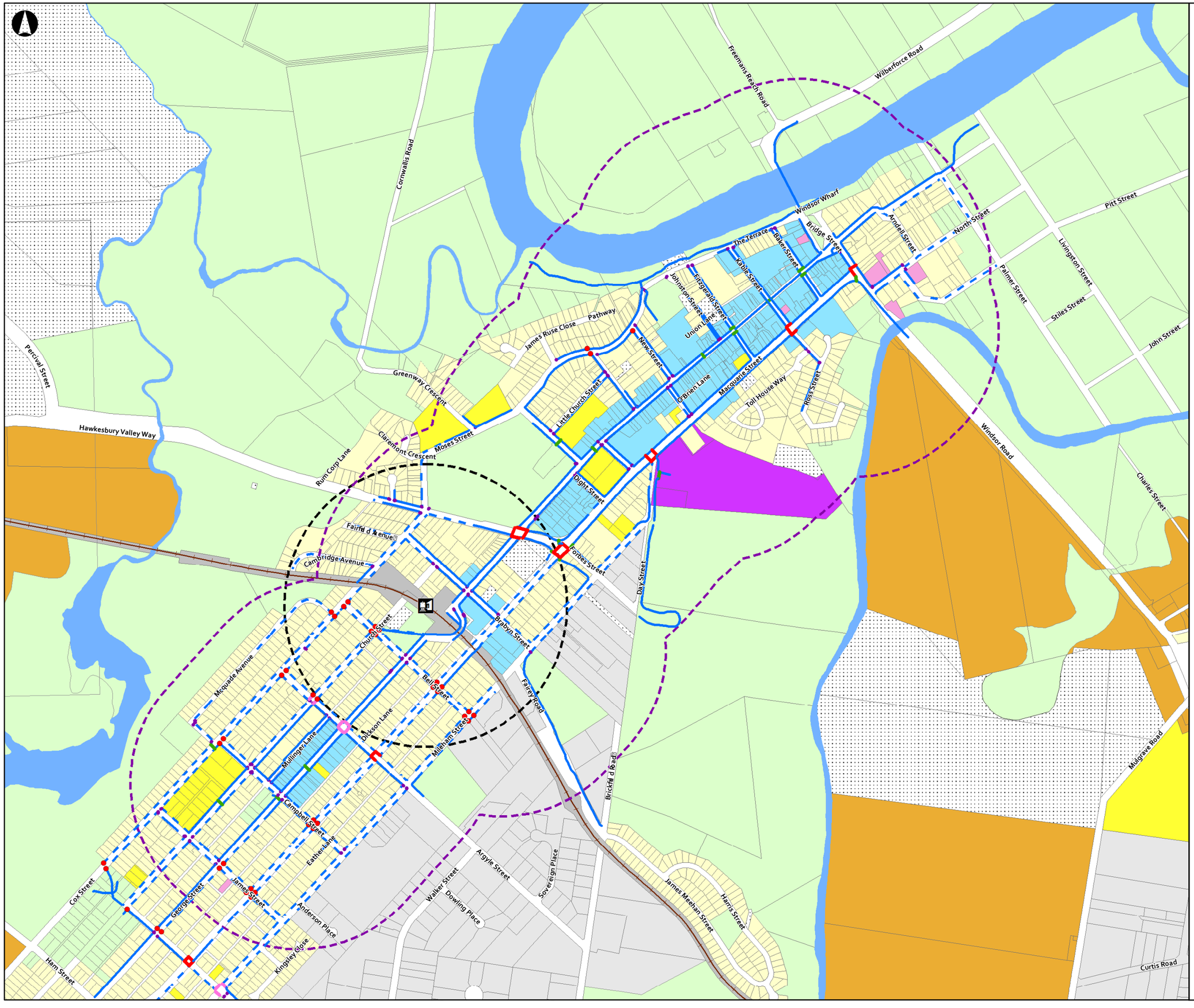
8. Audit of Proposed Routes

8.1 Route Audit Process

Pedestrian route audits were undertaken of the study area which included the key centres of North Richmond, Richmond and Windsor and the links between these three centres, the surrounding suburbs of South Windsor, Bligh Park and Windsor Downs and areas of activity such as in the vicinity of schools, University of Western Sydney (Hawkesbury Campus), railway stations and retail areas. The key focus of the route audits was to identify any obstacles and barriers which limited the ability for less mobile and vulnerable pedestrians to move along the routes. Such barriers included:

- Lack of kerb ramps at pedestrian crossing points.
- Inadequate kerb ramp design.
- Missing or inappropriate crossing treatments.
- Damaged/slippery footpaths and paving.
- Road furniture or obstructions such as seating, electricity boxes, light poles that conflict with travel paths.
- Trees and other obstructions above footpaths.

The existing routes, together with the proposed new footpaths, are shown in Figure 8.1, Figure 8.2 and Figure 8.3 for Windsor/ South Windsor, Richmond and North Richmond respectively.



Legend

Land Uses

- Business
- Residential
- Rural Residential
- Industrial
- Agriculture and Open Space
- Rail Corridor
- School, College or Church
- Hospital, Retirement Village
- General Community Uses
- Other Special Uses
- Train Station 400m Walking Catchment
- Town Centre Walking Catchment

Pedestrian Facilities

- Existing Footpath
- Existing Crossing (Signalised)
- Existing Crossing (Zebra)
- Existing Crossing (Refuge)
- Existing Kerb Ramp Only
- Proposed Footpath
- Proposed Kerb Ramp
- Proposed Refuge Crossing

Issue	Date	By	Chkd	Appd
A	19-03-10	BL	DC	BDM

Metres

0 150 300 600

GTAconsultants

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Client

Hawkesbury City Council

Job Title

Hawkesbury Mobility Plan

Drawing Title

Windsor Town Centre and South Windsor Proposed Pedestrian Network

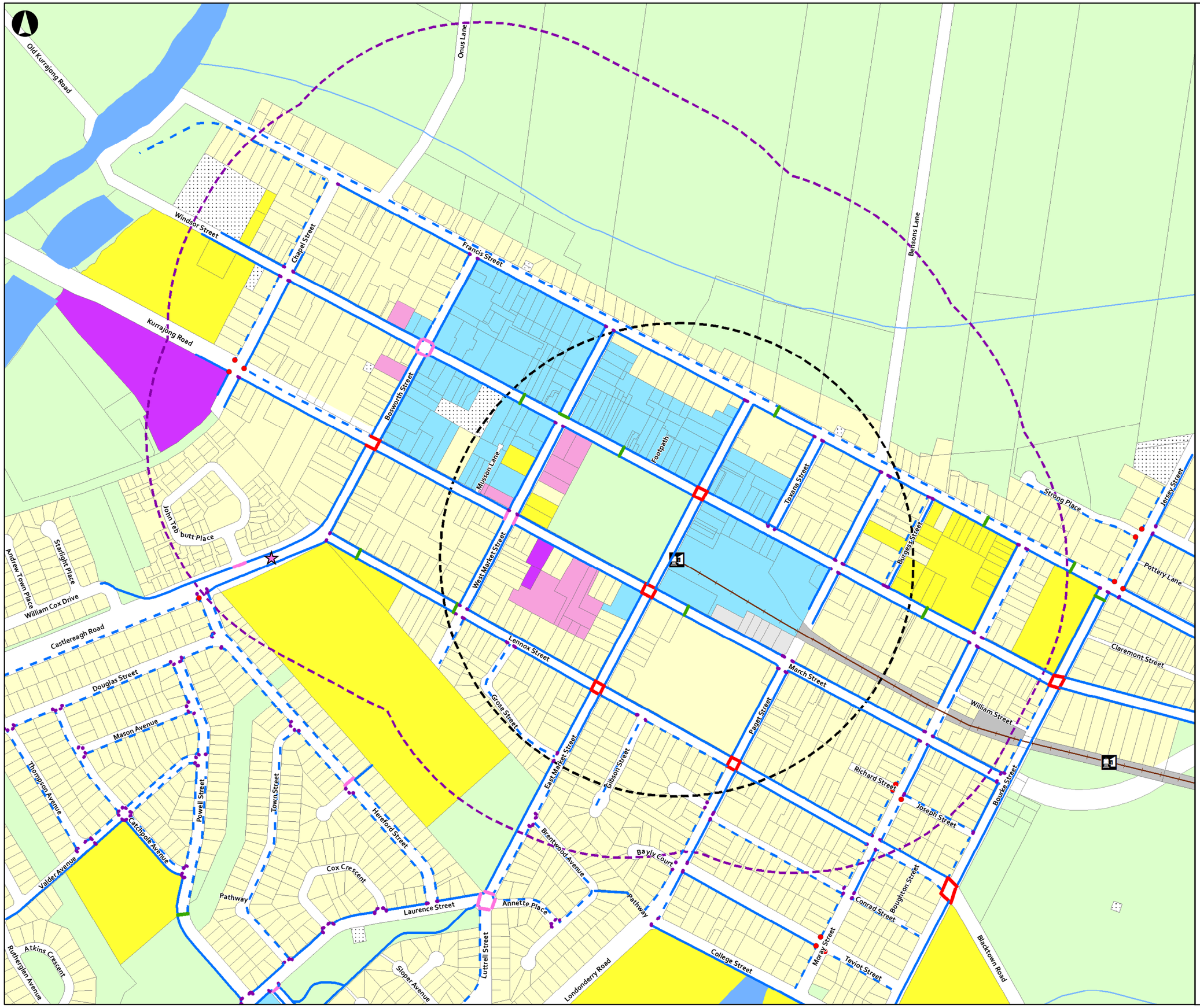
Scale at A3

1:10,000

Drawing Status

Final

Job No	Drawing No	Issue
HS11250	Figure 8.1	A



Legend

Land Uses

- Business
- Residential
- Rural Residential
- Industrial
- Agriculture and Open Space
- Rail Corridor
- School, College or Church
- Hospital, Retirement Village
- General Community Uses
- Other Special Uses
- Train Station 400m Walking Catchment
- Town Centre Walking Catchment

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- Existing Kerb Ramp Only
- Proposed Footpath
- Proposed Kerb Ramp
- Proposed Refuge Crossing

Issue	Date	By	Chkd	Appd
A	19-03-10	BL	DC	BDM

Metres

0 90 180 360

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Client

Hawkesbury City Council

Job Title

Hawkesbury Mobility Plan

Drawing Title

Richmond Town Centre
Proposed Pedestrian Network

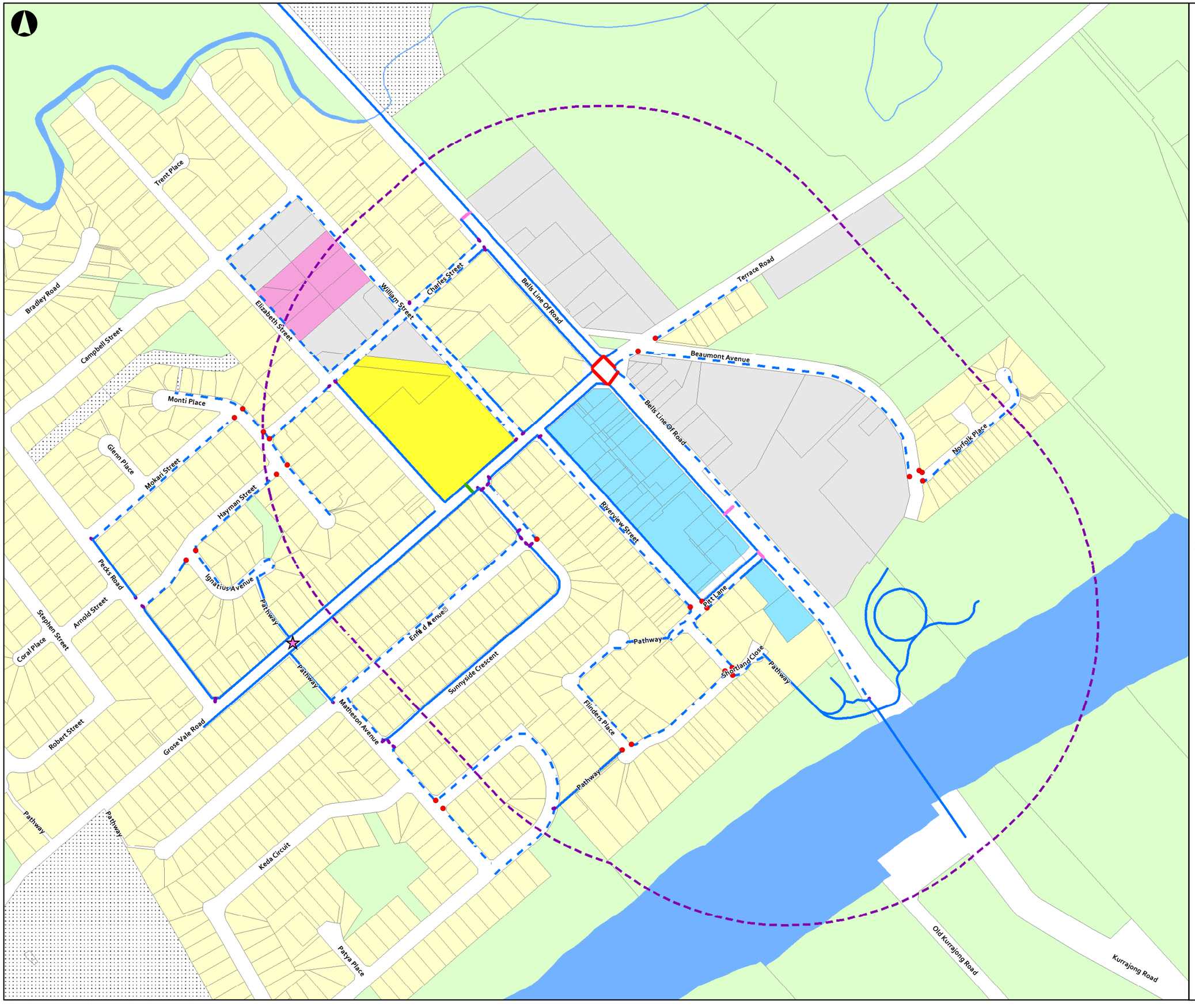
Scale at A3

1:6,000

Drawing Status

Final

Job No	Drawing No	Issue
HS11250	Figure 8.2	A



Legend

Land Uses

- Business
- Residential
- Rural Residential
- Industrial
- Agriculture and Open Space
- Rail Corridor
- School, College or Church
- Hospital, Retirement Village
- General Community Uses
- Other Special Uses
- Train Station 400m Walking Catchment
- Town Centre Walking Catchment

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- Existing Footpath
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- Existing Kerb Ramp Only
- Proposed Footpath
- Proposed Kerb Ramp
- Proposed Refuge Crossing

Issue	Date	By	Chkd	Appd
A	19-03-10	BL	DC	BDM

Metres

0 75 150 300

GTAconsultants

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Client

Hawkesbury City Council

Job Title

Hawkesbury Mobility Plan

Drawing Title

North Richmond Town Centre Proposed Pedestrian Network

Scale at A3

1:5,000

Drawing Status

Final

Job No	Drawing No	Issue
HS11250	Figure 8.3	A

8.2 Summary of Existing Facilities – Opportunities and Constraints

The findings from the route audit have been summarised in the following sections. This discussion includes details of the identified issues, both generally around the study area and at specific locations, and also includes some opportunities for improvement. This information has been used in the development of the recommended works schedule. Full audit findings are detailed in Appendix E.

8.2.1 General Comments

Some of the recurring issues that were observed throughout the study area are detailed as follows and shown in Figure 8.4 to Figure 8.13.

- Service pits – causing problems with cracking and failure of concrete and asphalt paving within footpaths and on road pavement at crossings.
- Kerb ramps
    - Poor alignment in some cases – directing pedestrians into traffic, not in line with formal crossing points
    - Some redundant kerb ramps that should be removed at unsafe locations
    - Not all intersections/road crossings provided with kerb ramps
    - In the outer areas, kerb ramps provided without any adjoining footpath.
- Vegetation
    - Overhanging trees
    - Bushes and grass encroaching into footpath, reducing the clear width
    - Tree roots pushing up existing footpath pavement
    - Large trees along some streets limiting the ability for a footpath to be installed.
- Paved surfacing
    - Pavers need to be regularly monitored, some locations observed to have lifted.

Figure 8.4: Damaged service pit in footpath

Figure 8.5: Kerb ramps at intersection – incorrect alignment

Figure 8.6: Disjointed kerb ramps at an intersection

Figure 8.7: Kerb ramps on only one side of a street

Figure 8.8: Non-continuous footpath around pedestrian activity areas

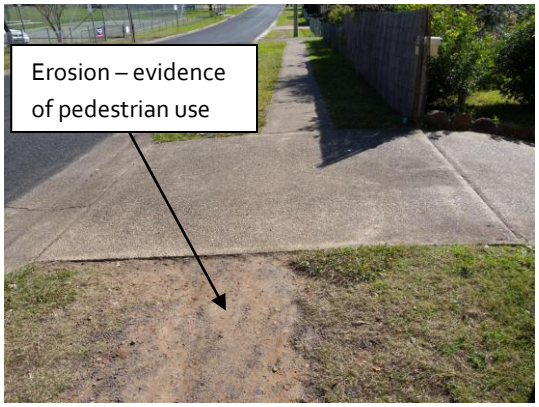

Figure 8.9: Unsatisfactory footpath repair with deteroiation

Figure 8.10: Obstruction within footpath

Figure 8.11: Narrow kerb ramps – pedestrians directed towards traffic

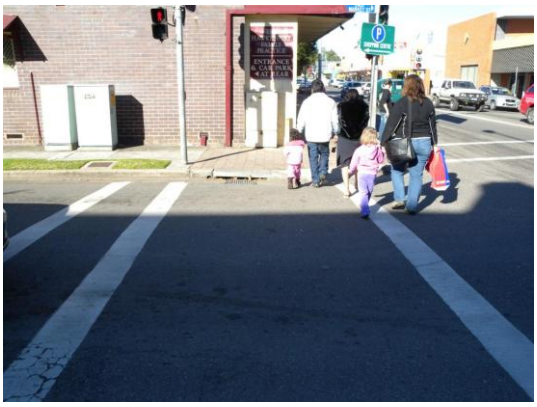

Figure 8.12: Lack of connectivity between footpaths

Figure 8.13: Driveway pavement with vehicle priority at interface with pedestrian path

8.2.2 Windsor

Windsor Station

Pedestrian footpaths in the vicinity of Windsor Station are provided along George Street and Brabyn Street, with some kerb ramps provided. Ideally, all streets within a 400m radius of the station should have footpaths on both sides of the carriageway. However, there is a general lack of facilities within the 400m station radius, including a lack of formal crossing facilities.

Further site inspections needed to identify crossing desire lines in the vicinity of the station and the need for formal pedestrian crossings.

It is noted that Windsor Railway Station has recently undergone an upgrade with the development of a transport interchange and a commuter car park. Pedestrian and cycle facilities are being improved as part of the upgrade to ensure appropriate access and egress for pedestrians and cyclists.

Windsor Mall

There are existing transitions on either end of the mall at Baker Street and Fitzgerald Street. At these locations, there is currently nothing to prevent pedestrians from walking into the intersection on exiting the mall. The existing raised thresholds with marked crossings are only provided for NE/SW movements (refer Figure 8.14).

Figure 8.14: Windsor Mall

East of Bridge Street

There are very few pedestrian footpaths and facilities within the residential streets immediately east of Bridge Street. Barriers to pedestrian travel in this vicinity include Bridge Street, which acts as a major barrier to east-west pedestrian travel, and the roundabout intersection of Bridge Street and George Street, where there are no kerb ramps, no east-west crossing points in the vicinity and a major tree obstruction on the northwest corner restricting the ability to install a footpath.

8.2.3 Richmond

Richmond Station

At Richmond Station, there is a lack of direct connectivity between the car park and the station entry (via East Market Street). There are no formal pedestrian facilities within the car park, with access to East Market Street via an opening in the fence. Access to the station platform from East Market Street is acceptable, with both stairs and a ramp provided. There is generally a good provision of footpaths on both sides of roads within a 400m radius of the station, but works are required to improve the condition of existing facilities (footpaths, kerb ramps, etc).

Pedestrian connections to TAFE/UWS

There is an existing continuous footpath along Bourke Street, College Street and College Drive which connects East Richmond to the TAFE and University.

Bourke Street

There are no east-west crossing points in the vicinity of East Richmond Station and to the south of the railway line. A crossing of the railway line for pedestrians at Bourke Street is on the east side only, but there are no crossing facilities to get between the east and west sides. This is particularly an issue for travel between East Richmond Station and the commuter car park.

A new crossing is required in the vicinity of March Street to service the clubhouse, scout/guide hall, etc. A new crossing is also required to service the East Richmond commuters via a formal crossing on the north side of the railway, and/or crossing of railway on the western side of Bourke Street and a formal crossing to the south of the railway line.

Francis Street

A pedestrian footpath is provided only on the south side of Francis Street. It is important to consider implementation of a new footpath on the north side of Francis Street to the east of Toxana Street. Long term planning should consider provision of a footpath on the north side of Francis Street to the west of East Market Street towards Smith Park and Pughs Lagoon Reserve.

Bensons Lane Reserve

Bensons Lane Reserve is a large sporting complex (baseball, softball, cricket, soccer) that is not accessible by walking. The narrow roadway of Bensons Lane is also difficult for cyclists. An off-road shared path facility should be provided along the western side of Bensons Lane to accommodate pedestrian and cyclist trips, and would require structures to be installed at two minor waterway crossings.

Hawkesbury Village Hostel and Nursing Home

There is a lack of crossing facilities to north side of Kurrajong Road/March Street, with a church, cemetery and parks all located on the opposite side to the Hawkesbury Village Hostel and Nursing Home. A suitable crossing in the vicinity of Chapel Street should be provided. Ideally, an additional footpath in Chapel Street

should be provided, but this is limited by the location of large trees planted within the verge.

Other Locations

There are several other locations where there are opportunities to make improvements to the existing pedestrian network, including:

- Lack of footpath facilities within residential streets to the south of Richmond High School – should have footpaths on at least one side of the road in these streets.
- Improve treatment of pedestrian railway crossing on Moray Street – maintain link to the schools to the north of the railway line (Richmond Public School and St Monicas).
- Lack of footpath facilities within residential streets to the northeast of Richmond Public School and St Monicas – should have footpaths on at least one side of the road in these streets.

8.2.4 North Richmond

There is a general lack of footpath facilities in the North Richmond area, notably at the following locations:

- Terrace Road, Beaumont Avenue and Norfolk Place (NE part of town centre).
- Bells Line of Road – northeast side to the SE of Terrace Road.
- SW of Pitt Lane and Shortland Close through to Matheson Avenue and Keda Circuit – connecting pathways provided between properties at cul-de-sacs but no footpaths along roadways.
- Residential streets surrounding North Richmond Public School, including the Charles Street and William Street frontages and other streets to the north and west.

8.3 Proposed Pedestrian Network – Future initiatives

8.3.1 Footpaths – General Requirements

In terms of establishing the need for new footpaths or for repair of existing footpaths, the following general requirements have been adopted:

- Footpaths should generally be provided on both sides of all streets within a 400m catchment of accessible centres and major trip attractors such as schools. They should also be provided on both sides of streets that serve as key routes between trip generators, e.g. a walking route between a railway station and a university. In addition, on those streets that do not serve as key walking routes outside of the 400m catchment and up to a minimum of 800m from centres and major trip attractors, sealed footpaths should be provided on at least one side of all streets. As such:
    - Ensure there are sealed footpaths on both sides of all streets within a 400m radius of the Windsor and Richmond railway stations.
    - Ensure there are sealed footpaths on at least one side (preferably both sides) of all streets within a 400m-800m radius of the Windsor, South Windsor, Richmond and North Richmond town centres.
    - Ensure there are sealed footpaths on at least one side (preferably both sides) of all streets within a 400m-800m radius of all schools, particularly those located in close proximity to the three town centres, namely:
        - Windsor Public School
        - St Matthews Primary School, Windsor
        - Richmond Public School
        - St Monicas Catholic School, Richmond

    - Richmond High School
    - North Richmond Public School.

- Repair localised footpath damage, including issues with service pits.
- Implement maintenance schedule for trimming of vegetation.
- Address issues outlined in summary of site inspection findings.
- Treatment of footpath across driveways:
    - To overcome any issues with vehicles assuming priority when crossing a footpath, ensure that future locations construct the footpath through the driveway and not the other way around, creating a visual link between both sides of the footpath.
    - Progressively replace footpaths at existing driveways where the pavement indicates a vehicle priority.

8.3.2 Pedestrian Facilities – Windsor

The future initiatives for improving the pedestrian network in Windsor are:

- Treatment of Windsor Mall transitions at Fitzgerald Street and Baker Street.
- Ensure improvements to pedestrian safety and connectivity are implemented as part of the Windsor Transport Interchange.
- Investigate redesign of intersection of Bridge Street and George Street (e.g. signals) to accommodate greater pedestrian movement – refer to Windsor Great River Walk Master Plan for proposed treatments in the vicinity of Thompson Square and Bridge Street/George Street intersection. Note that potential future realignment of Windsor Bridge would open up Thompson Square and allow opportunities for improved east-west connection.

8.3.3 Pedestrian Facilities – Richmond

The future initiatives for improving the pedestrian network in Richmond are:

- Bourke Street – East Richmond Station and surrounds:
    - New pedestrian crossing in the vicinity of March Street to service clubhouse, scout/guide hall, park, etc, as well as East Richmond Station.
    - New pedestrian crossing directly north of the railway crossing, mainly for use by commuters in car park. Refuge crossing likely to be preferred design.
- Improve treatment of pedestrian railway crossing on Moray Street, including extension of the sealed footpaths connecting to the north side of the crossing and provision of footpath on south side of crossing.
- Provide new footpath on the north side of Francis Street to the east of Toxana Street (connecting with existing footpath opposite Richmond Club).
- Long term – install footpath on north side of Francis Street to the west of East Market Street towards Smith Park/Pughs Lagoon Reserve.
- Provide off-road shared path facility along western side of Bensons Lane from Francis Street to Bensons Lane Reserve sporting complex. Note would require structures at two minor waterway crossings.
- Provide pedestrian crossing of Kurrajong Road in the vicinity of Chapel Street to link Hawkesbury Village Hostel and Nursing Home and the church, cemetery and parks located on north side.
- Richmond Station – It is noted that a proposal to upgrade the Richmond station interchange,

including pedestrian and cyclist facility improvements, was prepared by the Ministry of Transport in 2009, but it is unclear when this proposal will proceed.

8.3.4 Pedestrian Facilities – North Richmond

The future initiatives for improving the pedestrian network in North Richmond are:

- Install footpaths in accordance with the plan (see Figure 8.3), including at the following locations:
  - Terrace Road, Beaumont Avenue and Norfolk Place (NE part of town centre).
  - Bells Line of Road – northeast side to the SE of Terrace Road.
  - SW of Pitt Lane and Shortland Close through to Matheson Avenue and Keda Circuit – connecting pathways provided between properties at cul-de-sacs but no footpaths along roadways.
  - Residential streets surrounding North Richmond Public School, including the Charles Street and William Street frontages and other streets to the north and west.

9. Implementation

9.1 Cost Estimate for Typical Items

Rates used to cost the works were obtained primarily from previous bicycle and pedestrian projects undertaken by GTA Consultants. Details of the rates used for this project are included in Table 9.1.

Table 9.1: Typical Items Cost Rates (Note: 2009 costs)

Item No.	Item Description	Rate	Source
1	New or widen existing concrete path	$100/m^2	Campbelltown City Council contract rates 2008/09
2	New or widen existing bitumen path	$150/m^2	Leichhardt Council Annual Cost Schedule for 2003/2004
3	Shared path (crushed gravel)	$42.60/m^2	RTA – NSW Bicycle Guidelines, 2003
4	Road shoulder pavement construction	$126.50/m	Leichhardt Council Annual Cost Schedule for 2003/2004
5	Road shoulder 1.5m wide bitumen seal	$69.70/m	Leichhardt Council Annual Cost Schedule for 2003/2004
6	Bicycle directional signs	$407.10/sign	Quotes for Leichhardt Council by HVS Services
7	Bicycle logos	$101 per logo	Quotes for Leichhardt Council by HVS Services
8	Bicycle shoulder lanes – signs and markings	$25.80/m	Quotes for Leichhardt Council by HVS Services
9	Mixed traffic treatment – signs and markings	$2.50/m	Quotes for Leichhardt Council by HVS Services
10	Shared path treatment – signs and markings	$10.60/m	Quotes for Leichhardt Council by HVS Services
11	Kerb ramps	$600/Ramp	Leichhardt Council Annual Cost Schedule for 2003/2004
12	Bicycle refuge islands	$10,000/refuge	Nominal amount based on GTA Consultants experience
13	Bicycle lanterns at existing signalised crossings	$1,755/pair	Verbal advice from the RTA 4 April 2005
14	Bicycle parking – inverted U-rail	$1,000 each	Information provided by South Sydney Council based on recent projects
15	Bicycle parking – bicycle cage	$35,000 each (for15-20 parks)	Based on recent installation work at Railway Stations in Perth

9.2 Methodology for Establishing Priorities

In the current political environment, there is increasing pressure on the application of limited funding across a wide range of transport-related projects. Therefore it is important to establish a consistent project assessment framework across all transport projects such that the relative merits of (for example) a small cycling project can be compared to a major highway upgrade project.

One common tool used for road projects is cost-benefit analysis. Such analysis seeks to derive a benefit-cost ratio (BCR) through valuing in current terms:

- capital project cost
- maintenance and other ongoing costs
- vehicle operating cost (VOC) savings
- time cost savings per vehicle hour

- accident cost savings
- environmental externalities (costs or benefits).

Such analysis can relatively easily be applied to cycling projects with additional economic parameters included such as health benefits. Such analysis is dependent on the availability of suitable data which can be difficult, particularly for smaller projects. Due to the wide-ranging benefits, quantification can be difficult where these involve other government sectors and indirect links, such as health benefits.

Historically, in terms of local cycling projects, prioritisation of projects has often been on the basis of cost (absolute or distance-based), ease of funding or perceived feasibility (often a measure of political or community resistance). This relatively ad-hoc approach has focused on "quick wins" at an infrastructure level, creating an under-utilised and often disjointed network.

To provide a simple yet effective method of prioritising projects where consistent quantitative data is not available, GTA Consultants has devised the priority evaluation matrix shown in Table 9.2.

Table 9.2: Priority Evaluation Matrix

Cost Estimate		Potential Benefits		
		High	Medium	Low
<$20,000*	Low	Priority 1	Priority 1	Priority 2
$20,000 - $100,000*	Medium	Priority 1	Priority 2	Priority 3
>$100,000*	High	Priority 2	Priority 3	Priority 3

* Values are indicative only.

Assessment of the potential benefits would include consideration of the following characteristics:

- Range of trip purposes serviced – commuter, school and education, shopping, recreation, etc (i.e. the greater the number of trip purposes, the higher the potential benefits).
- The percentage of the population that can access the route (i.e. routes servicing high density/built out residential areas would be able to service a higher percentage of the population).
- The type of facility and the ability for it to service the expected users. For example, facilities in the vicinity of schools require a high level of safety and would achieve greater use as an off-road route than as on-road lanes, particularly for younger children. In contrast, a route along the alignment of a major highway for the use of commuters would achieve greater use as on-road lanes where higher speeds can be maintained.

Once the relative priorities have been established, it is valuable to consider the overall feasibility of the projects or initiatives being considered. This includes engineering feasibility, political feasibility, community consultation and opinion, as well as conflicting priorities and needs. This "degree of difficulty" for implementation should avoid overlap with cost considerations where possible. Table 9.3 shows how the priorities from Table 9.2 can be translated to short, medium and long term actions through consideration of project feasibility.

Table 9.3: Action Evaluation Matrix

Priority	Project Feasibility		
	High	Medium	Low
Priority 1	Short Term	Short Term	Medium Term
Priority 2	Short Term	Medium Term	Long Term
Priority 3	Medium Term	Long Term	Long Term

9.3 Physical Works Schedules

The works schedules for implementation of the Bicycle Plan and PAMP have been prepared based on the following categories:

- Bicycle-only facilities (on-road bicycle lanes, bicycle parking, etc).
- Pedestrian-only facilities (footpath, pedestrian crossing, etc).
- Shared path facilities (along road reserves and within parks and green corridors).

To align with funding constraints, only works associated with implementing the Regional Routes from the bicycle network have been costed. The Sub-regional Routes and Local Routes and Links are included on the bicycle network map (see Figure 6.2). It is envisaged that works associated with implementing and improving these routes would be scoped and undertaken as additional funds become available. The PAMP works have been fully costed and separated into three priorities. It is likely that only the Priority 1 works would be able to be delivered with the expected funding allocation; however the Priority 2 and 3 works would also be undertaken as additional funds become available.

Each of the proposed works items was given a priority of 1, 2 or 3 based on the route priority system detailed above. A summary of the Priority 1, 2 and 3 proposals and implementation costs are indicated in Table 9.4, Table 9.5 and Table 9.6. Full detail for all works is provided in the works schedules contained in Appendix G.

Table 9.4: Works Schedule - Bicycle-Only Facilities (2009 costs)

Route No.	Route Description	Total Route Length (bicycle only and shared facilities)	Bicycle-Only Route Cost	Priority
RR01	Parramatta to Windsor Off-Road Cycleway (Baulkham Hills/Blacktown LGA to Mulgrave)	4,900m	$2,500	2
RR02	Parramatta to Windsor Off-Road Cycleway (Mulgrave to McGraths Hill)	1,260m	$2,500	2
RR03	Parramatta to Windsor Off-Road Cycleway (McGraths Hill to Windsor)	1,320m	n/a	n/a
RR04	Windsor CBD – Macquarie Street	1,080m	$10,000	1
RR05	Windsor to Mulgrave via Hawkesbury Valley Way	3,220m	$90,000	2
RR06	Windsor CBD – Hawkesbury Valley Way	390m	$25,000	1
RR07	Windsor to Richmond	5,900m	$90,000	1
RR08	Richmond to North Richmond	3,725m	$12,000	1
			$15,000	2
RR09	North Richmond to Kurmond	4,280m	n/a	n/a
RR10	Kurmond to Kurrajong	6,300m	n/a	n/a
RR11	Windsor to South Windsor, Bligh Park and Penrith (via The Northern Road)	4,460m	$195,000	1
			$180,000	2
			$170,000	3
RR11a	Windsor to South Windsor via Windsor Railway Station	2,900m	$70,000	1
RR12	Richmond to Bligh Park	4,650m	$20,000	2
RR13	Bligh Park to Windsor Downs and Blacktown LGA	4,700m	$25,000	3
Total			**$402,000**	**1**
			$310,000	**2**
			$195,000	**3**

Table 9.5: Works Schedule - Shared Path Facilities (2009 costs)

Route No.	Route Description	Total Route Length (bicycle only and shared facilities)	Shared Path Facility Route Cost	Priority
RR01	Parramatta to Windsor Off-Road Cycleway (Baulkham Hills/Blacktown LGA to Mulgrave)	4,900m	n/a	n/a
RR02	Parramatta to Windsor Off-Road Cycleway (Mulgrave to McGraths Hill)	1,260m	n/a	n/a
RR03	Parramatta to Windsor Off-Road Cycleway (McGraths Hill to Windsor)	1,320m	$1,500	1
RR04	Windsor CBD – Macquarie Street	1,080m	$85,000	1
RR05	Windsor to Mulgrave via Hawkesbury Valley Way	3,220m	n/a	n/a
RR06	Windsor CBD – Hawkesbury Valley Way	390m	$30,000	1
RR07	Windsor to Richmond	5,900m	$730,000	1
RR08	Richmond to North Richmond	3,725m	$65,000	1
			$130,000	2
RR09	North Richmond to Kurmond	4,280m	$25,000	2
RR10	Kurmond to Kurrajong	6,300m	$850,000	3
RR11	Windsor to South Windsor, Bligh Park and Penrith (via The Northern Road)	4,460m	$130,000	1
			$15,000	2
RR11a	Windsor to South Windsor via Windsor Railway Station	2,900m	n/a	n/a
RR12	Richmond to Bligh Park	4,650m	n/a	n/a
RR13	Bligh Park to Windsor Downs and Blacktown LGA	4,700m	n/a	n/a
			$1,041,500	**1**
Total			**$170,000**	**2**
			$850,000	**3**

Table 9.6: Works Schedule - Pedestrian-Only Facilities (2009 costs)

Location	Priority	Total Distance (m)	Item Cost
Windsor and South Windsor	Priority 1	3,000m	$650,000
	Priority 2	7,500m	$1,500,000
	Priority 3	3,000m	$600,000
Richmond	Priority 1	1,300m	$365,000
	Priority 2	9,000m	$1,800,000
	Priority 3	680m	$140,000
North Richmond	Priority 1	2,150m	$430,000
	Priority 2	2,300m	$470,000
	Priority 3	1,700m	$325,000
Total	**Priority 1**	**6,450m**	**$1,445,000**
	Priority 2	**18,800m**	**$3,770,000**
	Priority 3	**5,380m**	**$1,065,000**

9.4 Monitoring Program and Integration with Hawkesbury Council Operations/Processes

A program to monitor implementation of the Mobility Plan is recommended. Such a program will feed back into the ongoing development of the Mobility Plan and ideally will permit improvements and cost savings. The most important way to do this is to integrate projected pedestrian infrastructure works and programs with other Council plans and procedures. Proper and detailed planning often results in substantial cost savings to the Council and its residents when pedestrian and cycling infrastructure works can be carried out as part of major new capital works construction, periodic maintenance and infrastructure upgrades.

To ensure the maximum integration of pedestrian and bicycle infrastructure provision across all operational departments of the Hawkesbury City Council, it is recommended that:

- All pedestrian networks and recommendations for physical infrastructure improvements be included in Council's geographic information system (GIS) to ensure all future works are coordinated with other street improvements, including road resealing and maintenance works. Council are to coordinate with the RTA to ensure that this also applies to works undertaken within the LGA by the RTA.
- Key council staff be progressively encouraged to attend RTA training courses "Designing for Bicycles and Pedestrians" for technical staff and "Bicycles and Pedestrians for Managers" as part of their normal training requirement.
- Review Council's road and path based engineering standards to ensure that pedestrians and cyclists are always included and implicitly planned for. This is to ensure that facilities which are potentially hazardous to pedestrians and/or cyclists are not inadvertently installed. This applies to such features as road lane widths, intersection layouts, path clearances/widths, standard LATM designs, etc.
- Inclusion of provision for walking and cycling in all future council plans and developments.
- Council review its current planning policies to include provision for pedestrian and cycling requirements in development control plans (DCPs) and local environment plans (LEPs) for new and modified developments as detailed in the Planning Guidelines for Walking and Cycling (DoP 2004). Such provision will include but not be confined to the provision of parking and end of trip facilities, access to buildings and developments and the requirement for walking and cycling to be included in site/place/workplace-based transport plans.
- Develop internal process and procedures whereby all Council departments can coordinate and support the development and delivery of their separate walking and cycling programs and projects.
- Develop a Hawkesbury-based hazard reporting scheme to ensure infrastructure defects are fixed promptly and efficiently in response to pedestrians' needs. Whilst there are a range of options used by other Sydney Councils, the recommended system would be the "Report a Hazard" online system. More information can be found at www.reportahazard.com.au.
- Implement a regular cycleway maintenance program to ensure that on-road and off-road bicycle facilities are kept in good repair.
- Continually monitor the footpath network to ensure that footpaths are kept in good repair.

9.5 Statutory Planning Requirements for Pedestrian Facilities

The provision of pedestrian facilities as part of new development approvals can be regulated by a number of Council planning instruments, including:

- Local Environmental Plan
- Various Development Control Plans
- Section 94 Contributions Plan
- "Standard" consent conditions.

In addition to the above Council planning instruments, the Planning department within Council should ensure that future developments make allowance for through ways at the end of cul-de-sacs and easement allowances for tracks.

The NSW Planning Guidelines for Walking and Cycling (DoP 2004) provides useful information to assist in this process. There are strong planning guidelines for pedestrian and cycling catchment mapping, which help determine urban densities and thus the viability of businesses and community facilities within walking and cycling range (refer Figure 9.1).

Figure 9.1: Planning NSW Pedestrian Catchment Mapping

9.6 Funding Sources

The recommended bicycle network plan proposes high quality infrastructure in line with contemporary community aspirations for bicycle use. There are a number of funding programs which may provide the additional financial support necessary for implementation of both the physical infrastructure and the related social plan to meet current and future community needs.

There are two websites that provide further detail:

http://www.cyclingresourcecentre.org.au/7/Funding

http://www.cyclingpromotion.com.au/content/view/28/51/

Department for Infrastructure, Transport, Regional Development and Local Government (DITRDLG)

- AusLink Roads to Recovery Program
  In November 2000, this program was introduced as a single intervention by the Commonwealth to address the specific problem of local roads reaching the end of their economic life, and their replacement being beyond the capacity of local government. Over four years from 1 July 2005, the Australian Government, will provide additional funding of $1.23 billion. This is in addition to its untied Financial Assistance Grants to councils for roads and other purposes. On 8 May 2007, the Australian Government announced that it will further extend the Roads to Recovery Program until June 2014. Funding for the program will also be increased from $307.5 million a year at present to $350 million a year from 2009-10. This program has been used by many Councils throughout Australia to fund bicycle infrastructure development and upgrades. It is administered by the Commonwealth Department of Transport and Regional Services.
- AusLink Black Spot Program:
  The Black Spot program began in 1996-97. In recognition of its success the Australian Government has now extended the program until 30 June 2014 and Black Spot funding under AusLink 2 will be increased to $60 million annually from 2009-10 to 2013-14. That is an increase of 33 % on current program funding. The government will also provide $45 million for black spot projects in 2008-09 as part of its current AusLink program. This program has been used by many Councils throughout Australia to fund bicycle infrastructure development and upgrades. It is administered by the Commonwealth Department of Transport and Regional Services.
- Infrastructure Australia fund; is a new, national approach to planning, funding and implementing the nation's future infrastructure needs. It will provide advice to Australian Governments about infrastructure gaps which can include cycling infrastructure. (www.infrastructure.gov.au/department/infrastructureaustralia).
- Sustainable Cities.

RTA

The RTA's Bicycle Program allocates approximately $5 million annually to NSW Council bicycle projects, which includes over $1 million for Sydney Metropolitan Councils. The dollar for dollar funding is to assist Councils with the development and implementation of their local bicycle networks. Detailed information on RTA funding for Sydney Council projects is available from the website www.rta.nsw.gov.au. Programs for potential funding include:

- Regional Road Block Grants: The RTA assists Council with the costs for maintaining regional roads. For the maintenance, construction, resurfacing, shoulder widening and upgrades of regional roads, walking and cycling infrastructure can easily be included within this cost.
- Black-spots and "black-areas": The NSW Black Spot Program is funded by the NSW government and is also part of the Australian Government's AusLink Black Spot Program. Its objective is to reduce the occurrence and severity of crashes at known locations by installing cost effective treatments. This funding benefits walking and cycling infrastructure by increasing safety and reducing crash rates at intersections and other known crash locations.
- NSW Bike Week Funding: This program is a government funded initiative that raises the profile of cycling as a healthy, easy, low cost and environmentally friendly transport alternative for driving short trips. RTA funding is only provided for the promotion and advertising component of an event's budget. Funding is not fixed and will be assessed and valued independently.
- Co-Funding Program for bicycle infrastructure: the Government recognises that most cycling takes place on local roads. The development and implementation of local cycling networks is important to increase cycling within communities. The Government provides dollar for dollar funding to local councils which assists improving and developing cycling infrastructure within the Local Government Area.
- Bicycle User Support: the program supports the use of cycling through research, training and promotion. Funding of bicycle use promotions, bike plan preparation, development and production of cycleway maps, research into bicycle facilities and the implementation of bicycle training facilities can increase the number of cyclists and improve skills and knowledge on bicycle facilities design and implementation.

Other funding for pedestrian infrastructure delivery include:

- Funding to assist Councils in the implementation of PAMP actions.
- Road maintenance/management program.
- Road safety.

Department of Planning

The Metropolitan Greenspace Program (MGP) has provided over $15m to over 300 projects since 1990. It allocates over $1 million annually to Councils on a matching dollar basis and last year provided almost $1.5 million to Councils. The key objective of the program is to assist local government in the development and planning of regionally significant open space and to enable more effective use of these areas by the public. The program aims to promote partnerships between State and Local Government.

Department of Environment, Climate Change and Water

Various grants can be awarded for projects addressing climate change, and reducing Australia's green house gas emissions. Councils can apply for the grants up to $50,000. Cycling infrastructure can be incorporated into projects as a way to reduce green house gas emissions by reducing car dependency and increasing cycling.

DECCW – Environmental Trust

The Environmental Trust is an independent statutory body established by the NSW government to support exceptional environmental projects that do not receive funds from the usual government sources. The Trust is empowered under the Environmental Trust Act 1998, and its main responsibility is to make and supervise the expenditure of grants. The Trust is administered by the Department of Environment and Climate Change.

Sport and Recreation

Grants and financial assistance: The NSW Sport and Recreation department provides funding for local councils to build and upgrade sporting facilities. This could include cycling tracks and training facilities. The 2008-2009 Capital Assistance Program can provide up to $30,000 for each local government and can be used for cycling sport and recreation facilities throughout the LGA.

Council

- Annual budget allocation for walking and cycling infrastructure.
- Developer contributions: until recently Council has depended upon Section 94 funding from developers to provide resources for construction of cycle ways, along with a range of other community facilities. This source is in doubt pending the outcomes of a review into the application of Section 94 levies on developers in NSW.

Business and Clubs

- Advertising (pedestrian bridges, bus shelters): Revenue from business and clubs in the local area can provide funding for advertising within the LGA. These advertisements could be cycling related by providing cycle maps and information as well as encouragement advertisements.
- Clubs NSW – CDSE funding: Clubs that earn over $1 million annually in gaming machine revenue provide funding for community projects and services, and in turn receive dollar-for-dollar gaming tax deductions. In 2008, clubs reported CDSE expenditure of over $58 million across New South Wales. This funding can be used to implement cycling encouragement initiatives like cycling programs, workshops and distributing maps. (www.clubsnsw.com.au/AM/ContentManagerNet/HTMLDisplay.aspx?ContentID=11935&Section=Community_Support).
- Developers can also choose to fund local cycling infrastructure in the local area. If a major development is occurring (such as a Shopping Centre), bicycle parking facilities and safe bicycle routes around the centre can be integrated into the plans to increase cycling and encourage cycling for short trips.

Cycling Promotion Fund

- Innovative projects to promote and encourage cycling: In the past the Cycling Promotion Fund has funded a number of innovative projects that promote and encourage cycling to assist in developing the evidence base that such projects are effective in encouraging and promoting cycling. CPF assists by listing potential funding sources for cycling encouragement and promotion programs.
- Continued advice and guidance on the development of effective cycling programs and initiatives.

10. References

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- RTA, 2007 How to Prepare a Bike Plan – An Easy 3 Stage Guide, Version 1, Roads and Traffic Authority of NSW, Sydney.
- RTA, 2002 How to Prepare a Pedestrian Access and Mobility Plan – An Easy Three Stage Guide, Roads and Traffic Authority of NSW, Sydney.

Appendix A

Global Policy Issues

Global Issues

Healthy and active transport includes walking and cycling as well as public transport, which invariably involves walking to and from bus stops and rail stations. There is substantive evidence that healthy and active transport provides a strong and effective policy response to five global public policy issues, including:

- Transport Equity
- Congestion
- Public Health
- Climate Change
- Peak Oil and Petrol Prices.

Investment in physical, social and organisational infrastructure to support healthy and active transport can deliver positive benefit: cost ratios for each of these five global policy issues individually, especially when considering externalities. The real benefit of investment in infrastructure for healthy and active transport, however, lies in recognition of the cross-disciplinary benefits.

The following sections detail the five global public policy issues referred to above.

Health Benefits

Physical inactivity is one of the major causes of ill health in Australia. Half the Australian adult population are insufficiently active to protect against sedentary lifestyle disease, such as diabetes (Australian Institute of Health and Welfare, 2006). Research shows that regular physical activity throughout life reduces the incidence and fatality rate from cardiovascular disease by up to 50% (Heart Foundation, 2007).

The direct gross cost of physical inactivity to the Australian health budget in 2006/07 was $1.49 billion (Econtech, 2007). This translates to **$198.57 per adult, per year**. Walking and cycling provide a practical, sustainable opportunity to help get more Australians active, and reduce the cost of physical inactivity. The specific health benefits relating to cycling are discussed in more detail below. Many of these benefits also apply to walking.

In 2006, over 1.68 million Australians cycled for recreation and of those, 417,400 cycled more than 104 times a year (Australian Sports Commission, 2006). These individuals can be classified as meeting the levels of physical activity to protect against sedentary lifestyle diseases from cycling alone.

By including the cycling that takes place for commuting purposes (to/from work) as well, bicycle riding participation cuts sedentary lifestyle disease costs by approximately $154 million (Bauman et al, 2008). There is also a significant amount of additional transport-based cycling that is not collected by the Census, such as visiting friends, or trips to local shops. According to the Australian Greenhouse Office (2006), around 66% of journeys are for non-commuting purposes.

Cycling has been shown by the World Health Organisation to be effective in the treatment and prevention of mental health (Dora & Phillips, 2000). Depression and anxiety have been found to cost Australian businesses almost $10 billion a year. This includes $6.6 billion for sick days and $3 billion for poor work performance (Hilton, 2005).

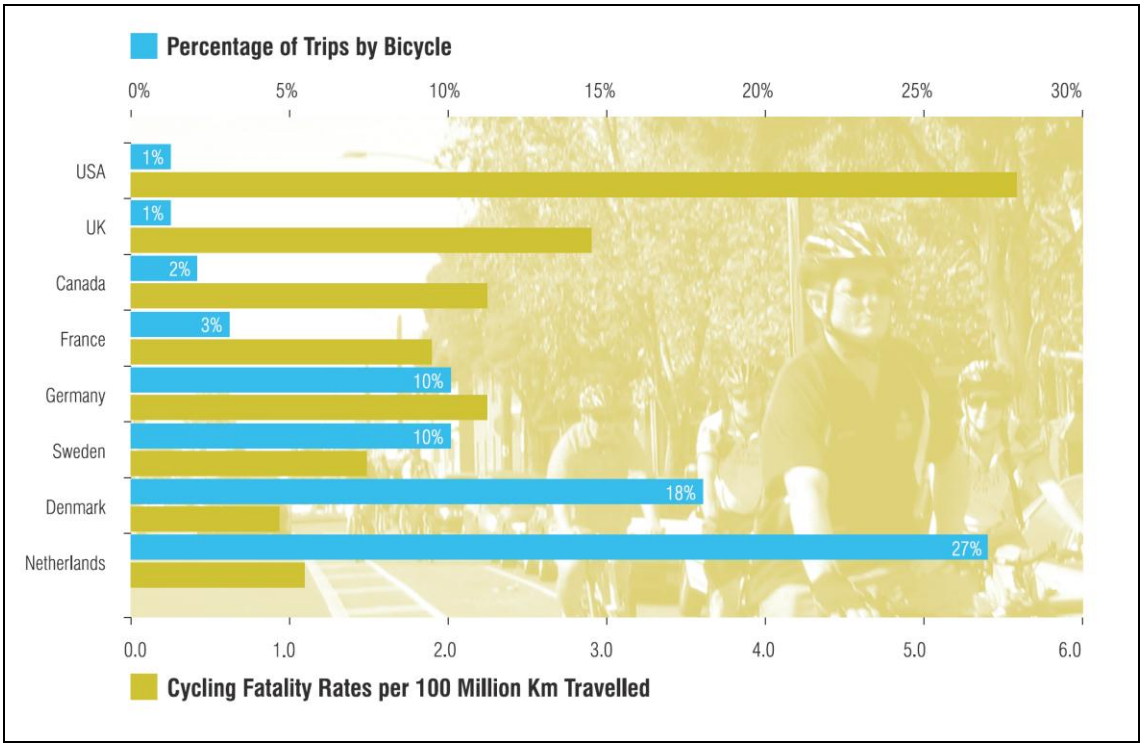
Cycling can provide benefits in terms of air quality. Air pollution caused by motor vehicles, especially in urban areas, is a major source of respiratory illness (Standing Committee on Environment and Heritage, 2005; Commissioner for Environmental Sustainability, 2007; Bureau of Transport and Regional Economics, 2005). Between 900 and 4500 cases of cardio-vascular and respiratory disease occurred due to motor vehicle related air pollution in 2000, costing between $0.4 billion to $1.2 billion. Air pollution caused by motor vehicles

accounted for between 900 and 2000 premature deaths, with an estimated cost of between $1.1 billion and $2.6 billion (Bureau of Transport and Regional Economics, 2005). Cycling, as a zero emission form of transport, offers significant potential to reduce this cost, particularly in urban areas where typical journey distances are short.

Cycling as a replacement for car use can have significant benefits in reducing road trauma. In Australia, road trauma costs $17 billion a year (Connelly & Supangan, 2006). Evidence is increasing that providing alternatives to motor vehicle use is an effective method of minimizing the incidence and severity of road trauma (Litman & Fitzroy, 2005).

Cyclists' safety is a crucial component of road trauma reduction. A recent review of the literature found that safety concerns are a primary reason why people choose *not* to cycle, and that the more cyclists there are, the safer cycling becomes. Figure A1 below demonstrates that the countries with the highest rates of cycling have the lowest levels of cyclists' fatality on a kilometre travelled basis.

Figure A1: Relationship between Bicycle Mode Share and Fatalities

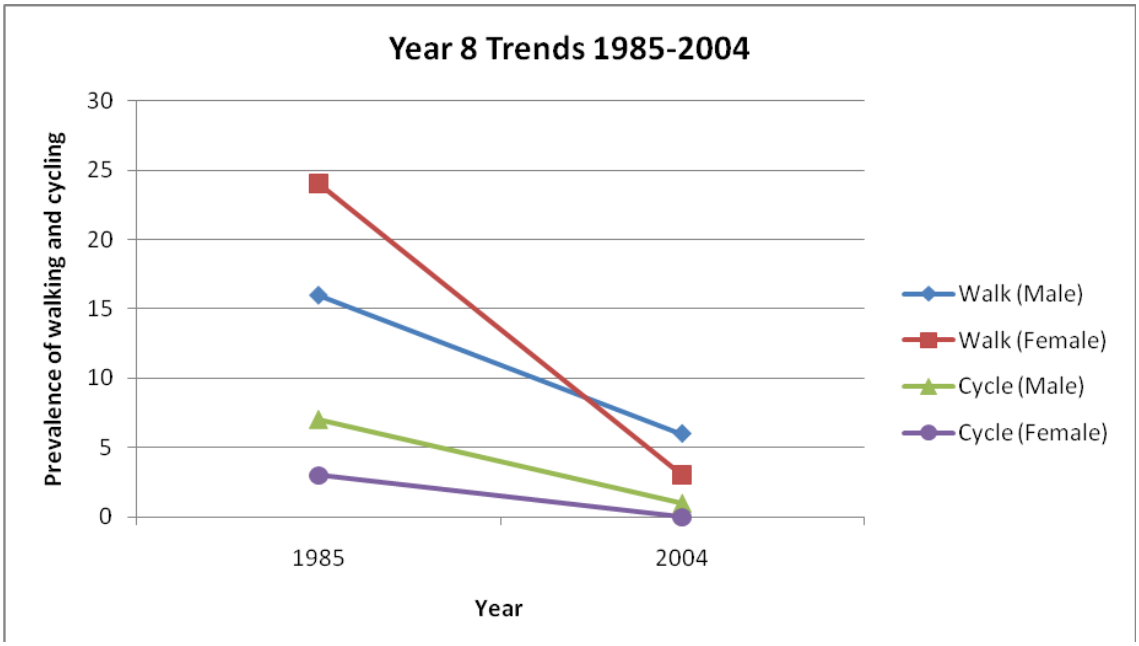


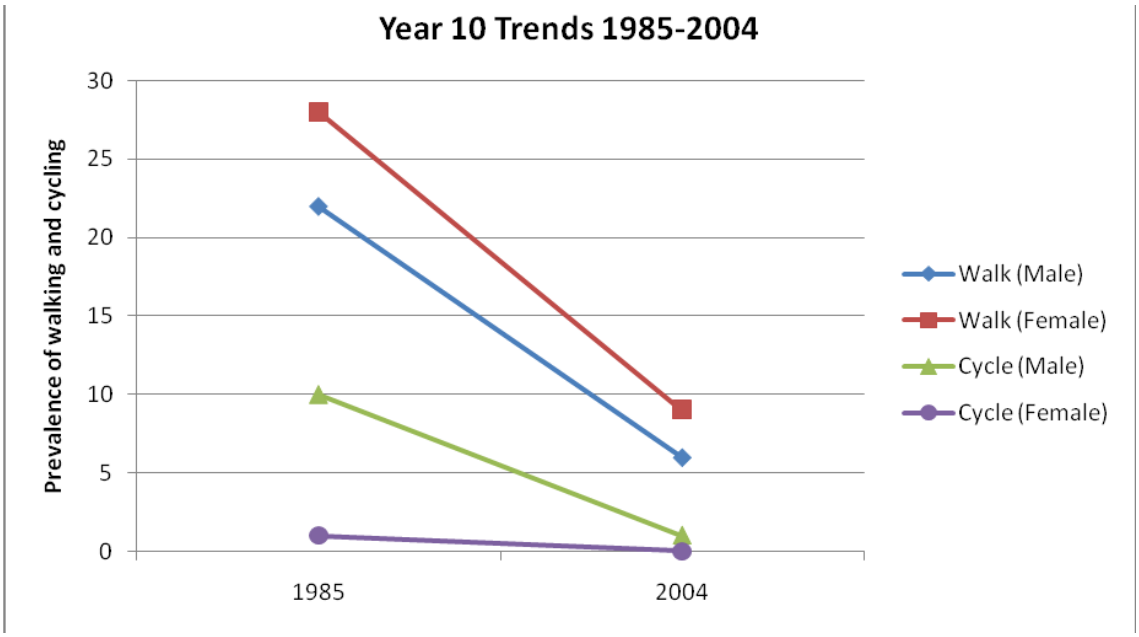
Source: Pucher & Buehler 2008; Organisation for Economic Cooperation and Development, 2005, European Union 2003, US Department of Transportation, 2003 & 2005 (cited in Pucher, 2006).

The data presented in Figure A1 is consistent with the findings of other road safety researchers who have discovered that when cyclist rates double, cyclist injury can be expected to fall by around 34% (Jacobsen, 2003, cited in Robinson, 2005).

In terms of the health benefits specifically for children, the SPANS reports by NSW Health indicate that walking and cycling to school have the potential to provide 50% of the daily physical activity requirement for children. However, there is evidence of a significant decline in walking and cycling to school as shown in Figure A2.

Figure A2: Trends in Walking and Cycling to School





Congestion Benefits

Cycling is an effective method of reducing unnecessary car use, and this has a congestion reduction benefit. Private automobile use is considered the major cause of congestion in Sydney (Bureau of Transport and Regional Economics, 2007). The Bureau of Transport and Regional Economics found that the cost of congestion in Sydney for 2005 was $3.5 billion and estimated to rise to $7.8 billion by 2020.

Cycling by Australians travelling to work in capital cities reduces congestion costs in Sydney by $23.7 million per year (based on calculations made in Bauman et al, 2008 using 2006 Census figures).

Climate Change

As a zero emission form of transport, cycling (and walking) is increasingly seen both in Australia and internationally as a way of reducing greenhouse gas emissions.

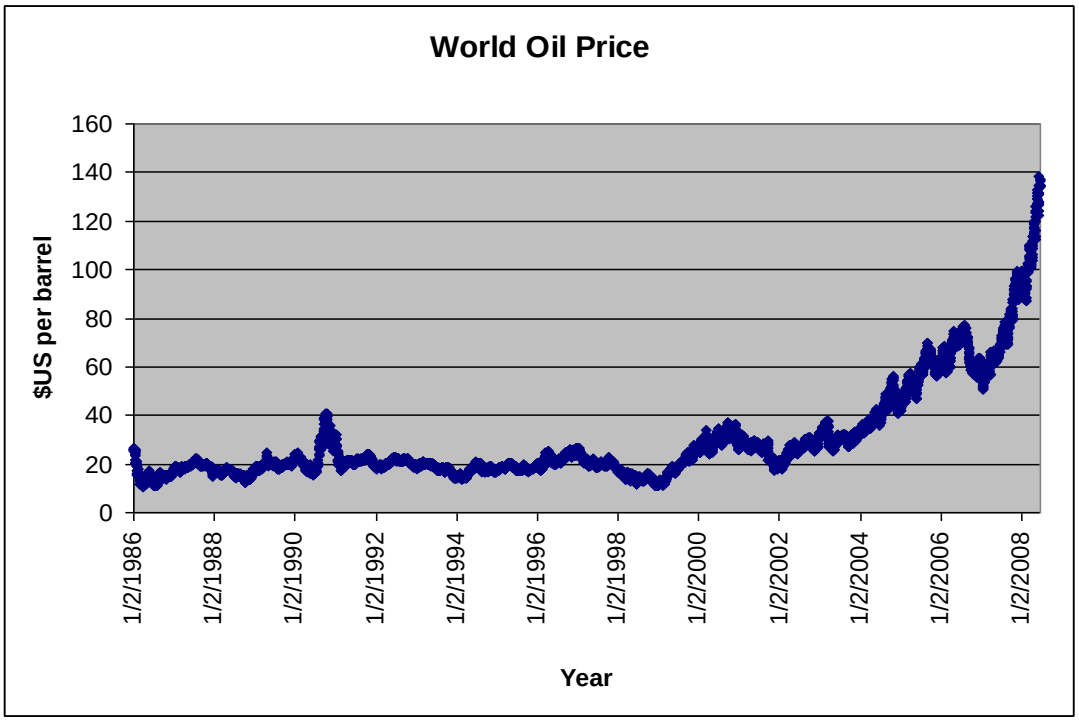
Motorised transport is currently a significant and growing source of greenhouse gas emissions. The Australian Greenhouse Office reports that 34% of household emissions are generated from transport (2006). Transport emissions increased 30% between 1990 and 2005 and this is expected to jump 67% above 1990 levels by 2020 (Department of Climate Change, 2008).

The Commonwealth *Carbon Pollution Reduction Scheme*, due for implementation in 2010 will include transport. This increases the importance of providing carbon free forms of transport, to lower the cost to the community of responding to climate change.

Fuel costs

Cycling has the potential to reduce household fuel costs as cycling is a petrol-free form of transport. Since 2004, world oil prices have increased significantly, as illustrated in the Figure A3.

Figure A3: World Oil Prices, 1996-2008

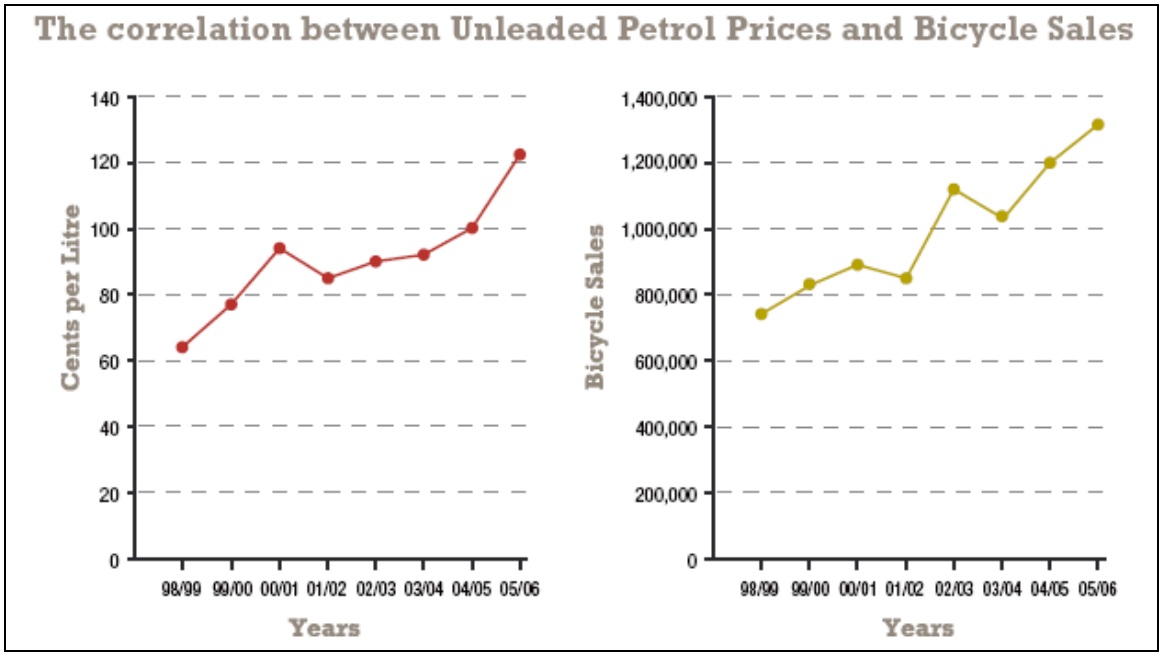


Source: Energy Information Administration, US Government.

In 2008, the cost of oil hit record levels and caused a significant increase in household fuel expenditure highlighting the vulnerability of Australian cities (Dodson & Sipe, 2008). Though oil prices have fallen since, there is growing evidence that a world production peak is imminent, bringing with it an era of greatly fluctuating oil prices and accompanying oil supply disturbances.

The rise in petrol prices over recent years has coincided with an increase in Australian bicycle sales, as demonstrated by the two graphs below in Figure A4.

Figure A4: Petrol Prices and Bike Sales



Taken from Cycling Promotion Fund, 2007

This relationship between fuel prices and bicycle sales is supported by research in the United States which showed that the vast majority of transport related bicycle expenditure has been influenced in part by the surge in petrol prices (Bikes Belong, 2008).

The provision of cycling infrastructure and encouragement programs, in combination with public transport improvements offers a very effective method of increasing the resilience to higher fuel prices (Litman, 2008; Pucher & Buehler, 2008).

The CSIRO found that the price of petrol in 2018 could reach $8 per litre (CSIRO, 2008). Even a rise to half that amount would put significant pressure on the transport system and strengthen public demand for the seamless integration of cycling and public transport.

Recent strategic transport modelling by Hensher for Melbourne and Northern Sydney further emphasises strong sensitivities to increases in petrol prices with shifts to public transport, walking and cycling (Hensher & Stanley 2008, Hensher & Li 2008, Sydney Morning Herald 2008).

Appendix B

List of Pedestrian Hazards and Issues Provided by Bicycle and Access Mobility Committee

	Windsor	
Location		**Problem**
Crn. Bell & George Streets	West side of intersection	Kerb ramps too steep
Bell Street to Station	South side of George Street	No paved footpath
Macquarie Street between Richmond Road & Dight Street	North western side	No paved footpath
Macquarie Street between Richmond Road &Christie Street	North western side	Trim grass to paved footpath
The Terrace and Catherine Street	South East and south west corners	No kerb ramps
The Terrace and New Street	Southern corner	No kerb ramp
New George and Suffolk Streets	Intersection is unsafe to cross in wheelchair	No Direct path to cross
George & Johnson Streets		Kerb ramps too steep
George Street outside Macquarie Arms		Cross fall too great
George Street & Bridge Street	At roundabout	No kerb ramps or marked crossing
Macquarie Street at Ross Street	Southern corner	Kerb ramp and crossing signal needs repositioning
Macquarie Street and Fitzgerald Street intersection	Western and northern corners	No kerb ramps
Macquarie Street and Suffolk Street intersection		No marked pedestrian crossing
Macquarie Street and Day Street intersection	North western side	Kerb ramps too steep
The Terrace at Windsor Bridge	Access to Windsor Wharf	No way of crossing in wheelchair
Richmond		
March Street approaching East Market Street		Bus shelter protruding into pathway
March Street approaching East Market Street	Pathway across corner	Stepped entrance to pathway
Corner March Street & East Market Street		All kerb ramps are too steep and badly positioned
East Market Street	McDonalds car park	Entrance pathway has crude ramp one end and a step on the other.
Richmond Station Car Park		No clear pedestrian pathway
Corner Windsor Street & East Market Street		All kerb ramps are too steep and badly positioned
Corner Windsor Street & East Market Street		Utility Box protrudes into pathway
Windsor Street	Approaching Chapel Street	50mm step in pathway
Windsor Street both sides	Between Bosworth & Chapel Streets	Steep driveways crossing pathway and steep ramps

		from low set driveways
Chapel Street	Between Windsor & March Streets	Trees have damaged pathway and caused steep gradients to be formed when repaved.
Corner of Chapel and March Streets		No kerb ramps on to cross either March or Chapel Street and only one on southern corner
Corner of Chapel and March Streets		No marked pedestrian crossing
Corner of Bosworth and March Streets		All kerb ramps too steep
Corner of Bosworth and March Streets Most Dangerous	Kerb ramp and pathway	Trucks cut across the corner trapping pedestrians against the fence
Corner of Bosworth and March Streets	Pedestrian crossing	Approaching southern corner, access cover below road surface and has gaps in the paving around the cover.
March Street	Between West Market and Bosworth Streets	Misaligned pavement
March Street	Between Chapel and Bosworth Streets	No footpath on north eastern side
Bosworth Street	Between March & Windsor Streets	No footpath on north western side
Bosworth Street	Between March & Windsor Streets	Steep driveways crossing pathway
Bosworth Street	Between Francis & Windsor Streets	Trees have damaged pathway and caused steep gradients to be formed in pavement.
Windsor Street	On the side fence alignment outside Ambulance Station	Badly damaged service access cover. (broken cover)
March Street	Corner of West market Street	Kerb ramps too steep
March Street	Corner of West market Street at School of Arts	Gutter crossing is lower than the road and kerb ramp, trip hazard

Appendix C

Summary and Responses to Public Exhibition Comment

Hawkesbury Mobility Plan 2010

Review of Public Exhibition Submissions

Submissions received:

Source	Date received	Method (email, letter, other)
Resident of Windsor Country Village	18/02/2010	Letter, sent by email (via Council)
Hawkesbury Valley BUG	18/02/2010	Email (via Council)
Richmond High School	18/02/2010	Letter, sent by email (via Council)
Hawkesbury Council Strategic Planning Team	23/02/2010	Email (via Council)
Resident of Kurrajong	23/02/2010	Letter, sent by email (via Council)
UWS Hawkesbury	25/02/2010	Email (via Council)

Resident of Windsor Country Village

A number of issues were raised in relation to Bandon Road, Vineyard, and the pedestrian deficiencies for residents of the Windsor Country Village. A number of solutions were suggested in the submission that are each addressed below.

Comment	GTA Consultants Response and Action
1. The most basic need is to control the traffic. At this point we would suggest that No Parking signs restricting parking outside No. 7 and No. 9 starting at the southern boundary line of No. 9 stretching down to the northern boundary (Windsor Road side) of No. 7 to the second tree.	Outside of the scope of the Mobility Plan. For consideration by Council's traffic engineer. No action required.
2. Pedestrian access to be improved, the hard shoulder on the Windsor side to be improved to a standard that it can be used as pedestrian access to the bus stop and Windsor Road. This should start at the southern boundary of No. 9. Pedestrians crossing the road would be south of O'Connell Street and have less traffic to contend with. A white line to indicate separation of traffic and pedestrians.	Shoulder improvements for Council consideration. It is noted that the focus of the PAMP component of the Mobility Plan was on the centres of Windsor, Richmond and North Richmond. As such, the proposed works to implement the PAMP focuses on these centres. As additional funds become available, other centres, including Vineyard, can be considered for improvement works. No action required.
3. Ask the RTA to move their school sign just to the south of WCV but without causing an obstruction of the view to the south.	Outside of the scope of the Mobility Plan. For consideration by Council's traffic engineer. No action required.
4. A flashing light to indicate traffic leaving WCV operated by a pad or Wi beam. Or an on demand traffic system to stop the traffic on Bandon Road as vehicles leave WCV with the option of a pedestrian control included i.e. a button.	Outside of the scope of the Mobility Plan. For consideration by Council's traffic engineer. No action required.
5. The eastern side (Blacktown side) at the southern end of Bandon where the concrete footpath stops, the placing of say a bitumen/concrete path and an access ramp to exit the station. The design should take into consideration that trucks use this area for parking or a turnaround spot: possibly damaging the pathway, alternatively add, maybe a few marked parking spots to be included for car minded train travellers, this may deter the trucks.	Outside of the scope of the Mobility Plan. For consideration by Blacktown Council in association with Hawkesbury Council's traffic engineer. No action required.
6. Complete the kerb and gutter from No. 9 down to No. 3. The development of No. 5 when started will take care of that part of the costs when building starts. This should also include the footpaths.	Outside of the scope of the Mobility Plan. For consideration by Council's Infrastructure and Development Assessment groups. No action required.

Hawkesbury Valley BUG

Comment	GTA Consultants Response and Action
RR03: Parramatta to Windsor Off Road Cycleway. • Install a : "Give way to cyclists and pedestrians", sign in the Jolly Frog Hotel car park. • Install a, " Cyclists on path", sign on the roadside verge before the entrance to the Jolly Frog car park to alert drivers entering the car park. Many Cyclists including myself have had near misses on the cycleway from vehicles aggressively entering and exiting the car park.	Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA. This could include a road safety review to identify all issues at this location. No action required.
RR02: Parramatta to Windsor Off Road Cycleway (Mulgrave to McGraths Hill) • Curtis Avenue. This is the only intersection the length of the off road cycleway from Parramatta to Windsor that does not have a signalised crossing for cyclists and pedestrians. • It is strongly recommended.	Signals would benefit residents of McGraths Hill, particularly those living towards the southern end towards McGrath Road, for crossing into the industrial area. There are already signalised pedestrian crossings of Windsor Road at Groves Avenue, Mulgrave Road and Pitt Town Road. The need for signals would be driven by any issues associated with the existing traffic operation of the Windsor Road/Curtis Road intersection and would be the responsibility of the RTA. Signals are to be considered by Council as a long term action. No action required to be made to the Mobility Plan.
RR06: Windsor CBD-Hawkesbury Valley Way. • Hawkesbury Valley Way, intersection of Moses Street and Cox Street. • Item: Install refuge crossing on west leg of intersection for pedestrian and bicycle use. This is one of the most dangerous intersections in the Hawkesbury and we do not believe that the intersection is wide enough for a refuge. We suggest that traffic coming out of Moses Street should be prevented from turning right and straight ahead and allowed to make a left turn only, and that traffic coming from Richmond is also prevented from turning right into Cox Street.	The refuge crossing is proposed to be located on the west side of Moses Street and Cox Street at the Hawkesbury Valley Way intersection. At this location, Hawkesbury Valley Way has a cross-section of approximately 11.5m, with one travel lane in each direction and marked shoulders which are used for parking and bicycle use. A refuge crossing would need to be between 2.0m and 2.5m wide, leaving up to 9.5m (i.e. 4.75m in each direction) for the travel lanes. A kerb extension of approximately 1.5m could be included on both sides of the carriageway to improve sight distance for crossing cyclists and pedestrians. As such, a refuge crossing is deemed appropriate for this location, with further detail to be addressed during the detailed design stage, including the implementation of any banned turns. Item to remain in schedule as proposed.
RR07: Windsor to Richmond. • Racecourse Road to tennis courts. • Include; "Mark cycle lane from the entrance of the car park of the tennis courts to the exit, on the Southern side of the car park". Cyclists using the George Capper cycleway from East Richmond to Clarendon invariably use the car park as part of the cycling network to avoid riding on Windsor Street which is heavily trafficked and with cars parked on the shoulders.	Continuation of the off-road shared path has been included in the works schedule, extending it from the tennis court car park entry to Bourke Street. Council does not support the provision of any treatment through the tennis court car park. No action required.
RR10: Kurmond to Kurrajong. • Priority column: Change priority 3 to priority 1 Members of the former HCC Bicycle Steering Committee and cyclists in the Hawkesbury in general have always believed that this cycleway should be given a high priority in being constructed. The management of the peak cycling body in NSW, Bicycle NSW and the major cycling group representing cyclists in the Western Sydney region, CAMWEST (Cycling Action Movement West) agree that this cycleway should be completed now before any other works. These two organisations have a comprehensive overview of what is required as a priority in each Local Government area, sometimes more than the locals.	The focus of the Bike Plan component of the Mobility Plan was on providing links between Richmond, North Richmond and Windsor, including links to South Windsor and Bligh Park. These are the larger population centres within the LGA, with works in these areas deemed to achieve the greatest benefits in encouraging an increase in cycling use. As such, Priority 1 has been assigned to routes that achieve the connectivity within the concentrated population areas, including Windsor CBD connections, a link from Windsor to Richmond and Windsor to South Windsor. Based on the availability of regular funding, it would not be possible to build all routes as Priority 1. However, as additional funds become available, the Priority 2 and 3 works, including RR10, can be considered for implementation. Item to remain as Priority 3.

Richmond High School

Comment	GTA Consultants Response and Action
Request for a safe crossing point on Castlereagh Road adjacent to Richmond High School.	The proposed pedestrian network for Richmond includes a pedestrian refuge crossing at the requested location. The detailed design would include consultation with the school and other relevant stakeholders to ensure that the facility provided meets the needs of all users. No action required.

Hawkesbury Council Strategic Planning Team

Comment	GTA Consultants Response and Action
Hawkesbury Community Strategic Plan comments	
1.1 In the area titled 'Strategic Context' (P4. ff) bring the reference to the Hawkesbury Community Strategic Plan (presently 2.4.2) forward to have greater prominence in the study. Reference should also be made here to the sub-regional planning context – specifically to the Sydney Metropolitan Strategy – Draft North West Sub-Regional Strategy. Particular reference could be made here to the linkages between jobs and housing targets set for the Hawkesbury area.	No proposed changes to the order of this section. It is structured to present the Global and National contexts, followed by general benefits and barriers, then a review of the local Council policies and plans. The first Council plan referred to is the Bike Plan, which is more relevant to the Mobility Plan project since it is the document which is being reviewed and updated. The North West Subregional Strategy has been referenced in the National Context section. Jobs and housing targets for the Hawkesbury area are not directly relevant and are better addressed at the strategic level (HCSP). The Mobility Plan concentrates on servicing the existing population and employment centres. No action required.
1.2 Greater focus could be made of 'Journey to Work' Data here (Ministry of Transport) – particularly destinations for Hawkesbury residents (to surrounding LGA/Region), and Hawkesbury as a destination (from surrounding LGA's/regional) data.	The journey to work data is intended to provide an overview of how cycling and walking rank amongst other travel modes. The data and accompanying discussion, which includes a summary graph of work trips by those living within and outside of Hawkesbury LGA, is sufficient for the purposes of the report. No action required.
1.3 While the scope of the Mobility Plan has area limitations (specifically to the urban areas of Windsor/South Windsor, Richmond and North Richmond) reference/comment should be made - where ever possible - to future work required to be consistent with the HCSP and sub-regional links to our neighbouring LGA's.	Neighbouring LGA cycling connections are identified in Section 6.4. Such "future works" commentary would be general in nature and of limited value. No action required.
1.4 Specific Strategies from HCSP "Linking the Hawkesbury" information should be presented more prominently in the introduction to the Mobility Plan. Text in the current draft Mobility Plan needs to be consistent with the adopted plan (see section 2.4.2 on page 9).	Adjust text in Section 2.4.2 to be consistent with the adopted plan. Summary text is most beneficial, with full excerpts from the HCSP not required.
Specific comments	
2.1 Suggest using larger font size in the document, small font is hard to read (in hard-copy)	The Mobility Plan uses the standard GTA Consultants report template. No action required.
2.2 Section 2.4.2 in page 9 HCSP 2010 goals to be reviewed and consistent with the adopted version.	Modify as suggested.
2.3 Section 2.4.3 - type error in first line of second paragraph	Modify as suggested.
2.4 Page 14, Figure 3.3 – blue colour legend used for business and river, it is confusing consider using different colours.	Colour of river has been changed to provide more contrast between business and river.
2.5 Page 15, Figure 3.4 only shows a road hierarchy of limited area, council has a better road hierarchy map for the whole of the LGA, check with GIS section.	The road hierarchy map covers the key areas of Windsor, Richmond and North Richmond. The map to be updated with using data from the GIS department.
2.6 Section 3.6.2 – the statement needs to be revised to reflect the substantially completed Windsor Station upgrade works.	Report to be updated to reflect the substantially completed works as requested.

Comment	GTA Consultants Response and Action
2.7 Section 3.6.3 very briefly touched on the bus routes, stops and shelters. Bus stops are one of the key pedestrian attractors and the plan does not address bus stop and access issues adequately. Also a bus stop location plan and catchment will assist in planning a pedestrian path network assessment.	Section 3.6.3 the objectives and requirements for bus stops and shelters. Footpath connections within the nominated study areas have been assessed. Wider area bus stop catchments are outside the scope of the Mobility Plan. No action required.
2.8 Regional Bicycle routes (e.g. code RR07 to link to Table 6.1) are shown in the Figure 6.2 on page 42, however it is very hard to locate them in the map, consider using different font/ graphics for legibility/different colour (RED?) or make larger font. Colour legend for RURAL doesn't match (may not be needed anyway/could remove – use this colour for Business?) Also the 'Local Link – Off Road' between Bligh Park to Windsor Downs is not correct and should be removed.	Regional routes are shown in pink/purple in Figure 6.2, with blue labels. A larger font for the labels would obscure other routes, roads or labels. Checks on the map indicated that other colours did not provide substantial differences in readability. Red has been used in Figure 5.5 to indicate deficient routes, so it is not appropriate to use the same colour for a different purpose (where possible). Rural Residential is orange in the legend, however there is a transparency applied to the map to reduce the intensity of the colours, hence the appearance is slightly different. They should not be removed, as it is an important zone to include. The local link from Bligh Park to Windsor Downs is a proposed future off-road link that is supported by the Hawkesbury Valley BUG and provides a valuable connection.
2.9 Page 47, RR 11a – in third dot point it is more appropriate to nominate a speed limit rather than simply making a reference to a speed limit in adjoining street which has no relevance.	It is relevant to refer to Macquarie Street as this is the parallel route of RR11, and RR11a is provided as a route more suited to less confident cyclists where vehicle speeds and volumes are lower. The speed limits for both roads are 60km/h, so the speed and volume benefits are due to George Street being a local Road while Macquarie Street is a State Road. A note has been added in the report to reflect this.
2.10 Page 47, RR 13 first dot point refers to Blacktown Road - this road actually is named Richmond Road (south of George Street intersection)	Modify as suggested.
2.11 Section 6.3 touches on the access or linkage to neighbouring LGAs, however the description and assessment of the linkage routes is inadequate and should be expanded. If it is beyond the scope of the brief please make a statement to this effect and suggest a separate study if appropriate. Note: One of HCSP's strategic goals is about linking Hawkesbury to neighbouring LGAs. Also under "Blacktown" the description of route is missing	The links are not to be discussed in detail at this location, with any detailed works on these routes included separately in the schedules. No action required. Include description of Blacktown route as requested.
2.12 Figure 8.1 – Check HCC LEP land zoning. Reference to Open Space land in the figure seems to be incorrect. Also please show roundabouts in the legend.	The LEP zoning information was provided by Council. The legend includes "Agriculture and Open Space" in a green colour. Intersection types have not been included on the plans. No action required.
2.13 Section 8.2.3 Richmond Station – note that interchange design is currently being undertaken.	A proposal to upgrade the Richmond station interchange was undertaken by the MOT in 2009, but it is unclear when this proposal will proceed. Include additional information in text.
2.14 For any future expansion of the areas for the PAMP it is suggested that we use the same measures as Penrith City Council's PAMP - 800 metres from train stations & 400 metres for bus & business centres. Penrith is our Regional City under the North West Metro Strategy and it would be good to emphasize the importance of these links and maintain consistency with their PAMP.	Section 8.3.1 lists the general requirements that have been adopted for the provision of new footpaths. It is stated that footpaths are to be provided on both sides of a road that is within 400m of a centre or major trip attractor, which includes railway stations and schools/universities. Outside of this catchment, a footpath should be provided on at least one side of the road. These characteristics would apply to future developments and application to other centres that were not specifically covered in this PAMP. Update to note that a minimum radius of at least 800m from stations and other major trip attractors should be considered for footpath provision.

Comment	GTA Consultants Response and Action
2.15 Future areas to be covered in an expanded PAMP should include all of South Windsor and Bligh Park. These areas represent our largest population centres, they link with key recreational and industrial areas, and form a significant 'Gate-way' to the Hawkesbury along George Street. A comment to this effect in the Mobility Plan would identify this as a priority area for future planning.	Include a comment in Section 7.1 Study Area indicating that other areas are to be considered in future, with the focus on North Richmond, Richmond, Windsor and South Windsor at this stage.
2.16 Consideration could be given to including the RTA Bridge Upgrade in Windsor; the HCSP recommendation for a second bridge near North Richmond; (under 8.2); and future linkages with the proposed Senior's Housing Development in North Richmond (as improving linkages of major centres across the Hawkesbury).	The Windsor Bridge upgrade is mentioned in Section 8.3.2 associated with investigating the re-design of the intersection of Bridge Street and George Street. The second bridge near North Richmond is likely to beyond the 5-10 year focus of the Mobility Plan. The North Richmond seniors' development is located outside of the 400m catchment of the North Richmond town centre, which was the focus of the future network proposals. Grose Vale Road already has footpaths on both sides of the road up to Pecks Road. The developers of the seniors' development would be required to provide footpaths as part of the project. No action required.

Resident of Kurrajong

Comment	GTA Consultants Response and Action
Council should recognise the following local factors relevant to the general route from Kurrajong through North Richmond and Richmond to Windsor: 1. This route is regularly used by cyclists of all four "key categories" listed in 6.1 on page 40 of the report; vulnerable, borderline, active and sports. This means that facilities to support all these categories are required. 2. The presence of Colo High School on Bells Line of Road, creates a significant demand for safe cycling routes from all directions, including Kurrajong. Encouraging cycling at school-age is an important step in promoting lifelong healthy activity. 3. Commensurate with the rapid growth in popularity of cycling in the general community in the last year there has been a steady increase in the number of recreational cyclists using Bells Line of Road/Old Bells Line of Road between North Richmond and Kurrajong village.	Noted. No action required.
Recommendation – for Council to address, as a priority, the most dangerous hazards (Items 1 to 3 below)	
1. The newly installed traffic lights at the junction of Old Bells Line of Road and Bells Line of Road do not register the presence of a cyclist waiting on a red light to enter Bells Line of Road (it registers cars and changes after 4 seconds). As there are no pedestrian lights, this leaves cyclists no option other than to cross against the lights if there is no other traffic to trigger the lights to change. This makes the intersection more dangerous than it was before the lights were installed.	This is a detailed issue that is outside the scope of the Mobility Plan and recommended to be investigated by Council and/or forwarded to the RTA.
2. The narrow, sealed shoulder on the southern side of Bells Line of Road completely disappears in the vicinity of Comleroy Road. This pinch point is particularly dangerous because of traffic veering to the left to go around traffic waiting to turn right into Comleroy Road.	Off-road shared path proposed for Bells Line of Road and Old Bells of Line Road between Kurmond and Kurrajong. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
3. The concrete barriers beside the columns of the old wooden footbridge at the eastern end of the Hawkesbury River bridge at North Richmond are particularly hazardous as they force cyclists into the single traffic lane on the bend leading into or out of the bridge.	On-road bicycle shoulder lane proposed between the Hawkesbury River Bridge and Richmond. Existing issue to be resolved by Council (maintenance register).

Comment	GTA Consultants Response and Action
Other issues :	
4. The shoulders on both sides of Old Bells Line of Road between Vincent Road and St. Gregory's Church are so dangerously pitted and rough that occupying the single lane in either direction is the only option and an unsafe one as the road crests a steep hill in that section.	Off-road shared path proposed for Bells Line of Road and Old Bells of Line Road between Kurmond and Kurrajong. Existing issue to be resolved by Council (maintenance register).
5. The shoulders on both sides of Bells Line of Road between Old Bells Line of Road and Redbank Road are inadequately narrow for those experienced cyclists who nevertheless use them regularly, travelling too fast when going downhill to safely use the shared cycle path. In addition, it is also regularly encroached upon by grass and bushes.	No remedial works for the existing on-road facilities have been proposed in this area. For consideration as part of the RTA long-term strategy for Bells Line of Road. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
6. The shoulder surface on the southern side of Old Bells Line of Road for several hundred metres opposite Colo High School is both narrow and dangerously rough. Being on a corner the shoulder is needed as a safe space for cycling.	Off-road shared path proposed for Bells Line of Road and Old Bells of Line Road between Kurmond and Kurrajong. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
7. There is an on-road cyclists pinch point at the crossing of Redbank Creek.	No remedial works for the existing on-road facilities have been proposed in this area. For consideration as part of the RTA long-term strategy for Bells Line of Road. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
8. There is a cyclists pinch point beside the traffic island opposite the Hannah factory in North Richmond.	Off-road shared path proposed for Kurrajong Road and Bells Line of Road through North Richmond. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
9. The marked bike lane shoulders through North Richmond are discontinuous in many places.	Off-road shared path proposed for Kurrajong Road and Bells Line of Road through North Richmond. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
10. There are pinch points for cyclists at the entry to the Hawkesbury River bridge from both directions.	Short and long term shared path treatments identified in the vicinity of the Hawkesbury River Bridge. Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
11. The shared cycle/pedestrian crossing over Hawkesbury River at North Richmond is difficult to access from both sides, narrow and rough.	Short and long term shared path treatments identified in the vicinity of the Hawkesbury River Bridge.
12. The dual lane shoulder on Hawkesbury Valley Way on the eastern side of Perceval Street needs signage to direct cyclists to keep left. Presently cyclists heading for the RAAF base cycle on the right (furthest from traffic) into the path of cyclists keeping left.	Existing issue to be resolved by Council (maintenance register) and/or forwarded to the RTA.
13. The Rickabys Creek bridge shared crossing that is a continuation of the shoulder is unsuitable for cyclists.	The existing treatment is not ideal – long term shared path treatments identified in the vicinity of the Rickabys Creek bridge.
14. There are dangerous pinch points for cyclists from both directions on Hawkesbury Valley Way at the intersection with George Street in Windsor. This is a busy intersection for all forms of traffic.	Off-road shared path proposed through McQuade Park, with bicycle lanterns at the George Street signals.

UWS Hawkesbury Campus

Comment	GTA Consultants Response and Action
We are interested in a regional bike way (on-road is ok) with sealed shoulders connecting Penrith to Richmond	The preferred route between Penrith and Richmond is via The Northern Road and Blacktown Road. Regional Route 12 (Richmond to Bligh Park) follows the alignment of Blacktown Road to the Northern Road at the Penrith LGA boundary. The schedules contain approximately $20,000 of works associated with delineation, intersection treatments and shoulder widening upgrades along this route, which will help to improve the link between Penrith and Richmond. No action required.
UWS Hawkesbury has a shared path along College Drive which is scenic and used by UWS and TAFE students	Noted. No action required.
There is real danger to pedestrians and cyclists who access the parking lot (for bike and cars) nearest the boom gates at East Richmond Station	Pedestrian improvements are proposed for the railway crossing treatment on the east and west sides of Bourke Street. This will contribute to improved safety for pedestrians and cyclists using the parking lot. No action required.
Bike parking is too far away and difficult to access (see above)	Additional parking is proposed for East Richmond Station (refer Table 6.3). This would need to be in a convenient location, with signage and good access. During the implementation of the new parking facilities, there is an opportunity to improve the access and signage for the existing parking facilities.
Footpath connection along East Market street could be widened and have some maintenance to improve its usability	Additional footpaths are proposed as part of the pedestrian network for Richmond on East Market Street, Brentwood Avenue, Annette Place and Paget Street, which all help to improve the connection from Richmond to the UWS site. No specific maintenance items have been included in the schedules, but any deficiencies should be identified and addressed by Council's maintenance program.
Signage is important – particularly to UWS from East Richmond Station	The Mobility Plan recommends Council prepare a signage strategy. This could include University-related signage as a significant trip attractor (local route)
Bike parking at East Richmond station is needed (even 'U' racks)	Table 6.3 identifies the recommended locations for bicycle parking, which includes rails and a bicycle cage with rails as Priority 1 implementation. No action required.

Appendix D

Assessment of 1997 Bike Plan Routes

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SUB REGIONAL WORK SCHEDULES - GTA Consultants Assessment Summary

ROUTE DESCRIPTION							REQUIRED WORKS			GTA comments/Review
Route No.	Sub-Sect. No.	Road	Section	Classification	Dominant Bicyce Facility Type	Status Existing/Future	Major Works Required	Cost	Priority H, M, L	
1	1	Bells Line of Road	Kurmond Road to Gross Vale Road	Arterial	Sealed shoulder	Future	Construct sealed shoulder - 2.5m each side	$537,130	H	On-road facility not completed. Off-road shared path provided on east side between Kurmond Road and Grose Vale Road.
1	2	Colo High	Colo High access to Redbank Rd	Arterial	Shared bicycle/pedestrian path	Future	Construct shared path and cyclist refuge	$30,375	H	Shared path complete (between Kurmond Road and Grose Vale Road). Refuge not completed.
1	3	Kurrajong Road	Grose Vale Rd to Chapel St	Arterial	Sealed shoulder	Existing	Construct pedestrian refuge at Chapel Street	$6,075	H	Southbound from Grose Vale Rd/Terrace Rd: Bike lane on southbound departure (50m), Service road (130m), Bike lane from service road to ped refuge (70m), No facility (260m), Bike lane to bridge (55m) followed by squeeze point - need to get to facility on west/south side of carriageway, Shared path (south side of Richmond Bridge), Shoulder lane (no parking) from Richmond Bridge to Chapel St, alternative route on Old Kurrajong Rd, no treatment at Old Kurrajong Rd intersection Northbound from Chapel St: Shoulder lane (no parking) from Chapel St to Richmond Bridge, alternative route on Old Kurrajong Rd, no treatment at Old Kurrajong Rd intersection, Shared path (south side of Richmond Bridge), shoulder lane (90m), no facility - left turn lane (170m), shoulder lane - unmarked (200m), no facility - left turn lane (130m) Refuge not completed
1	4	Richmond Bridge	Richmond Bridge	Arterial	Shared bicycle/pedestrian path	Future	Declare bridge footpath "shared" and investigate eastern access	To be determined	H	Not completed.
1	5	Chapel Street	Kurrajong Road to Francis Street	Local	Shared road space (signed route)	Future	Nil	$225	H	Not completed.
1	6	Francis Street	Chapel Street to Pitt Street	Collector	Bicycle/car parking lane	Future	Paint bike/parking lanes and centreline	$9,474	H	Not completed.
1	7	Pitt St/Clarendon St	Windsor Rd to Dight St	Local	Shared road space (signed route)	Future	Nil	$525	H	Not completed.
1	8	Windsor St/ Hawkesbury Valley Way	Bourke St to Moses St	Arterial	Sealed shoulder	Existing	Construct cyclist refuges at Pitt St and Moses St	$12,000	H	Treatment of intersections to be improved, westbound shoulder lane disappears in the vicinity of Clarendon (left turn slip lanes, crossovers and intersection without a designated lane for cyclists) - approx. 200m, unsafe and non-standard treatment at Percival Street, pinch point at bridge over Rickabys Creek (no shoulder on south side - bicycles diverted onto "footpath", north shoulder also narrow - less than 2m), narrow shoulder on north side between Gosper St and Moses St, no treatment at Moses St intersection Refuges not completed
1	9	Hawkesbury Valley Way	Moses St to Macquarie St	Arterial	Wide kerbside lane	Future	Widen kerbside lanes as part of next maintenance program	$0		No bicycle treatment in this section.
2	10	Terrace Rd	Bells Line of Rd to end 60km/h zone	Collector	Sealed shoulder	Future	Construct sealed shoulder - 1.5m W side	$19,290	L	Bicycle shoulder lanes marked. Varying quality and width of shoulders.
2	11	Terrace Rd	End 60km/h zone to Redbank Ck	Collector	Sealed shoulder	Future	Construct sealed shoulder - 1.8m each side	$115,780	L	Bicycle shoulder lanes marked. Varying quality and width of shoulders.
2	12	Terrace Rd	Redbank Ck to Brahma Rd	Collector	Sealed shoulder	Future	Construct sealed shoulder - 1.8m each side	$115,915	H	Bicycle shoulder lanes marked. Varying quality and width of shoulders.
2	13	Terrace Rd	Brahma Rd to Kurmond Rd	Collector	Sealed shoulder	Future	Construct sealed shoulder - 1.8m each side	$519,865	L	Bicycle shoulder lanes marked from Brahma Rd to Wire Lane. Varying quality and width of shoulders.
2	14	Kurmond Rd	Terrace Rd to Marlene Rd	Collector	Sealed shoulder	Future	Construct sealed shoulder - 1.5m each side	$63,435	M	Not completed.
2	15	Kurmond Rd	Marlene St to Gorricks Ln	Collector	Shared road space and shared path	Future	Construct shared footpath - 2.0m S side	$69,075	M	Not completed.
2	16	Kurmond Rd	Gorricks Ln to Wilberforce Rd	Collector	Shared road space (signed route)	Future	Paint edgelines and centreline	$11,970	M	Not completed.
3	17	March St	Chapel St to Bosworth St	Arterial	Wide kerbside lane	Future	Widen kerbside lanes, stand up bicycle lane at signals	$10,075	M	On-road cycleway is currently provided with wide kerbside lanes allowing parking however not for the entire length Bicycle lane disappears prior to intersection. Two traffic lanes provided at the intersection and no bicycle pavement markings.

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SUB REGIONAL WORK SCHEDULES - GTA Consultants Assessment Summary

ROUTE DESCRIPTION							REQUIRED WORKS			GTA comments/Review
Route No.	Sub-Sect. No.	Road	Section	Classification	Dominant Bicyce Facility Type	Status Existing/Future	Major Works Required	Cost	Priority H, M, L	
3	18	Bosworth St	March St to Lennox St	Arterial	Wide kerbside lane	Future	Widen kerbside lanes			On-road cycleway however no linemarking provided for bicycles. Lanes are quite narrow on this section of road. Heavy vehicle volumes particularly at school drop off / pick up times.
3	19	Castlereagh Rd	Lennox St- Southee Rd	Arterial	Sealed shoulder	Existing	Nil			On-road cycleway provided southbound adjacent to school. Northbound has an off road footpath which is narrow but satisfactory. South of John Tebbutt Place on-road cycleway is provided. Linemarking disappears at intersections. Could be continued through. Good intersection treatment at the intersection with Southee Road (southbound).
3	20	Castlereagh Rd	Southee Rd- The Driftway	Arterial	Sealed shoulder	Existing	Nil			On-road cycleway. Poor shoulders, often disappear and are overgrown. Recommend to keep in bicycle plan but need to improve shoulders.
4	21	Bourke St	Lennox St- College St	Collector	Shared road space (signed route)	Future	Nil			On-road and off-road cycleway. On-road not well defined, improve linemarking. Off-road path 2.0m wide, east side of road only.
4	22	College St	Londonderry Rd- Bourke St	Collector	Shared road space (signed route)	Future	Nil			On-road and off-road cycleway. Parking lane on the north, off-road path on the south. Parking lane is quite narrow forcing cyclists to ride on the road.
4	23	Londonderry Rd	College St to Southee Rd	Arterial	Sealed shoulder	Existing	Seal unsealed shoulder W side	$27,905	L	On-road cycleway. Narrow shoulders in parts and overgrown with grass in places. Recommend improve shoulders and widen where required. Bicycle lane at give way intersection currently not provided. Bicycle lane ends at this location southbound. Shoulders narrow further southbound. Recommend improve connection with off-road path into TAFE. Also recommend to remove median marker at intersection of Southee and Castlereagh.
4	24	Londonderry Rd	Southee Rd to The Driftway	Arterial	Sealed shoulder	Future	Construct sealed shoulder - 2.0m each side	$184,865	M	Not completed.
5	25	Hereford St/Luttrell St/Cameron	Castlereagh Rd to Londonderry Rd	Collector	Shared road space (signed route)	Future	Nil	$300	H	On-road cycleway with wide kerbside lanes and parking lanes provided. Kerbside lanes disappear at intersection with Castlereagh Rd.
6	26	Windsor Rd	Bourke St- Pitt St	Arterial	Shared road space (signed route)	Future	Nil			On-road cycleway, future off-road cycleway. Trees may cause width issues off-road. Busy section of road which makes it only suitable for experienced cyclists without dedicated lanes.
6	27	Bourke St	Lennox St- Windsor Rd	Arterial	Shared road space (signed route)	Future	Nil			On-road and off-road cycleway on the east side south of the train line.
6	28	Blacktown Rd	Bourke St- George St	Arterial	Sealed shoulder	Existing	Nil			On-road cycleway. Shoulders generally in good condition. Bicycle lane not continued through intersection with The Driftway (Southbound)
7	29	The Driftway	Castlereagh Rd to Londonderry Rd	Collector	Sealed shoulder	Existing	Construct additional 0.3m pavement N side, remark lane lines	$28,295	L	On-road cycleway. Shoulders generally provided for the full length. Poor pavement condition in some locations. Linemarking disappears near intersection with Bonner Street and Jockbett Road. East of Jockbett Road, the shoulders are generally wider and in good condition.
7	30	The Driftway	Londonderry Rd- Blacktown Rd	Collector	Sealed shoulder	Existing	Construct additional 1.0m pavement N side, remark lane lines	$99,610	L	On-road cycleway. Proposed works not completed. Pavement generally in good condition. Shoulders are generally too narrow and disappear altogether adjacent to the Driftway Public Reserve. Faded lines should be remarked.
8	31	Dight St	Clarendon St to Cupitts Ln	Collector	Sealed shoulder	Future	Construct sealed shoulder - 1.5m each side	$188,685	M	On-road cycleway. Proposed works not completed. No pavement shoulders.

SUB REGIONAL WORK SCHEDULES - GTA Consultants Assessment Summary

ROUTE DESCRIPTION							REQUIRED WORKS			GTA comments/Review
Route No.	Sub-Sect. No.	Road	Section	Classification	Dominant Bicyce Facility Type	Status Existing/Future	Major Works Required	Cost	Priority H, M, L	
8	32	Percival St	Hawkesbury Valley Way to Cupitts Ln	Collector	Sealed shoulder	Future	Construct additional 1.0m pavement W side, remark lane lines	$62,435	M	Two-way cycleway on east side of road is overgrown with grass and narrow in parts. Non-standard treatment with inadequate clearance from roadway. Preferable to provide a path on each side of the road extended at least to the RAAF base entry.
8	33	Lowlands Route	Francis St to Moses St	Local	Shared road space (signed route)	Future	Upgrade pavement condition	$20,825	M	On-road cycleway. Requires signage. To be used as a recreational route.
8	34	Cupitts Ln	Percival St to Cornwallis Rd	Local	Shared road space (signed route)	Future	Nil	$150	M	On-road cycleway. Requires signage. To be used as a recreational route.
9	35	George St	Blacktown Rd- Macquarie St	Arterial	Sealed shoulder	Existing	Nil			On-road cycleway. Line marking disappears at roundabout with Blacktown Road as the road splits. Shoulders generally in good condition and well line marked. Shoulder lines disappear and merge to kerb at intersections. Intersection treatments are required to continue bicycle lanes through the intersection.
9	36	Macquarie St	Hawkesbury Valley Way- George St	Arterial	Wide parking lane	Existing	Nil			On-road cycleway. At intersection of George St and Macquarie St, linemarking for bicycles disappears and directs them along George Street. Consider allowing cyclists to continue to travel along Macquarie St across intersection in a dedicated lane. Sufficient width currently exists. Wide parking / bicycle lanes disappear to kerb at intersections. Recommend to continue bicyle lanes through the intersection to remind drivers to look for cyclists. Bicycle start boxes at intersections could also be used to give priority to bicycles and allow them a head start. Under railway bridge, cycle lane disappears. Sufficient room exists on the south but on north, off-road path could be constructed to improve safety for cyclists and allow them to avoid cars at the squeeze point.
9	37	Moses St	Hawkesbury Valley Way- Tebbutt St	Local	Bicycle/car parking lane	Existing	Nil			On-road cycleway. Generally good shoulder condition. Shoulders disappear near intersections. Recommend continue bicycle linemarking through intersections. Angled car parking can be dangerous for bicycles with reduced visibility. Recommend reinforcing shoulder markings with dedicated bicycle lane. Some faded bicycle logos on the ground need to be reinstated.
9	38	The Terrace	Tebbutt St- Bridge St	Local	Shared road space (signed route)	Existing	Nil			On-road cycleway, part future off-road cycleway. 'Watch for Bicycles' signs present along route. Shoulders and linemarking generally in good condition. Some faded bicycle logos on the pavement need to be reinstated. Off-road path is only a footpath and is quite narrow. Path runs through BBQ area (near Kable Street) which may cause issues when being used.
10	39	Rifle Range Rd	George St to Sanctuary Dr	Collector	Bicycle/car parking lane	Future	Exclusive bicycle lane - 1.5m (N side), Bicycle/car parking lane - 4.0m (S side)	$28,775	H	On-road cycleway currently not marked. Proposed works not completed. Unmarked road carriageway encourages vehicles to travel at a high speed. Dedicated bicycle lanes would narrow the road carriageway and provide safety to cyclists and possibly reduce vehicle speeds. Important local route. Need to ensure that LATM treatments have adequate provision for cyclists.
11	40	Windsor Rd	Macquarie St- Mulgrave Rd	Arterial	Shared bicycle/pedestrian path	Existing	Extend shared path to Mulgrave Road	$22,500	M	Off-road shared path constructed. Requirements required at transition at northern end to Macquarie Street (lack of signage and delineation).
11	41	South Creek bridge	Fitzroy bridge	Arterial	Shared bicycle/pedestrian path	Future	Declare bridge footpath "shared", construct additional 200m of 2.0m shared path			New shared path bridge constructed.

SUB REGIONAL WORK SCHEDULES - GTA Consultants Assessment Summary

ROUTE DESCRIPTION							REQUIRED WORKS			GTA comments/Review
Route No.	Sub-Sect. No.	Road	Section	Classification	Dominant Bicyce Facility Type	Status Existing/Future	Major Works Required	Cost	Priority H, M, L	
11	42	Mulgrave Rd	Windsor Rd to Mulgrave Station	Collector	Sealed shoulder	Existing	Seal unsealed shoulder additional 0.5m each side	$42,145	L	Adjacent to school, on-road cycleway (parking lane) is in good condition. Further south there are no shoulders and only a narrow footpath southbound. Recommend to continue shoulders or improve footpath to shared path standard to Mulgrave Station. Northbound from Station to Mulgrave Road, shoulder is constructed. Further north shoulder is very narrow in parts and disappears in parts and is often in poor condition. Recommend to improve shoulder to connect with existing off-road path on Windsor Road.
12	43	Pitt Town Rd	Windsor Rd to McKenzies Ck	Arterial	Sealed shoulder	Future	Construct sealed shoulder - 1.5m each side	$181,705	L	Proposed works not completed.
12	44	Pitt Town Rd	McKenzies Ck to Bathurst St	Arterial	Sealed shoulder	Future	Construct sealed shoulder - 2.0m each side	$294,610	L	Proposed works not completed.
12	45	Bathurst St	Pitt Town Rd to Pitt Town Bottoms Rd	Local	Shared road space (signed route)	Future	Nil	$350		On-road cycleway, signage required.
12	46	Pitt Town Bottoms Rd	Bathurst St - Pitt Town Rd	Local	Shared road space (signed route)	Future	Upgrade pavement condition	$20,000	M	On-road cycleway, signage required. Proposed works not completed.
13	47	Bridge St	Freemans Reach Rd - Macquarie St	Arterial	Shared road space (signed route)	Existing	Nil			On-road cycleway. Signage required. Mixed traffic not suitable treatment in this location due to topography, vehicle speeds and traffic volumes. Designate suitable off-road route on bridge and north of bridge. Off-road or mixed traffic on south side of bridge as alternative to Bridge St.
13	48	Windsor Bridge	Windsor Bridge	Arterial	Shared bicycle/pedestrian path	Future	Declare bridge footpath "shared", investigate northern access	To be determined	H	Not completed.
13	49	Wilberforce Rd	Freemans Reach Rd to Buttsworth Ck	Arterial	Sealed shoulder	Existing	Nil	$1,610	H	On-road cycleway. Shoulders generally in good condition. Improved delineation and signage required.
13	50	Wilberforce Rd	Buttsworth Ck to Rose St	Arterial	Sealed shoulder	Existing	Nil	$380	H	On-road cycleway. Shoulders generally in good condition. Improved delineation and signage required.
13	51	Wilberforce Rd	Rose St to Kurmond Rd	Arterial	Bicycle/car parking lane	Existing	Nil			On-road cycleway. Pavement width generally satisfactory. Improved delineation and signage required.

Appendix E

Identified Issues – GTA Consultants Site Inspection

HS11250
Hawkesbury Pedestrian and Access Mobility Plan
Site Inspection Findings
29 May 2009 and 16 June 2009
Auditors: BM, MH

Facility Key	
1	Off-road bicycle
2	On-road bicycle
3	Pedestrian
4	Railway Station
5	Other

Suburb	Location	Facility	Issue	Opportunity	Constraint	Photo
Windsor	Off Road path adjacent to Windsor Road	1	New off road path (last couple of years probably) is nice and wide, well marked, signed. New bridge completed probably opening soon. Path ends and goes nowhere. Connectivity required.	Connectivity required to link up with existing on-road or off-road paths	Further investigation required to identify routes.	5695
South Windsor	Cnr Rickaby Street and Cox Street	1	Connectivity between Bligh Park and Windsor Downs to Richmond is poor with residents forced to ride on Blacktown Road which is subject to heavy traffic volumes. Suitable for the experienced cyclist only.	Create a connection between Rickaby Street south and north over Rickabys Creek. Also possibility to connect further to Showground, Racecourse and George Cappa Cycleway.	Would require a new bridge and path within the existing road reserve. Also, Rickaby Street north would require sealing for entire length. Connectivity issue further north with improvements to Racecourse Road possibly required to connect bicycle path with Clarendon Station and George Cappa cycleway.	36 to 41 and 66 to 71
Windsor	Hawkesbury Valley Way westbound near golf course	2	Grass encroaching on road forces vehicles to park away from the edge of the road reducing width available to cyclists	Regularly cut back grass	Maintenance register	168
Windsor	Macquarie btw Suffolk and Christie	2	Damage to drainage pit with metal bars exposed.	Repair damaged section of kerb		6114
Windsor	Windsor Road westbound adjacent to golf course and bridge.	2	On-road path narrows from 3.1m to 1.7m on bridge. Where overgrowth, 1.2m path width. Kerb jutting out causing possible danger to cyclists and pedestrians.	Ensure vegetation is cut back regularly. Cover kerb jutting out.		169 to 178
Windsor	Macquarie Street	2	Bicycle lanes / shoulders disappear through intersections with small and large side streets	Continue bicycle lanes through all intersections or at a minimum markings to give priority and protections for bicycles with cars. Possibility of using bicycle start boxes at intersections.	Width of road especially at intersections	379, 381 to 382
Windsor	George Street adjacent to McQuade Park	3	Concrete footpath damage around services pit	Repair damage		6019
Windsor	Tebbutt Street ped crossing	3	Metal grate across drainage kerbside at the pedestrian crossing has raised	Repair		6020
Windsor	Tebbutt Street east, south of ped crossing	3	Damaged footpath.	Repair footpath		6022
Windsor	George and Catherine	3	Pedestrian crossing does not follow desire line. Peds will either continue straight ahead anyway or go around the corner to the crossing. Vehicles may get confused with direction of peds. Pedestrian visibility may be reduced by property fences	Where possible, realign existing crossings. Ensure that future crossings follow pedestrian desire lines as close as possible.		6031
Windsor	George btw Catherine and New	3	Asphalt footpath pavement damage around services pit	Repair damage		6032
Windsor	George btw Catherine and New	3	Damaged asphalt footpath.	Repair footpath		6033
Windsor	New Street west	3	Damaged crossover and gravel over footpath	repair crossover and liaise with owner to remove gravel from footpath		6037
Windsor	New Street east	3	Damage around services pit	Repair damage		6038
Windsor	George Street (Nth) near ped crossing	3	Damage around services pit	Repair damage		6041
Windsor	Int of George and Baker	3	Faded pedestrian crossing	Repaint lines		6048
Windsor	Int of George and Baker	3	Missing Ped crossing signs on south approach	Reinstate signs		6049
Windsor	George btw Christie and Dight	3	Footpath Damage	Repair damage		6072
Windsor	Macquarie btw Dight and Christie	3	Grass growing over footpath	Cut grass back over footpath.	Council not responsible.	6082
Windsor	Macquarie btw Dight and Christie	3	Vegetation growing over footpath hindering walkers	Cut vegetation above 2.4m		6084
Windsor	Int of Macquarie and Christie	3	No kerb ramp	Install kerb ramp		6087
Windsor	Suffolk btw Macquarie and George	3	Footpaths start and stop.	Continue footpaths along length of road.		6091
Windsor	Macquarie btw Suffolk and Fitzgerald	3	Grass growing over footpath (adjacent to vacant block)	Cut grass back over footpath.		6092
Windsor	Int of Macquarie and Windsor	3	Damage to footpath	Repair damage		6104
Windsor	Macquarie btw Suffolk and Christie	3	Vegetation height problem	prune vegetation		6110
Windsor	Macquarie btw Suffolk and Christie	3	Damage around services pit	Repair damage		6115

Suburb	Location	Facility	Issue	Opportunity	Constraint	Photo
Windsor	George Street btw Tebbutt and Catherine	3	Damage around services pit	Repair damage		6023 to 6024
Windsor	George and New	3	Pedestrian crossing does not follow desire line. Peds will either continue straight ahead anyway or go around the corner to the crossing. Vehicles may get confused with direction of peds. Pedestrian visibility may be reduced by property fences	Where possible, realign existing crossings. Ensure that future crossings follow pedestrian desire lines as close as possible.		6034 to 6036, 6039
Windsor	George Street Mall	3	Damage to pavers	Repair damage		6044, 6046, 6060, 6061
Windsor	Int of George and Thompson	3	Missing kerb ramps	Install kerb ramps		6050 to 6052
Windsor	Int of George and Windsor	3	Path ends and no kerb ramps south or continuing. Difficult to cross at intersection.	Install formal ped refuge areas to give better priority and awareness to drivers of pedestrians. Install pram crossings at int of Windsor and George		6053 to 6058
Windsor	George btw Kable and Fitzgerald	3	Footpath Damage	Repair damage		6064, 6066
Windsor	George btw Suffolk and Christie	3	Footpath Damage	Repair damage		6068, 6069, 6070
Windsor	Macquarie Street btw Windsor Road and Dight	3	New path ends and goes nowhere. Evidence of walking along dirt.	Continue path northbound to existing path.		6075 to 6081, 6083
Windsor	Int of Macquarie and Suffolk	3	Old driveways remain and lengthen pram crossings associated with crossing. Pram crossings do not match ped crossings.	Remove excess crossings. Reorient pram crossings as required.		6088, 6089, 6107, 6109
Windsor	Int of Macquarie and Fitzgerald	3	Missing kerb ramps	Install kerb ramps		6093 to 6096
Windsor	Int of Macquarie and Kable	3	Kerb ramps do not line up with ped crossings in some locations. No ped button / signals installed on south approach	Relocate kerb ramp and install ped button and lantern		6099 to 6100
Windsor	Int of Macquarie and Baker	3	Kerb ramp on one side only	Install kerb ramp		6101 to 6102
Windsor	Railway Station - Windsor	4	Ped access not good to station. Ped paths towards Windsor Road too need to be looked at. Missing kerb ramp, poor ped access. Noted that a station upgrade is coming. Bike parking close to station	Ensure ped improvements to streetscape are part of station upgrade.		344 to 372

Appendix F

Bicycle Parking Infrastructure

Bicycle Parking Types and Standards

In order to conform to Australian Standards (AS2890.3-1993 Part 3: Bicycle Parking Facilities) parking rails must allow the wheels and frame of a bike to be locked to it securely and also provide sufficient support to prevent the bike from falling over. The three classes of bicycle parking are:

i Class 1 facilities provide a high level of security such as enclosed individual lockers.
ii Class 2 facilities provide a medium level of security such as locked compounds with internal bike rails.
iii Class 3 facilities provide a low level of security such as external bicycle rails and racks.

When determining the type of facility required the following principles apply:

- Class 1 and 2 facilities should generally be provided for medium to long term parking (i.e. railway stations, workplaces).
- Class 3 facilities are suitable for short term parking (cafes, shops, parks, etc).

An alternative bicycle parking facility to the Class 1 bicycle lockers is the Class 2 bicycle cage. These are becoming more popular around Australia as the preferred storage facility for large numbers of bicycles particularly at transport nodes such as railway stations and large bus stops. This type of facility contains racks within a compound that provides security and shelter from the weather. An essential feature of this type of parking is the smart card technology to enable a high level of security to be provided. Users would register with the relevant authority (Council, Bicycle NSW, Ministry of Transport or other) and receive a swipe card which contains identification details. This would enable the activity of the user to be recorded each time they use the facility. Only those that are registered users would be able to access the cage.

One example of this type of facility being implemented in Sydney is the Whistler Street Bicycle Parking Station. The bicycle parking station, set up and administered by Manly Council, has the capacity to store 72 bicycles in an area the size of five car parking spaces. Users are charged a one-off access card fee of $50 per bicycle parking space that enables easy access into the facility.

Another example at a location in Perth is shown in Figure F1.

Figure F1: Class 2 Bicycle Facility Example – High security bike cage, Perth

Photos: Jim Krynen, PTA WA

In terms of Class 3 facilities for short term parking, U-rails or medium top high density racks are the preferred design. The inverted U-rail (Securabike BR85 or similar approved) has the capacity to accommodate two parked bicycles and are appropriate for areas where large capacity rails cannot be provided either due to space or level of demand. Some examples of U-rail bicycle parking are shown in Figure F2 and Figure F3.

Figure F2: Class 3 Bicycle Parking Example

Figure F3: Class 3 Bicycle Parking Example

A number of proprietary rack systems are available for providing medium and high density bike parking. A summary of the size and capacity of some typical solutions are as follows:

- Cora "Expo Series" – single unit 1250 long x 850mm deep, holding 5 bikes (see Figure F4). Other single unit sizes are available.
- Securabike "Compact Security" – single unit 1200mm long x 1100mmm deep, holding 4 bikes (see Figure F5).
- Securabike "Concord" – single unit 950mm long x 950mm deep, holding 3 bikes (see Figure F6).

Figure F4: Cora "Expo Series" bike racks

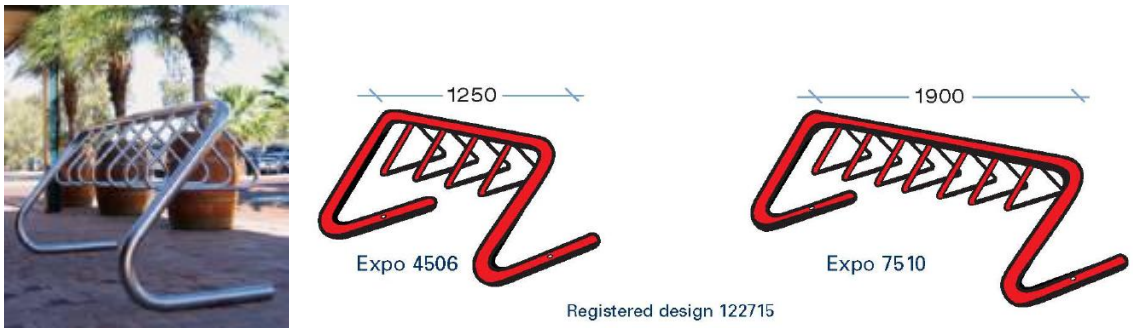


Figure F5: Securabike "Compact Security" bike racks

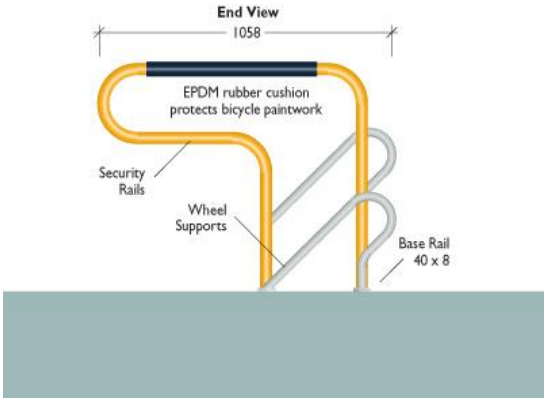
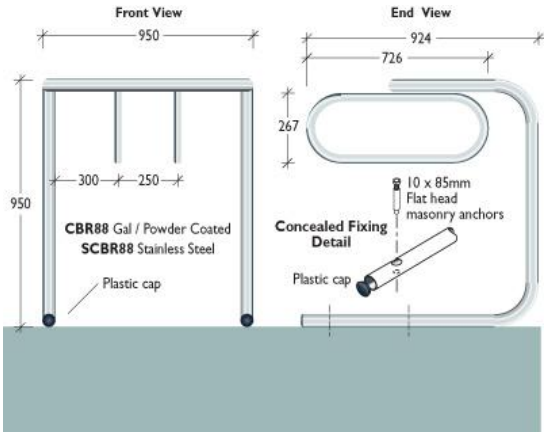


Figure F6: Securabike "Concord" bike racks



Another bicycle parking option for short-term (Class 3) facilities that could be utilised is a sign post ring, as has been installed throughout the City of Sydney. These rings can be retrofitted to existing signposts or power poles for low cost and are capable of holding up to two bicycles. An example of this style or bicycle parking is shown in Figure F7.

Figure F7: Bicycle Parking fitted to Existing Infrastructure

Appendix G

Implementation Works Schedules

Bicycle Strategy for Hawkesbury
Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description		Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	On-road	Off-road	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
RR01	Parramatta to Windsor Off-Road Cycleway (Baulkham Hills/Blacktown LGA to Mulgrave)	Windsor Road	Boundary Road to Groves Avenue	Existing 3.0m shared path	n/a	EXISTING	-	4,900		4,900	4,900	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Signalised crossing of Groves Avenue - west leg of intersection	Install bicycle lanterns	2	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$0	$2,250	$0	$2,250
									-	4,900		$1,755								$0	$2,250	$0	$2,250
RR02	Parramatta to Windsor Off-Road Cycleway (Mulgrave to McGraths Hill)	Windsor Road	Groves Avenue to Pitt Town Road	Existing 3.0m shared path	n/a	EXISTING	-	1,260		1,260	1,260	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Signalised crossing of Windsor Road at Pitt Town Road - south leg of intersection	Install bicycle lanterns	2	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$0	$2,250	$0	$2,250
									-	1,260		$1,755								$0	$2,250	$0	$2,250
RR03	Parramatta to Windsor Off-Road Cycleway (McGraths Hill to Windsor)	Windsor Road	Pitt Town Road to hotel entrance (opposite Court Street)	Existing 3.0m shared path	n/a	EXISTING	-	1320		1320	1,320	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Hotel entrance (opposite Court Street) to Macquarie Street	Improve delineation of existing shared path (signs, lines and logos)	1	LINE	3	100			100	$1,062	10%	20%	0%	0%	0%	3%	33%	$1,410	$0	$0	$1,410
									-	1,320		$1,062								$1,410	$0	$0	$1,410
RR04	Windsor CBD – Macquarie Street	Macquarie Street	Windsor Road to Hawkesbury Valley Way	Existing 2.0m shared path	n/a	EXISTING	-	1,080		1,080	1,080	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
				Improve delineation of existing shared path (centreline and logos)	1	LINE	3	1,080			1,080	$11,466	10%	20%	0%	0%	0%	3%	33%	$15,250	$0	$0	$15,250
				Tree trimming and edge trimming (ongoing maintenance)	1	MAINTENANCE	42	1,080			1,080	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Signalised intersection of Macquarie Street and Kable Street/ Ross Street	Install bicycle lanterns on south leg of intersection (across Macquarie Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install additional signalised crossing on west leg of intersection (across Ross Street) - including pedestrian and bicycle lanterns and push buttons	1	CIVIL	27a	-			1	$50,000	10%	5%	10%	0%	0%	3%	28%	$64,000	$0	$0	$64,000
				Directional signage (to Windsor Town Centre)	1	SIGN	5	-			2	$814	10%	10%	0%	0%	0%	3%	23%	$1,000	$0	$0	$1,000
			Signalised intersection of Macquarie Street and Day Street	Install bicycle lanterns on west leg of intersection (across Day Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install bicycle lanterns on south leg of intersection (across Macquarie Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Replace existing kerb ramps on west leg of intersection	1	CIVIL	16	-			4	$2,380	10%	5%	10%	0%	0%	3%	28%	$3,050	$0	$0	$3,050
				Directional signage (to Windsor Town Centre - via Christie Street)	1	SIGN	5	-			2	$814	10%	10%	0%	0%	0%	3%	23%	$1,000	$0	$0	$1,000
			Signalised intersection of Macquarie Street and Hawkesbury Valley Way	Install bicycle lanterns on west leg of intersection (across Hawkesbury Valley Way)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
									-	1,080		$72,494								$93,300	$0	$0	$93,300
RR05	Windsor to Mulgrave via Hawkesbury Valley Way	Hawkesbury Valley Way	Macquarie Street to Groves Avenue	Provide delineation of existing shoulders and bicycle lanes (logos and signage)	2	LINE	4.1	2,600	2,600		2,600	$11,947	10%	20%	0%	0%	0%	3%	33%	$0	$15,890	$0	$15,890
			Intersection of Hawkesbury Valley Way, Groves Avenue and Railway Road North	Treatment of pinch point for southbound cyclists - merge into traffic lane on curve (logos and arrows)	2	LINE	18	-			4	$404	10%	20%	0%	0%	0%	3%	33%	$0	$540	$0	$540
		Groves Avenue	Hawkesbury Valley Way to 75m west of Windsor Road	On-road bicycle shoulder lanes - remove existing parking lane lines	2	LINE	44	620			1,240	$7,738	10%	20%	0%	0%	0%	3%	33%	$0	$10,290	$0	$10,290
				On-road bicycle shoulder lanes - linemarking and signage	2	LINE	4	620	620		620	$15,966	10%	20%	0%	0%	0%	3%	33%	$0	$21,230	$0	$21,230
			75m west of Windsor Road to Windsor Road	Shared path construction on north and south sides of Groves Avenue	2	CIVIL	14a	75			150	$30,000	10%	5%	10%	0%	0%	3%	28%	$0	$38,400	$0	$38,400
				Shared path delineation on north and south sides of Groves Avenue	2	LINE	3	75			150	$1,593	10%	20%	0%	0%	0%	3%	33%	$0	$2,120	$0	$2,120
				Kerb ramps	2	CIVIL	16	-			4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
									3,220	-		$70,027								$0	$91,520	$0	$91,520
RR06	Windsor CBD – Hawkesbury Valley Way	Hawkesbury Valley Way	Intersection of Macquarie Street and Hawkesbury Valley Way	Install bicycle lanterns on north leg of intersection (across Macquarie Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
			Macquarie Street to George Street	Widen existing concrete footpath by 1.0m	1	CIVIL	14	110		110	110	$11,000	10%	5%	10%	0%	0%	3%	28%	$14,080	$0	$0	$14,080
			Intersection of George Street and Hawkesbury Valley Way	Install bicycle lanterns on north leg of intersection (across George Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install bicycle lanterns on east leg of intersection (across Hawkesbury Valley Way)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install bicycle lanterns on west leg of intersection (across Hawkesbury Valley Way)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Directional signage (to Windsor Town Centre - via George Street)	1	SIGN	5	-			2	$814	10%	10%	0%	0%	0%	3%	23%	$1,000	$0	$0	$1,000
		McQuade Park	New link between existing park path and NW corner of George Street and Hawkesbury Valley Way intersection	Install 2.5m shared path	1	CIVIL	12	25		25	25	$6,250	10%	5%	10%	0%	0%	3%	28%	$8,000	$0	$0	$8,000
			South side of park between George Street and Moses Street	Use existing path facilty - provide delineation for a shared path (logos and signage)	1	SIGN	35	230		230	230	$528	10%	10%	0%	0%	0%	3%	23%	$650	$0	$0	$650
			New link between existing park path and NE corner of Moses Street and Hawkesbury Valley Way intersection	Install 2.5m shared path	1	CIVIL	12	25		25	25	$6,250	10%	5%	10%	0%	0%	3%	28%	$8,000	$0	$0	$8,000
		Hawkesbury Valley Way	Intersection of Moses Street and Cox Street	Install refuge crossing on west leg of intersection - for pedestrian and bicycle use	1	CIVIL	17	-			1	$10,000	10%	5%	10%	0%	0%	3%	28%	$12,800	$0	$0	$12,800
									-	390		$41,862								$53,530	$0	$0	$53,530
RR07	Windsor to Richmond	Hawkesbury Valley Way	Moses Street and Cox Street to Rickabys Creek	Off-road shared path on south side of carriageway - construction	1	CIVIL	12	700		700	700	$175,000	10%	5%	10%	0%	0%	3%	28%	$224,000	$0	$0	$224,000
				Off-road shared path on south side of carriageway - delineation	1	LINE	3	700			700	$7,432	10%	20%	0%	0%	0%	3%	33%	$9,880	$0	$0	$9,880
				Off-road shared path on south side of carriageway - kerb ramps	1	CIVIL	16	4			4	$2,380	10%	5%	10%	0%	0%	3%	28%	$3,050	$0	$0	$3,050
			Rickabys Creek to Percival Street	On-road bicycle shoulder lanes - existing facility	n/a	EXISTING	-	365			-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Hawkesbury Valley Way and Percival Street intersection	Remove existing two-way separated crossing on the east leg of the intersection, install crossing on west leg of intersection to acommodate cyclists travelling from Windsor to the RAAF base - linemarking only	1	LINE	30	200			400	$2,116	10%	20%	0%	0%	0%	3%	33%	$2,810	$0	$0	$2,810
			Rickabys Creek to Percival Street - LONG TERM TREATMENT	Rickabys Creek and low land crossing - new shared path bridge on the north side of existing bridge and raised roadway	1	PLANNING	2	365		365	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Percival Street to Racecourse Road and Ham Common existing shared path	Off-road shared path on south side of carriageway - construction	1	CIVIL	12	1,025		1,025	1,025	$256,250	10%	5%	10%	0%	0%	3%	28%	$328,000	$0	$0	$328,000

Bicycle Strategy for Hawkesbury
Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description		Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	On-road	Off-road	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
				Off-road shared path on south side of carriageway - delineation	1	LINE	3	1,025			1,025	$10,882	10%	20%	0%	0%	0%	3%	33%	$14,470	$0	$0	$14,470
				Off-road shared path on south side of carriageway - kerb ramps	1	CIVIL	16	6			6	$3,570	10%	5%	10%	0%	0%	3%	28%	$4,570	$0	$0	$4,570
		Windsor Road (Ham Common Track)	Racecourse Road to tennis courts	Existing off-road shared path	1	EXISTING	-	2,200		2,200	2,200	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
				Existing off-road shared path - improved delineation	1	LINE	3	2,200			2,200	$23,357	10%	20%	0%	0%	0%	3%	33%	$31,070	$0	$0	$31,070
			Tennis courts to House No. 54 Windsor Street (i.e. along park frontage)	Off-road shared path on south side of carriageway - widen existing path by 1.0m - construction	1	CIVIL	14	465		465	465	$46,500	10%	5%	10%	0%	0%	3%	28%	$59,520	$0	$0	$59,520
				Off-road shared path on south side of carriageway - delineation (signs and logos)	1	LINE	3	465			465	$4,937	10%	20%	0%	0%	0%	3%	33%	$6,570	$0	$0	$6,570
			House No. 54 Windsor Street to Bourke Street	Off-road path on south side of carriageway - widen existing path by 1.0m (note that there are some restrictions due to the location of trees) - on-road facility could be provided in the short term	1	CIVIL	14	205		205	205	$20,500	10%	5%	10%	0%	0%	3%	28%	$26,240	$0	$0	$26,240
				Off-road path on south side of carriageway - delineation (signs and logos)	1	LINE	3	205			205	$2,176	10%	20%	0%	0%	0%	3%	33%	$2,890	$0	$0	$2,890
		Bourke Street	Windsor Street to March Street	Off-road shared path on east side of carriageway - widen existing path by 1.0m	1	CIVIL	14	170		170	170	$17,000	10%	5%	10%	0%	0%	3%	28%	$21,760	$0	$0	$21,760
				Off-road shared path on east side of carriageway - delineation	1	LINE	3	170			170	$1,805	10%	20%	0%	0%	0%	3%	33%	$2,400	$0	$0	$2,400
			Railway crossing treatment (east and west sides of Bourke Street)	To be completed as part of Council programmed works	1	EXISTING	-	-			-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Bourke Street and March Street Intersection	Refuge crossing on north leg of intersection - shared pedestrian and bicycle use	1	CIVIL	17	-			1	$10,000	10%	5%	10%	0%	0%	3%	28%	$12,800	$0	$0	$12,800
		March Street	Bourke Street to East Market Street	On-road bicycle shoulder lanes	1	LINE	4	670	670		670	$17,253	10%	20%	0%	0%	0%	3%	33%	$22,950	$0	$0	$22,950
			100m east of East Market Street to East Market Street	Shared path on north and south sides of March Street - widen existing paths by 1.0m	1	CIVIL	14	100		100	200	$20,000	10%	5%	10%	0%	0%	3%	28%	$25,600	$0	$0	$25,600
				Shared path delineation on north and south sides of March Street	1	LINE	3	100			200	$2,123	10%	20%	0%	0%	0%	3%	33%	$2,820	$0	$0	$2,820
				Kerb ramps	1	CIVIL	16	-			2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
			March Street and East Market Street intersection (signalised)	Install bicycle lanterns on east leg of intersection (across March Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install bicycle lanterns on north leg of intersection (across East Market Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install bicycle lanterns on south leg of intersection (across East Market Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
			East Market Street	Wide shoulder lane marked with mixed traffic bicycle logos	1	LINE	18	-			6	$606	10%	20%	0%	0%	0%	3%	33%	$810	$0	$0	$810
									670	5,230		$630,343								$810,480	$0	$0	$810,480
RR08	Richmond to North Richmond	March Street	East Market Street to 50m west of East Market Street	Shared path on north and south sides of March Street - widen existing paths by 1.0m	1	CIVIL	14	50		50	100	$10,000	10%	5%	10%	0%	0%	3%	28%	$12,800	$0	$0	$12,800
				Shared path delineation on north and south sides of March Street	1	LINE	3	50			100	$1,062	10%	20%	0%	0%	0%	3%	33%	$1,410	$0	$0	$1,410
				Kerb ramps	1	CIVIL	16	-			2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
			50m west of East Market Street to 50m east of Bosworth Street	Bicycle shoulder lanes	1	LINE	4.1	380	380		380	$1,746	10%	20%	0%	0%	0%	3%	33%	$2,320	$0	$0	$2,320
			100m east of Bosworth Street to 70m west of Bosworth Street	Shared path on north and south sides of March Street - widen existing paths by 1.0m	1	CIVIL	14	170		170	340	$34,000	10%	5%	10%	0%	0%	3%	28%	$43,520	$0	$0	$43,520
				Shared path delineation on north and south sides of March Street	1	LINE	3	170			340	$3,610	10%	20%	0%	0%	0%	3%	33%	$4,800	$0	$0	$4,800
				Kerb ramps	1	CIVIL	16	-			4	$2,380	10%	5%	10%	0%	0%	3%	28%	$3,050	$0	$0	$3,050
				Install bicycle lanterns on north leg of intersection (across Bosworth Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
				Install bicycle lanterns on south leg of intersection (across Bosworth Street)	1	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$2,250	$0	$0	$2,250
		March Street and Kurrajong Road	70m west of Bosworth Street to Richmond Bridge	Bicycle shoulder lanes - delineation	2	LINE	4.1	2,300	2,300		2,300	$10,569	10%	20%	0%	0%	0%	3%	33%	$0	$14,060	$0	$14,060
		Kurrajong Road	Richmond Bridge - Existing facility	Shared path on the south side of existing road bridge	n/a	EXISTING	-	240		240	240	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Richmond Bridge - LONG TERM TREATMENT	New shared path bridge or bridge widening on the south side of existing road bridge	2	PLANNING	2	240			240	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
			Richmond Bridge to Grose Vale Road/ Terrace Road	Shared path on south/west side of the carriageway - new path construction	2	CIVIL	12	220		220	220	$55,000	10%	5%	10%	0%	0%	3%	28%	$0	$70,400	$0	$70,400
				Shared path on south/west side of the carriageway - existing path widening (by 1.0m)	2	CIVIL	14	365		365	365	$36,500	10%	5%	10%	0%	0%	3%	28%	$0	$46,720	$0	$46,720
				Shared path on south/west side of the carriageway - delineation	2	LINE	3	585			585	$6,211	10%	20%	0%	0%	0%	3%	33%	$0	$8,260	$0	$8,260
				Shared path on south/west side of the carriageway - kerb ramps	2	CIVIL	16	-			4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
								4,770	2,680	1,045		$168,157								$73,920	$142,490	$0	$216,410
RR09	North Richmond to Kurmond	Bells Line of Road	Terrace Road to Charles Street	Off-road shared path (existing facility - north side of carriageway) - widen existing path by a minimum of 0.5m	2	CIVIL	14b	280		280	280	$14,000	10%	5%	10%	0%	0%	3%	28%	$0	$17,920	$0	$17,920
				Improve delineation of existing shared path (centreline and logos)	2	LINE	3	280			280	$2,973	10%	20%	0%	0%	0%	3%	33%	$0	$3,950	$0	$3,950
			Charles Street to Kurmond Road	Off-road shared path - existing facility - north side of carriageway	n/a	EXISTING	-	4,000		4,000	4,000	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
									-	4,280		$16,973								$0	$21,870	$0	$21,870
RR10	Kurmond to Kurrajong	Bells Line of Road	Kurmond Road to Old Bells Line of Road	Off-road shared path (south side of carriageway) - construction	3	CIVIL	14a	1,900		1,900	1,900	$380,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$486,400	$486,400
				Off-road shared path (south side of carriageway) - delineation	3	LINE	3	1,900		1,900	1,900	$20,172	10%	20%	0%	0%	0%	3%	33%	$0	$0	$26,830	$26,830
		Old Bells Line of Road	Bells Line of Road to Grose Vale Road	Off-road shared path (south side of carriageway) - construction	3	CIVIL	14a	1,250		1,250	1,250	$250,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$320,000	$320,000
				Off-road shared path (south side of carriageway) - delineation	3	LINE	3	1,250		1,250	1,250	$13,271	10%	20%	0%	0%	0%	3%	33%	$0	$0	$17,650	$17,650
									-	6,300		$663,443								$0	$0	$850,880	$850,880
RR11	Windsor to South Windsor, Bligh Park and Penrith (via The Northern Road)	Macquarie Street	Hawkesbury Valley Way and Macquarie Street intersection (signalised)	Install bicycle lanterns on west leg of intersection (across Hawkesbury Valley Way)	2	CIVIL	26	-			1	$1,755	10%	5%	10%	0%	0%	3%	28%	$0	$2,250	$0	$2,250
			Hawkesbury Valley Way to 150m south of Hawkesbury Valley Way	Shared path construction on east and west sides of Macquarie Street	2	CIVIL	14a	150		150	300	$60,000	10%	5%	10%	0%	0%	3%	28%	$0	$76,800	$0	$76,800
				Shared path delineation on east and west sides of Macquarie Street	2	LINE	3	150			300	$3,185	10%	20%	0%	0%	0%	3%	33%	$0	$4,240	$0	$4,240
				Kerb ramps	2	CIVIL	16	-			2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520

Bicycle Strategy for Hawkesbury
Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description		Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	On-road	Off-road	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
			150m south of Hawkesbury Valley Way to Brabyn Street	Bicycle shoulder lanes (logos and signs)	2	LINE	4.1	150	150		150	$689	10%	20%	0%	0%	0%	3%	33%	$0	$920	$0	$920
			Macquarie Street and Brabyn Street intersection (unsignalised)	Install refuge crossing on north leg of intersection - for pedestrian and bicycle use	2	CIVIL	17	-			1	$10,000	10%	5%	10%	0%	0%	3%	28%	$0	$12,800	$0	$12,800
			Brabyn Street to 70m north of Bell Street	Shared path construction on east side of Macquarie Street	2	CIVIL	14a	180		180	180	$36,000	10%	5%	10%	0%	0%	3%	28%	$0	$46,080	$0	$46,080
				Shared path delineation on east side of Macquarie Street	2	LINE	3	180			180	$1,911	10%	20%	0%	0%	0%	3%	33%	$0	$2,540	$0	$2,540
			70m north of Bell Street	Install refuge crossing - for pedestrian and bicycle use	2	CIVIL	17	-			1	$10,000	10%	5%	10%	0%	0%	3%	28%	$0	$12,800	$0	$12,800
		Macquarie Street and George Street	70m north of Bell Street to Blacktown Road	Bicycle shoulder lanes (logos and signs)	2	LINE	4.1	3,700	3,700		3,700	$17,002	10%	20%	0%	0%	0%	3%	33%	$0	$22,610	$0	$22,610
		Macquarie Street	Macquarie Street and Bell Street intersection (unsignalised)	Continue bicycle lane markings through intersection	2	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$0	$1,030	$0	$1,030
			Macquarie Street and Argyle Street intersection (signalised)	Logos to merge bicycles into traffic lanes through signalised intersection (north and southbound lanes)	2	LINE	18	-			4	$404	10%	20%	0%	0%	0%	3%	33%	$0	$540	$0	$540
				Signs to merge bicycles into traffic lanes through signalised intersection (north and southbound lanes)	2	SIGN	6	-			4	$1,030	10%	10%	0%	0%	0%	3%	23%	$0	$1,270	$0	$1,270
			Macquarie Street and Campbell Street intersection (unsignalised)	Continue bicycle lane markings through intersection	2	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$0	$1,030	$0	$1,030
			Macquarie Street and James Street intersection (unsignalised)	Continue bicycle lane markings through intersection	2	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$0	$1,030	$0	$1,030
			Macquarie Street and Drummond Street intersection (signalised)	Logos to merge bicycles into traffic lanes through signalised intersection (north and southbound lanes)	2	LINE	18	-			4	$404	10%	20%	0%	0%	0%	3%	33%	$0	$540	$0	$540
				Signs to merge bicycles into traffic lanes through signalised intersection (north and southbound lanes)	2	SIGN	6	-			4	$1,030	10%	10%	0%	0%	0%	3%	23%	$0	$1,270	$0	$1,270
			Macquarie Street and Ham Street intersection (unsignalised)	Continue bicycle lane markings through intersection	2	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$0	$1,030	$0	$1,030
			Macquarie Street and George Street intersection (unsignalised) and Yarrawonga Street intersection (unsignalised)	Continue bicycle lane markings through intersection	1	LINE	4	160			160	$4,120	10%	20%	0%	0%	0%	3%	33%	$5,480	$0	$0	$5,480
		George Street	George Street and Wood Street intersection (unsignalised)	Continue bicycle lane markings through intersection	1	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$1,030	$0	$0	$1,030
			Woods Street to Rickaby Street	Shoulder widening works	1	CIVIL	31	250			500	$34,840	10%	5%	10%	0%	0%	3%	28%	$44,590	$0	$0	$44,590
			George Street and Rickaby Street intersection (unsignalised)	Continue bicycle lane markings through intersection	1	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$1,030	$0	$0	$1,030
			George Street and Rifle Range Road intersection (signalised)	Install shared pedestrian and bicycle crossing on north leg of intersection (across George Street)	1	CIVIL	27a	-			1	$50,000	10%	5%	10%	0%	0%	3%	28%	$64,000	$0	$0	$64,000
				Install shared pedestrian and bicycle crossing on east leg of intersection (across Rifle Range Road)	1	CIVIL	27a	-			1	$50,000	10%	5%	10%	0%	0%	3%	28%	$64,000	$0	$0	$64,000
				Kerb ramps (southbound transition into signalised crossing and through intersection)	1	CIVIL	16	-			6	$3,570	10%	5%	10%	0%	0%	3%	28%	$4,570	$0	$0	$4,570
				Shared path for southbound off-road transition (on George Street and around the curve into Rifle Range Road)	1	CIVIL	14a	75			150	$30,000	10%	5%	10%	0%	0%	3%	28%	$38,400	$0	$0	$38,400
			Rifle Range Road to Colonial Drive	Widen existing sealed shoulder	1	CIVIL	31	450			900	$62,712	10%	5%	10%	0%	0%	3%	28%	$80,270	$0	$0	$80,270
			George Street and Colonial Drive intersection (roundabout)	Southbound cyclists - new shared path for off-road transition	1	CIVIL	14a	25			50	$10,000	10%	5%	10%	0%	0%	3%	28%	$12,800	$0	$0	$12,800
				Kerb ramps for southbound cyclists	1	CIVIL	16	-			4	$2,380	10%	5%	10%	0%	0%	3%	28%	$3,050	$0	$0	$3,050
				Northbound cyclists - use existing off-road path to the west of the roundabout - delineate with signs	1	SIGN	6	-			2	$515	10%	10%	0%	0%	0%	3%	23%	$630	$0	$0	$630
				Northbound cyclists - use existing off-road path to the west of the roundabout - delineate with logos	1	LINE	18	-			2	$202	10%	20%	0%	0%	0%	3%	33%	$270	$0	$0	$270
			Colonial Drive to Blacktown Road	Widen existing sealed shoulder	3	CIVIL	31	630			1,260	$87,796	10%	5%	10%	0%	0%	3%	28%	$0	$0	$112,380	$112,380
			George Street and Blacktown Road intersection	Southbound cyclists - use existing service road across NE corner of intersection - delineate with signs	3	SIGN	6	-			2	$515	10%	10%	0%	0%	0%	3%	23%	$0	$0	$630	$630
				Southbound cyclists - use existing service road across NE corner of intersection - delineate with logos	3	LINE	18	-			2	$202	10%	20%	0%	0%	0%	3%	33%	$0	$0	$270	$270
				Off-road shared path link to eastbound shoulder lane	3	CIVIL	14a	10			10	$2,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$2,560	$2,560
				Refuge crossing on west leg of intersection	3	CIVIL	17	-			1.5	$15,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$19,200	$19,200
		Blacktown Road	George Street to The Northern Road	Shared path on south side of carriageway (to the west of bicycle shoulder lane)	3	CIVIL	14a	100		100	100	$20,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$25,600	$25,600
				Shoulder widening works - south side of carriageway (to the east of guardrail)	3	CIVIL	31	80			80	$5,574	10%	5%	10%	0%	0%	3%	28%	$0	$0	$7,140	$7,140
				Shoulder narrows on north side of carriageway - widening of eastbound shoulder lane (bridge structure)	3	PLANNING	2	75			75	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
				Bicycle shoulder lanes (logos and signs)	3	LINE	4.1	180	180		180	$827	10%	20%	0%	0%	0%	3%	33%	$0	$0	$1,100	$1,100
									4,030	430		$529,489								$320,120	$190,300	$168,880	$679,300
RR11a	Windsor Mall to South Windsor via Windsor Station	George Street	Fitzgerald Street to 60m north of Hawkesbury Valley Way	Mixed traffic treatment - mark 2.0m parking edgelines and logos along centre of traffic lanes	1	LINE	4.2	750	750		750	$11,380	10%	20%	0%	0%	0%	3%	33%	$15,140	$0	$0	$15,140
			60m north of Richmond Street to Hawkesbury Valley Way	Shared path delineation on east and west sides of George Street	1	LINE	3	60		60	120	$1,274	10%	20%	0%	0%	0%	3%	33%	$1,690	$0	$0	$1,690
				Kerb ramps	1	CIVIL	16	-			2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
			Hawkesbury Valley Way to 60m south of Hawkesbury Valley Way	Shared path delineation on east and west sides of George Street	1	LINE	3	60		60	120	$1,274	10%	20%	0%	0%	0%	3%	33%	$1,690	$0	$0	$1,690
				Kerb ramps	1	CIVIL	16	-			2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
			60m south of Hawkesbury Valley Way to Macquarie Street	Mixed traffic treatment - mark 2.0m parking edgelines and logos along centre of traffic lanes	1	LINE	4.2	2,000	2,000		2,000	$30,346	10%	20%	0%	0%	0%	3%	33%	$40,360	$0	$0	$40,360
			Intersection of George Street and Macquarie Street	Southbound cyclists - bring off-road by providing new shared path along the west side of George Street	1	CIVIL	14a	30		30	30	$6,000	10%	5%	10%	0%	0%	3%	28%	$7,680	$0	$0	$7,680
				Kerb ramp at Macquarie Street to continue onto Macquarie Street bicycle shoulder lanes	1	CIVIL	16	-			1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
									2,750	150		$53,249								$70,360	$0	$0	$70,360
RR12	Richmond to Bligh Park	Blacktown Road	Bourke Street to George Street	Bicycle shoulder lanes - existing facility	n/a	EXISTING	-	4,650	4,650		4,650	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
				Delineation of shoulder lanes to the south of Bourke Street - logos leading to transition	2	LINE	18	4			4	$404	10%	20%	0%	0%	0%	3%	33%	$0	$540	$0	$540
				Extend southbound bicycle lane across intersection with sewage treatment works access	2	LINE	4	50			50	$1,288	10%	20%	0%	0%	0%	3%	33%	$0	$1,710	$0	$1,710
				Extend southbound bicycle lane across intersection with The Driftway	2	LINE	4	50			50	$1,288	10%	20%	0%	0%	0%	3%	33%	$0	$1,710	$0	$1,710
				Extend southbound bicycle lane across intersection with Racecourse Road	2	LINE	4	50			50	$1,288	10%	20%	0%	0%	0%	3%	33%	$0	$1,710	$0	$1,710
				Shoulder widening works - south side of carriageway between Bennett Road and George Street	2	CIVIL	31	150			150	$10,452	10%	5%	10%	0%	0%	3%	28%	$0	$13,380	$0	$13,380

Bicycle Strategy for Hawkesbury
Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description		Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	On-road	Off-road	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
				Delineation of shoulder lanes between Bennett Road and George Street	2	LINE	4.1	220			220	$1,011	10%	20%	0%	0%	0%	3%	33%	$0	$1,340	$0	$1,340
									4,650	-		$15,730								$0	$20,390	$0	$20,390
RR13	Bligh Park to Windsor Downs and Blacktown LGA	Blacktown Road	Blacktown Road and The Northern Road intersection (unsignalised)	Continue northbound bicycle lane markings through intersection	3	LINE	4	30			30	$773	10%	20%	0%	0%	0%	3%	33%	$0	$0	$1,030	$1,030
			The Northern Road to South Creek Bridge	Bicycle shoulder lanes - existing facility	n/a	EXISTING	-	4,700	4,700		4,700	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
				Delineation of the bicycle lanes through Llandilo Road intersection	3	LINE	4	200			200	$5,150	10%	20%	0%	0%	0%	3%	33%	$0	$0	$6,850	$6,850
				Delineation of the bicycle lanes through the intersections in the vicinity of Berkshire Park and Windsor Downs - lines	3	LINE	30	1,000			2,000	$10,578	10%	20%	0%	0%	0%	3%	33%	$0	$0	$14,070	$14,070
				Delineation of the bicycle lanes through the intersections in the vicinity of Berkshire Park and Windsor Downs - logos	3	LINE	18	-			20	$2,020	10%	20%	0%	0%	0%	3%	33%	$0	$0	$2,690	$2,690
									4,700	-		$18,521								$0	$0	$24,640	$24,640
Total									**22,700**	**26,385**		**$2,284,859**								**$1,423,120**	**$471,070**	**$1,044,400**	**$2,938,590**

PAMP for Hawkesbury
Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description	Side	Works Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
Windsor and South Windsor																					
New footpaths																					
	Moses Street	Hawkesbury Valley Way to south of Greenway Crescent	West	New footpath	2	CIVIL	12a	250	250	$37,500	10%	5%	10%	0%	0%	3%	28%	$0	$48,000	$0	$48,000
	Hawkesbury Valley Way	George Street to Cox Street	South	Shared path - refer bicycle schedule	n/a	-	-	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	Macquarie Street	South of Dight Street	West	New footpath	1	CIVIL	12a	70	70	$10,500	10%	5%	10%	0%	0%	3%	28%	$13,440	$0	$0	$13,440
	Day Street	South of Macquarie Street	West	New footpath	2	CIVIL	12a	120	120	$18,000	10%	5%	10%	0%	0%	3%	28%	$0	$23,040	$0	$23,040
	Mileham Street	Day Street to Hawkesbury Valley Way	West	New footpath	2	CIVIL	12a	140	140	$21,000	10%	5%	10%	0%	0%	3%	28%	$0	$26,880	$0	$26,880
	Mileham Street	Day Street to Hawkesbury Valley Way	East	New footpath	2	CIVIL	12a	140	140	$21,000	10%	5%	10%	0%	0%	3%	28%	$0	$26,880	$0	$26,880
	Mileham Street	Hawkesbury Valley Way to Brabyn Street	West	New footpath	2	CIVIL	12a	220	220	$33,000	10%	5%	10%	0%	0%	3%	28%	$0	$42,240	$0	$42,240
	Mileham Street	Hawkesbury Valley Way to Brabyn Street	East	New footpath	2	CIVIL	12a	280	280	$42,000	10%	5%	10%	0%	0%	3%	28%	$0	$53,760	$0	$53,760
	Macquarie Street	Hawkesbury Valley Way to Brabyn Street	West	New footpath (150m of path is included as shared path in bicycle schedule)	1	CIVIL	12a	150	150	$22,500	10%	5%	10%	0%	0%	3%	28%	$28,800	$0	$0	$28,800
	Macquarie Street	Hawkesbury Valley Way to Brabyn Street	East	New footpath (150m of path is included as shared path in bicycle schedule)	1	CIVIL	12a	150	150	$22,500	10%	5%	10%	0%	0%	3%	28%	$28,800	$0	$0	$28,800
	Brabyn Street	Macquarie Street to Mileham Street	North	New footpath	1	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	Brabyn Street	Macquarie Street to Mileham Street	South	New footpath	1	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	Brabyn Street	Cox Street to Church Street	South	New footpath	1	CIVIL	12a	105	105	$15,750	10%	5%	10%	0%	0%	3%	28%	$20,160	$0	$0	$20,160
	Cox Street	Hawkesbury Valley Way to Cambridge Avenue	West	New footpath	2	CIVIL	12a	170	170	$25,500	10%	5%	10%	0%	0%	3%	28%	$0	$32,640	$0	$32,640
	Cox Street	Hawkesbury Valley Way to railway line	East	New footpath	1	CIVIL	12a	230	230	$34,500	10%	5%	10%	0%	0%	3%	28%	$44,160	$0	$0	$44,160
	Macquarie Street	Brabyn Street to railway line	East	Shared path - refer bicycle schedule	n/a	-	-	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	Macquarie Street	Brabyn Street to Bell Street	West	New footpath	2	CIVIL	12a	240	240	$36,000	10%	5%	10%	0%	0%	3%	28%	$0	$46,080	$0	$46,080
	George Street	Bell Street to railway line	East	New footpath	1	CIVIL	12a	65	65	$9,750	10%	5%	10%	0%	0%	3%	28%	$12,480	$0	$0	$12,480
	Suffolk Street	Macquarie Street to George Street	South	New footpath	1	CIVIL	12a	25	25	$3,750	10%	5%	10%	0%	0%	3%	28%	$4,800	$0	$0	$4,800
	Fairfield Avenue	West of Cox Street	North	New footpath	3	CIVIL	12a	135	135	$20,250	10%	5%	10%	0%	0%	3%	28%	$0	$0	$25,920	$25,920
	Cambridge Avenue	West of Cox Street	South	New footpath	3	CIVIL	12a	225	225	$33,750	10%	5%	10%	0%	0%	3%	28%	$0	$0	$43,200	$43,200
	Cox Street	Railway line to Argyle Street	East	New footpath	1	CIVIL	12a	300	300	$45,000	10%	5%	10%	0%	0%	3%	28%	$57,600	$0	$0	$57,600
	Bell Street	Cox Street to Mileham Street	North	New footpath	1	CIVIL	12a	430	430	$64,500	10%	5%	10%	0%	0%	3%	28%	$82,560	$0	$0	$82,560
	Bell Street	Cox Street to Mileham Street	South	New footpath	2	CIVIL	12a	430	430	$64,500	10%	5%	10%	0%	0%	3%	28%	$0	$82,560	$0	$82,560
	Church Street	Bell Street to Argyle Street	East	New footpath	1	CIVIL	12a	250	250	$37,500	10%	5%	10%	0%	0%	3%	28%	$48,000	$0	$0	$48,000
	Church Street	Bell Street to Argyle Street	West	New footpath	2	CIVIL	12a	250	250	$37,500	10%	5%	10%	0%	0%	3%	28%	$0	$48,000	$0	$48,000
	Church Street	Argyle Street to Campbell Street	West	New footpath	2	CIVIL	12a	245	245	$36,750	10%	5%	10%	0%	0%	3%	28%	$0	$47,040	$0	$47,040
	Church Street	Campbell Street to Drummond Street	East	New footpath	2	CIVIL	12a	450	450	$67,500	10%	5%	10%	0%	0%	3%	28%	$0	$86,400	$0	$86,400
	Church Street	James Street to Drummond Street	West	New footpath	2	CIVIL	12a	260	260	$39,000	10%	5%	10%	0%	0%	3%	28%	$0	$49,920	$0	$49,920
	George Street	Campbell Street to Drummond Street	East	New footpath	1	CIVIL	12a	240	240	$36,000	10%	5%	10%	0%	0%	3%	28%	$46,080	$0	$0	$46,080
	Macquarie Street	Bell Street to Drummond Street	East	New footpath	2	CIVIL	12a	880	880	$132,000	10%	5%	10%	0%	0%	3%	28%	$0	$168,960	$0	$168,960
	Macquarie Street	Bell Street to James Street	West	New footpath	2	CIVIL	12a	720	720	$108,000	10%	5%	10%	0%	0%	3%	28%	$0	$138,240	$0	$138,240
	Mileham Street	Railway line to Argyle Street	East	New footpath	2	CIVIL	12a	320	320	$48,000	10%	5%	10%	0%	0%	3%	28%	$0	$61,440	$0	$61,440
	Mileham Street	Railway line to Argyle Street	West	New footpath	3	CIVIL	12a	320	320	$48,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$61,440	$61,440
	Mileham Street	Argyle Street to Drummond Street	West	New footpath	3	CIVIL	12a	740	740	$111,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$142,080	$142,080
	Mileham Street	Argyle Street to Drummond Street	East	New footpath	2	CIVIL	12a	720	720	$108,000	10%	5%	10%	0%	0%	3%	28%	$0	$138,240	$0	$138,240
	Cox Street	Argyle Street to the leisure centre	East	New footpath	2	CIVIL	12a	680	680	$102,000	10%	5%	10%	0%	0%	3%	28%	$0	$130,560	$0	$130,560
	Cox Street	McQuade Avenue to leisure centre	West	New footpath	3	CIVIL	12a	950	950	$142,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$182,400	$182,400
	McQuade Avenue	Cox Street loop	East	New footpath	3	CIVIL	12a	610	610	$91,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$117,120	$117,120
	Argyle Street	Cox Street to Mileham Street	North	New footpath	1	CIVIL	12a	400	400	$60,000	10%	5%	10%	0%	0%	3%	28%	$76,800	$0	$0	$76,800
	Argyle Street	Cox Street to Church Street	South	New footpath	1	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	Campbell Street	Cox Street to Church Street	North	New footpath	1	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	James Street	Cox Street to Church Street	North	New footpath	2	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$0	$19,200	$0	$19,200
	Campbell Street	George Street to Mileham Street	North	New footpath	1	CIVIL	12a	200	200	$30,000	10%	5%	10%	0%	0%	3%	28%	$38,400	$0	$0	$38,400
	Campbell Street	Church Street to Mileham Street	South	New footpath	2	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$0	$19,200	$0	$19,200
	James Street	Church Street to Mileham Street	North	New footpath	2	CIVIL	12a	300	300	$45,000	10%	5%	10%	0%	0%	3%	28%	$0	$57,600	$0	$57,600
	James Street	Church Street to Mileham Street	South	New footpath	2	CIVIL	12a	300	300	$45,000	10%	5%	10%	0%	0%	3%	28%	$0	$57,600	$0	$57,600
	Drummond Street	Macquarie Street to Mileham Street	South	New footpath	2	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$0	$19,200	$0	$19,200
	Macquarie Street	South of Drummond Street	West	New footpath	3	CIVIL	12a	110	110	$16,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$21,120	$21,120
								13,520		$2,028,000								$578,880	$1,423,680	$593,280	$2,595,840
New kerb ramps																					
	Cox Street	East corner at Hawkesbury Valley Way		New kerb ramps	1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	Macquarie Street	At Dight Street	West	New kerb ramps	1	CIVIL	16	-	3	$1,785	10%	5%	10%	0%	0%	3%	28%	$2,280	$0	$0	$2,280
	Mileham Street	At Brabyn Street	West	New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Brabyn Street	At Macquarie Street		New kerb ramps	1	CIVIL	16	-	3	$1,785	10%	5%	10%	0%	0%	3%	28%	$2,280	$0	$0	$2,280
	Cox Street	At Fairfield Avenue	West	New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Cox Street	At Cambridge Avenue	West	New kerb ramps	2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Cox Street	At Brabyn Street	East	New kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Macquarie Street	At Brabyn Street	West	New kerb ramps	1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	George Street	At Bell Street	West	Replace existing kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	The Terrace	At Catherine Street	South	New kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	The Terrace	At New Street	South	New kerb ramps	1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	George Street	At Johnston Street	West	Replace existing kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Macquarie Street	Crossing at Ross Street	South	Replace existing kerb ramp (move closer to signal push button)	1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	Macquarie Street	At Fitzgerald Street	West	New kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Macquarie Street	At Day Street	West	Replace existing kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Cox Street	At Bell Street	East	New kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Cox Street	At McQuade Avenue	East	New kerb ramps	2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Bell Street	At Church Street intersection		New kerb ramps	2	CIVIL	16	-	8	$4,760	10%	5%	10%	0%	0%	3%	28%	$0	$6,090	$0	$6,090
	Bell Street	At Macquarie Street intersection		New kerb ramps	2	CIVIL	16	-	8	$4,760	10%	5%	10%	0%	0%	3%	28%	$0	$6,090	$0	$6,090
	George Street	At James Street intersection		New kerb ramps	1	CIVIL	16	-	3	$1,785	10%	5%	10%	0%	0%	3%	28%	$2,280	$0	$0	$2,280
	George Street	At Drummond Street intersection		New kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Macquarie Street	At Campbell Street intersection		New kerb ramps	2	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
	Macquarie Street	At James Street intersection		New kerb ramps	2	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
	Mileham Street	At Bell Street	West	New kerb ramps	3	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$0	$1,520	$1,520

PAMP for Hawkesbury
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Route No.	Route Name	Route Description	Side	Works Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
	Mileham Street	At James Street	West	New kerb ramps	3	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$0	$1,520	$1,520
	Cox Street	At Argyle Street	East	New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Cox Street	At Campbell Street	East	New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Cox Street	At leisure centre	West	New kerb ramps	3	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$0	$760	$760
	Argyle Street	At Church Street intersection	North	New kerb ramps	1	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$3,050	$0	$0	$3,050
	Argyle Street	At Mileham Street	North	New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
										$44,031								$25,090	$27,400	$3,800	$56,290
Other works																					
	George Street	Between New Street and Suffolk Street		Install raised marked pedestrian crossing	1	CIVIL	24	-	1	$21,666	10%	5%	10%	0%	0%	3%	28%	$27,730	$0	$0	$27,730
	George Street	South of Thompson Square		Review levels and reinstate paving	n/a	PLANNING	2	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	George Street	Intersection with Bridge Street		As part of future upgrades to Windsor Bridge, ensure provision of suitable crossing facilities	n/a	PLANNING	2	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	Windsor Mall	Kable Street		Provide bollards at ped-only and traffic transition (nominal cost allowance)	1	CIVIL	-	-	-	$2,000	10%	5%	10%	0%	0%	3%	28%	$2,560	$0	$0	$2,560
	Windsor Mall	Fitzgerald Street		Provide bollards at ped-only and traffic transition (nominal cost allowance)	1	CIVIL	-	-	-	$2,000	10%	5%	10%	0%	0%	3%	28%	$2,560	$0	$0	$2,560
										$25,666								$32,850	$0	$0	$32,850
										$2,097,698								$636,820	$1,451,080	$597,080	$2,684,980
Richmond																					
New footpaths																					
	Kurrajong Road	Chapel Street to Bosworth Street	North	New footpath	2	CIVIL	12a	240	240	$36,000	10%	5%	10%	0%	0%	3%	28%	$0	$46,080	$0	$46,080
	Chapel Street	Kurrajong Road to Francis Street	West	New footpath	2	CIVIL	12a	320	320	$48,000	10%	5%	10%	0%	0%	3%	28%	$0	$61,440	$0	$61,440
	Francis Street	West of Chapel Street	South	New footpath	3	CIVIL	12a	200	200	$30,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$38,400	$38,400
	Francis Street	West of Chapel Street	North	New footpath	3	CIVIL	12a	200	200	$30,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$38,400	$38,400
	Francis Street	Chapel Street to East Market Street	North	New footpath	2	CIVIL	12a	830	830	$124,500	10%	5%	10%	0%	0%	3%	28%	$0	$159,360	$0	$159,360
	Francis Street	Toxana Street to Jersey Street	North	New footpath	2	CIVIL	12a	520	520	$78,000	10%	5%	10%	0%	0%	3%	28%	$0	$99,840	$0	$99,840
	Bosworth Street	Windsor Street to Francis Street	West	New footpath	2	CIVIL	12a	160	160	$24,000	10%	5%	10%	0%	0%	3%	28%	$0	$30,720	$0	$30,720
	West Market Street	South of Lennox Street	East	New footpath	1	CIVIL	12a	85	85	$12,750	10%	5%	10%	0%	0%	3%	28%	$16,320	$0	$0	$16,320
	Grose Street	Lennox Street to East Market Street	South	New footpath	2	CIVIL	12a	230	230	$34,500	10%	5%	10%	0%	0%	3%	28%	$0	$44,160	$0	$44,160
	Hereford Street	Castlereagh Road to Laurence Street	North	New footpath	1	CIVIL	12a	660	660	$99,000	10%	5%	10%	0%	0%	3%	28%	$126,720	$0	$0	$126,720
	Hereford Street	Castlereagh Road to Laurence Street	South	New footpath	2	CIVIL	12a	630	630	$94,500	10%	5%	10%	0%	0%	3%	28%	$0	$120,960	$0	$120,960
	Castlereagh Road	Hereford Street to Southee Road	SE	New footpath	2	CIVIL	12a	920	920	$138,000	10%	5%	10%	0%	0%	3%	28%	$0	$176,640	$0	$176,640
	Douglas Street	Hereford Street to Thompson Avenue	SE	New footpath	2	CIVIL	12a	340	340	$51,000	10%	5%	10%	0%	0%	3%	28%	$0	$65,280	$0	$65,280
	Powell Street	Douglas Street to existing marked crossing	East	New footpath	2	CIVIL	12a	430	430	$64,500	10%	5%	10%	0%	0%	3%	28%	$0	$82,560	$0	$82,560
	Powell Street	Douglas Street to Catchpole Avenue	West	New footpath	2	CIVIL	12a	320	320	$48,000	10%	5%	10%	0%	0%	3%	28%	$0	$61,440	$0	$61,440
	Catchpole Avenue	Douglas Street to Valder Avenue	West	New footpath	2	CIVIL	12a	205	205	$30,750	10%	5%	10%	0%	0%	3%	28%	$0	$39,360	$0	$39,360
	Catchpole Avenue	Valder Avenue to Powell Street	East	New footpath	2	CIVIL	12a	125	125	$18,750	10%	5%	10%	0%	0%	3%	28%	$0	$24,000	$0	$24,000
	Thompson Avenue	Douglas Street to Valder Avenue	West	New footpath	2	CIVIL	12a	230	230	$34,500	10%	5%	10%	0%	0%	3%	28%	$0	$44,160	$0	$44,160
	Mason Avenue	Powell Street to Catchpole Avenue	South	New footpath	2	CIVIL	12a	200	200	$30,000	10%	5%	10%	0%	0%	3%	28%	$0	$38,400	$0	$38,400
	Valder Avenue	Thompson Avenue to Powell Street	North	New footpath	2	CIVIL	12a	210	210	$31,500	10%	5%	10%	0%	0%	3%	28%	$0	$40,320	$0	$40,320
	Valder Avenue	Catchpole Avenue to Powell Street	South	New footpath	2	CIVIL	12a	140	140	$21,000	10%	5%	10%	0%	0%	3%	28%	$0	$26,880	$0	$26,880
	Town Street	Hereford Street to Laurence Street	East	New footpath	2	CIVIL	12a	440	440	$66,000	10%	5%	10%	0%	0%	3%	28%	$0	$84,480	$0	$84,480
	Luttrell Street	Laurence Street to Cameron Street	West	New footpath	3	CIVIL	12a	150	150	$22,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$28,800	$28,800
	East Market Street	Grose Street to Annette Place	East	New footpath	2	CIVIL	12a	240	240	$36,000	10%	5%	10%	0%	0%	3%	28%	$0	$46,080	$0	$46,080
	Brentwood Avenue	East Market Street to Annette Place	West	New footpath	2	CIVIL	12a	250	250	$37,500	10%	5%	10%	0%	0%	3%	28%	$0	$48,000	$0	$48,000
	Annette Place	East Market Street to Brentwood Avenue	North	New footpath	2	CIVIL	12a	120	120	$18,000	10%	5%	10%	0%	0%	3%	28%	$0	$23,040	$0	$23,040
	Gibson Street	South of Lennox Street	West	New footpath	2	CIVIL	12a	185	185	$27,750	10%	5%	10%	0%	0%	3%	28%	$0	$35,520	$0	$35,520
	Lennox Street	Gibson Street to Paget Street	South	New footpath	2	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$24,960	$0	$24,960
	Paget Street	Lennox Street to pathway (opposite College Street)	West	New footpath	2	CIVIL	12a	255	255	$38,250	10%	5%	10%	0%	0%	3%	28%	$0	$48,960	$0	$48,960
	Paget Street	South of Teviot Street to College Street	East	New footpath	2	CIVIL	12a	45	45	$6,750	10%	5%	10%	0%	0%	3%	28%	$0	$8,640	$0	$8,640
	Paget Street	South of Francis Street	East	New footpath	2	CIVIL	12a	50	50	$7,500	10%	5%	10%	0%	0%	3%	28%	$0	$9,600	$0	$9,600
	Burgess Street	Francis Street to Windsor Street	West	New footpath	1	CIVIL	12a	170	170	$25,500	10%	5%	10%	0%	0%	3%	28%	$32,640	$0	$0	$32,640
	Conrad Street	Paget Street to Bourke Street	South	New footpath	2	CIVIL	12a	385	385	$57,750	10%	5%	10%	0%	0%	3%	28%	$0	$73,920	$0	$73,920
	Teviot Street	Moray Street to Bourke Street	South	New footpath	3	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$24,960	$24,960
	Moray Street	Francis Street to Windsor Street	East	New footpath	1	CIVIL	12a	170	170	$25,500	10%	5%	10%	0%	0%	3%	28%	$32,640	$0	$0	$32,640
	Moray Street	Railway line to March Street	East	New footpath	1	CIVIL	12a	40	40	$6,000	10%	5%	10%	0%	0%	3%	28%	$7,680	$0	$0	$7,680
	Moray Street	Joseph Street to Lennox Street	East	New footpath	1	CIVIL	12a	75	75	$11,250	10%	5%	10%	0%	0%	3%	28%	$14,400	$0	$0	$14,400
	Moray Street	Railway line to College Street	West	New footpath	2	CIVIL	12a	160	160	$24,000	10%	5%	10%	0%	0%	3%	28%	$0	$30,720	$0	$30,720
	Joseph Street	Moray Street to Bourke Street	North	New footpath	2	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$24,960	$0	$24,960
	Lennox Street	Moray Street to Bourke Street	North	New footpath	2	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$24,960	$0	$24,960
	Bourke Street	Joseph Street to Lennox Street	West	New footpath	2	CIVIL	12a	85	85	$12,750	10%	5%	10%	0%	0%	3%	28%	$0	$16,320	$0	$16,320
	Bourke Street	Windsor Street to March Street	West	New footpath	1	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$24,960	$0	$0	$24,960
	Jersey Street	Francis Street to 85m north of Strong Place	West	New footpath	2	CIVIL	12a	170	170	$25,500	10%	5%	10%	0%	0%	3%	28%	$0	$32,640	$0	$32,640
	Strong Place	West of Jersey Street	South	New footpath	2	CIVIL	12a	220	220	$33,000	10%	5%	10%	0%	0%	3%	28%	$0	$42,240	$0	$42,240
										$1,658,250								$255,360	$1,736,640	$130,560	$2,122,560
New kerb ramps																					
	Kurrajong Road/ March Street	At Chapel Street intersection		New kerb ramps	1	CIVIL	16	-	3	$1,785	10%	5%	10%	0%	0%	3%	28%	$2,280	$0	$0	$2,280
	Chapel Street	At Windsor Street intersection		New and replaced kerb ramps	2	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
	Chapel Street	At Francis Street intersection		New kerb ramps	2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Francis Street	At Bensons Lane intersection		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Francis Street	At Jersey Street intersection		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Castlereagh Road	At Hereford Street intersection		New kerb ramps	2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Castlereagh Road	At Long Street intersection		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Hereford Street	At Douglas Street		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Hereford Street	At Town Street		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Hereford Street	At Katrina Close		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Douglas Street	At Powell Street		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Douglas Street	At Catchpole Avenue		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Douglas Street	At Thompson Avenue		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520

PAMP for Hawkesbury
Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description	Side	Works Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
	Powell Street	South leg of Mason Avenue		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Powell Street	At Valder Avenue		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Powell Street	At Catchpole Avenue		New kerb ramps	2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Mason Avenue	At Catchpole Avenue		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Valder Avenue	At Catchpole Avenue		New kerb ramps	2	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
	Paget Street	At Ridge Place		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Paget Street	At Bayly Court		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Paget Street	At College Street		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Moray Street	At Richard Street		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Moray Street	At Teviot Street		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Moray Street	At Joseph Street		New kerb ramps	1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	Bourke Street	At Joseph Street		New kerb ramps	2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Jersey Street	At Strong Place		New kerb ramps	2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	March Street	At West Market Street		Replace existing kerb ramps (potential issues with drainage and services)	1	CIVIL	16	-	8	$4,760	10%	5%	10%	0%	0%	3%	28%	$6,090	$0	$0	$6,090
										$35,701								$9,130	$36,500	$0	$45,630
Other works																					
	Castlereagh Street	Between Hereford Street and Lennox Street	East	New pedestrian refuge crossing adjacent to school	1	CIVIL	17	-	1	$10,000	10%	5%	10%	0%	0%	3%	28%	$12,800	$0	$0	$12,800
	March Street	Intersection of March Street and West Market Street - west and east legs		Remove infill signs from rails at refuge crossings	1	MAINTENANCE	42	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	March Street	West of East Market Street	North	Concrete footpath widening to kerb either side of bus stop	1	CIVIL	12a	5	5	$750	10%	5%	10%	0%	0%	3%	28%	$960	$0	$0	$960
	March Street	West of East Market Street at entrance to park	North	Install ramp (to replace existing step)	1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	March Street and Bosworth Street	Signalised intersection		All kerb ramps are too steep and are to be replaced, substantial civil works, may require service pit relocation (nominal cost allowance)	1	CIVIL	-	-	-	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
				SW corner - potential land acquisition on corner to enable more storage space for pedestrians and clearance from the roadway	1	PLANNING	2	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	March Street	West of East Market Street	North	Replace damaged concrete panel	2	CIVIL	12a	2	2	$300	10%	5%	10%	0%	0%	3%	28%	$0	$380	$0	$380
	March Street and East Market Street	Signalised intersection		Replace missing push button cover	1	MAINTENANCE	42	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
				All kerb ramps are too steep and are to be replaced, substantial civil works, may require service pit relocation (nominal cost allowance)	1	CIVIL	-	-	-	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	Lennox Street	Marked crossing to the east of Castlereagh Road		Install raised pedestrian crossing with kerb outstands	1	CIVIL	24	-	1	$21,666	10%	5%	10%	0%	0%	3%	28%	$27,730	$0	$0	$27,730
	Blacktown Road	Intersection with Bourke Street		Kerb ramp replacement	3	CIVIL	16	-	8	$4,760	10%	5%	10%	0%	0%	3%	28%	$0	$0	$6,090	$6,090
	Blacktown Road	Intersection with Bourke Street		Concrete footpaths to join the kerb ramps on all four corners	3	CIVIL	12a	20	20	$3,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$3,840	$3,840
	Windsor Street and East Market Street	Signalised intersection		All kerb ramps are too steep and are to be replaced, substantial civil works, may require service pit relocation (nominal cost allowance)	1	CIVIL	-	-	-	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	General	Various locations where trees have been planted next to footpaths resulting in footpath damage		Review Council procedure for tree planting next to footpaths. Many locations of footpath are failing (cracking, etc) and if replaced will fail in the same way.	1	MAINTENANCE	42	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
										$86,071								$99,850	$380	$9,930	$110,160
										$1,780,022								$364,340	$1,773,520	$140,490	$2,278,350
North Richmond																					
New footpaths																					
	Bells Line of Road	Pitt Lane to Richmond Bridge	South	Shared path - refer bicycle schedule	n/a	-	-	-	-	$0	10%	0%	0%	0%	0%	3%	13%	$0	$0	$0	$0
	Bells Line of Road	Terrace Road to end of service lane	North	New footpath	1	CIVIL	12a	500	500	$75,000	10%	5%	10%	0%	0%	3%	28%	$96,000	$0	$0	$96,000
	Terrace Road	Bells Line of Road to industrial centre driveway	East	New footpath	3	CIVIL	12a	240	240	$36,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$46,080	$46,080
	Beaumont Avenue	Terrace Road to Norfolk Place	South	New footpath	2	CIVIL	12a	475	475	$71,250	10%	5%	10%	0%	0%	3%	28%	$0	$91,200	$0	$91,200
	Norfolk Place	Beaumont Road to end	East	New footpath	2	CIVIL	12a	230	230	$34,500	10%	5%	10%	0%	0%	3%	28%	$0	$44,160	$0	$44,160
	Riverview Street	Pitt Lane to pathway	West	New footpath	1	CIVIL	12a	25	25	$3,750	10%	5%	10%	0%	0%	3%	28%	$4,800	$0	$0	$4,800
	Pitt Lane	South of Bells Line of Road to Riverview Street	East	New footpath	1	CIVIL	12a	75	75	$11,250	10%	5%	10%	0%	0%	3%	28%	$14,400	$0	$0	$14,400
	Flinders Place	Pitt Lane to Shortland Close	North	New footpath	2	CIVIL	12a	110	110	$16,500	10%	5%	10%	0%	0%	3%	28%	$0	$21,120	$0	$21,120
	Shortland Close	Pathway and Riverview Street	East	New footpath	2	CIVIL	12a	50	50	$7,500	10%	5%	10%	0%	0%	3%	28%	$0	$9,600	$0	$9,600
	Flinders Place	Riverview Street to pathway (loop)	North	New footpath	2	CIVIL	12a	360	360	$54,000	10%	5%	10%	0%	0%	3%	28%	$0	$69,120	$0	$69,120
	Riverview Street	Grose Vale Road to Pitt Lane	South	New footpath	1	CIVIL	12a	325	325	$48,750	10%	5%	10%	0%	0%	3%	28%	$62,400	$0	$0	$62,400
	Sunnyside Crescent	Grose Vale Road to Enfield Avenue	North	New footpath	1	CIVIL	12a	100	100	$15,000	10%	5%	10%	0%	0%	3%	28%	$19,200	$0	$0	$19,200
	Keda Circuit	Matheson Avenue to Matheson Avenue (loop)	North	New footpath	3	CIVIL	12a	400	400	$60,000	10%	5%	10%	0%	0%	3%	28%	$0	$0	$76,800	$76,800
	Matheson Avenue	Keda Circuit (east) to Enfield Avenue	North	New footpath	3	CIVIL	12a	275	275	$41,250	10%	5%	10%	0%	0%	3%	28%	$0	$0	$52,800	$52,800
	Enfield Avenue	Sunnyside Crescent to pathway opposite Matheson Avenue	West	New footpath	2	CIVIL	12a	335	335	$50,250	10%	5%	10%	0%	0%	3%	28%	$0	$64,320	$0	$64,320
	William Street	Grose Vale Road to Charles Street	North	New footpath	1	CIVIL	12a	230	230	$34,500	10%	5%	10%	0%	0%	3%	28%	$44,160	$0	$0	$44,160
	William Street	Grose Vale Road to Charles Street	South	New footpath	1	CIVIL	12a	230	230	$34,500	10%	5%	10%	0%	0%	3%	28%	$44,160	$0	$0	$44,160
	William Street	Charles Street to Campbell Street	South	New footpath	1	CIVIL	12a	215	215	$32,250	10%	5%	10%	0%	0%	3%	28%	$41,280	$0	$0	$41,280
	Elizabeth Street	Charles Street to Campbell Street	North	New footpath	1	CIVIL	12a	215	215	$32,250	10%	5%	10%	0%	0%	3%	28%	$41,280	$0	$0	$41,280
	Campbell Street	William Street to Elizabeth Street	East	New footpath	2	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$24,960	$0	$24,960
	Charles Street	South of Bells Line of Road to William Street	East	New footpath	1	CIVIL	12a	105	105	$15,750	10%	5%	10%	0%	0%	3%	28%	$20,160	$0	$0	$20,160
	Charles Street	William Street to Elizabeth Street	East	New footpath	1	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$24,960	$0	$0	$24,960
	Charles Street	Elizabeth Street to Monti Place	East	New footpath	2	CIVIL	12a	110	110	$16,500	10%	5%	10%	0%	0%	3%	28%	$0	$21,120	$0	$21,120
	Charles Street	Bells Line of Road to William Street	West	New footpath	2	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$24,960	$0	$24,960
	Charles Street	William Street to Elizabeth Street	West	New footpath	2	CIVIL	12a	130	130	$19,500	10%	5%	10%	0%	0%	3%	28%	$0	$24,960	$0	$24,960
	Monti Place	End to end	North	New footpath	3	CIVIL	12a	310	310	$46,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$59,520	$59,520
	Mokari Street	Monti Place to Pecks Road	East	New footpath	3	CIVIL	12a	270	270	$40,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$51,840	$51,840
	Hayman Street	Monti Place to Pecks Road	East	New footpath	2	CIVIL	12a	250	250	$37,500	10%	5%	10%	0%	0%	3%	28%	$0	$48,000	$0	$48,000
	Ignatius Avenue	Haymarket Street to pathway	North	New footpath	3	CIVIL	12a	150	150	$22,500	10%	5%	10%	0%	0%	3%	28%	$0	$0	$28,800	$28,800
										$915,750								$412,800	$443,520	$315,840	$1,172,160

PAMP for Hawkesbury

Job No HS11250
Date Oct-09

GTAconsultants

Route No.	Route Name	Route Description	Side	Works Item	Priority (1, 2, 3)	Works Type	Standard Cost Ref	Total Distance (m)	Multiplier*	Base Cost	Contingencies	Maintenance and Repairs	Minor Utility Adjustments	Landscaping & Urban Design	Work Under Traffic	Design Fees	Total Mark Up	Priority 1 Item Cost	Priority 2 Item Cost	Priority 3 Item Cost	Total Item Cost
New kerb ramps																					
	Bells Line of Road	NE corner of Terrace Road			1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	Terrace Road	NE and SE corners of Beaumont Ave			3	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$0	$760	$760
	Beaumont Avenue	West and north legs of Norfolk Place			2	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
	Pitt Lane and Riverview Street	North and west legs of intersection			1	CIVIL	16	-	5	$2,975	10%	5%	10%	0%	0%	3%	28%	$3,810	$0	$0	$3,810
	Shortland Close and Riverview Road	North and west legs of intersection			2	CIVIL	16	-	4	$2,380	10%	5%	10%	0%	0%	3%	28%	$0	$3,050	$0	$3,050
	Matheson Avenue	Keda Circuit			3	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$0	$1,520	$1,520
	Matheson Avenue	Enfield Avenue			3	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$0	$1,520	$1,520
	Sunnyside Crescent	NW corner at Enfield Avenue			1	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$760	$0	$0	$760
	William Street	Intersection with Charles Street			1	CIVIL	16	-	8	$4,760	10%	5%	10%	0%	0%	3%	28%	$6,090	$0	$0	$6,090
	Elizabeth Street	NW and SE corners at Charles Street			1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
	William Street	At Campbell Street			2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Elizabeth Street	At Campbell Street			2	CIVIL	16	-	1	$595	10%	5%	10%	0%	0%	3%	28%	$0	$760	$0	$760
	Monti Place	At Charles Street			2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Monti Place	East of Haymarket Street			3	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$0	$1,520	$1,520
	Monti Place	East of Mokari Street			3	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$0	$1,520	$1,520
	Hayman Street	At Ignatius Avenue			2	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$0	$1,520	$0	$1,520
	Grose Vale Road	At Sunnyside Crescent		Replace existing kerb ramps	1	CIVIL	16	-	2	$1,190	10%	5%	10%	0%	0%	3%	28%	$1,520	$0	$0	$1,520
										$25,586								$15,220	$10,660	$6,840	$32,720
Other works																					
	Grose Vale Road	140m north of Pecks Road		Refuge crossing	2	CIVIL	17	-	1	$10,000	10%	5%	10%	0%	0%	3%	28%	$0	$12,800	$0	$12,800
	Bells Line of Road	Across intersection with Pitt Lane		Reinstate kerb and provide metal plate across drainage on western corner (nominal cost allowance)	1	CIVIL	-	-	-	$3,000	10%	5%	10%	0%	0%	3%	28%	$3,840	$0	$0	$3,840
										$13,000								$3,840	$12,800	$0	$16,640
										$954,336								$431,860	$466,980	$322,680	$1,221,520
Total										**$4,832,056**								**$1,433,020**	**$3,691,580**	**$1,060,250**	**$6,184,850**

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