integrated transport & land use strategy

~ draft report ~

Prepared for Penrith City Council

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GEOPLAN

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GLOSSARY

ACRONYMS

Acronym	Full Name
ABC	Australian Bicycle Council
ABS	Australian Bureau of Statistics
AHHS	Average household size (average number of persons per dwelling). Calculated by dividing the number of people in occupied private dwellings by the number of occupied private dwellings.
AMCORD	Australian Model Code for Residential Development
AS	Australian Standards
AT	Active Transport
BASIX	Building Sustainability Index, NSW
BFA	Bicycle Federation of Australia
BNSW	Bicycle NSW
BSWC	Bus Stop Walking Catchment
BUG	Bicycle User Group
CBD	Central Business District
CCD	Census Collector District
CCTV	Closed Circuit Television
DA	Development Application (defined by EP&A Act)
DCP	Development Control Plan (defined by EP&A Act)
DEC	Department of Environment and Conservation, NSW
DIPNR	Department of Infrastructure, Planning and Natural Resources, NSW (now DOP)
DOP	Department of Planning, NSW (formerly DIPNR, PlanningNSW and DUAP)
DUAP	Department of Urban Affairs and Planning, NSW (now DOP)
EP&A	Act NSW Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority, NSW (now DEC)
GIS	Geographic information system
HTS	Household Travel Survey
JTW	Journey to Work
LATM	Local Area Traffic Management.
LEP	Local Environmental Plan (defined by EP&A Act)
LGA	Local Government Area
LGSA	Local Government and Shires Associations, NSW
MOT	Ministry of Transport, NSW
NPWS	National Parks and Wildlife Service, NSW (now DEC)
NSW	New South Wales
OPD	Occupied private dwelling
PAMP	Pedestrian Access and Mobility Plan
PCA	Pedestrian Council of Australia
PCC	Penrith City Council

Acronym	Full Name
PITLUS	Penrith Integrated Transport & Land Use Strategy
PMV	Private motorised vehicle
PPT	Personal Public Transport
PT	Public Transport
REP	Regional Environmental Plan (defined by EP&A Act)
RTA	Roads and Traffic Authority, NSW
SACC	Standard Australian Classification of Countries
SCATS	Sydney Coordinated Adaptive Traffic System
SD	Statistical Division
SEDA	Sustainable Energy Development Authority, NSW
SEIFA	Socio-Economic Indexes for Areas
SEPP	State Environmental Planning Policy (defined by EP&A Act)
SLA	Statistical Local Area
SoER	State of the Environment Report (defined by NSW Local Government Act 1993)
SREP	Sydney Regional Environmental Plan (defined by EP&A Act)
SVG	Scalable Vector Graphic
TAFE	Technical And Further Education institute
TAG	Transport Access Guide
TDC	Transport Data Centre (formerly Transport and Population Data Centre)
TDM	Travel Demand Management
TMAP	Transport Management and Access Plan
TMC	Transport Management Centre
TOD	Transit Oriented Development
TP	Travel Plan
TPDC	Transport and Population Data Centre (now Transport Data Centre)
UDAS	Urban Design Advisory Service (a business unit of DIPNR)
URA	Urban Release Area
UWS	University of Western Sydney
VKT	Vehicle Kilometres Travelled
VMS	Variable Message Signs

TERMS

Term	Definition
Accessibility	The ease with which people can access or undertake a range of daily activities (employment, shopping, education, health, entertainment, social and other) in an area with a minimum of travel. The word 'accessible' is often more narrowly used to describe improvements to transport for people with physical and other disabilities.
Accessibility zoning	Areas of equal accessibility, defined on a map.
Accessible centre	A concentration of mixed land uses, generally around a public transport stop with an environment favourable to walking, cycling and access to public transport.
Active Transport	Travel modes that involve physical activity - movement undertaken by active means, e.g. walking, cycling, jogging, skating, roller blading etc — including access to public transport.
Average household size	Average number of persons per dwelling - calculated by dividing the number of people in occupied private dwellings by the number of occupied private dwellings.
Bicycle lane	A marked on-road lane provided for the movement of cyclists.
Brownfields development	Redevelopment of built sites or development of vacant sites within existing urban areas. Related terms are infill development and urban renewal.
Bus lanes	Traffic lanes on a roadway that are for the use of buses. Bus lanes can be exclusively for buses and or shared with taxis and high occupancy vehicles.
Bus Priority	Traffic management measures where buses have priority over other vehicles in the traffic stream. These include bus-activated traffic signals and bus only lanes.
Busways	Special roadways designed for the exclusive use of buses. A busway can be in its own right-of-way or part of a highway. Short stretches of streets designated for exclusive bus use are sometimes also called busways.
Census Collector District	The smallest geography for which Census data is available (comprise around 200 households each).
Cities for Climate Protection	A program that helps local government and communities reduce greenhouse gas emissions.
Closed Circuit Television	The RTA's Transport Management Centre uses a network of over 400 CCTV cameras to confirm and manage traffic incidents.
Commuter car parks	Provided for the use of public transport passengers at public transport nodes, for example, at railway stations.
Commuter Cyclists	Commuter cyclists ride more days per week, travel longer distances and make more trips per week by bicycle than other cyclists.
Connectivity	The degree to which streets join to each other.
Cycle Advisory Group	A group of stakeholder representatives that advises on improving cycling conditions.
Cycle Facility	Infrastructure that is cycling-specific, such as cycle lanes, paths and parking.
Cycle Lane	A lane marked on a road with a cycle symbol, which can only be used by cyclists.
Cycle Network Plan	A map of the primary cycle route network (see definition below) and a schedule of the cycle infrastructure projects required to develop it.
Cycle Path	An off-road path for cycles. It can be an exclusive cycle path, a shared-use path or a separated path (see definitions below).

Term	Definition
Cycle Provision	The provision of satisfactory conditions for cycling, whether or not there are specific cycle facilities.
Cycle Planner/Champion	A road controlling authority employee who is responsible for the day-to-day planning and implementation of cycle provision in the authority's area.
Cycling Policy	A general course of action relating to cycling to be adopted by the government or an organisation.
(Cycling) Safety Audit	A formal process to identify factors that could either increase the risk of crashes involving cyclists, or increase the severity of cyclists' injuries in a crash.
Cycling Strategic Plan (or Bike Plan)	A document setting out cycling objectives and the actions required to achieve them including a cycle network plan.
Cycleway	An off-road cycling path — in almost all instances in NSW, these are shared walking and cycling paths.
Desire Lines	A straight line or fastest route between the origin and destination of a potential trip.
Developed Areas	Developed areas are considered to be those areas where more intensive land use activity occurs, such as urban residential areas, employment centres etc.
Directness	The degree to which streets lead directly, without deviation, to destinations such as accessible centres.
Exclusive bike path	A path that can be used legally only by cyclists.
Externalities and External Costs	The impacts of people's behaviours that are borne by others or the community generally. Externalities are made up of external costs and external benefits. They can be distinguished from internal costs and benefits, which are borne directly by the user. For example, when people use their cars, they incur the internal costs of fuel and wear and tear of their motor vehicle. They also generate greenhouse gas emissions, air pollution and noise pollution that adversely impact on the wider community. These are external costs.
Footpath	The sealed walking path (or 1.5–2m wide corridor if unsealed) along the footway.
Footway	The property boundary to kerb pedestrian movement space which generally includes a footpath and nature strip.
Frontage	The interface between a land use and the street.
GIS	Geographic information system - a computer based mapping system. Other information can be linked to the geographic information using a data base.
Grade Separation	The vertical separation of cyclists by a bridge or underpass across a roadway, railway line etc. It contrasts with an at grade intersection or level crossing.
Greenfield Development	New development on undeveloped land on the city's fringe.
Incident	Any event which causes a temporary reduction in road capacity or an abnormal increase in traffic demand.
Indicator	Data used to show, either directly or by proxy, a trend over time. This may be used to assess the effectiveness of plan objectives.
Interchange	A facility that provides for the safe and convenient transfer of passengers from one mode of transport to another.
Legibility	The ease of understanding of how a transport system works, including how to move around and how to access and use the system.

Term	Definition
Level Of Service	The quality measure of how well conditions provide for road users. For motor traffic it mainly assesses interruptions to free traffic flow. For cycling, other factors such as perceived safety, comfort, and directness of route are more important.
LGA	Local government area i.e. municipality, shire or council. The ACT government also fulfills the role of a local government.
Livability	The quality of life of an area, including such factors as the quality of public areas, accessibility and economic vitality.
Managing travel demand	Refers to measures which: • minimise the need to travel and the length of trips, particularly by cars; and • direct travel to the most sustainable mode of transport.
Masterplan	A concept design for a release area or redevelopment site, usually prepared as part of a rezoning.
Mixed use centres	Centres containing a variety of services and activities such as businesses, shops, community services and entertainment facilities.
Mixed use development	Development that involves more than one activity, either vertically or horizontally, for example, housing located above shops.
Mode	The means of travel, for example, car, ferry and bicycle.
Multi-purpose trips	Trips taken for more than one purpose, for example, shopping is done on the way home from work.
Net community benefit	Development which has no detrimental effect on public or private investment in centres and which addresses the assessment criteria in this policy.
Nodes	Are centres of activity such as commercial centres, retail centres, education facilities and other centres of human activity. In the transport context they generally refer to centres that are trip origins and/or destinations.
Opportunity Costs	Are costs that result from not taking up the alternate use of a good, service or asset. For example, the opportunity cost of a car park is the value that the land on which the car park sits if it was used for another purpose for which it is suitable. Residential or commercial development might be among the alternative purposes for a car park site.
Pedestrian Access Plans (or Travel Access Plans)	Plans usually developed for an office, industrial facility, business, school, university or some other activity that show how users of the facility might maximise opportunities to walk to the facility rather than use their cars to access the site. Such plans might also include opportunities to access a site using cycling and public transport.
Pedestrian and walking	Includes people using non-motorised mobility aids and motorised wheel chairs.
Permeability	The degree to which streets allow pedestrians and cyclist to take short cuts and select multiple alternative route options.
Personal Rapid Transit Systems	Are new rail based technologies, with driver-less vehicles that operate on demand.
Primary Cycle Network	The most used cycle facilities, designed mainly for trips across town, between suburbs and to major destinations such as schools, shopping centres etc.
Public transport node	The point at which one gains access to the public transport network, for example, bus stop, railway or transitway station.
Rail or transitway station precinct	The area immediately surrounding a railway or transitway station.
Rail trails	Are shared-use paths recycled from abandoned railway corridors. They can be used for walking, cycling and horse riding. Rail trails link big and small country towns and meander through scenic countryside just as railways did in the past. Description by 'Railtrails Australia' Copyright 2005.

Term	Definition
real time information systems	Accurately predict the arrival time of buses at bus stops, based on knowing the location of the bus and then disseminating this information to the public. In other areas, this has involved the use of telemetry relaying a bus' position for analysis and arrival prediction.
Recreational Cyclists	Recreational cyclists are likely to ride less often per week than commuter cyclists and are more likely to ride on bicycle paths, but there are likely to me more of them.
Road reserve	The entire street space from property boundary to property boundary.
Roadway	The kerb-to-kerb vehicular movement space.
Safety	The degree to which pedestrians and cyclists are (or feel) free from the risk of injury from falls or collisions.
SCATS	The Sydney Coordinated Adaptive Traffic System. SCATS is a computer-based system which controls and co-ordinates signalised intersections. SCATS was developed by the RTA and is currently in use in over 80 cities around the world.
Security	The degree to which people walking or cycling are (or feel) safe from personal attack.
Separated Path	A path where the section for cyclists' use is separated from the section for pedestrians' use.
Shared Use Path	A path provided for use by both cyclists and pedestrians.
Statistical Local Area	A statistical area 'usually' smaller than an LGA.
Street network	The pattern of street connections.
Structure plan	A spatial concept design for a major release area, usually covering a broad area.
Surveillance	Overlooking of streets, laneways and open space areas by people using these spaces, or by people within adjacent dwellings, shops and other buildings. Surveillance generally improves security.
Sustainable transport	Has been defined as transportation that does not endanger public health or ecosystems and meets the needs for access consistent with sustainable use of renewable resources at below their rates of regeneration, and use of non-renewable resources at below the rates of development of renewable solutions (OECD, 1999) from Hans Westerman, ARRB conference, Dec. 2002.
Sustainable Transport Modes	Walking, cycling and public transport, as these modes are seen as important in achieving a more sustainable transport system in future.
Tidal Flow	A stem which optimises the flow of traffic along a roadway by increasing the number of lanes available in the direction which carries more traffic. The best known example is the Sydney Harbour Bridge, which adjusts the direction of travel of its 8 lanes according to traffic demand
Transit Oriented Development	Transit Oriented Development (TOD) is development that is built around and oriented towards public transport services. The design of transit-oriented development is such that development encourages and supports the use of public transport services and, as a corollary, development is supported and enhanced by the public transport services. TODs can be commercial, residential or a mixture of the two and are generally characterised by high to medium building development around a public transport node.
Transport Access Guide (TAG)	A Transport Access Guide presents ways to reach a site or venue using low-energy forms of transport such as public transport, walking or cycling. (Refer to 7-A for further information)
Transport Management Centre	A purpose-built RTA facility, which manages the NSW road network. The TMC monitors and manages traffic 24 hours a day, 7 days a week through the use of advanced technologies and systems.

Term	Definition
Travel Demand Management	Measures designed to minimise the need for travel as well as the length of trips, particularly by cars. TDM techniques can be broken into the following classifications: • improved transport options; • incentives to use alternative modes and reduce driving; • parking and land use management; and • policy and institutional reforms.
Travel Plan	Travel Plans can also be known as Employee travel programs, or green travel plans, and are workplace initiatives undertaken by the employer that are generally appropriate in large workplaces. The aim of these programs is to provide transport options and encouragement for employees in a workplace to encourage more sustainable travel. Travel plans can also be used for commercial, residential, educational and tourism developments. (Refer to 7-A for further information)
TravelSmart	A generic name for Travel Demand Management programs designed to influence people's use of travel modes through travel behaviour change. They are generally used to encourage greater use of walking, cycling and public transport.
Traffic Calming	A combination of measures (mostly changes to the road environment) aimed at altering driver behaviour (such as by reducing speed) and improving conditions for pedestrians and cyclists.
Transit Lane	A lane which can only be used by public passenger vehicles, motor cycles, bicycles and motor vehicles carrying a specified minimum number of passengers.
Trip generator	A land use that attracts people and so creates trips. This may be on a regular or irregular basis. Hospitals for example generate many trips on a regular basis, whilst events do so on an irregular basis.
Trip-generating development	Businesses and services that are frequently accessed by many people and create a demand for travel.
Utility Cycling	Cycling done mainly to get to an activity at the journey's end, such as shops or major activity centres.
Variable Message Signs	Their primary function is to display information about current incidents in the immediate area. When they are not being used for this purpose, they are utilised to display standby road safety and traffic management messages. 60 permanent Variable Message Signs (VMS) are in use in NSW.
Vehicle kilometres Travelled (VKT)	A measure of the total distances of travel by cars, that is, the number of kilometres travelled by private car.

REFERENCES

PENRITH CITY COUNCIL DOCUMENTS

Acronym/ Abbreviation	Full Title
	Access and Transport Analysis of Penrith City Centre & St Marys Town Centre, Sinclair Knight Merz (SKM), 19 October 2004;
	Penrith City Council – Bus Service Analysis Study, 2 Plan Consulting, May 2006
	Bus Shelter Program
	City Centre Access Map – Penrith, Penrith City Council
DCP2006	*Penrith Development Control Plan 2006, Penrith City Council*
EPDP	*City of Penrith Employment Planning Discussion Paper, Newplan Urban Planning Solutions, June 2006*
PARS	*Revised Penrith LGA Arterial Road Study (A Focus on Development Infrastructure), Sims Varley, February 2005*
	Penrith City Council Bicycle Plan – Final Report, Cycle Planning Consulting Services, December 1996
	Penrith City Council Draft Employment Planning Strategy, June 2006;
	Penrith City Council Management Plan 2006-2007, Part A – Summary, 1 July 2006
	Penrith City Council Management Plan 2006-2007, Part B – Operational Plan, 1 July 2006
	Penrith City Centre Review
	Penrith City Centre Parking Strategy, Glazebrook and Associates, 19 May 2006
	Our City Centres: Penrith City Centre Strategy, MG Planning, July 2006
	Penrith City Council Strategic Plan 2005-2009
	Strategic Plan 2005 – 2009, Penrith City – The Competitive Edge, Strategic Program Progress Report, 31 December 2005
PLANS	*PLANS Study strategy Report – Final report, Urbis JHD & Stratcorp Consulting, 19 November 2003*
PAMP	*Penrith Pedestrian Access and Mobility Plan, Arup Transportation Planning, April 2001*
	Penrith & St Marys Our City Centres Project Community Visioning Process Report, Village Well, January 2005
	Penrith Traffic Volumes, CFE Information Technologies, August 2006
	Rezonings ~ 'Stand Alone' Applications and Current Proposals, PCC
	Rezoning Proposals: City Centres; Employment; Rural & Residential, Penrith City Council
	Sustainable Penrith - Sustainability Blueprint for Urban Release Areas, June 2005.
	Our City Centres: St Marys Town Centre Strategy, MG Planning, July 2006
	Status of New Release Areas in Penrith, - Council's Report – 6 March 2006
	Town Centre Access Map – St Marys, Penrith City Council
	Transport Management & Accessibility Plan (TMAP) – Proposed Glenmore Park Stage 2, Transport & Traffic Planning Associates, October 2005
TMAP-SM	*St Marys Development (former A.D.I. Site) - Revised Transport Management Plan*

Acronym/ Abbreviation	Full Title
	Traffic Study, Sims Varely, May 2004
TMAP-WELL	*Transport Management & Accessibility Plan (TMAP) – Werrington Enterprise Living & Learning (WELL) Precinct, Maunsell/AECOM, 30 October 2006*
TPPR	*Summary of Travel Patterns of Penrith Residents, Transport & Population Data Centre, Revised 2004*
TPPSM	*Transport and Parking in the Penrith City Centre and St Marys Town Centre: The views of users and businesses, IRIS Research, March 2006*
	Penrith City Council Community Participation Manual v. 1.4. Procedures, Guidelines and Toolkit for Staff
	Penrith City Council Draft DCP, Part 2 Section 2.12 - Car Parking
	Penrith City Council Draft Employment Planning Strategy, June 2006
	City of Penrith Employment Planning Discussion Paper, June 2006
	Ordinary Meeting - Status of New Release Area. The City as a Social Place, March 2006
	Penrith Council Employment Plan Discussion Paper, June 2006, Penrith City Council and Newplan Urban Planning Solutions
	Penrith City Council Customer Survey, June 2005, IRIS Research Ltd
	Penrith City Centre Plan, 2006
	Established Residential Areas, Infrastructure Facilities and Services Strategy, adopted March 2004
	Out and About in Penrith: A study in cultural and physical barriers to public use of outdoor and recreational spaces in Penrith City, University of Western Sydney
	Penrith Employment Lands Study Stage 1 Leyshon Consulting Pty Ltd
	Penrith Employment Lands Study Stage 2 Leyshon Consulting Pty Ltd
	Sustainable Transport Gap Analysis Pilot, ICLEI-A/NZ Report, Final Report, June 2006, Penrith City Council and CCP Plus
	Developmental Health Impact Assessment Sites Submission Form, 2007.
	Information Paper: Proposed New Urban Areas in Penrith, May 2004. ADI Site, St Marys
	Community Profiles, Profile ID, November 2006

OTHER DOCUMENTS

Abbreviation	Full Title
AA	*Action for Air, Department of Environment & Conservation NSW, 2006 Update*
ATAP	*Accessible Transport Action Plan for NSW Transport, Roads & Maritime Agencies, Ministry of Transport, Roads & Traffic Authority, RailCorp, State Transit, Sydney ferries, NSW Maritime, June 2005 (http://www.transport.nsw.gov.au/abouttrans/access-trans-action-plan.pdf)*
BikePlan2010	*Action for Bikes - BikePlan 2010 NSW, Roads & Traffic Authority of NSW*
BPGPTS	*Best Practice Guidelines for NSW Public Transport Signage and Information Displays, Transport NSW, November 2002 (http://www.transport.nsw.gov.au/abouttrans/signage-guide.html*
BSPG	*Ministry of Transport Bus Service Planning Guidelines*
DSAPT	*Disability Standards for Accessible Public Transport, Commonwealth Legislation, 2002 (http://www.transport.nsw.gov.au/abouttrans/access-disability-standards.html);*

Abbreviation	Full Title
SEPP66	*Integrating Land Use And Transport - Draft State Environmental Planning Policy No 66 — Integration Of Land Use And transport (http://www.planning.nsw.gov.au/programservices/pdf/sepp66_transport.pdf);*
ILUT-O	*Integrating Land Use And Transport - Overview, Transport NSW & Department of Urban Affairs and Planning, September 2001*
ILUT-ITC	*Integrating Land Use And Transport - Improving Transport Choice — Guidelines for planning and development, Transport NSW, RTA & Department of Urban Affairs and Planning*
ILUT-BSPP	*Integrating Land Use And Transport - The right Place for Business & Services – Planning Policy, Transport NSW & Department of Urban Affairs and Planning*
IDG	*Interchange Design Guidelines, Ministry of Transport, September 2006*
MPP	*Metropolitan Parking Policy (draft not released)*
MS	*NSW Governments Metropolitan Strategy - City of Cities, A Plan for Sydney's Future, Department of Planning, December 2005*
MS(A)	*NSW Governments Metropolitan Strategy - Economy & Employment Strategy for Sydney, Department of Planning, December 2005*
MS(B)	*NSW Governments Metropolitan Strategy - Centres & Corridors Strategy for Sydney, Department of Planning, December 2005*
MS(C)	*NSW Governments Metropolitan Strategy - Housing Strategy for Sydney, Department of Planning, December 2005*
MS(D)	*NSW Governments Metropolitan Strategy - Transport Strategy for Sydney, Department of Planning, December 2005*
MS(E)	*NSW Governments Metropolitan Strategy - Environment & Resources Strategy for Sydney, Department of Planning, December 2005*
MS(F)	*NSW Governments Metropolitan Strategy - Parks & Public Places Strategy for Sydney, Department of Planning, December 2005*
MS(G)	*NSW Governments Metropolitan Strategy - Implementation & Governance Strategy for Sydney, Department of Planning, December 2005*
MS(app)	*NSW Governments Metropolitan Strategy - Appendices, References & Glossary, Department of Planning, December 2005*
MS-PIR	*NSW Governments Metropolitan Strategy - Preliminary Infrastructure Report for the North West and South West Growth Centres, Department of Planning, December 2005*
MS-TA	*NSW Governments Metropolitan Strategy - Transport Actions – Bus Corridor Map, Department of Planning, December 2005*
PARRY	*Ministerial Inquiry into Sustainable Transport in NSW, A Framework for the Future – Final Report (Parry), December 2003 (http://www.transport.nsw.gov.au/inquiries/parry-final-report.pdf)*
PGWC	*Planning Guidelines for Walking & Cycling, Department of Infrastructure, planning & Natural Resources, December 2004 (http://www.planning.nsw.gov.au/plansforaction/cycling.asp)*
PUAG	*Producing & Using Transport Access Guides, Roads & Traffic Authority of NSW (http://www.transport.nsw.gov.au/publications/transport-access-guide.pdf)*
S117	*Section 117 Ministerial Directions issued under the Environmental Planning and Assessment Act 1979 – NSW Planning Reforms, NSW Government Department of Planning, 30 September 2005*
S117 (DIRECTION#17)	*Section 117 Ministerial Directions issued under the Environmental Planning and Assessment Act 1979 – NSW Planning Reforms, NSW Government Department of Planning, 30 September 2005 (Direction Number 17 - Integrating Landuse and Transport)*

Abbreviation	Full Title
	(http://www.planning.nsw.gov.au/planning_reforms/p/s117s_30sept05.pdf)
SP	*State Plan, A New Direction for NSW, NSW Government, November 2006 (http://www.nsw.gov.au/stateplan)*
SPG	*Service Planning Guidelines, Ministry of Transport, June 2006 (http://www.transport.nsw.gov.au/busreform/service-planning-guidelines.pdf)*
SIS	*State Infrastructure Strategy NSW 2006-07 to 2015-16, NSW Treasury, June 2006*
SMBSM	*Sydney Metropolitan Bus Services Map, Area 1, 22 May 2006*
SMCR	*Sydney Metropolitan Contract Regions 2005, Department of Infrastructure, planning & Natural Resources*
TIPTU	*NSW Ministry of Transport Tax Incentives for Public Transport Users, Ernst & Young, August 2006*
UNSWORTH	*Review of Bus Services in New South Wales – Final Report (Unsworth), February 2004*
UTS	*Urban Transport Statement, responding to the Challenges of Travel & Transport within & across Sydney, Statement by Morris Iemma MP, Premier of New South Wales, Minister for State Development, Minister for Citizenship, November 2006 (http://www.nsw.gov.au/urban_transport.asp)*

chapter 1
introduction

1 INTRODUCTION

Penrith City Council (PCC) welcome you to the first Penrith Integrated Transport & Land Use Strategy (PITLUS). As well as listing the plans for integrating transport and land use, the Strategy provides the context for the development of the City's new Local Plan and informs state infrastructure provision plans post 2016 and recognises the regional City status of Penrith.

The strategy area encompasses the entire Penrith City Local Government Area (LGA) which is located at the western fringe of the Sydney metropolitan area - about 54 kilometres from the Sydney GPO. The City is bounded by Hawkesbury City in the north, Blacktown City and Fairfield City in the east, Liverpool City and Wollondilly Shire in the south, and Blue Mountains City in the west, and covers 40,476 hectares with a density of 4.25 people/ha. The estimated residential population of the Penrith LGA was 178,000 in 2005. At the 2001 Census, Penrith was the third most populous LGA in greater Western Sydney and the sixth largest in the State.

This draft of the Strategy will allow residents and stakeholders to comment on the plans to integrate transport and land uses and ensure that Council is heading in the right direction with their transportation aspirations for Penrith.

This report is divided into 9 sections:

1. Introduction – details the need for the strategy as well as highlighting the focus, objectives, vision and goals;
2. Strategy Development – provides a background to the development of the strategy;
3. Policy Context – presents an overview of key state and local policies and documents that are relevant to the development of the strategy;
4. Land Use Overview – highlights the key land use, population, workforce and employment opportunities and constraints;
5. Transport Overview - considers the existing transport opportunities and travel patterns and highlights the future travel with planned growth;
6. Area Overview – provides a detailed description of the issues in local areas and the key commercial centres;
7. PITLUS Actions – provides a list of strategy actions divided into a City Wide Action Plan and a Local Action Plan;
8. Key performance indicators – define the measures for determining the success of the strategy in achieving it's goals ; and
9. Implementation Plan – details the responsibility, stakeholders, cost implications, priority and timing for each of the strategy actions.

Key issues are easily identified within this report using the following legend:

Key Issues:

No. Description of Issue

Actions are easily identified using the following legend:

No. **Description of Action**

1.1 ABOUT THIS STRATEGY

The Strategy will pave the way for changing how decisions are made within Council to ensure that transport impacts of developments are positive and integrated with land uses. The nature of providing and encouraging the use of more integrated, accessible and environmentally friendly transport supports environmental, social and economic policy.

In brief, the aim of the strategy is to:

1. Bring together the various existing transport studies and strategies affecting the region into one comprehensive strategy document;
2. Engage agencies and others who contribute to the city's transportation network in the development of the Integrated Transport and Land Use Strategy;
3. Investigate factors that encourage or detract from use of non-car transport modes, in order to establish transport priorities;
4. Outline the economic, social and environmental costs and benefits of the various transport priorities identified for the region, and potentially conflicting outcomes among those priorities;
5. Provide Council with information and facts to support actions to implement and inform infrastructure planning for transport improvements; and
6. Outline an implementation strategy for transport improvements, including costing, timing and identify responsibilities.

1.2 WHY WE NEED A STRATEGY

Given the critical nature of challenges associated with transport and accessibility to the Penrith LGA, there is clearly a need to take appropriate interventions to produce more suitable and sustainable transport outcomes. A number of other reasons have prompted Council to prepare this strategy, some of which are highlighted below.

1.2.1 MEMORANDUM OF UNDERSTANDING

Penrith City Council entered into a Memorandum of Understanding with the Department of Planning (DOP) under the Planning reform fund program to ensure consistency between Council's planning directions and State and Regional planning objectives. One of the sub-tasks of this process was to develop an agreed strategy for Integrated Transport and Land Use Strategy that incorporates the agreed residential and employment projections set in Sydney's Metropolitan Strategy and to provide the context for the development of the City's new Local Environmental Plan, to inform state infrastructure provision plans and to recognise the regional City status of Penrith.

1.2.2 GOVERNMENT POLICY

In 1999, the NSW Government released Action for Transport 2010 – An Integrated Transport Plan for Sydney. This Plan identified the need to undertake an Access Strategy for the Penrith region. This proposal recognises the need for a coordinated plan to address the local and regional transport challenges that present themselves to the Penrith LGA. However, Action for Transport 2010 has been overtaken by policy decisions following from the Unsworth Report and Parry Inquiry, and the Metropolitan Strategy.

There has been a clear shift in public policy for transport planning and provision in Australia. While the motor vehicle is still the principle mode of choice for most trips, continuous attempts are being made to upgrade public transport as an alternative to the private car for longer trips, as well as bicycle and pedestrian facilities for local trips. This has resulted in initiatives over the last 20 years,

to contain vehicle speed and access on a local level, including local area traffic management schemes (LATM) which acknowledge that safety is a key ingredient in assisting pedestrian and bicycle use. Through the RTA, the State government has subsequently developed guidelines which assist local government to plan and provide infrastructure for cyclists and pedestrians.

More recently public transport infrastructure is being upgraded through rail duplication and station improvements (Clearways program), the opening of dedicated bus only roads such as the Transitways from Parramatta to Liverpool, Rouse Hill and Blacktown and the progressive introduction of strategic bus corridors linking major metropolitan centres and enjoying intersection priority. The Urban Transport Statement (pg64) nominates Penrith as part of the possible catchment for new metro line transport. Also reports in the paper indicate that the NSW Government has considered private sector proposals for very fast trains from the City to Penrith via Parramatta.

1.2.3 ACCESS TO EMPLOYMENT & SERVICES

The availability of transport and ready access to jobs, leisure facilities and services affects people's quality of life. Through this Strategy, Council will work towards providing a safe and efficient transport system to serve its residents, to support a strong and prosperous economy and to protect the environment.

The attractiveness in terms of access to employment opportunities in western Sydney presents specific issues. Whilst Penrith City Council, together with other stakeholders, is seeking to deliver local economic programs, the lack of local employment opportunities in previous years has led to residents having to travel great distances to access the major employment centres across Sydney. The scale of this problem is highlighted in the travel statistics as the local population is almost entirely reliant upon the use of private motor vehicles as the means of access to work opportunities located within and outside of the LGA.

In recent decades, there has been a disproportionate emphasis towards the private car within developments at the expense of other transport options. This is particularly evident in the Penrith LGA. This Strategy aims to redress this balance by advising on changes to development policy and ensuring land use planning is integrated with transport.

1.2.4 WESTERN SYDNEY EMPLOYMENT HUB

The Metropolitan Strategy caters for the creation of 500,000 extra jobs over the next 25 years, with nearly half of these in Western Sydney. The plan forecasts that up to 7,500 hectares more employment land would be required in Sydney to accommodate future demand. The NSW Government announced the creation of a new major employment hub near the intersection of the M4 and M7 motorways, Western Sydney Employment Hub (WSEH), where up to 36,000 jobs could be created. This 2,450 hectare area is well positioned to become a major new job generating precinct, because of its strategic location near these two major roadways.

The Western Sydney Employment Hub spans four local government areas - Fairfield, Penrith, Blacktown and Holroyd. This area is already evolving as a key location for industrial and related development. It currently contains over 1,500 hectares of zoned employment lands, including the Erskine Park area.

The NSW Government will create a further 929 hectares of employment land within the Western Sydney Employment Hub. The area under investigation would include the rezoning of four major sites for employment purposes:

- 656 hectare site south of the Sydney Water pipeline (Fairfield and Penrith Local Government Areas (LGAs));
- 190 hectare site at Ropes Creek (Blacktown LGA);
- 22 hectare site at Quarantine Station (Blacktown LGA); and
- 61 hectare site at Huntingwood West (Blacktown LGA).

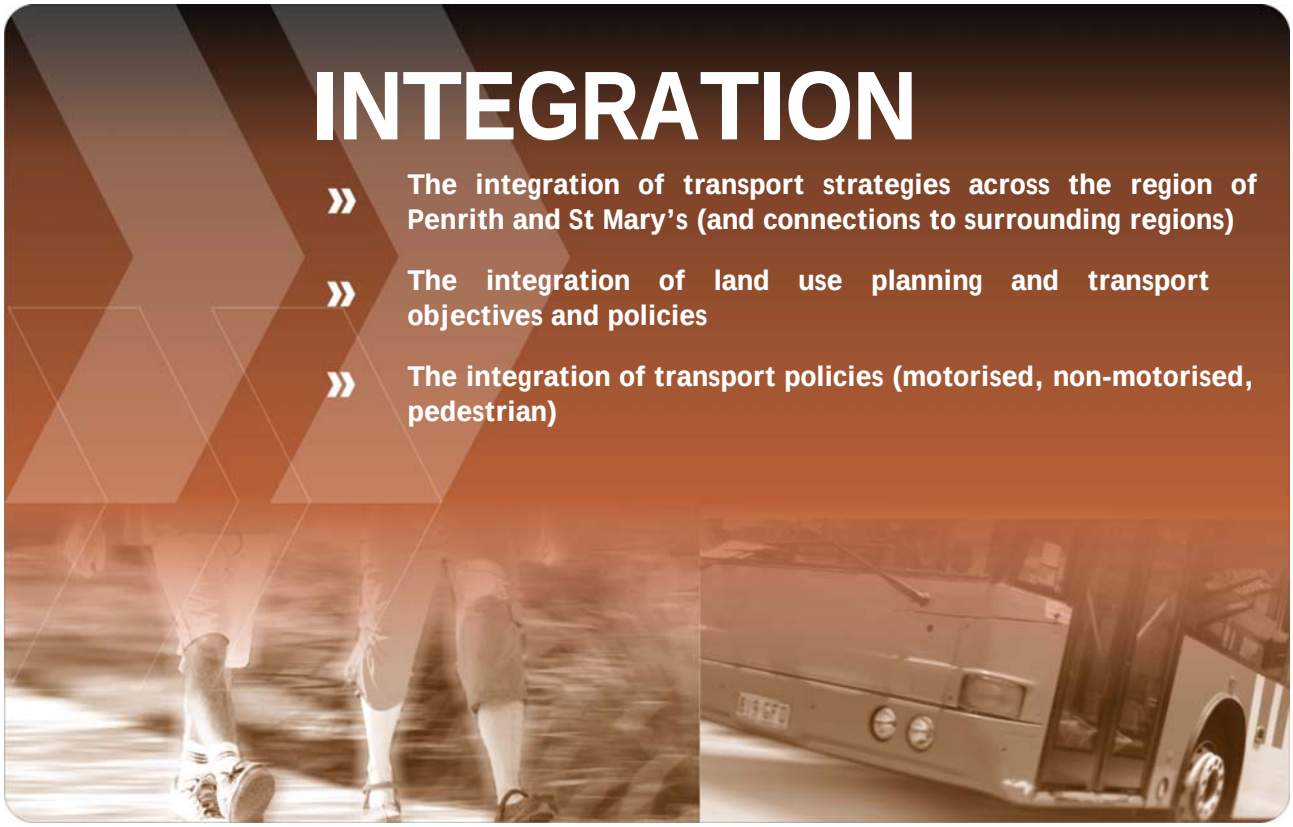
1.2.5 ENVIRONMENTAL CONCERNS

Whilst the current situation exhibits real problems and challenges, the full extent of the difficulties associated with the state of the local transport environment is highlighted through examination and analysis of future trends. Despite over two decades of state government policy, an examination of Penrith's existing transport environment reveals stressed air quality and a community that is experiencing significant challenges associated with accessibility. Future trends analysis reveals a likelihood of further increases in private car use and subsequent further stresses on local air quality and accessibility levels. The input of significant additional residential and business populations planned for the Penrith LGA, and the additional associated vehicular trips under Business As Usual (BAU), will only exacerbate these existing stresses to critical levels.

The prospect of a worsening transport environment such as increases in private car use, local air quality, accessibility levels is clearly an unacceptable outcome as it will be to the detriment to of the City's environmental health and the region's and residents' social and economic well being.

1.3 FOCUS OF THE STRATEGY

The focus of the project is land use and transport integration. The term *integration* refers to three distinct areas:



The need for 'integration' has always existed, however this need becomes more critical as a city grows. It becomes more evident then, that transport is closely linked to settlement patterns, health, access and the economy. Integrated transport planning therefore acknowledges the connection of transport infrastructure and investment to broader community goals of sustainability, amenity, and health.

The integrated transport approach requires the consideration of all transport modes rather than focusing on the component parts as discussed above. Through integration, more sustainable outcomes for land use, environmental and health outcomes can be affected.

The proposed Integrated Transport and Land Use Strategy will provide a framework to plan, facilitate and implement an integrated transport system for Penrith City that is based on the principles of sustainability. There is a need to provide viable, attractive and safe alternatives to different modes of transport (motorised, non-motorised, pedestrian) as a key to creating a more sustainable community.

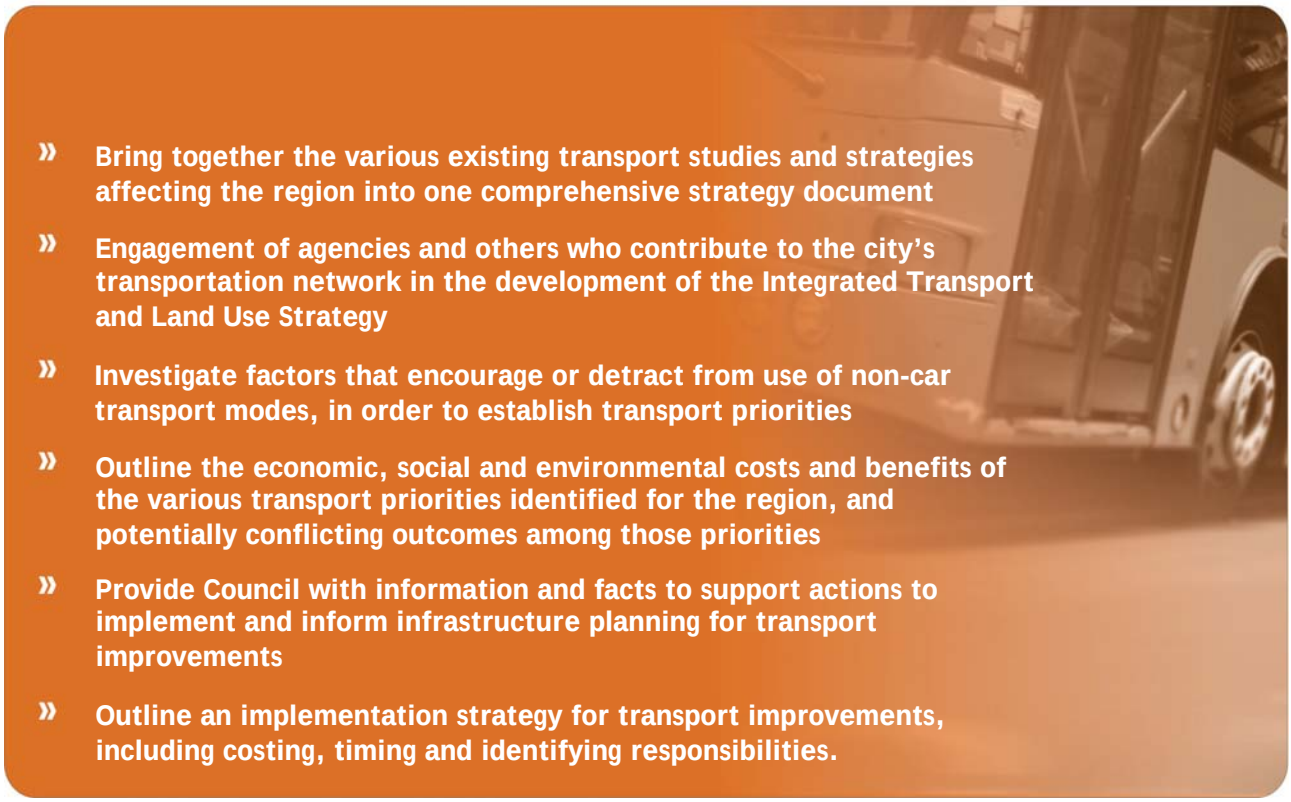
Penrith's Sustainability Blueprint for Urban Release Areas June 2005 provides principles that seek to form a cohesive community based on sustainable, safe and satisfying living and working environments. The Blueprint provides the delivery of key principles and strategies and provides a criteria to address in such areas as Transport and Land Use.

1.4 COUNCIL OBJECTIVES

The overall objectives of the Penrith Integrated Transport and Land Use Strategy were established by Penrith City Council (PCC). The objectives were defined in terms of the following three categories:

- For the Strategy;
- For the City; and
- For the Region

objectives for the STRATEGY



- Bring together the various existing transport studies and strategies affecting the region into one comprehensive strategy document
- Engagement of agencies and others who contribute to the city's transportation network in the development of the Integrated Transport and Land Use Strategy
- Investigate factors that encourage or detract from use of non-car transport modes, in order to establish transport priorities
- Outline the economic, social and environmental costs and benefits of the various transport priorities identified for the region, and potentially conflicting outcomes among those priorities
- Provide Council with information and facts to support actions to implement and inform infrastructure planning for transport improvements
- Outline an implementation strategy for transport improvements, including costing, timing and identifying responsibilities.

objectives for the CITY

- Provide improved and more sustainable transport options for residents of Penrith City to reduce dependence on the private motor vehicle
- Provide a local transport environment that encourages residents of the region to make more choices in favour of sustainable transport
- Determine transport infrastructure and improvements for the future growth in the LGA
- Determine the future transport and access requirements and recommend a broad traffic management scheme to achieve:
  - a safe, efficient and controlled public and private transport system
  - recommendations for an accessibility scheme that promotes a core pedestrian network;
  - provision of long term parking in peripheral areas with the possibility of an associated bus shuttle
- Provide safe and easy access throughout the City for all members of the
- Achieve a minimum 10% reduction in the use of the single-occupant motor vehicles
- Achieve an increase in the mode share to public transport of at least 10% above current levels

objectives for the REGION

- Provide access to services in the City that is equivalent to, or better than, in other regional cities
- Provision of public transport facilities and services that reasonably match the travel needs of the community for access to employment, centres, education and recreational facilities and other activity centres
- Provide information to support actions and make informed transport enhancements to extend the rail and bus networks to connect identified Strategic (Regional) Centres.
- Provide information to support actions to implement and to inform the need for early implementation of bus corridors (consistent with the Unsworth Report) for Region 1
- To provide improved transport options between Sydney's regional centres.
- To provide opportunities to increase transport connections to the North-west & South-west Growth Centres, and Western Region – with Penrith as a hub servicing these areas.
- Identify improvements for railway services to and from Penrith.
- Improve reliability and increase capacity of rail services.
- Identify regional freight corridors and reduce noise and air impacts of freight operations
- Improve local and regional walking and cycling networks.

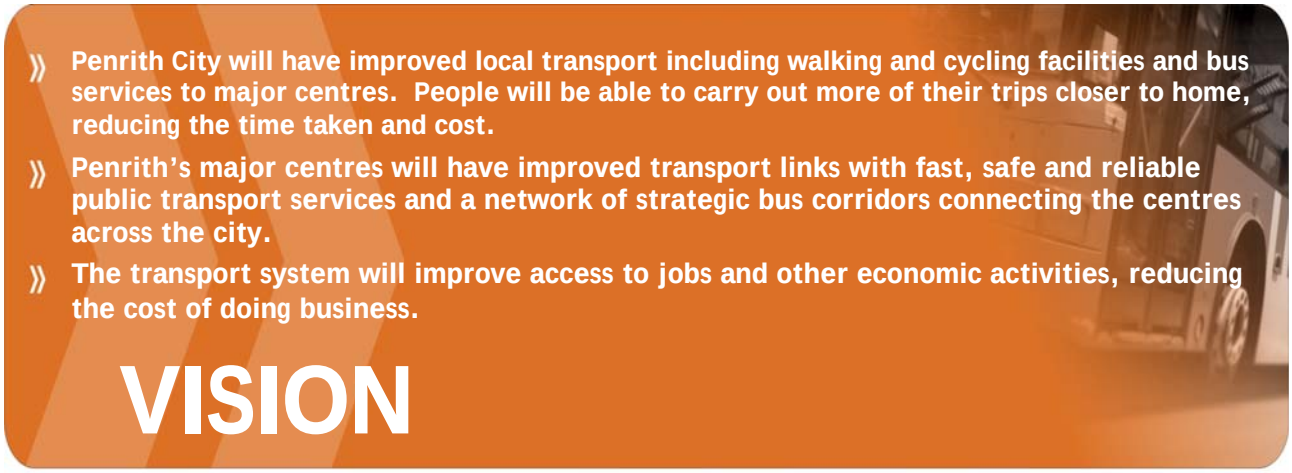
1.5 VISION AND GOALS OF THE STRATEGY

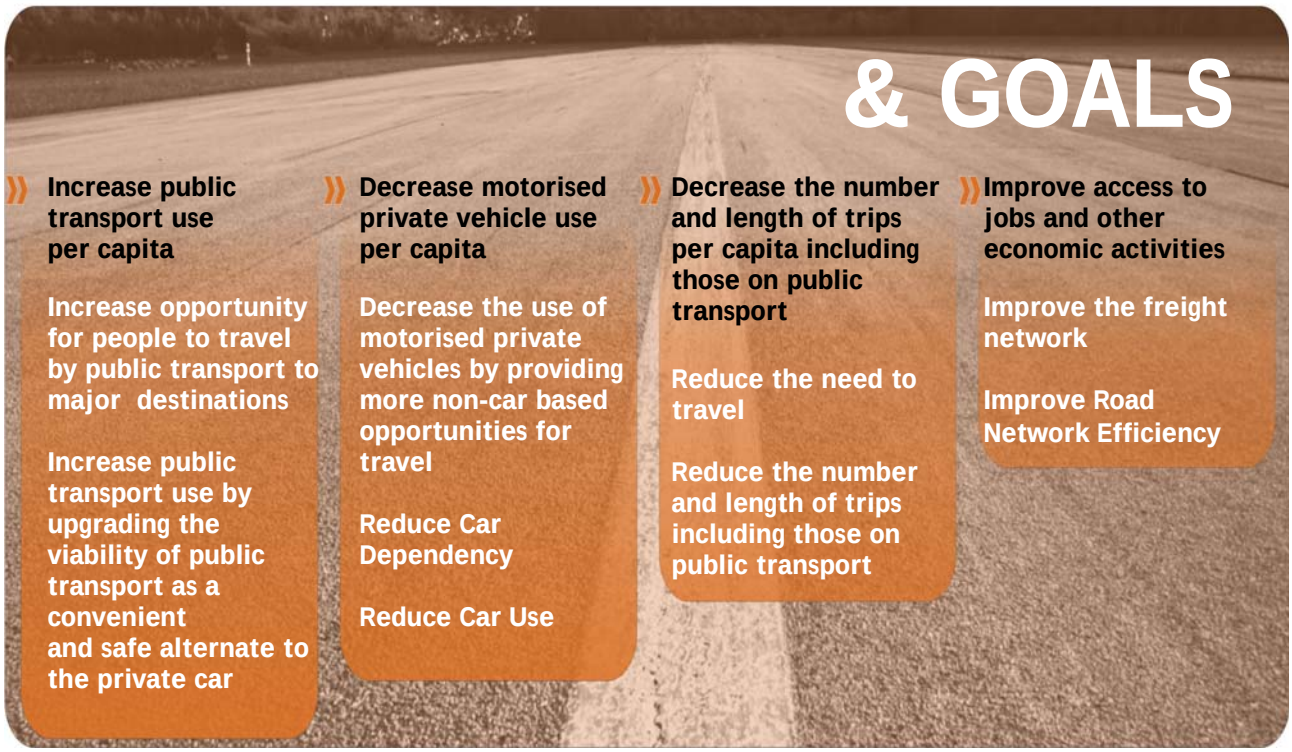
An important part of the study was to develop a clear vision and strategy goals for the PITLUS to guide the development of the strategy. During the initial stages of the study a vision and goals were established. In developing the vision and goals Councils aims and objectives for the Local Government Area and the visions outlined in the relevant State Government policies and strategies that relate to transport eg the NSW State Plan and the NSW Metropolitan Strategy were reviewed.

Key stakeholders in the study process were involved in an interactive and iterative process in developing the vision and goals for this strategy which included a series of three workshops involving:

- Council Officers;
- Project Steering Committee; and
- Councilors

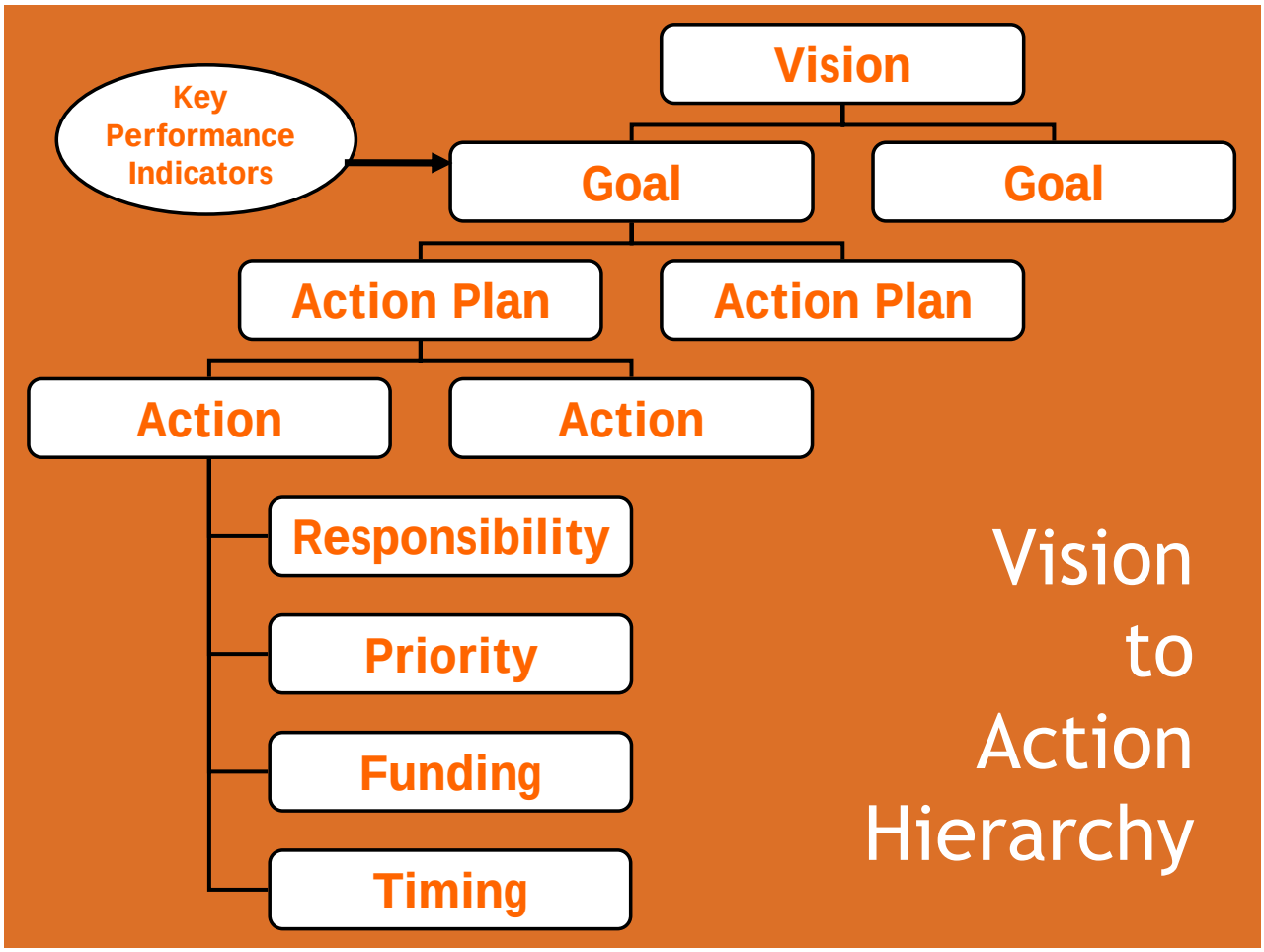
The final vision and goals for PITLUS are outlined below:



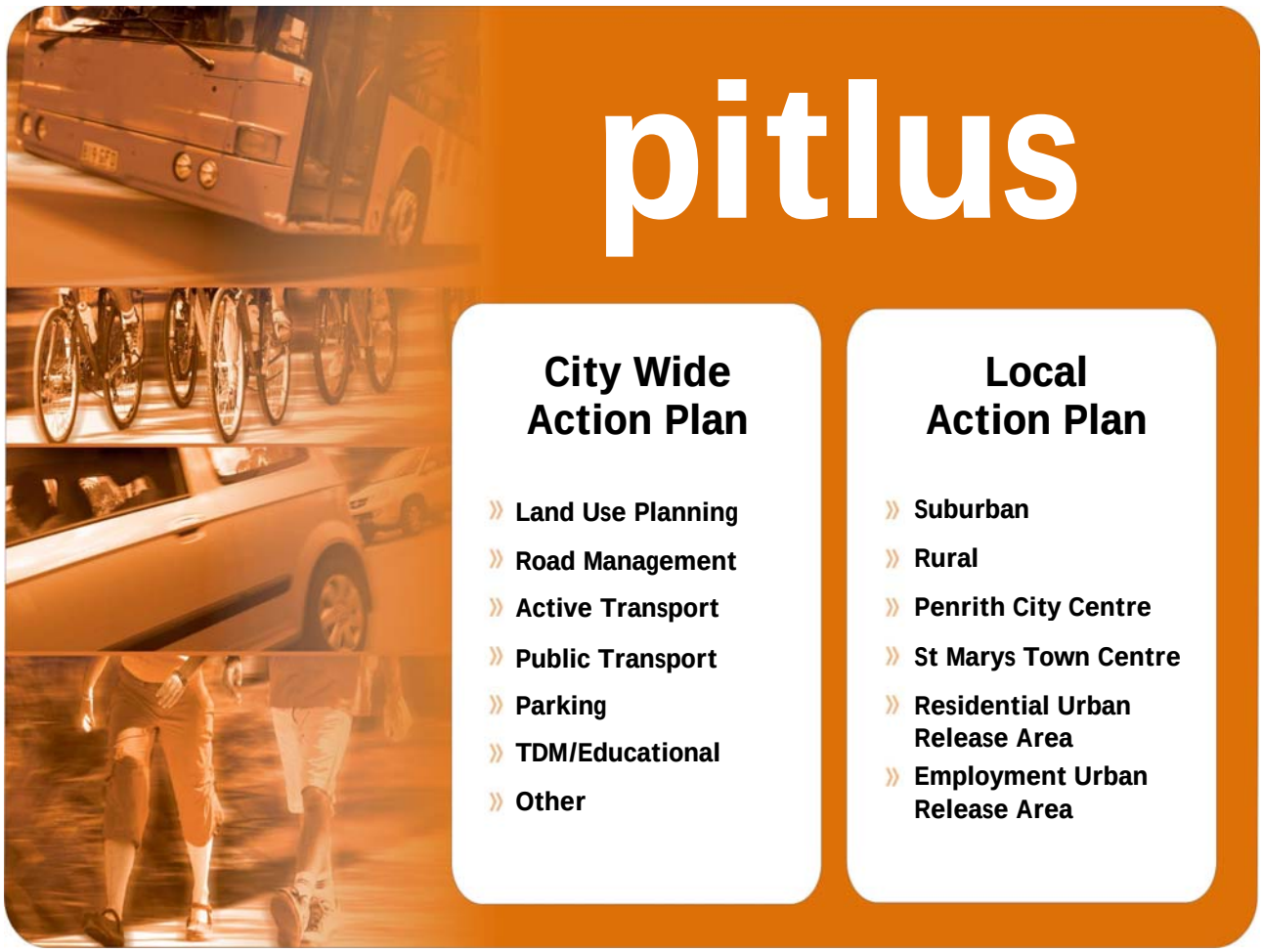


1.6 STRUCTURE OF THE STRATEGY

The figure below represents the vision to action hierarchy. The vision is at the top of the hierarchy and represents the desired outcome of the strategy. The goals have been established as achievable measurable aims that will assist in achieving this vision. The Penrith Integrated Transport and Land Use Strategy (PITLUS) consists of a series actions which combined will meet the Strategy's Vision and Goals.



The actions have been grouped together into city wide and specific local actions as such the overall PITLUS has been divided into two action plans as shown below:



1.6.1 CITY WIDE AND LOCAL ACTION PLANS

Each action plan includes groupings of actions in relevant categories for ease of reference. The City Wide Action Plan identifies seven action groupings and the Local Action Plan identifies six (as shown above). Each of the Action Plan provides a list of specific actions to be implemented.

1.6.2 IMPLEMENTATION PLAN

Following the action plan an implementation strategy brings all the identified actions together and details the following:

- Type of Action eg infrastructure, behavioural, planning policy lobbying and innovations;
- Delivery Responsibility;
- Funding Responsibility;
- Stakeholders;
- Cost implications for Penrith City Council;
- Priority;
- Timing; and
- References.

1.6.3 KEY PERFORMANCE INDICATORS

The outcomes of the PITLUS will be monitored to ensure progress is made. This monitoring will take the form of performance measures which will record the status quo of the city's transport infrastructure and services and identify future targets for change. This is documented as Key Performance Indicators (KPI), which relate to the specific goals of the strategy.

chapter 2
strategy development

2 STRATEGY DEVELOPMENT

This section details how the Strategy has been developed and how the vision and goals have been set. The process has involved working in partnership within Council and key stakeholders. This particular document is the Consultative Draft version of the Strategy and will be open to further consultation and refinement.

The development of the Strategy involved the following tasks:

- Identifying and documenting the existing situation (transport and infrastructure), opportunities and constraints, and the changing transport environment in Penrith LGA (in the broader Sydney context).
- Reviewing existing transport studies, strategies and programs, highlighting areas of consistency and inconsistency and identifying any areas that require additional detailed study.
- Assessing and identifying suitable locations for specific land uses that meet Metropolitan Strategy targets (eg Medium/higher density developments, employment centres, community facilities and Seniors Living housing).
- Developing a consultation program that ensured participation of all relevant stakeholders to determine their key priorities and strategic directions and provided for Councillor's participation to determine their key priorities and strategic directions. Part of this consultation program included the formation and running of a Workshop, and the minutes of such being forwarded to Penrith City Council.
- Investigating and reporting on options to improve accessibility in the region, including infrastructure improvements (RailCorp, MoT, RTA and Council programs), travel demand estimation, travel demand management programs, promotion of public transport, better coordination of services, parking strategies, employment strategies, land use planning policies and the like, and any other viable and innovative options not yet identified.
- Developing commuter car parking strategies at railway stations and review car parking strategies for the Penrith and St Marys CBD to reflect the broader goals of the Integrated Transport and Land Use Strategy. This was to have had regard to the Metropolitan Parking Policy, which has not yet been released.
- Recommending strategies to achieve improved transport options in relation to road infrastructure, public transport infrastructure, public transport services, cyclist and pedestrian infrastructure, commuter and commercial parking, demand management and transport behaviour programs, employment strategies, and land use planning policies.
- Identifying the access requirements to satisfy the existing demands in the area and region. Identifying the future access improvements required to accommodate the projected growth in the area
- Recommending realistic performance measures to be used as indicators of improvements (or otherwise) to the transport environment over time. Developing a hierarchy of transport infrastructure that can be used to determine development levies.

2.1 CONSULTATION

The development of the Strategy has been preceded by a detailed process of consultation, data review and analysis. The consultation process involved:

- Conducting workshops to provide input into visions and goals and identify opportunities and constraints, with the following groups:
  - Council officers
  - Steering Committee
  - Stakeholders
  - Councillors
- General community consultation through:
  - Public advertisement in local newspapers
  - Web-site; and
  - Issues questionnaire

2.2 LITERATURE REVIEW

A literature review was undertaken including the review of over 40 Federal, State and Council policies, strategies and studies. An analysis period followed where all the relevant data from previous studies was analysed and mapped through an extensive GIS mapping process. Further detail on the most relevant policy for the development of this Strategy is contained in the Policy Context Chapter.

2.3 WORKING PAPER

A three volume Discussion Paper was completed in March 2007. The discussion paper provided a thorough basis for the development of PITLUS and included:

- An introduction and background to the study
- A detailed description of the vision and goal setting process
- An extensive discussion of the Federal, State and Council policy context, with a detailed literature review provided as a separate volume. The literature review also incorporated all relevant Council planning studies
- An overview of Penrith today was provided for:
  - Population (people, labour force, families, dwellings and car ownership)
  - Topography
  - Land use (major trip attractors, development controls, commercial centres, major employment centres, other significant trip attractors)
  - The transport network (transport infrastructure and public transport services)
  - Travel patterns (employment & workforce and non-work trips)
- A comprehensive description of the community consultation process and results
- An overview of Penrith in the future was provided for:
  - Urban Release Areas
  - Future projected travel patterns
  - Future transport initiatives, and
- An introduction to a broad range of potential options to improve accessibility in the region.

This strategy report should be read in conjunction with the working paper.

2.4 THE NEXT STAGE

This is the Consultative Draft version of the Penrith Integrated Transport & Land Use Strategy. Following a consultation program determined by Council, CARDNO will collate responses from consultees and in partnership with Council, amend the Strategy where necessary.

After the public exhibition of the strategy the following tasks will also be undertaken:

- Developing an Apportionment Model to equitably allocate responsibility for any future access improvements for projected growth to the developments that generate that growth. This will consider the State Capital Expenditure Plans for the period beyond as determined by the NSW Government and State Treasury.
- Developing an implementation program, including preliminary costing and cost benefit analysis (incorporating social, environmental and economic costs and benefits), responsibilities, and timeframes for implementation.

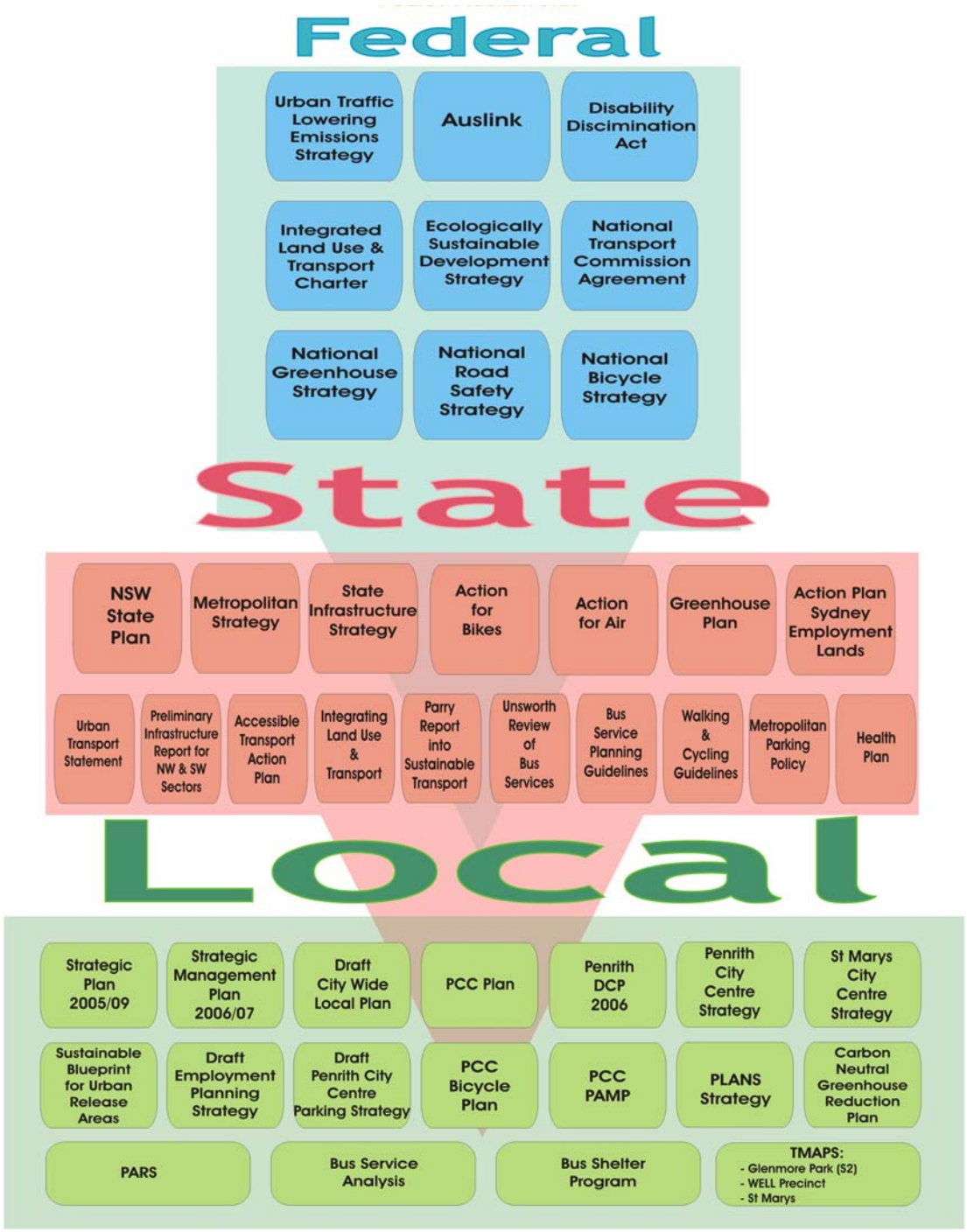
chapter 3
policy context

3 THE POLICY CONTEXT

Responsibilities for transport planning are spread across all three levels of government and provide an important context for an integrated transport and land use strategy. Both the Federal and State Governments have important roles to play in the development and management of all transport systems and in establishing the framework to guide transport planning and land use within the Penrith LGA.

In order to inform the development of the PITLUS over 40 Federal, State and Council policies, strategies and studies were reviewed. A detailed literature review was provided in the Discussion Paper that summarised all these documents as they related to the study.

The following chart summarises the Policy Framework within which the PITLUS has been prepared.



3.1 METROPOLITAN STRATEGY

The NSW Department of Planning (DOP) released the details of the Metropolitan Strategy in 2005/6. The Metropolitan Strategy outlines the vision for Sydney over the next 25 years, and is a strategic plan for the future growth and development of Sydney. The strategy includes five aims for the future direction of Sydney:

- Enhance livability;
- Strengthen economic competitiveness;
- Ensure fairness;
- Protect the environment; and
- Improve governance.

The metropolitan area of Sydney has been arranged into ten sub-regions that combine local government areas with similar issues and challenges when it comes to planning for growth and managing change. These sub-regions also relate to particular transport routes, natural features, and patterns of employment and retail activity that are important factors in the way people move around and use their area.

The South West and North West growth centres of Sydney are to accommodate new growth of 160,000 homes. Additionally, more than 120,000 homes will be accommodated in existing and other Greenfield areas of the North and South West sub-regions. Penrith City is essentially wedged between the two new Sydney Metropolitan Growth Sectors of the North West and South West. Penrith City has been designated as one of three Regional Cities which will provide the focus for a larger growth in jobs – the Metropolitan Strategy specifically notes an increase from the present 19,000 to 30,000 in 2031 representing an increase of 57% in employment. Growth in jobs in Penrith is actually likely to exceed this.

Key Issues:

1) Council will need to work in partnership with agencies and stakeholders to ensure that the increase in employment and residential areas is planned in a way to reduce the need to travel

3.2 LEP AND DCP

Penrith City Council is preparing a Citywide Local Plan in response to recent State Government reforms to provide for a single comprehensive local environmental plan.

Key Issues:

2) The current planning documents do not have a comprehensive integrated transport & land use policy.
3) The LEP must take into account the recommendations of this Strategy

3.3 SECTION 94 PLANS

Section 94 of the Environmental Planning and Assessment Act 1979, enables councils to levy contributions from developers for the provision of public amenities and services which are required as a consequence of development. The Land and Environment Court have determined that Section 94 is the sole mechanism that a council can use to levy contributions from a developer.

The application of Section 94 follows three general principles:

- The contribution must be for, or relate to, a planning purpose;
- The contribution must fairly and reasonably relate to the subject development; and
- The contribution must be such as a reasonable planning authority, duly appreciating its statutory duties, could have properly imposed.

Under Section 94(1) a council is able to impose a condition on any development consent requiring a contribution to:

- Provide works or facilities to be carried out in the future; or
- Fund works or facilities from which the development or its occupants will benefit.

Key Issues:

4) Current Section 94 Plans need to be revised to include road, cycleways, car parking and other transport infrastructure provisions where necessary.

3.4 ROAD SAFETY PLAN

Penrith Council has an effective strategic direction in place to make sure that the people that live in and visit our city are safe on the roads. An important priority for Council is to reduce the number of people losing their lives or injured on roads in the City. This plan provides an opportunity to link road safety to strategies Council already has in place for the future of the City. A "whole of Council" approach to road safety will ensure we make the best use of resources already committed to improving the quality of life for our residents. The plan will also build on existing engineering, education and enforcement achievements already made in improving road safety.

Key Issues:

5) Council needs to maintain its strong commitment to road safety and ensure that the plan is updated regularly

3.5 PENRITH ARTERIAL ROADS STUDY

Penrith Arterial Roads Study (PARS) was initially developed in consultation with the Roads and Traffic Authority but later used as the basis for the review for ADI and expanded to cover future major developments in Blacktown LGA (Marsden Park and Riverstone releases).

This study identified a number of deficiencies in the local arterial road network, which are required to sustain natural traffic growth in the short term, even without the additional impacts of the significant future populations planned for the LGA. These works are not currently funded and have not been identified as part of the RTA's short or long-term capital works programs or strategic plans.

The expanded study was overseen by the then Department of Infrastructure, Planning & Natural Resources, NSW (DIPNR). The study has addressed the future release areas in the Penrith LGA as well as Marsden Park and Riverstone. The PARS has assumed a 10% reduction in the use of single occupant motor vehicles. An apportionment methodology was developed using model outputs that identified the traffic that had its origin/destination in each release area that contributed to the need for the upgrades. This enabled percentage apportionments to be calculated for each upgrade. Whilst these apportionments are related to traffic volumes associated with the increased traffic that generates a need for the upgrade, they provide a sound basis for informing State Government of funding requirements.

Recent changes to the Environmental Planning and Assessment Act, mean that it may be possible to fund road works from regional infrastructure levies which may be imposed on any substantial new developments.

Key Issues:

6) Deficiencies in the local arterial road network
7) Uncertainty of funding to implement the recommendations of PARS

3.6 PENRITH BUS SERVICE ANALYSIS

Council recently completed the Penrith Bus Service Analysis Study for the LGA, which provides an improved and more detailed understanding of public transport in the Penrith LGA. The study developed a methodology to measure public transport use and availability indicators so that evaluation of the implications of various transport and land use planning initiatives could assist Council in its decision making, planning, approvals processes and development agreements.

The study also undertook surveys of bus operators and drivers and developed a range of recommendations for all the sites raised in the surveys. This information can be used to feed into the consultation process for the development of the new bus Integrated Network Plan (INP) for the area. Penrith falls within the new bus contract Region 1, and is planned for network redesign in 2007/2008.

Key Issues:

8) The analysis highlights deficiencies in the bus network, these issues need to feed into the Ministry of Transport's Bus Review for the region.

3.7 BIKE PLAN

Penrith City Council in conjunction with Cycle Planning Consultants has prepared a Penrith City Bike Plan. The Bicycle plan was based on extensive community consultation due to the resident demand for a cycleway system to be developed throughout the Penrith LGA for recreation, commuting, journey to school, to encourage bicycle tourism and to replace the use of the private vehicle.

Key Issues:

9) The Bike Plan is out of date and needs to be reviewed.

3.8 BUS SHELTER PROGRAM

Penrith City Council has a bus shelter construction program that currently is deferred pending development of a Bus Shelter and Bus Zone/Bus Stop Installation Policy. Locations of bus shelters have been placed on hold awaiting bus reform outcomes which will amend bus routes and timetables and flag patronage levels on those routes. Generally, Ministry of Transport policy is for bus shelters to be provided, as a minimum, wherever a weekday peak hour (0700 – 0900) average of 30 passengers or more will use a stop, or where service frequency is 60 minutes or greater.

Key Issues:

10) The installation of bus stops and shelters is currently deferred
11) Funding for shelters and other associated infrastructure is insufficient

chapter 4
land use overview

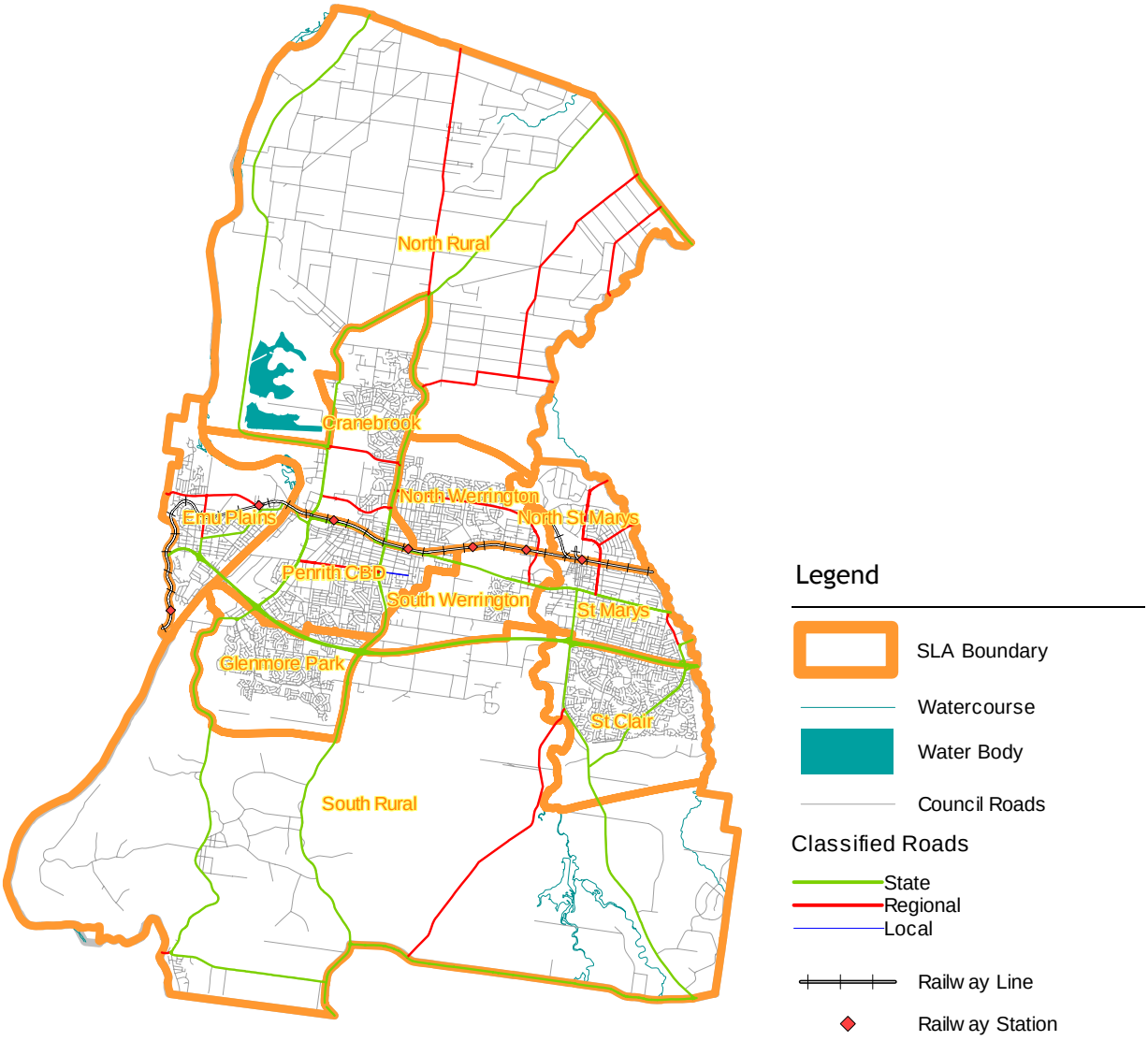
4 LAND USE OVERVIEW

This chapter provides an overview of land use and the resident population and workforce within the Penrith LGA. Topography in Penrith plays a key role in the land use development and access, a brief description of topography is therefore provided. Land use is described in terms of the developed area and major trip attractors such as employment centres, education etc. A description of the key urban release areas is provided. A summary of the existing and future population, workforce and employment within the Penrith LGA is presented. A more detailed description of land use and population in the LGA has been provided in the PITLUS Discussion Paper.

To provide a comparative analyse of the land use in the Penrith LGA we consider the 11 Statistical Local Areas (SLAs) that were identified in Penrith Councils' Travel Patterns Report. These 11 SLAs are shown in Figure 4.1 and defined as follows:

- **St Clair** – incorporating the suburbs of St Clair and Erskine Park, with a small portion of Orchard Hills (east of South Wianamatta Creek);
- **St Marys** - incorporating the southern part of the suburb of St Marys (south of the Great Western Highway) plus the suburbs of Oxley Park and Colyton;
- **Emu Plains** - incorporating the suburbs of Emu Heights, Emu Plains and Leonay;
- **North Werrington** - incorporating the southern part of Llandilo Werrington Downs, Werrington County, Cambridge Park, Cambridge Gardens, the northern parts of Werrington (north of the Great Western Highway) and parts of Kingswood;
- **South Werrington** - incorporating the southern part of Werrington (south of the Great Western Highway), Claremont Meadows, parts of Kingswood and a small portion of the northern part of Orchard Hills;
- **Penrith** – primarily incorporating South Penrith, Jamisontown, the southern part of Penrith (south of the Great Western Highway) and parts of Kingswood;
- **Glenmore Park** - incorporating Regentville, Glenmore Park and small portion of the northern part of Mulgoa;
- **Cranebrook** – primarily incorporating the northern part of Penrith (north of the Great Western Highway) and the southern part of Cranebrook (south of Cranebrook Road);
- **North St Marys** - incorporating the northern part of the suburb St Marys (north of the Great Western Highway) and North St Marys;
- **Southern LGA Rural** - primarily incorporating Wallacia, Luddenham, Badgerys Creek, Kemps Creek, Mount Vernon, Mulgoa and Orchard Hills; and
- **Northern LGA Rural** – primarily incorporating Agnes Banks, Londonderry, Berkshire Park, Castlereagh, Llandilo a small portion of the northern parts of Cranebrook.

Figure 4.1 SLA Boundaries



4.1 POLICY

Council is preparing a Citywide Local Plan in response to recent State Government planning reforms to provide for a single comprehensive local environmental plan for all local government areas within NSW. Council Strategies that will inform the citywide local plan include the City Centre Strategies, Rural Lands Study and Strategy, and Draft Employment Lands Strategy.

The draft Plan is expected to be released mid to late 2007. Recommendations from this Integrated Transport Strategy will assist Council in the preparation of the comprehensive local plan and will inform landuse controls and zones.

Future urban release developments in Penrith City are required to satisfy State Government Metropolitan Strategy objectives and to provide Penrith with new residential and employment opportunities. The urban release areas will utilise best practice to reduce the city's ecological footprint, enhance the environment, and improve quality of life (health, housing, employment opportunities) within the capacity and constraints of the bioregion.

Council's Strategic Plan 2005-2009 outlines an approach to new urban areas in Penrith that seeks to form cohesive communities based on sustainable, safe and satisfying living and working environments. A key focus area of Council's Management Plan for 2006 – 2007 is building sustainable communities.

There are nine new urban release areas, an education precinct and an employment precinct in the Penrith LGA, for which planning processes are advancing concurrently:

- Werrington Enterprise Living and Learning (WELL) Precinct
- Werrington Mixed Use Area (within WELL Precinct)
- Claremont Meadows Stage 2 (within WELL Precinct)
- Caddens Release Area (within WELL Precinct)
- South Werrington Urban Village (within WELL Precinct)
- Penrith Lakes
- Waterside (Lakes Environs)
- Glenmore Park Stage 2
- St Marys Release Area (former ADI site)
- North Penrith Urban Area
- Erskine Park Employment Area

These release areas are planned to deliver over 14,000 new dwellings over the next 15 years and will play a significant role in providing housing and employment lands across Penrith.

Fostering sustainable communities has continually underpinned Council's planning for new urban areas. The provision of quality recreational, educational, health and community facilities and services, that are accessible, is essential to creating a quality place for a new community to live, play and work in. In creating communities, it is also imperative that a base-line of services and facilities is in place.

The establishment of these base-line requirements has been achieved through the Penrith Sustainability Blueprint for Urban Release Areas which was developed and adopted in 2005, and is providing guidance for developers currently active in Penrith's new urban areas.

Clearly, the effective roll-out of new release areas is contingent on the efficient delivery of required infrastructure, both at the local and regional level. Extensive negotiations are required with developer groups to establish agreement on the delivery of facilities and services necessary to support new urban community formation.

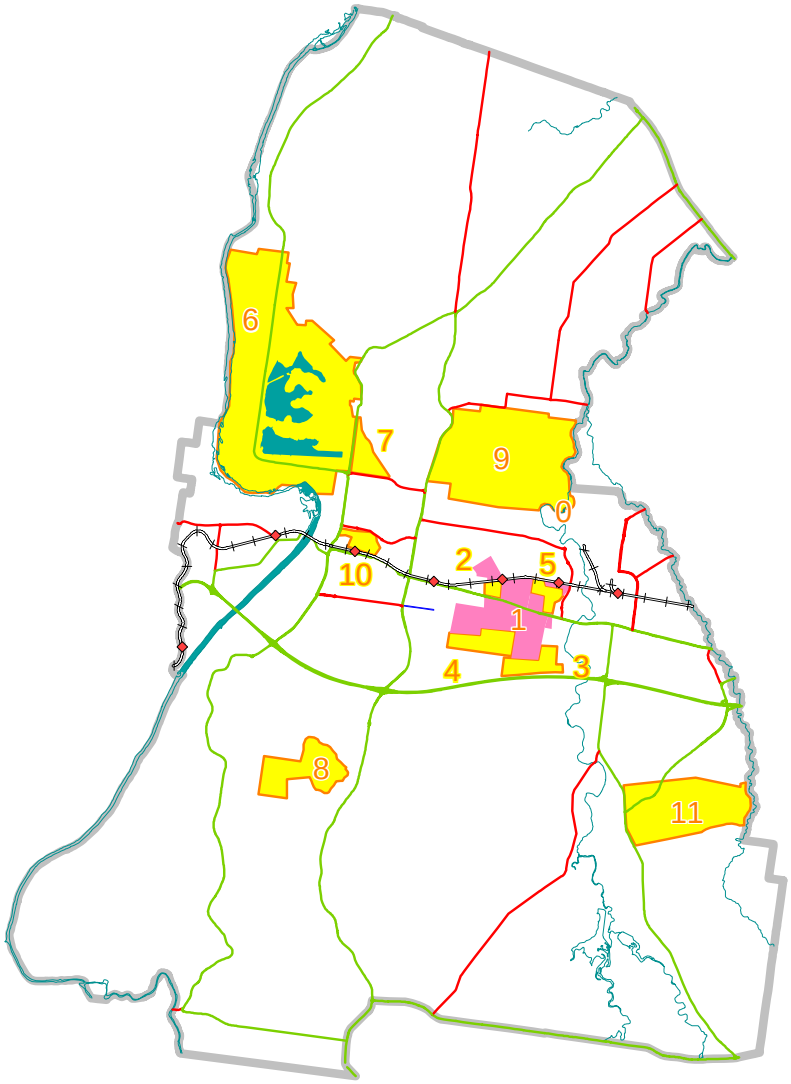
The funding for the delivery of regional infrastructure elements is now required to be brokered with State Government to ensure an alignment with the Government's requirements for regional infrastructure levies and the related delivery of facilities and services for which government agencies hold responsibility, eg, arterial roads, public transport, schools, etc.

4.2 URBAN RELEASE AREAS

The eleven key sites that have been identified for growth in the Penrith LGA consist of nine new urban release areas, an education precinct and an employment precinct in the Penrith LGA. The areas are identified in Figure 4.2.

The latest estimated ultimate yields for the URAs to 2021are provided in Table 4.1.

Figure 4.2 Urban Release Areas



1. Werrington Enterprise Living and Learning (WELL) Precinct
2. Werrington Mixed Use Area*
3. Claremont Meadows Stage 2*
4. Caddens Release Area*
5. South Werrington Urban Village*
6. Penrith Lakes
7. Waterside (Lakes Environs)
8. Glenmore Park Stage 2
9. St Marys Release Area (former ADI site)
10. North Penrith Urban Area
11. Erskine Park Employment Area

*(within WELL Precinct)

Table 4.1: Urban Release Areas – Potential Ultimate Development to 2021

Release Area	Site Area	Residential		Employment	
		Dwellings	Population	Area	Jobs
Werrington Mixed Use Area#	22ha	190	520	8ha	300
Claremont Meadows Stage 2#	63ha	511	1,500		
Caddens Release Area#	103ha	1,231	3,323		
South Werrington Urban Village#	48ha	410	1,107	19.4ha	
WELL Precinct Other *	434ha	566	1,528		37,500
Penrith Lakes~	1,940ha	4,050	11,570	60ha	5,260
Waterside (Lakes Environs)	71ha	701	1,612	17ha	
Glenmore Park Stage 2	168ha	1,500	4,050		
St Marys Release Area (former ADI site)	1,545ha	3,068	7,830	43ha	3,460
North Penrith Urban Area	50ha	850	2,000	9.5ha	950
Erskine Park Employment Area	510ha			276ha	6,000
TOTAL		**13,077**	**35,040**		**53,470**

part of WELL Precinct
* Includes increases in students and staff at Werrington TAFE & UWS
* Penrith Lakes Development deferred pending review of financial implications by owners
Source: Penrith City Council Business Paper for the Policy Review Committee Meeting for Monday 19 February 2007, updated by environmental planning Staff on 7 January 2008 and WELL S94 Plan November 2007.

The urban release areas will play a significant role in providing housing and employment lands across Penrith. It is expected that the release areas will ultimately provide in excess of 31,000 new jobs plus a significant increase in tertiary students (22,000).

The majority of the release areas are expected to be implemented in the next 2-5 years, with Waterside (Lakes Environs) and Claremont Meadows Stage 2 currently delivering housing.

Following the rezoning of proposed urban release areas the extent of land zoned rural will decrease and land zoned residential or employment will increase. This will have implications for the location of employment centres and residential densities, and will also improve the viability of public transport previously servicing rural communities.

The development to 2016 was estimated in the Penrith Arterial Roads Study (PARS) (Sims Varley, Feb 2005). For consistency these figures have been adopted for assessment purposes in this study.

Future Employment

It has been estimated that there will be an increase of around almost 47,000 jobs (this figure includes tertiary student at the TAFE and UWS) within the LGA over the next 10 years. This figure was based on the estimates provided in the PARS Report (as discussed previously). The employment estimates are summarised in Table 4.2.

Table 4.2: Potential 2016 Employment Growth

Precinct	Type	Area (ha)	Employees 2016
St Marys site (including Blacktown area)	Commercial / Retail	67.57	4,723
	Educational	29	725
North Penrith Urban Area	Commercial/Retail	7	336
Erskine Park		277	7,756
Penrith Lakes (Environs)		7	336
Penrith Lakes (Scheme)		63.25	3,036
Werrington TAFE	(Students and Staff)		15,400
UWS	(Students and Staff)		14,600
TOTAL			**46,912**

Future Dwellings

It has been estimated that there will be an increase of around 18,750 dwellings within the LGA over the next 10 years. This figure was based on the estimates provided in the PARS Report. This information is summarised in Table 4.3. These increases also include potential infill of almost 6,000 dwellings in established areas.

Table 4.3: Potential 2016 Residential Development

Category	Location	Potential Yield # (Dwellings)
Confirmed Release Areas (MDP)	Combined Areas* (including Erskine Park, North Cranebrook)	200
	Claremont Meadows	380
	Penrith Lakes Environs	640
	Caddens Release Area**	1,300
	North Penrith Urban Area	800
	St Marys (Penrith Component)##	2,912
	Sub-total	**6,232**
Un-confirmed Areas (Non MDP)	Penrith Lakes Scheme**	4,900
	Werrington Signals Land*	350
	Glenmore Park Extension**	1,300
	Sub-total	**6,550**
In-fill Development	Cambridge Gardens	7
	Cambridge Park	158
	Claremont Meadows	22
	Colyton	93
	Emu Heights	79
	Emu Plains	345
	Jamisontown	718
	Kingswood	790
	Leonay	22
	North St Marys	14
	Oxley Park	302
	Penrith Suburb	1228
	Regentville	22
	St Clair	201
	St Marys	1091
	Other	876
	Sub-total	**5,968**
	Total (Penrith)	**18,750**

Source: Revised Penrith LGA Arterial Road Study PARS (A Focus on Development Infrastructure), February 2005
* Combined areas are small pockets of undeveloped land, mainly in established suburbs.
** Lot potential estimate only, sites have been re-evaluated during this study to be confirmed release areas (MDP).
Residential lots only, excluding employment land and other uses

Key Land Use Issues:

LU1) The URA's will generate significant demand for all modes of transport in the area
LU2) Consideration will need to be given on the location and transport infrastructure requirements of all additional developments
LU3) Co-ordination and staging of transport provision will need to be planned due to the majority of the release areas being implemented in the next 2-5 years
LU4) Location and networking of employment centres
LU5) Access to new residential areas to recreational and employment opportunities

4.3 TOPOGRAPHY

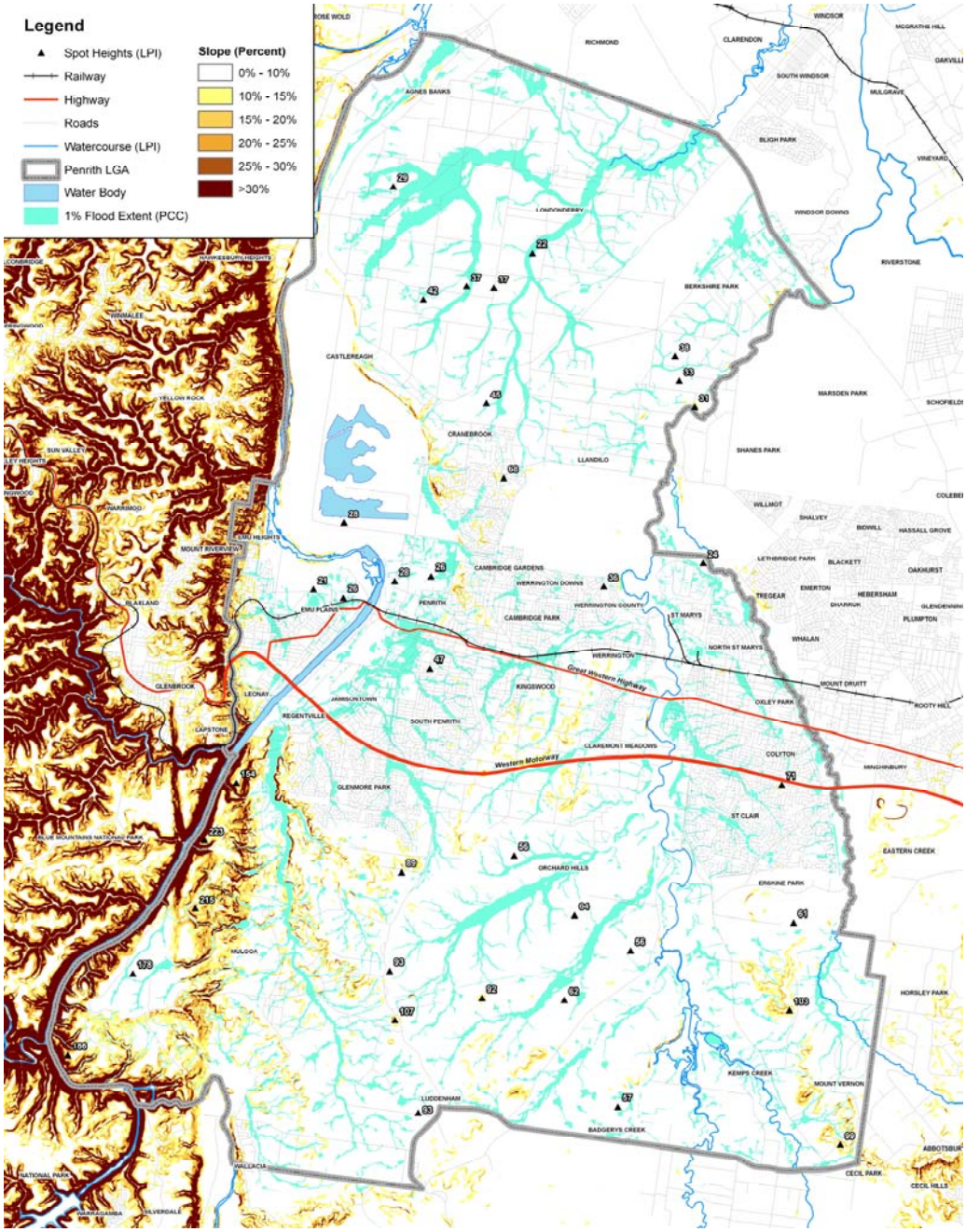
The Penrith LGA is approximately 40,476 hectares and covers some 29 kilometres from north to south. At its widest in the southern part of the region, the LGA is approximately 21 kilometres from east to west. At its narrowest the LGA is just over 10 kilometres wide (east to west), around the Penrith Lakes area. Figure 4.3 shows key topographic features of the LGA such as:

- Spot heights – which are notably higher in the Mulgoa region;
- Slopes - the vast majority of the LGA has slopes less than 10%, however slopes are much greater in the Mulgoa region;
- Watercourses - are a prominent feature throughout the LGA, the most significant being the Nepean River, which primarily forms the western boundary and is the focus of many recreational activities within the LGA;
- Water bodies - the most notable of the water bodies is the Penrith Lakes, currently home to many sport and recreation facilities and is earmarked for new urban release growth;
- 1% flood extent – areas where there is a 1 in 100 chance of flood occurring in any given year. Significant portions of land fall within the 1% flood extent, this is most notable in the in the northern part of the LGA, but is observed throughout much of the city.

Key Land Use Issues:

LU6) The LGA is large, particularly from north to south (some 29 kilometres)
LU7) Watercourses such as the Nepean River form natural barriers
LU8) Slopes in some areas restrict development potential and lessen the likelihood of walking and cycling
LU9) Significant portions of land fall within the 1% flood extent and are hence unlikely to be developed

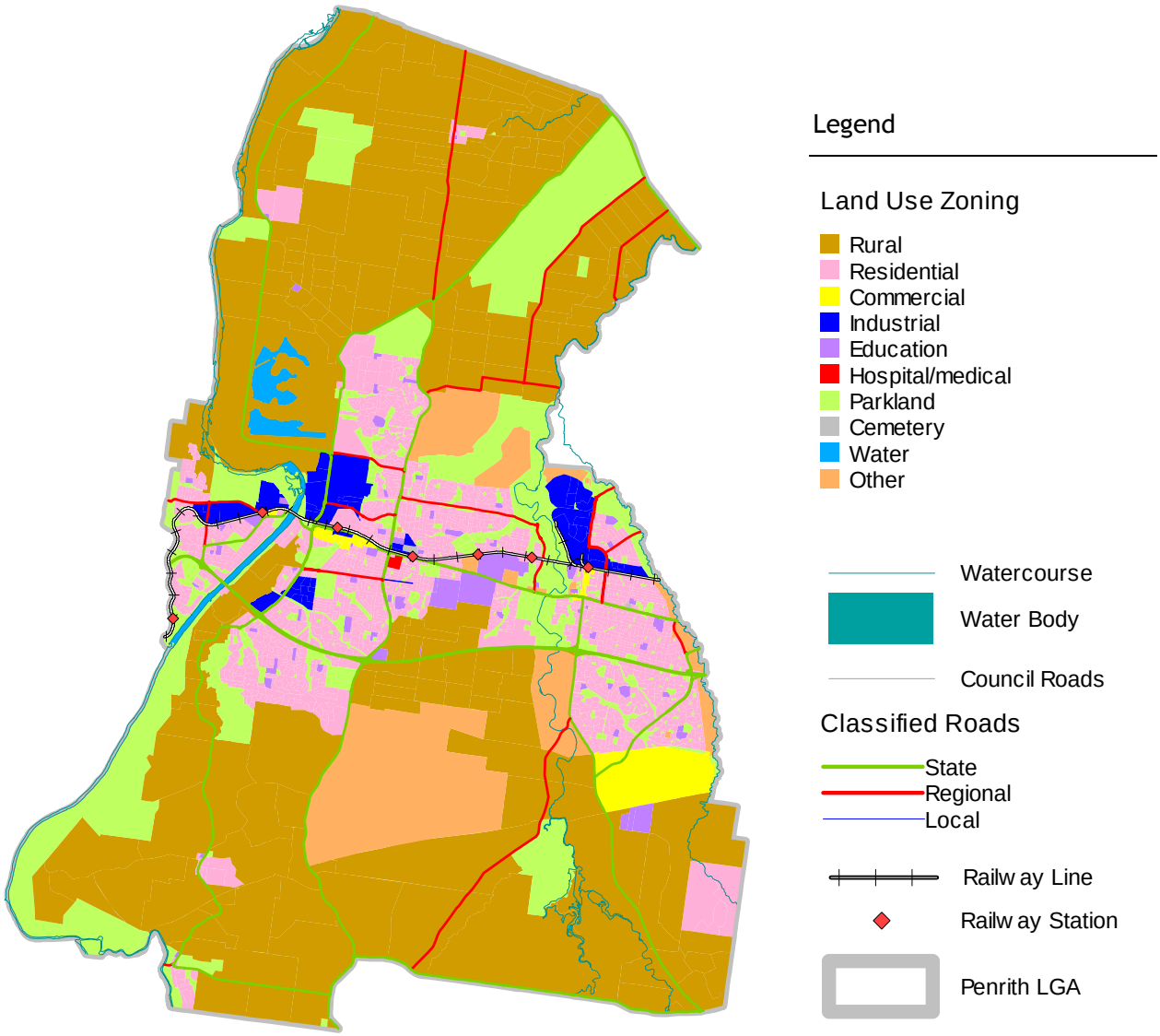
Figure 4.3 Topographic Constraints



4.4 ZONING

Land use zoning within a Local Environmental Plan (LEP) determines the range of permitted land uses within an area and also provides an indication of current land uses likely to exist within an area. Figure 4.4 shows the current zoning within the Penrith LGA. In the absence of detailed land use surveys, the zoning is considered to be useful indicator of current land use, although it is noted that non-conforming landuses do exist as a result of previous plans, some land will remain vacant, and landuse may not represent the permissible highest and best use for the land.

Figure 4.4 Zoning



Under the current LEPs the vast majority (56%) of Penrith LGA is zoned for rural uses such as residential, commercial and industrial. Residential land currently accounts for 15% of land use and parkland for a further 15%. Following the rezoning of proposed urban release areas the extent of land zoned Rural will decrease and land zoned residential or employment will increase.

Refer Appendix 4-A for detailed proportion of Land Use Zoning.

Key Land Use Issues:

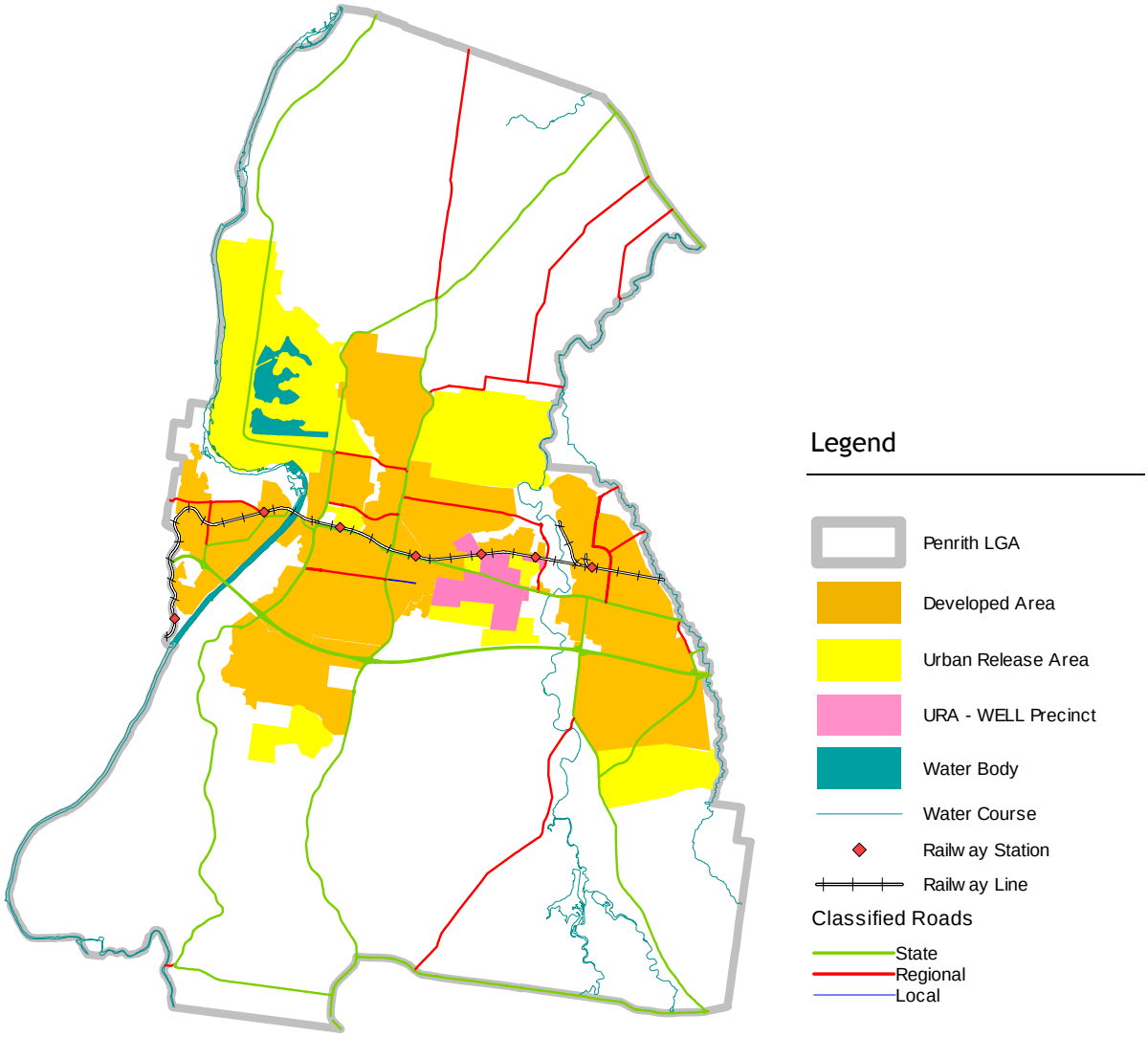
LU10) No detailed survey data exists for detailed land uses
LU11) Much of the LGA is still zoned for rural uses

4.5 DEVELOPED AREAS

Penrith LGA is approximately 405 sqkm, of this approximately 75sqkm (19%) is developed for more intensive uses, see Figure 4.5. The developed areas are considered to be those areas where more intensive land use activity occurs, such as urban residential areas, employment centres etc. The future Urban Release Areas (URA) will add a further 40sqkm of developed land. This is an increase of over 50% in developed land within the LGA with associated implications for infrastructure and servicing.

Refer Appendix 4-B for site area, existing developed area and URA.

Figure 4.5 Developed Areas



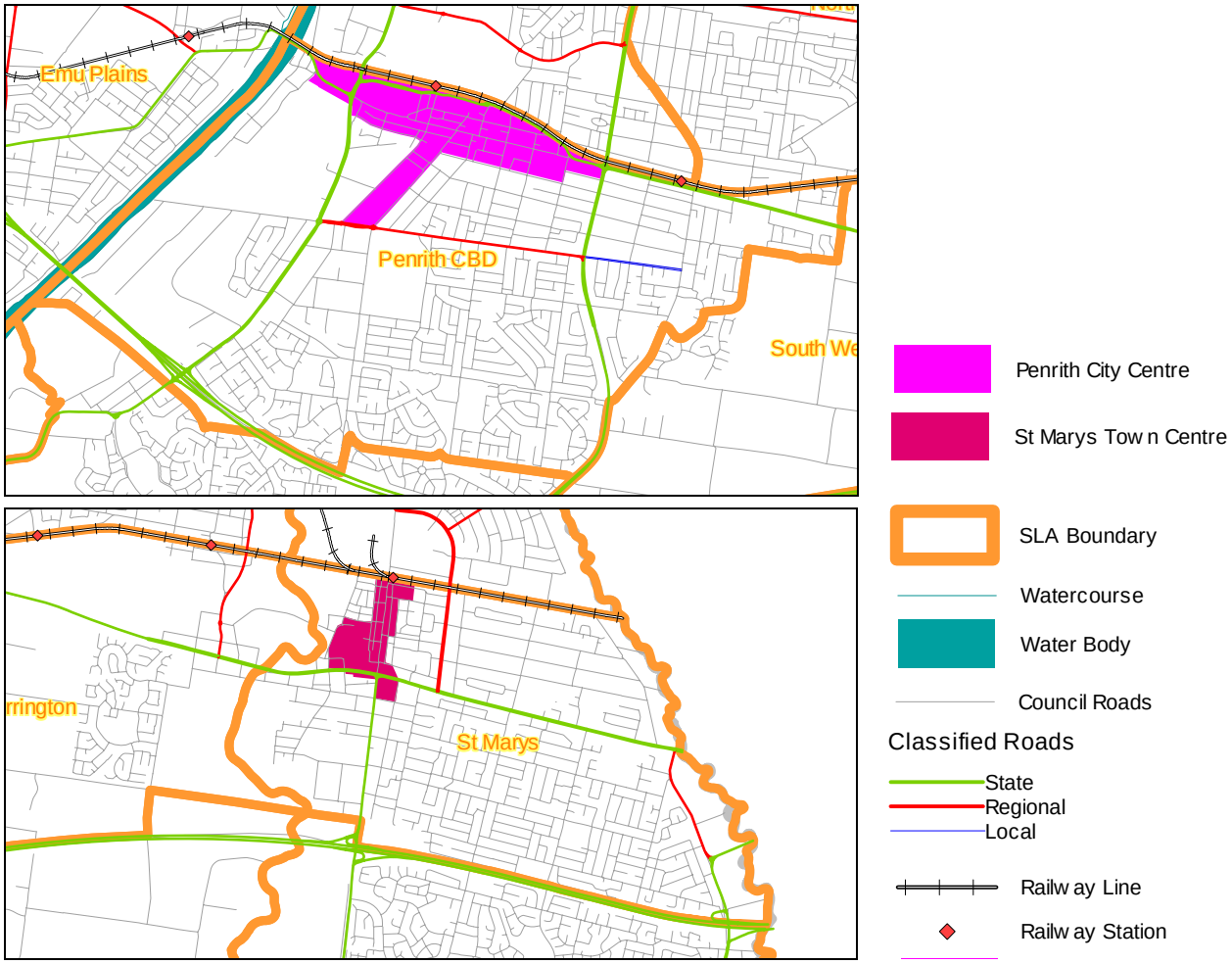
Key Land Use Issues:

LU12) Less than 20% of the Penrith LGA is considered to be developed land
LU13) Developed areas need to correlate with transport accessibility
LU14) The URAs will increase the proportion of developed area within the Penrith LGA

4.6 COMMERCIAL CENTRES

There are 2 major commercial centres in the Penrith LGA: Penrith City Centre and St Marys Town Centre. The boundaries of these centres are shown in Figure 4.6.

Figure 4.6 Commercial Centres



4.6.1 PENRITH CITY CENTRE

Penrith City Centre has been identified as a Regional City within the Metropolitan Strategy and is one of Sydney's major commercial centres, with 100,000m^2 of commercial office space and 156,000m^2 of retail floor space. The Penrith City Centre stretches over 2.5km, and is located 55km from Sydney's CBD at the foothills of the Blue Mountains escarpment and 1km east from the Nepean River.

96,600m^2 of the 156,000m^2 of retail development is contained within 5 key indoor retail centres: Penrith Plaza; Nepean Centro; Penrith Centre (corner of High St and Station St); Henry Street Mall; and Henry Lawson Centre. The 'main street' strip retailing in Penrith is primarily located along High Street, extending to Henry Street in the north and Union Road in the south, and comprises a total of approximately 50,300 m^2 of retail space.

The Penrith City Centre is the seventh largest commercial centre in Greater Sydney and has a higher than average ratio of commercial to retail floor space for a regional centre.

In 2004, Penrith City Council undertook a Community Visioning Consultation and Process, as part of Stage One of the Our City Centres Review. The Our City Centre' Review aims to stimulate debate about the framework, direction and planning of two key centres, Penrith and St Marys. The Review seeks to build on the distinctive character and values of each centre, fostering them as attractive, diverse and culturally vibrant working and living destinations.

The vision for the Penrith City Centre was derived from the community consultation process:

Penrith City Centre is a vibrant, forward-looking regional centre that provides quality urban living with easy access to unique natural surrounds.

Current issues for the Penrith City Centre were identified and they included traffic congestion and the perception that public transport is inadequate and under-utilised. The vision sees Penrith City Centre as a major transport hub and an easy place to get around and has an objective to create a more people & pedestrian-friendly city centre.

Council endorsed the Penrith City Centre Strategy on the 24th July 2006. This provides a strategic direction for future growth and development within the Penrith City Centre and establishes key steps to achieve a range of goals and objectives to achieve the Vision.

The Strategy aims to guide future planning directions and to establish a set of principles for the development of revised planning controls for Penrith City Centre. The principles will inform the work to be undertaken by the Regional City Centres Taskforce, set up by the Department of Planning to review the planning for the identified Regional Cities, and subsequently inform the development of local planning controls to be incorporated into the Penrith Local Plan.

The key issues of relevance to this study include managing parking and improving access: providing for improved public transport, cycling and pedestrian access to and within the Centres and managing car parking more efficiently and in a way that supports a vibrant Centre;

Part of the process included undertaking an Access and Transport Analysis of Penrith City Centre and St Marys Town Centre (prepared by Sinclair Knight Merz on behalf of Penrith City Council, November 2004). Further analysis regarding access and car parking within the City Centre was undertaken by Glazebrook and Associates, and was completed in May 2006.

Strategies for improving car parking and access to Penrith City Centre and St Marys Town Centre were identified as:

- Understand access and transport issues within the centres
- Plan for improved access to the centres
- Review car parking provision
- Reduce reliance on private vehicular access to the centres
- Reduce pedestrian/ vehicular conflict

The strategy has identified that transport links to/from St Mary's and links between St Mary's and other centres need to be strengthened and improved. Similar to St Mary's, Penrith CBD will require strengthened links between it and other centres, as well as between the CBD and neighbourhood and residential centres.

4.6.2 ST MARYS TOWN CENTRE

St Marys is the major centre on the eastern side of the Penrith LGA, servicing a wide range of rural and urban communities. The Centre is located approximately mid-way between the Penrith City Centre and the Mount Druitt town centre in neighbouring Blacktown LGA. There is no distinct role at present for St Marys as it is typical of an older style retail centre that does not fit into the current retail categories.

23,900m^2 of development is contained within 3 key indoor retail centres: The Village Centre; Station Street Plaza; and Astley Centre. The majority of strip retail is located along Queen Street, providing around 20,600m^2 of retail floor area. There is approximately 16,500m^2 of commercial floor space in the Town Centre.

The vision for the St Marys Town Centre was derived from the community consultation process:

St Marys is the vibrant heart of the district, providing diverse experiences and services in a friendly atmosphere.

The current challenges for St Marys Town Centre included poor linking of activity centre, the railway line divides district, under-utilised car parks and perceived lack of safety around the station area. The vision sees St Marys Town Centre as a major transport hub and has the objectives to connect the various activity centres and link the town to existing suburbs and growth areas.

Key Land Use Issues:

LU15) Managing parking and improving access
LU16) Developments shall facilitate improved public transport, cycling and pedestrian access to and within the Centres
LU17) Developments within Penrith and St Mary's CBDs shall promote links between both CBDs and other centres and residential areas
LU18) Developments shall not lead to increased traffic congestion within Penrith CBD
LU19) Penrith City Centre shall be a major transport hub, an easy place to get around being a more people & pedestrian-friendly city centre
LU20) St Marys Town Centre shall be a major transport hub connected to the various activity centres and linked to existing suburbs and growth areas

4.7 MAJOR EMPLOYMENT CENTRES

Major Employment Centres represent larger concentrations of employment lands or employees. Employment Centres are major attractors of trips. The major employment areas for Penrith have been identified in Figure 4.7.

Estimates of the employment within each of these key employment centres are provided in Table 4.4. This tells us that there are almost 36,000 jobs (72%) located within these major employment areas. 42.8% of these jobs are taken by people who travel from outside the LGA. There are a further 13,900 jobs in areas outside of these major centres.

Figure 4.7 Employment Centres

Table 4.4: Travel to Major Employment Centres (2001 JTW)

Employment Area (Destination)	Origin			All
	Local*1	Penrith*2	Sydney*3	
St Marys CBD	203	1,307	1,038	2,548
Dunheved Industrial Area	168	2,144	2,950	5,262
Jamisontown Industrial Area / Mulgoa Road Bulky Goods Precinct	694	1,539	1,288	3,521
Penrith CBD / Panthers	331	7,458	5,188	12,977
North Penrith Industrial Area	173	1973	1,340	3,486
Orchard Hills Defence Base	10	104	46	160
Emu Plains Industrial Area / Emu Plains CBD	1028	968	1,221	3217
Erskine Park Employment Area	23	29	21	73
University of Western Sydney / Kingswood TAFE	123	449	687	1,259
Nepean Hospital	230	1,589	1,609	3,428
SUB-TOTAL	**2,983 8.3%**	**17,560 48.9%**	**15,388 42.8%**	**35,931 100.0%**
Other Areas	3,964	5,237	4,677	13,878
TOTAL	**6,947 13.9%**	**22,797 45.8%**	**20,065 40.3%**	**49,809 100.0%**

*1 Employees that start their employment journey locally
*2 Employees that start their employment journey elsewhere in the Penrith LGA
*3 Employees that start their employment journey outside of the Penrith LGA

Key Land Use Issues:

LU21) Distances of employment centres from public transport
LU22) Dispersed nature of employment centres
LU23) Increased residential densities to be facilitated within close proximity to employment centres
LU24) Jobs in employment centres to complement the increase in the number of working residents in new URAs

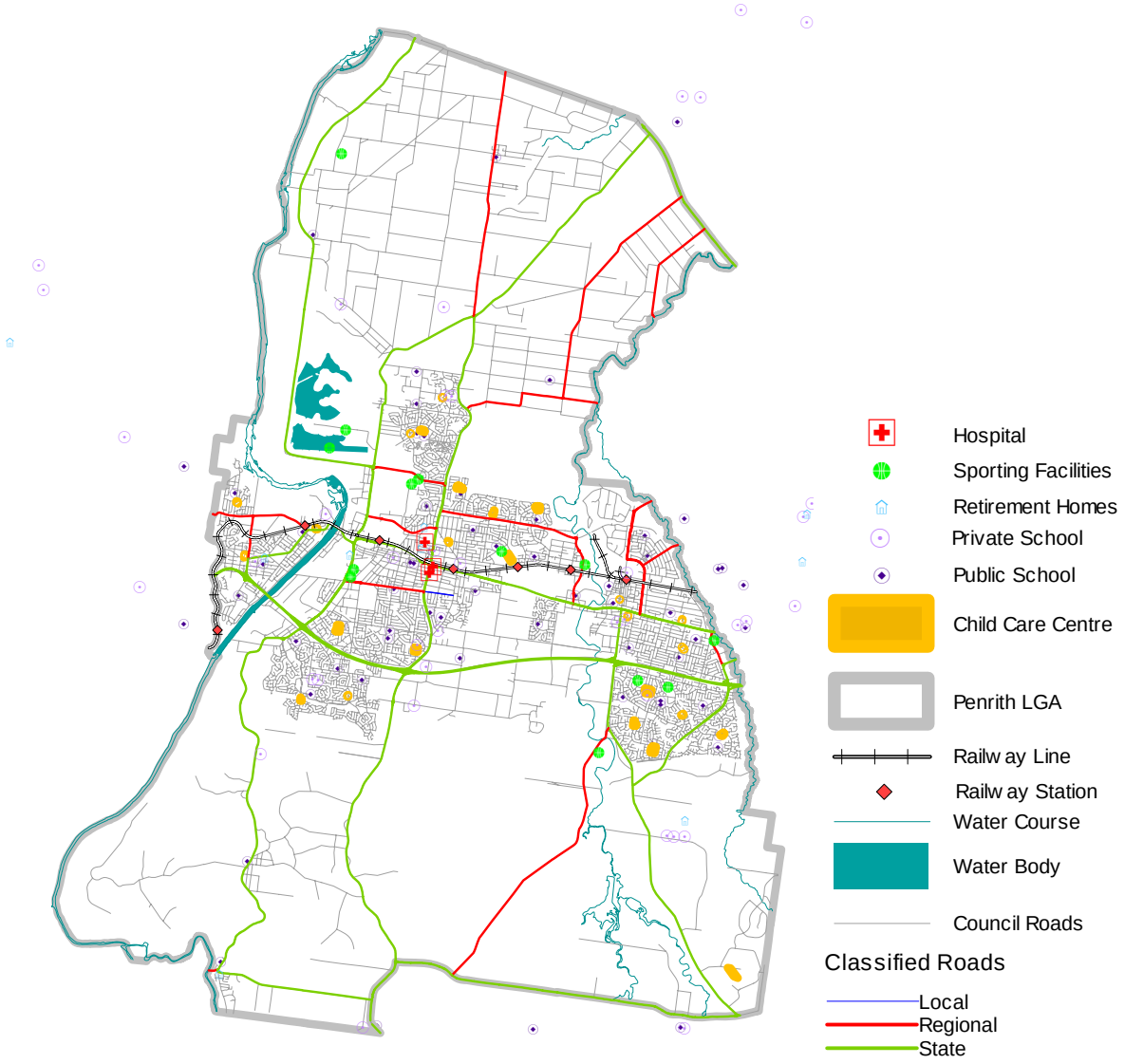
4.8 OTHER TRIP ATTRACTORS

The Transport and Population Data Centre (TPDC) 2001 Household Travel Surveys (HTS) reveal that work related trips (journey to work and other work related business) represent only 27% of all trips that people make in an average day. For this reasons it is important to consider major trip attractors that are not primarily work related. These trip attractors can have an element of work related trips, but they often have a far larger portion of non-work related trips e.g. to a school – the trips to and from the school by teachers represent only a small proportion of the total trips to the school.

Many of these significant trip attractors are noted on Figure 4.8. Key land use trip attractors include:

- Smaller Activity Centres - such as Neighbourhood Centres, Local urban shops/shopping centres, Rural Villages and Community Centres (34 sites);
- Significant health care facilities - Nepean Hospital, Nepean Private Hospital and Wentworth Area Health Service;
- Child Care Centres (41);
- Schools (76);
- Tertiary Education - University of Western Sydney and Western Sydney Institute of TAFE
- Special Residential – such as aged care facilities (17 sites) and public housing;
- Sport, Recreation, Cultural & Services;
- Major regional sport, recreation & cultural facilities;
- Significant institutions including Libraries and Youth Centres; and
- A range of other minor trip attractors include:
  - Churches/places of worship
  - Pools
  - Railway stations
  - Licensed clubs
  - Civic centres
  - Libraries
  - Police stations
  - Post Offices
  - Law Courts and legal services
  - Community service providers

Figure 4.8 Significant Trip Attractors



Key Land Use Issues:

LU25) Trip attractors should be located within areas of greater residential and/or employment density

LU26) Trip attractors should be linked to residential and employment areas

LU27) Trip attractors such as places or worship, schools, and other institutions should be discouraged from locating in rural areas

4.9 LOCAL AREA ACCESS

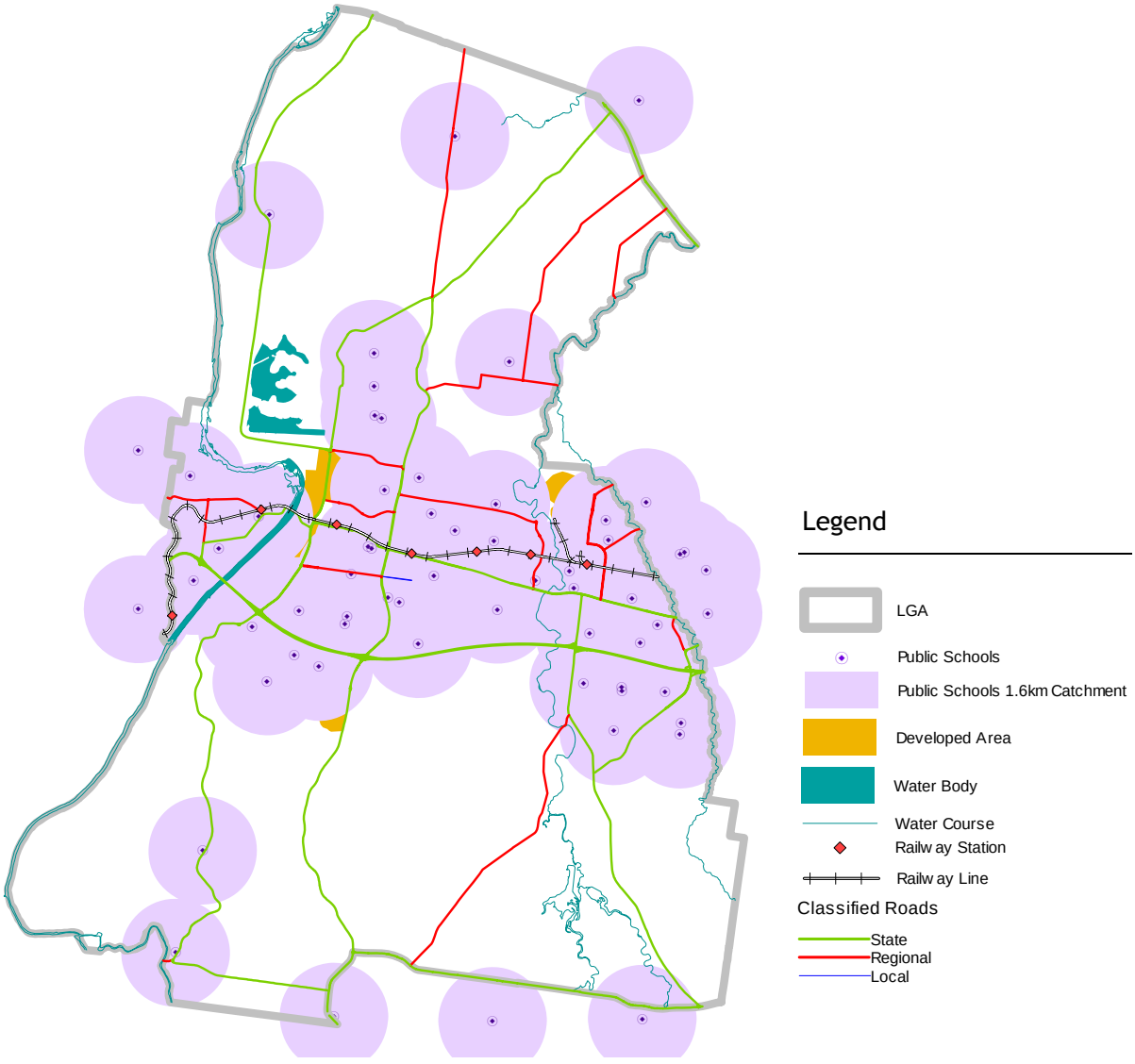
The ability to walk and cycle to key local trip generators is very important, particularly in local neighborhoods where good access to schools and local shops is vital. This section highlights the location of public schools and local business zones (shops) within the LGA.

4.9.1 PUBLIC SCHOOL

Traditionally school children who live outside of a 1.6km radius of their school are provided with free State Government subsidised bus travel to their school. State Government Subsidised bus travel is also available for children within the 1.6km radius if they are below year 2 at school or if they have with a defined medical condition.

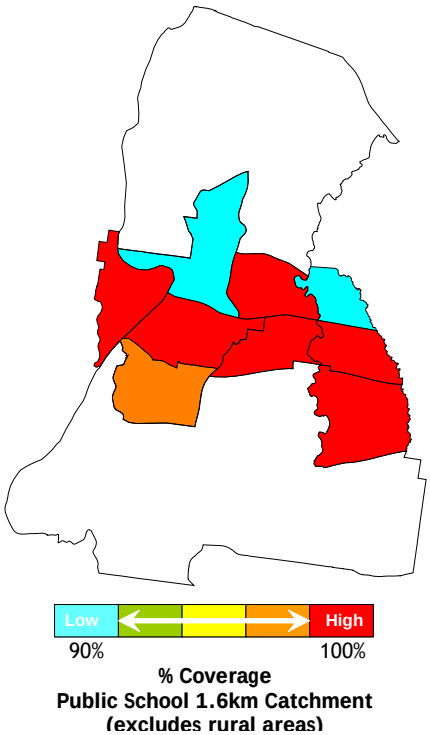
This 1.6km radius has been used to establish the extent of public primary and secondary servicing of the LGA. This radius represents the distance within which children are generally not eligible for free bus travel. Figure 4.9 shows these catchments overlayed against the developed area. The target mode within this radius is walking or cycling ("Active Transport").

Figure 4.9 Public School 1.6km Catchments



Refer Appendix 4-C Public School Catchment detail.

The figure to the right highlights the 1.6km school catchment coverage within the urban developed areas. Overall 97% of the urban developed areas fall within the 1.6km school catchments, with the exception of the north and south rural areas.



The implication of this is that in all urban areas the majority of children live within a cyclable-walkable catchment. These children are generally ineligible for free bus travel, unless they attend out of area schools or are below year 2. If walking or cycling is perceived to be unsafe these parents will continue to drive children to school.

A concentrated bike path program within the defined public school catchment would improve opportunities for children to cycle to school. This program should concentrate on journeys older children can make from home to school followed up by school to school linkages to enhance safety and ensure the paths enjoy high usage rates.

Council may consider, in conjunction with other residential strategies, increasing residential densities within the 1.6km school catchment to increase housing choice within close proximity to schools and facilitate cycleway and footpath infrastructure improvements and utilisation. Families of school age children may currently have limited opportunities within existing urban areas to obtain appropriate housing within the school catchment to enable children to safely cycle or walk to school.

New urban release areas should maximise residential densities and housing choice, and ensure the provision of footpath/cycleway infrastructure within the 1.6km school catchment. School location within new urban release areas should be determined following a detailed assessment of masterplans for residential development having regard to areas of higher density, and be located within areas that will facilitate walking/cycling to school. School location is often determined based on surplus land location or acquisition costs/requirements. It is considered appropriate that school location be determined based on an expanded locational criteria to maximise sustainable transport opportunities.

Key Land Use Issues:

LU28) Increase residential densities and housing choice within the 1.6km school catchment within existing urban areas

LU29) New urban release areas should maximise residential densities and housing choice within the 1.6km school catchment.

LU30) New urban release areas should ensure the provision of footpath/cycleway infrastructure within the 1.6km school catchment.

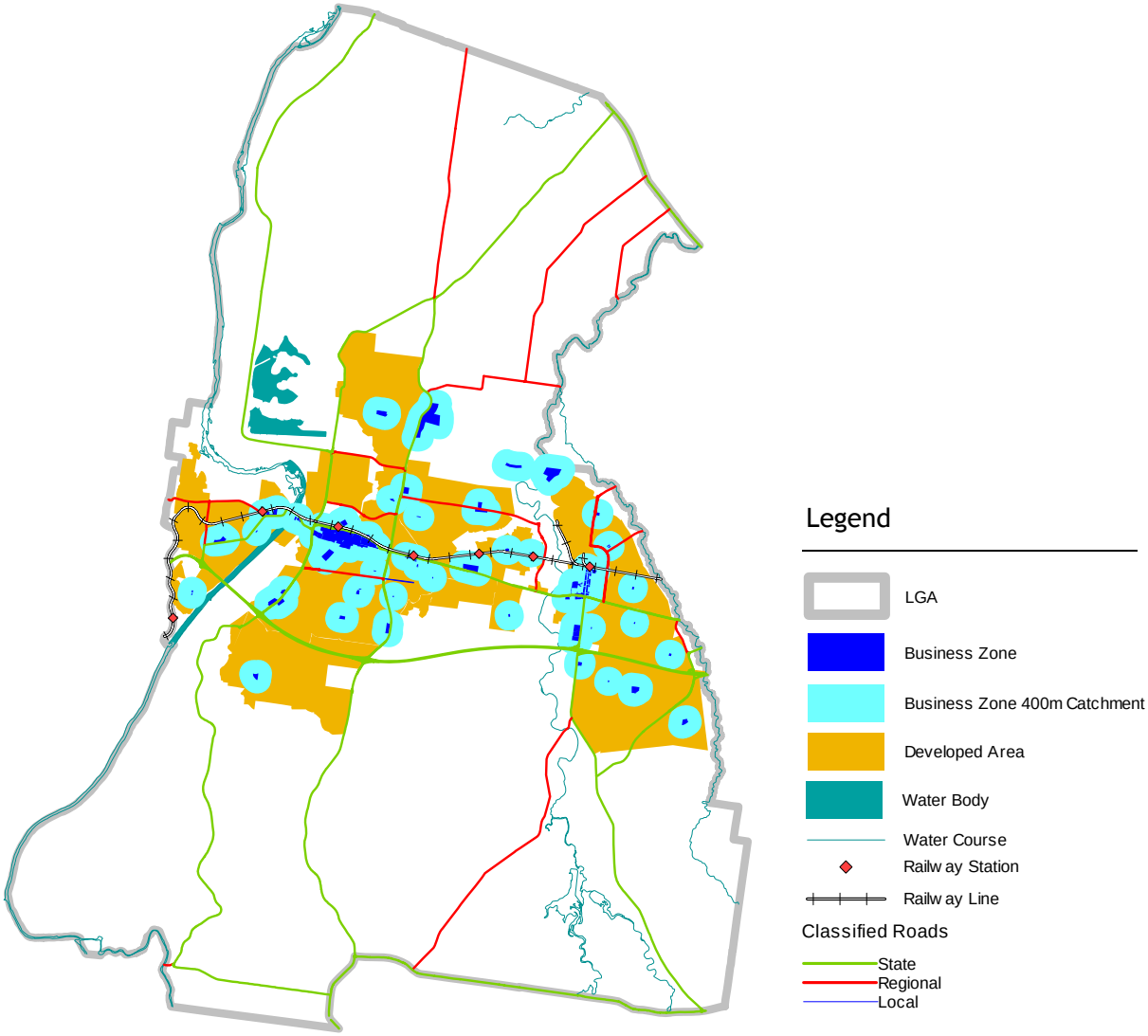
4.9.2 BUSINESS

Penrith Council have defined business zones within the LGA, which represent retail activity areas, including the Penrith CBD and St Marys Town Centre. In suburban areas these generally represent neighbourhood centres (shops). The business zones are represented in Figure 4.10.

Traditionally 400m is considered a comfortable walking distance. Hence a 400m radius has been used to establish the walking catchment to the business zones within the LGA, also represented in Figure 4.10. Active transport is the target mode within this catchment.

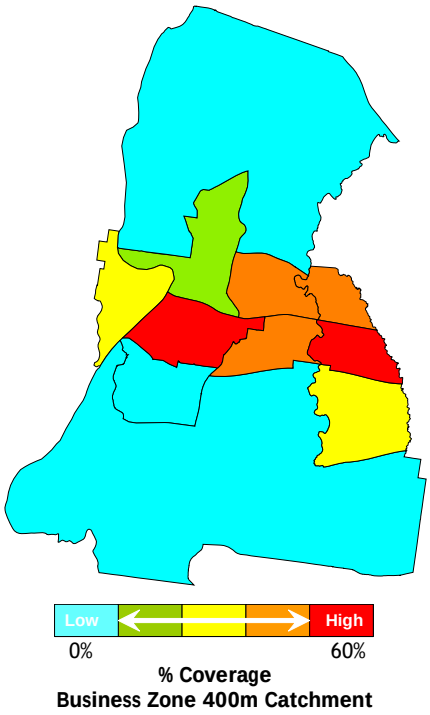
Refer Appendix 4-D Business Zone Catchment detail.

Figure 4.10 Business Zone 400m Catchments



The figure to the right shows that with the exception of St Marys and Penrith, all other SLAs have less than 40% of the developed area within a 400m walking distance.

Of particular concern are Glenmore Park, St Clair and Cranebrook SLAs where only a small number of centres are provided, with minimal coverage. Around 63% of the existing developed area is outside the 400m walking distance. In almost all areas more neighbourhood centres distributed over the entire area is required to address this issue.



Key Land Use Issues:

LU31) Increase residential densities within the 400m neighbourhood centre catchment within existing urban areas

LU32) Improve the provision of footpath/cycleway infrastructure within the 400m catchment of neighbourhood centres

LU33) New urban release areas should maximise residential densities within the 400m catchment of neighbourhood centres

LU34) New urban release areas should ensure the provision of footpath/cycleway infrastructure within the 400m catchment of neighbourhood centres

4.10 POPULATION, WORKFORCE & EMPLOYMENT

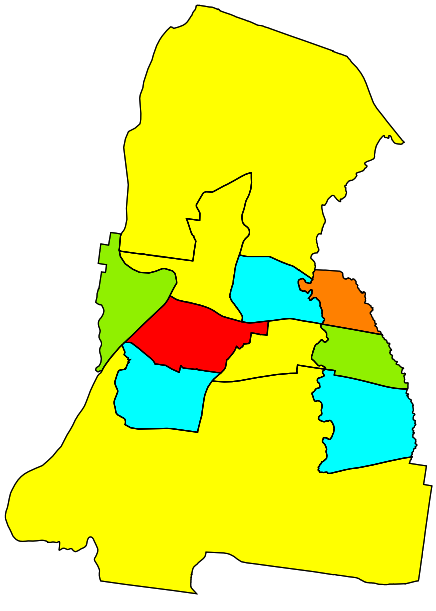
In 2001, the population of Penrith LGA was over 172,400. Almost half of the 2001 population (more than 80,990) participate in the workforce, however there were fewer than 49,800 jobs available in Penrith in 2001 resulting in a deficit of jobs. This is one of the factors for movement out of the area for employment.

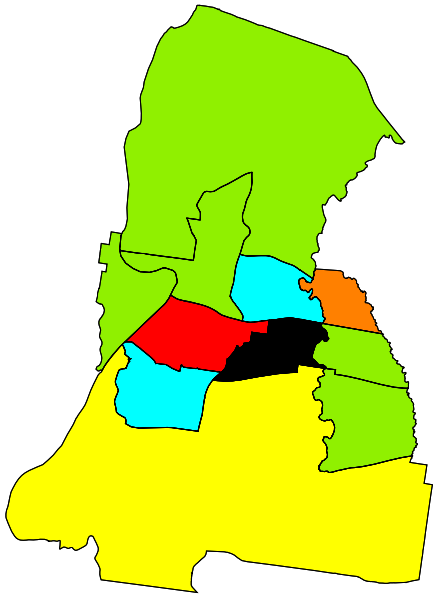
The map to the right shows the difference between workforce and jobs within individual SLAs. Only Penrith and North St Marys have more jobs than workers or a surplus of jobs (shown as a positive difference on the scale). The greatest deficit of jobs is found in St Clair (11,500), Glenmore Park (8,200) and North Werrington (8700).

Refer Appendix 4-E and 4-F for detailed Population, Workforce & Employment figures for the existing & future.

With the URA developments, the population, workforce & employment will increase. Overall there will be an increase of around 46,900 jobs by 2016 resulting in the workforce-job imbalance decreasing from more than 31,000 to approximately 10,000 within the LGA. The concentration of jobs will be dramatically intensified in the WELL precinct.

It should be noted too that some of the jobs within the WELL Precinct will be in tertiary education and creative industries which may not relate to the skills base of Penrith SLA





Due to the WELL precinct in South Werrington, the difference between employment and workforce is approximately 26,700. This is because students are considered as employees in this assessment. This SLA is shown as black on the figure as it is off the legend scale.

The relationship between workforce and employment within an SLA can be defined through a Ratio, where:

- 1.00 represents equilibrium;
- <1.00 indicates a deficit in jobs; and
- >1.00 indicates an excess of jobs.

Overall the LGA will experience a change in this ratio from 0.6 to 0.9 thus moving closer to equilibrium between jobs and workforce. However on closer examination, the ratio will actually decrease in all SLAs except in St Clair and South Werrington. Thus while more jobs will be available within the LGA, they will not be evenly distributed throughout the Council areas, resulting in cross LGA trips to the main employment centres in South Werrington, Penrith CBD and Erskine Park. Table 4.5 show the existing and future Ratio change by SLA.

Table 4.5: Population, Workforce & Employment

	Population		Workforce		Employment		Workforce: Employment Ratio	
SLA Name	2001	2016	2001	2016	2001	2016	2001	2016
St Clair	28,551	29,957	13,910	14,547	2,270	10,026	0.2	0.7
St Marys	19,598	21,704	8,034	8,988	4,073	4,073	0.5	0.5
Emu Plains	13,982	15,333	7,129	7,741	3,217	3,217	0.5	0.4
North Werrington	20,327	25,220	9,991	12,208	1,270	3,270	0.1	0.3
South Werrington	5,405	11,320	2,558	5,237	1,913	31,913	0.7	6.1
Penrith	27,154	32,814	12,528	15,093	20,869	20,869	1.7	1.4
Glenmore Park	19,545	20,824	10,136	10,715	1,914	1,914	0.2	0.2
Cranebrook	19,611	26,186	8,627	11,606	5,388	6,060	0.6	0.5
North St Marys	3,972	4,469	1,407	1,632	5,262	5,262	3.7	3.2
Southern LGA Rural	5,944	9,922	2,922	4,722	1,514	1,514	0.5	0.3
Northern LGA Rural	8,309	31,461	3,750	14,236	2,119	8,603	0.6	0.6
Total	**172,398**	**229,211**	**80,992**	**106,725**	**49,809**	**96,721**	**0.6**	**0.9**

Council will therefore need to facilitate an increase in residential densities within close proximity to new employment centres. This will assist in ensuring that jobs in employment centres will not only complement the increase in the number of working residents in new URAs, but also ensure improved accessibility to employment centres by closely linking housing location to job location. This will in turn create opportunities for people to live and work within particular locations.

Key Land Use Issues:

LU35) Facilitate an increase in residential densities within close proximity to new employment centres

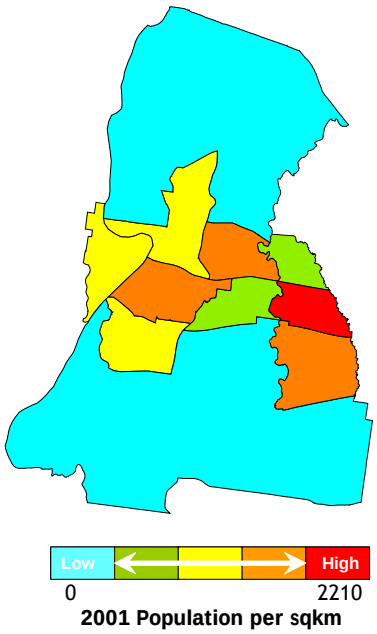
LU36) Ensure the provision of appropriate infrastructure linking areas of increased residential density to new employment centres

LU37) Encourage medium to high employment generating businesses within close proximity to higher density residential areas

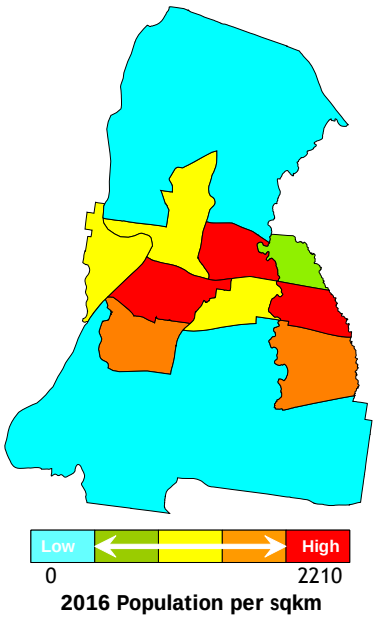
4.11 PEOPLE – LAND USE RELATIONSHIP

There are currently 426 people/sqkm in the LGA. The figures below show population density in people per square kilometre for each SLA.

Refer Appendix 2-G for existing & future densities (population, workforce & employment).



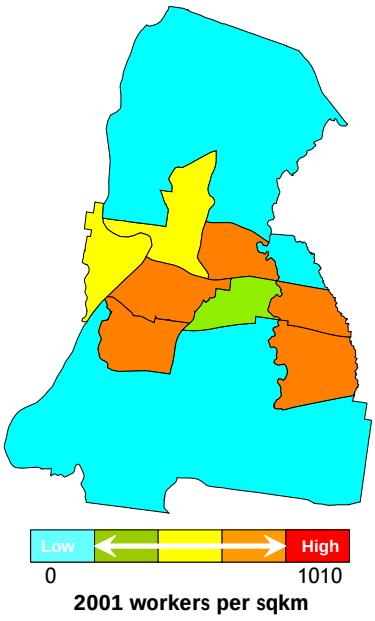
2001 Population per sqkm



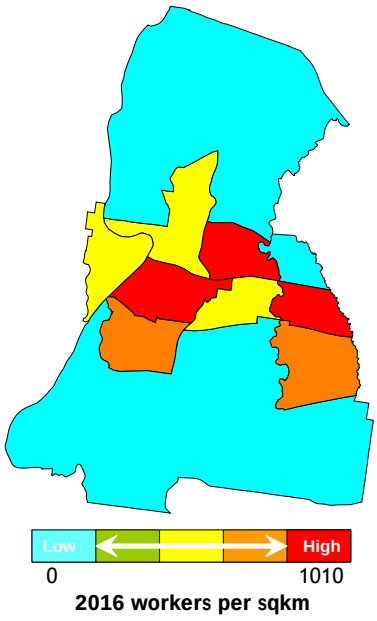
2016 Population per sqkm

The greatest density of population is in the St Marys SLA (1988 people/sqkm), Penrith SLA (1713 people/sqkm) and North Werrington SLA (1688 people/sqkm). There will be density increases in all SLAs with the greatest change to occur in South Werrington from 494 to 1034 people/sqkm (this includes the university campus site areas).

The workforce density, in terms of workers per square kilometre, is shown in the figures below and is generally proportional to the residential population.

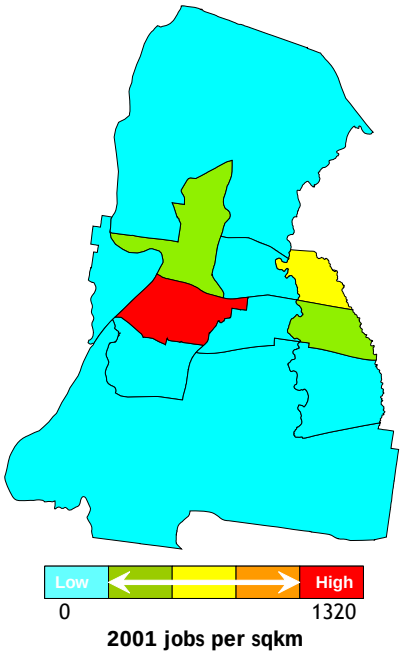


2001 workers per sqkm

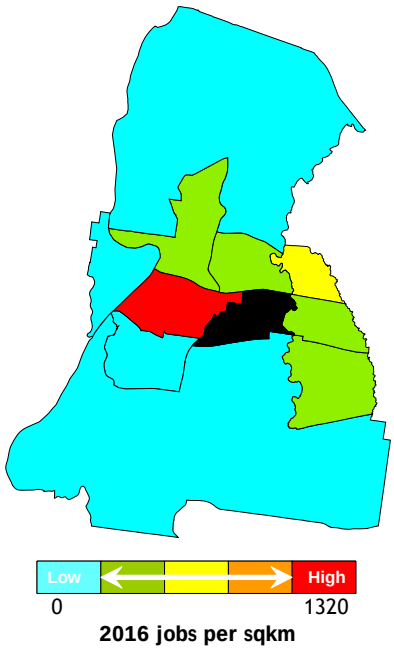


2016 workers per sqkm

The employment density, in terms of jobs per square kilometre, is shown in the following figures. Increases are also most notable in South Werrington



2001 jobs per sqkm



2016 jobs per sqkm

Due to the WELL precinct in South Werrington, the difference density increase dramatically. This is because students are considered as employees in this assessment. This SLA is shown as black on the figure as it is off the legend scale. North Werrington and St Claire will also experience a notable increase in employment density.

Key Land Use Issues:

LU38) Facilitate high quality transport links to new employment centres

chapter 5
transport overview

5 TRANSPORT OVERVIEW

This chapter provides an overview of transport within the Penrith LGA. Transport is described in terms of the infrastructure provisions such as roads, footpaths, cycleways, railways, bus stops and parking. Information is also provided on service levels for public transport. A summary of the existing travel patterns of people traveling to, within and from Penrith LGA is presented. Finally this chapter considers the future travel patterns with the projected growth in the LGA and the implications of achieving a significant mode shift. A more detailed description of transport in the LGA has been provided in the PITLUS Discussion Paper.

5.1 ROADS

By far the most popular form of transport within the Penrith LGA is the private motorised vehicle - car.

The road network is critical not only for the movement of private vehicles but also business vehicles, freight, taxis and buses.

Major east-west arterial access to the LGA is dependent on the Great Western Highway and the M4 Motorway, which run parallel to each other through the most developed parts of the municipality. Major North-South arterial connections consist of:

- Castlereagh Road - Mulgoa Road joining Richmond in the north and Wallacia to the south.
- The Northern Road joining Richmond in the north and connecting Elizabeth Drive to Camden and Campbelltown in the south.
- Mamre Road, connecting the Great Western Highway in St Marys and Elizabeth Drive at Cecil Park in the south.
- Erskine Park Road-Carlisle Avenue, forming an offshoot from Mamre Road at Erskine Park to Mount Druitt in Blacktown City.

5.1.1 ROAD HIERARCHY

In the past, roads have been simply classified according to the role they fulfil and the volume of traffic they should appropriately carry. For instance an arterial road was typically considered a main road carrying over 15,000 vehicles per day and fulfilling a role as a major inter-regional link. This classification defines arterial, sub-arterial, collector and local roads. The Penrith LGA has a defined a simplified road hierarchy in terms of the following classification groups:

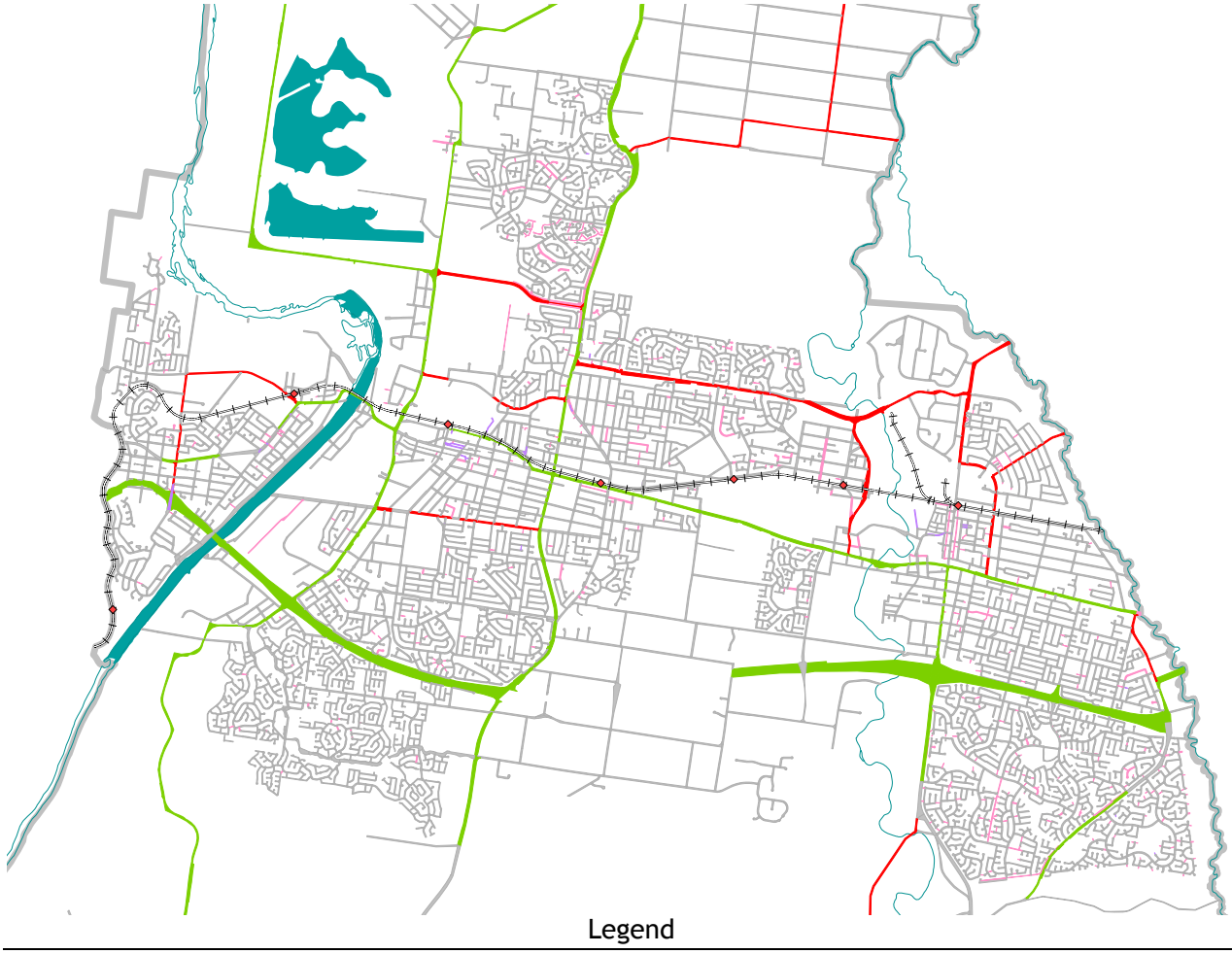
- RTA roads;
- Regional roads;
- Local roads;
- Laneways; and
- Undedicated roads.

This simple current road hierarchy is presented for the urban areas of the Penrith LGA in Figure 5.1.

The road network should be classified according to a functional road hierarchy, where the key objective should be:

- Orderly grouping of roadways that facilitates planning, building and management of the system;
- Guidance in land use decisions.

Figure 5.1 Road Hierarchy



Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. The purpose and priorities on arterial roads are of particular importance in a number of locations within the Penrith LGA where the arterial road forms the main shopping street or where it is adjacent to schools and school children are required to cross these roads on their way to and from school.

Key Transport Issues:

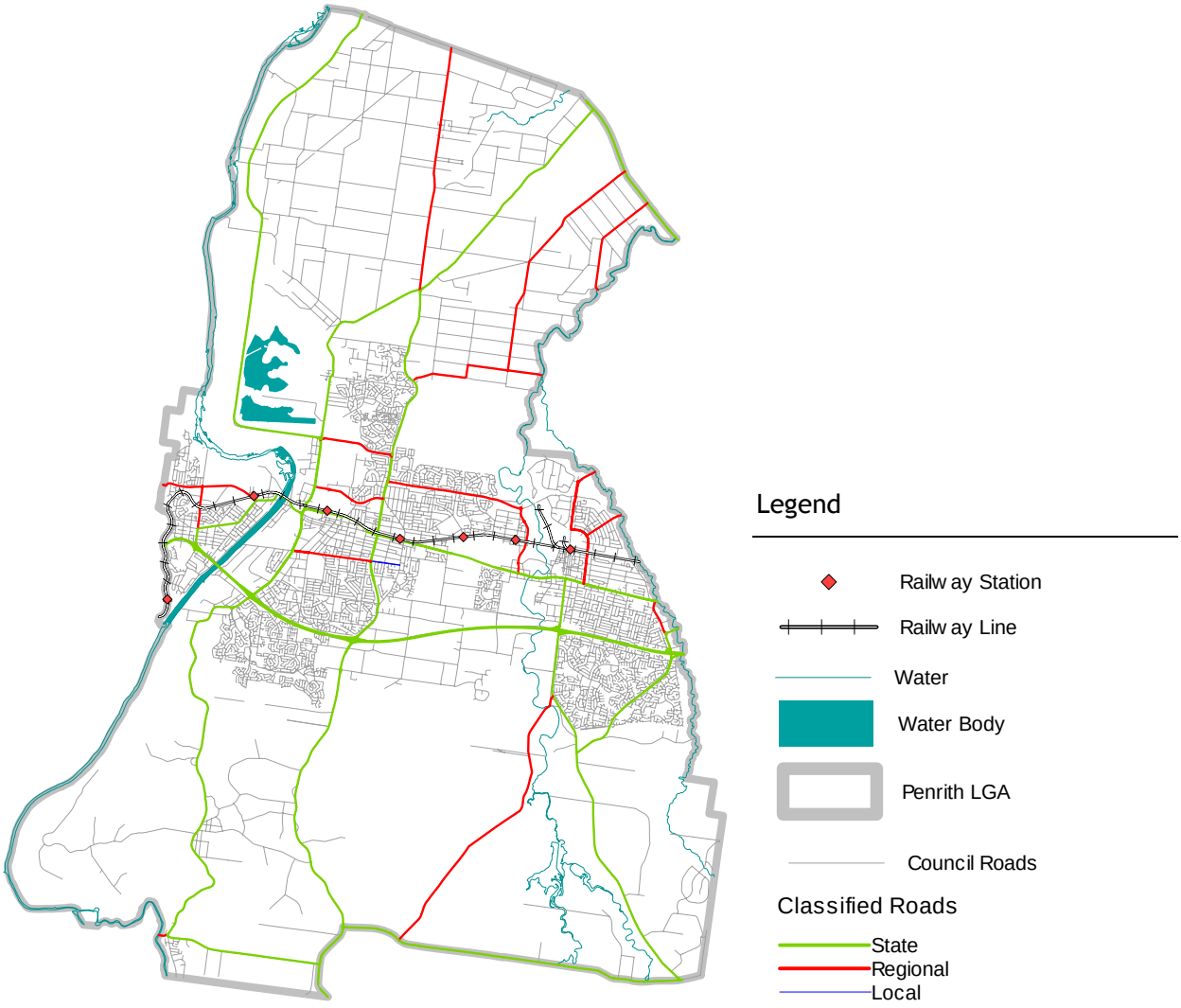
T1) The existing road hierarchy does not reflect the functional classification of the road network in terms of all modes of transport

T2) Roads cannot be assessed against a set of criteria based on functional classification

5.1.2 ROAD INFRASTRUCTURE

Road infrastructure within the Penrith LGA is further categorised by the responsible authority. Classified roads are road infrastructure under the care and control of the Roads and Traffic Authority, whilst all other roads are under the care and control of Penrith City Council. A classified road is defined as a road declared under Part 5 of the Roads Act 1993 to be a main road, a secondary road, a State highway, a tourist road, a State work, a freeway or a controlled access road within the meaning of that Act. Classified roads are typically further defined as State or Regional Roads. There is approximately 200km of classified State and Regional roads in the LGA. There is over 1000km of roads under the care and control of Council. Figure 5.2 identifies the Classified (state and regional) and Council Roads within the Penrith LGA.

Figure 5.2 Road Classification by Responsibility



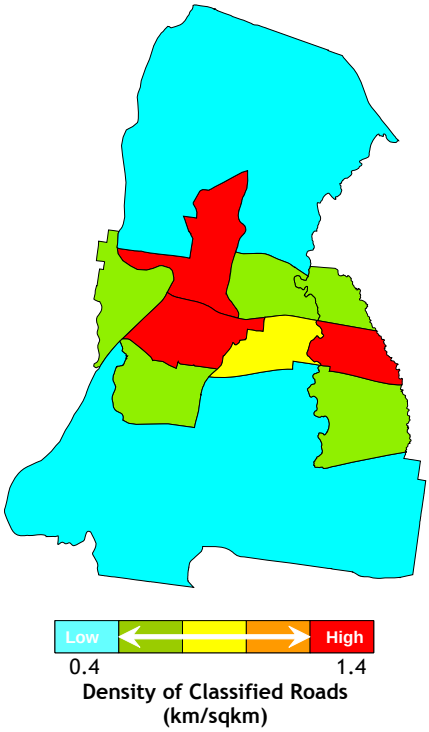
Source: The classified roads were provided by the RTA in GIS Format, in February 2007

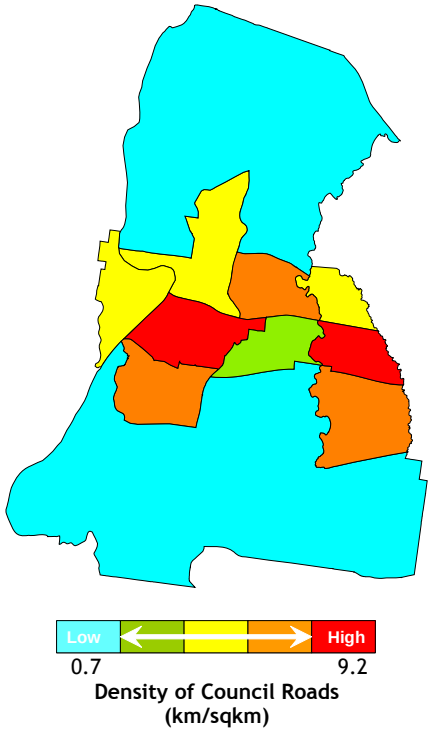
Refer to Appendix 5-A for road lengths and densities.

Key Transport Issues:

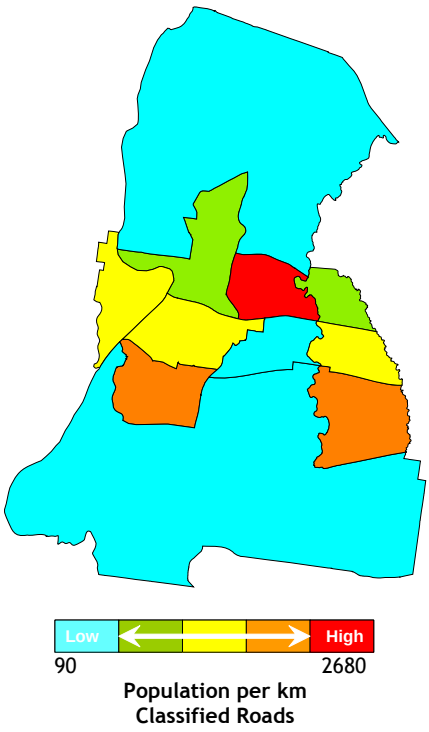
T3) Council has no control over the responsibility classification roads
T4) Council can only try and influence the RTA for changes to the state and regional road network.

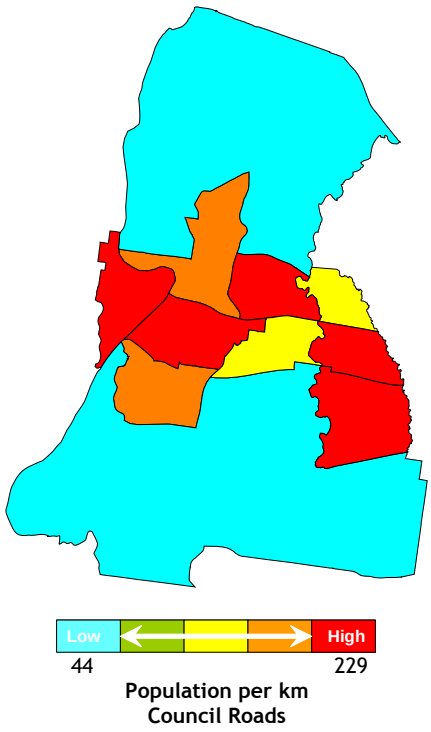
The following figures show the length of road in kilometres per square kilometre (km/sqkm) for the LGA. This is effectively a measure of the density of roads. A comparison of classified road density to Council Road density is provided. Penrith, Cranebrook and St Marys SLAs have the greatest density of classified roads, whilst Penrith and St Marys also have the greatest density of Council roads.





The following figures show population per kilometre of Classified and Council Road.





In the future, with the growth of the URAs there will be a need to review the classification of major road links, specifically to employment centres including the WSEH. Arterial roads provide greater opportunities for bus priority and more direct connections between regional areas.

Key Transport Issues:

T5) Classified roads connecting major employment centres within the LGA and connecting to the WSEH should be identified

T6) Review the classification of major road links, specifically to employment centres

Future Road Planning

Arterial Roads Study

The Penrith Arterial Roads Study and the associated revisions (PARS, Feb 2005) were undertaken to develop a network traffic model that would determine:

- the existing deficiencies in the road network (allowing for background growth);
- the future network upgrades required to meet the demands generated by the future URAs;
- the apportionment that each release area contributed to the need for the future upgrades;
- the timeframe for the delivery of the future upgrades.

This St Marys Development Revised TMAP (May 2004) is a supplement to the original Penrith Arterial Roads Study, and was undertaken specifically to address the impacts of planned developments in the urban release areas of Penrith LGA. A lack of programs or strategies in place at State Government level to implement infrastructure needs led Council, in conjunction with the RTA, to develop the Penrith Arterial Roads Study with the purpose of identifying required road improvements implement by the year 2016.

PARS used traffic modelling to assess the current road network, identify current deficiencies, predict deficiencies in the future and assess the impact of traffic from new developments on the road network as a whole. This enables Council and the RTA to identify the infrastructure improvements needed to maintain the road network satisfactorily, from a capacity perspective.

PARS identified a number of deficiencies in the local arterial road network, which are required to sustain natural traffic growth in the short term, even without the additional impacts of the significant future populations planned for the LGA. These works are not currently funded and have not been identified as part of the RTA's short or long-term capital works programs or strategic plans.

Key new road infrastructure identified includes the following:

- Werrington Arterial;
- Erskine Park Arterial – Erskine Park Employment area/M7 Link Road;
- Jane Street Extension; and
- Bus lane underpass under the Penrith to Kingswood railway line from Belmore St to Penrith North Army land.

St Marys Release Area

The St Marys Release Area Transport Management Strategy Committee is to review the schedule of works and cost apportionment for the road and transport infrastructure for the St Marys Release Area. The State Infrastructure Strategy identified the need for the Mamre Road/M4 overpass duplication at St Marys.

North Penrith Masterplan

The North Penrith Master Plan sets out the services and facilities which include road upgrading.

Erskine Park Employment Area

Planning of the Erskine Park Employment Area (EPEA) has made provision for an arterial link through the estate, linking this estate to the SEPP No. 59 lands and to the M7. Council considers that this link will enhance both estates, and enable both effective and efficient public transport services to be provided, to reduce the dependency by the employees in the area on motor vehicles. A Route Alignment Study, to determine a preferred route alignment and notional costings for the road, has been completed by Council and presented to the DoP and RTA. Council, in conjunction with the EPEA landowners group, also prepared a Position Paper to the former Minister for Planning, outlining the case for the link road and the benefits for the estate.

The Metro Strategy released by the State Government in December 2005 specifically nominated the then named EPEA-M7 Link Road as a major piece of infrastructure to be provided by landowner contributions, and also indicated a route consistent with that proposed by Council. The Minister for Planning formally declared on 9 June 2006 the Erskine Park Link Road Network as a Major Project to which Part 3 A of the Environmental Planning and Assessment Act would apply.

Western Sydney Employment Hub

In response to the above announcement, Council officers have met with DoP to seek the finalisation of the route of the Erskine Park Link Road as a priority, and for that process not to be delayed by the longer term planning process to be carried out for the newly identified Western Sydney Employment Hub (WSEH).

The RTA has been engaged as the proponent for the arterial road network required to service the WSEH. This includes the link road proposed by Council to connect Lenore Drive with Old Wallgrove Road and the M7. This proposal will be advanced as an amendment of the Government's Major Projects SEPP.

Extensive development has already occurred within EPEA and this is expected to accelerate after decisions are taken by Government in relation to the final route alignment, timing and funding arrangements for the EPEA-M7 Link Road.

Key Transport Issues:

T7) the PARS recommendations have not been identified as part of the RTA's short or long-term capital works programs or strategic plans;
T8) Links to WSEH have not been identified

5.2 ACTIVE TRANSPORT MODES

Active transport modes, that is, where people are active when travelling, are the most sustainable form of transport available and these generally refer walking and cycling.

5.2.1 CYCLING

In 1996 the *Penrith City Council Bicycle Plan* (Bike Plan) was commissioned to provide a platform for the implementation of measures to ensure safe and convenient cycling within Penrith LGA. The Bike Plan was undertaken with the aim of fulfilling a community wish for a cycling system to be established. Extensive community consultation was undertaken to ascertain what the community wanted out of the cycling system for recreation, commuting, journey to school, to encourage bicycle

tourism and to replace the use of the private vehicle. From the survey results, and consideration of trip-generating land uses, a network of bicycle routes and associated facilities was developed.
The community consultation revealed that the most popular cycling routes in Penrith LGA were:

- Route along the Nepean River
- Werrington Lakes off-road pedestrian/cycle path
- Jamison Park off-road path
- Training routes along major regional routes
- Route to University of Western Sydney from neighbouring suburbs
- Routes to railway stations – especially Penrith, Emu Plains and St Marys
- Routes to Wallacia, Mulgoa and Luddenham
- Routes along local streets to schools and local parks

The major recommendations of the report were the implementation of a network of bicycle routes and also contained a detailed list of recommended engineering improvements. The Bicycle Plan report also recommended that all new roads and reconstructed sections of road make provision for cyclists. The following recommendations were made:

- Adopt the Penrith Bicycle Plan 1995
- Fund the proposed staged cycle network jointly between the RTA and local council with additional funding to be obtained for projects of regional significance such as end trip facilities at the University of Western Sydney and proposed new railway station between Werrington and Kingswood
- Consideration should be given to the implementation of a proposed cycleway route in the design of new on-road and off-road construction works
- New residential subdivisions with road geometry that does not conform to the minimum widths outlined in the Austroads Guide to Traffic Engineering Practice, Part 14 – Bicycles, should be planned according to the guideline
- Bicycle parking facilities recommended in the Australian Standard to be included as a high priority of implementation
- New residential areas are to have cycleway routes linking up nearby suburbs. Cycle facility funding is to be provided as part of the Section 94 Contributions Scheme imposed on developers, where appropriate.
- Ongoing maintenance of existing cycleways and sweeping of cycle routes to remove hazardous debris
- Any future works to the railway stations or railway land should incorporate Australian Standard bicycle parking facilities into the design

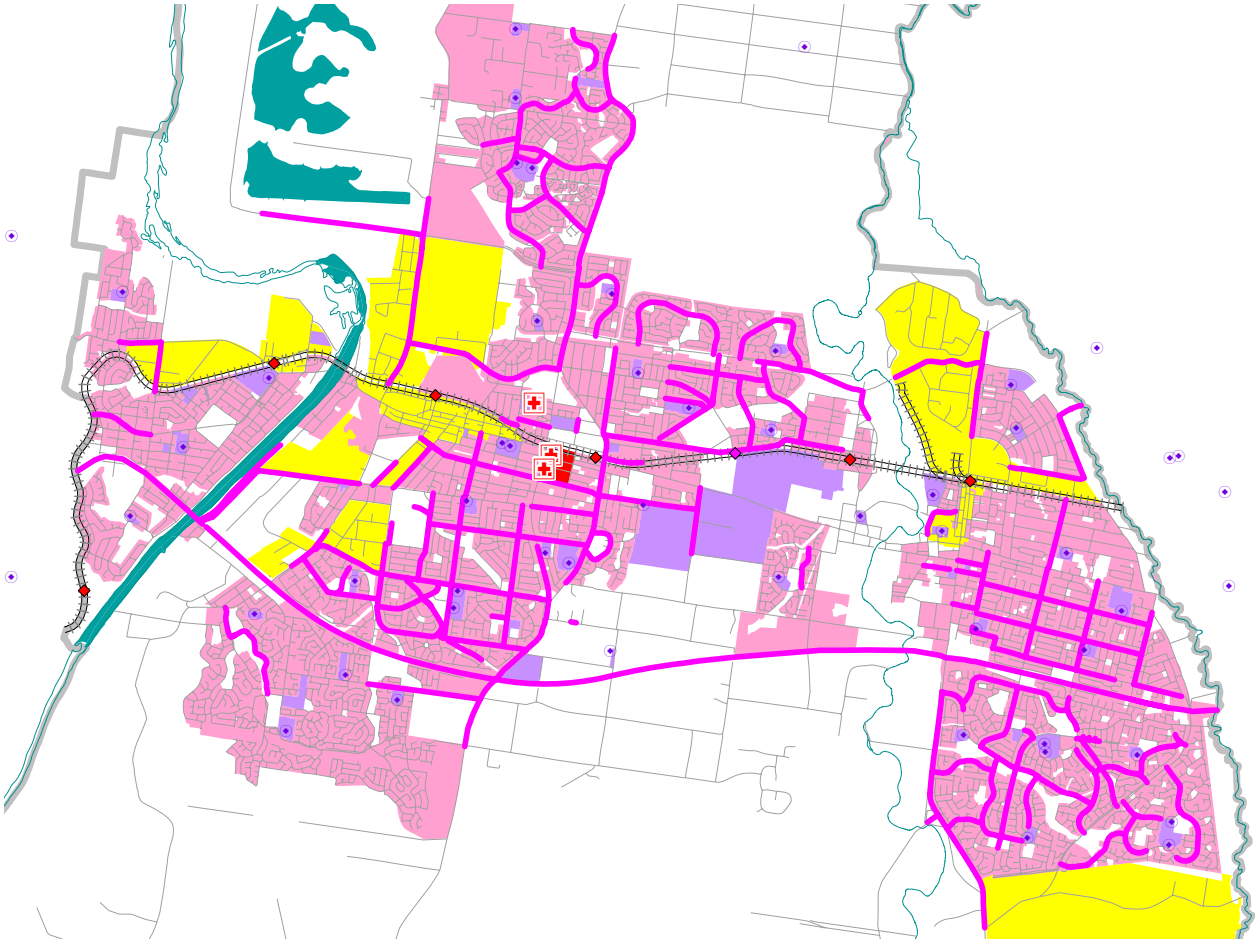
As a result of the implementation of the 1996 Bike Plan, today it is estimated that there is around 154km of on-road bikeways in the LGA representing 12% of total road length in the LGA. About 51km are on classified roads (25% of road length) and 103km on council roads (9% of road length). There is just over 18km of bikeways identified in the rural areas.

Figure 5.3 identifies the bikeways within the urban part of the Penrith LGA.

It should be noted that the source of this data is from PCC's GIS mapping database. Although these paths are designated as bikeways on the mapping database the actual level of facilities on the roads is unknown. Although designated routes, many have very little in the way of provisions and often even lack basic line marking and signposting.

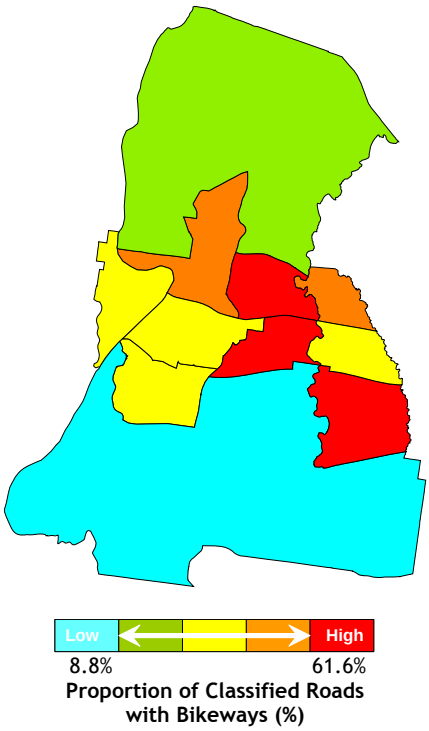
Refer Appendix 5-B for bikeway lengths and densities.

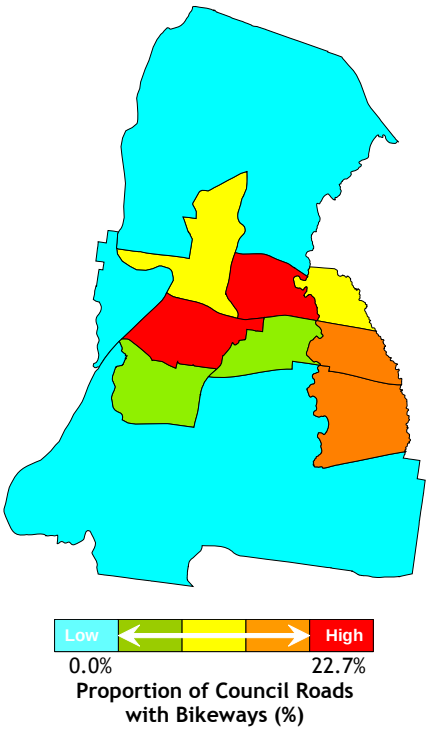
Figure 5.3 Bikeways



This figure shows the bikeway network overlaid onto a map showing key attractors such as residential areas, employment centres, commercial centres, hospitals, education facilities and rail stations. This clearly highlights the lack of connectivity between the residential areas and these other attractors. The network is patchy and there are very few clear routes between attractors. Most key areas like commercial centres and rail stations have very little facilities.

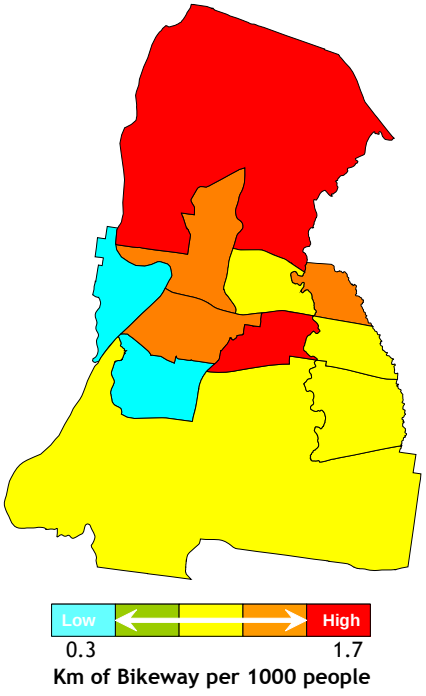
The maps below show the proportion of classified and Council Roads that have Bikeways.



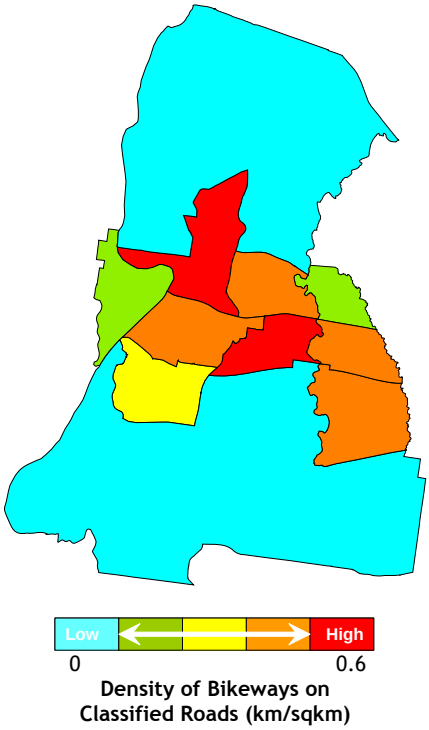


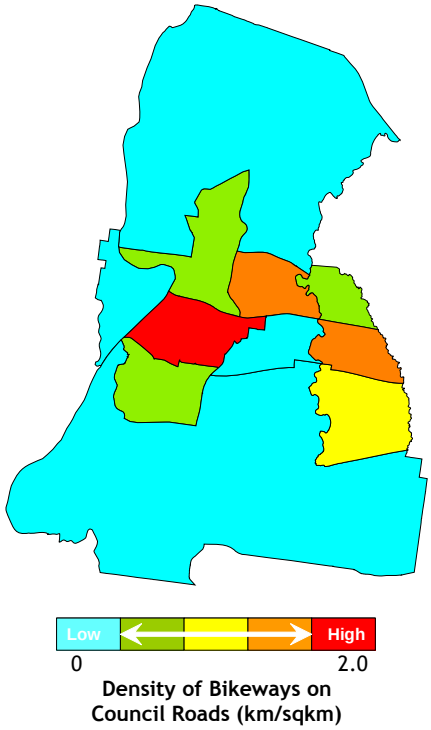
Overall Penrith SLA has the greatest extent of bikeways (38km) representing 24% of total SLA road length, followed by St Clair SLA with 29km representing 21% of road length. Emu Plains and Glenmore Park have very low levels of provision comparable with the rural SLAs, 5% and 9% respectively.

The figure to the right compares the length of bike route per person in each SLA. There is a range of 0.3 km of bikeway per 1000 people in Emu Plains to 1.7 km of bikeway per 1000 people in South Werrington.



The following figures show the density of bikeways on classified and council roads within the SLA. This is an effective density of bikeways for each area (in kms per sqkm). This shows that Cranebrook has the greatest density of Bikepaths on classified roads whilst Penrith SLA has the greatest density of bikeways on Council roads.





Bikeways on State and Regional roads with separated facilities (off road or on road) are particularly critical as a prerequisite for encouraging commuter cycling and a mode shift from the car for internal LGA trips. Bikeways on local roads (signed and separated facilities) encourage local cycling within the SLA to school, local shops and recreation facilities especially by children between the ages of 10-16 years. Cycling to school can affect a mode shift from the car which presently substantially adds to local traffic.

Future Planning

The North Penrith Master Plan sets out the services and facilities which include a regional cycleway/pedestrian network.

Key Transport Issues:

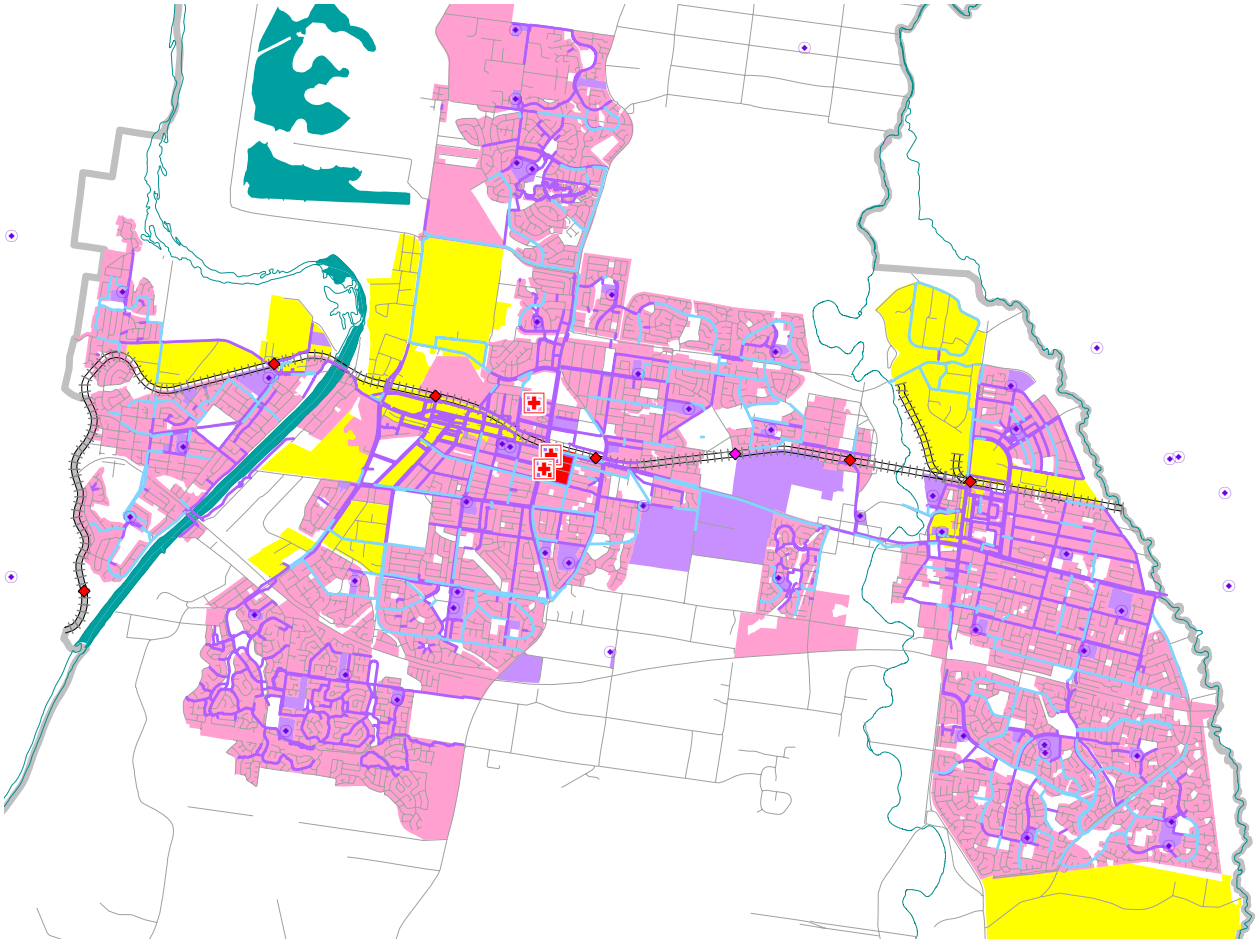
T9) Information on current cycle network and infrastructure is lacking, updates of Council GIS database is also required
T10) Patchy cycle network with little connectivity between residential areas and key attractors
T11) Lack of provision around stations and at commercial centres
T12) Inequity in cycle provisions across SLAs
T13) Commitment from Council is required to providing cycle facilities and infrastructure to make it a viable transport option in the LGA

5.2.2 WALKING

Council maintains an asset management database of footpaths in the LGA (refer to Appendix 5-A). As of June 2007 the database indicates that there is approximately 300km of footpaths in the LGA. There is just less than 1300km of roads in the LGA, however footpaths can run along both sides of a road, hence the 300km represents 11.6% of the total road length in the LGA (classified roads and local roads). No known studies have been undertaken by Council into the provision of other walking infrastructure such as pram ramps, pedestrian crossings etc.

Figure 5.4 identifies the existing and proposed footpaths within the urban part of the Penrith LGA, based on Council GIS datasets.

Figure 5.4 Footpaths



Legend

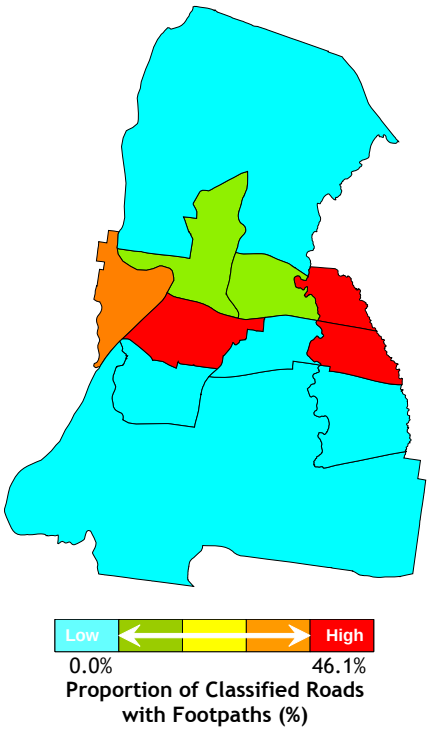
Figure 5.4 shows the existing and proposed footpath network overlaid onto a map showing key attractors such as residential areas, employment centres, commercial centres, hospitals, education facilities and rail stations. This shows some lack of connectivity between the residential areas and these other attractors. The network is patchy, with greater densities around Penrith City Centre and St Marys Town Centre.

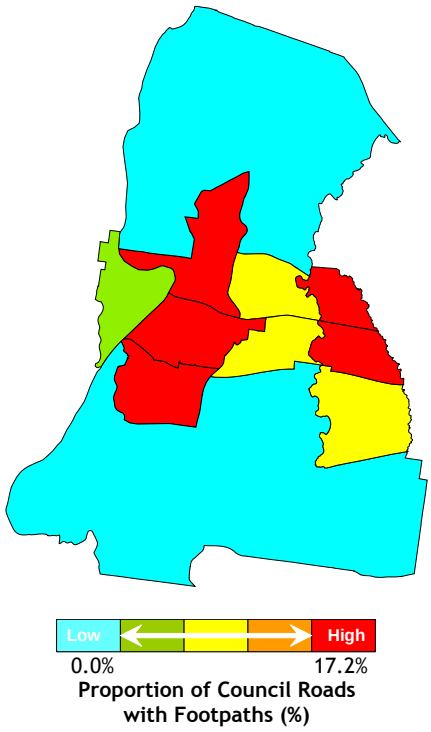
Council's GIS database has not been updated to reflect the full extent of footpaths in the LGA. The GIS database indicates that there is over 240km of footpaths in the LGA (9% of the total road length). The analysis undertaken in this study relies on the use of GIS mapping, hence the lower figure of 240km of footpaths has been used for analysis purposes. It is recommended that Council update the GIS database.

The Council GIS datasets also contain a list of proposed footpaths, there is approximately 133km of footpaths proposed for construction. Presumably some of these footpaths have already been constructed. If we consider the existing and future planned footpaths, as outlined in Council's GIS datasets, footpath provision will increase to 14% of the total road length in the LGA. The timeframe for completing this program is not known.

Refer Appendix 5-D and 5-E for existing and proposed footpath lengths and densities based on Council's GIS datasets. All subsequent comments relate to the GIS dataset figures.

The maps below show the proportion of classified and Council roads that have footpaths.

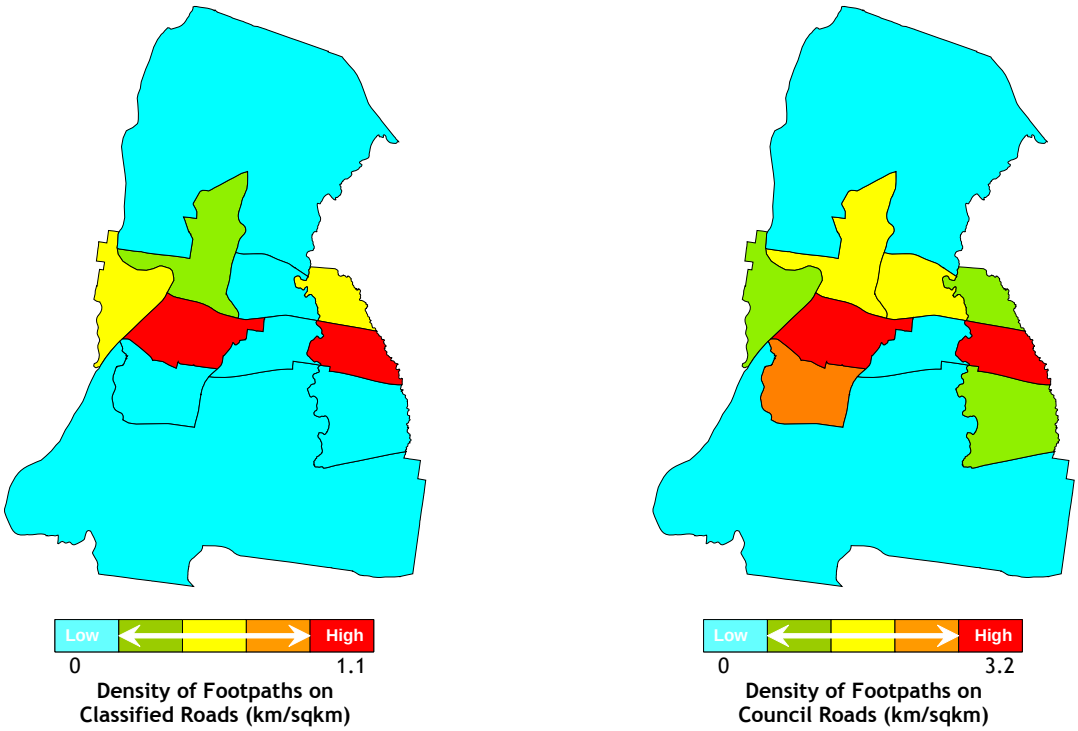




In the Penrith and St Marys SLAs about 17% of local roads have footpaths and over 40% of classified roads have footpaths. The lowest level of footpath provision on local roads is in Emu Plains SLA (6%), St Clair SLA (7%), South Werrington (8%) and North Werrington (9%). St Clair and Glenmore Park have only negligible proportions of footpaths on classified roads.

Footpaths on local roads are particularly critical as a prerequisite for encouraging local walking and a mode shift from the car for local trips, therefore the amount and quality of footpaths will need to increase dramatically to address this desired mode shift.

The figures below show the density of footpaths on classified roads and council roads in kilometres per square kilometre. This shows that Penrith & St Marys SLAs have the greatest density of footpaths on both classified and council roads.



Future Planning

The North Penrith Master Plan sets out the services and facilities for the area, which include a regional cycleway/pedestrian network.

Key Transport Issues:

- T14) GIS data sets for footpaths need to be updated to reflect the actual existing footpaths in the LGA
- T15) Information on other walking infrastructure (pram ramps, pedestrian crossings etc) is lacking
- T16) A program for implementation of the proposed footpath sis required
- T17) Patchy footpath network with little connectivity between residential areas and key attractors
- T18) Inequity in footpath provisions across SLAs
- T19) Low footpath provisions in some areas
- T20) Commitment from Council is required to providing continuous footpath facilities to make it a viable transport option in the LGA

5.3 PUBLIC TRANSPORT

5.3.1 RAIL

Penrith is currently served by a single train line travelling east-west through the region, the Main Western Line (CityRail) and the Blue Mountains (CountryLink) rail line operated by RailCorp. The western line extends from Emu Plains to Sydney City, then becomes the northern line and extends to Berowra via North Sydney. This rail line also spurs north from Blacktown to Richmond. The Blue Mountains (CountryLink) rail line connects Emu Plains to the Blue Mountains and Central Western NSW.

There are 5 railway stations in the Penrith LGA - Emu Plains; Penrith; Kingswood; Werrington; and St Marys. There is existing proposal to provide a Station near UWS. Adjoining stations in other LGAs to the west and east are Lapstone & Mt Druitt respectively.

Over recent years upgrade works and plans have been undertaken by Railcorp at the Penrith LGA Stations:

- An $8 million Easy Access upgrade was completed at **Penrith Station** in 2000. The upgrade included the installation of a new overhead concourse, four lifts and tactile indicators, refurbishment of the existing heritage buildings, erection of new platform canopies and improved lighting and CCTV systems.
- A $3.3 million Easy Access upgrade at **St Mary's Station** in 1996 saw the addition of lifts, wheelchair accessible car spaces and toilets, and hearing loops to existing facilities. In line with the Premier's Urban Transport Statement, RailCorp will be working with the Ministry of Transport to deliver additional commuter car parking at St Marys Station by the end of 2011.
- RailCorp completed a $300,000 upgrade to **Kingswood Station** in mid 2006, including repairs and painting to improve the facilities and appearance of the station, as well as improvements to the station's entry points to make it easier to enter and exit.
- RailCorp is currently finalising design and planning works for an Easy Access upgrade at **Werrington Station**, which is due to start mid this year. The $4.8 million project will include the installation of two new lifts, new stairs, upgrading the car parking area including allowing for two new disabled parking spaces, new canopies over stairs and lift entries, tactile indicators and upgrading lighting and CCTV coverage. It is expected this upgrade will be completed by mid 2008.

There are no current plans for significant upgrading facilities at Kingswood or Emu Plains.

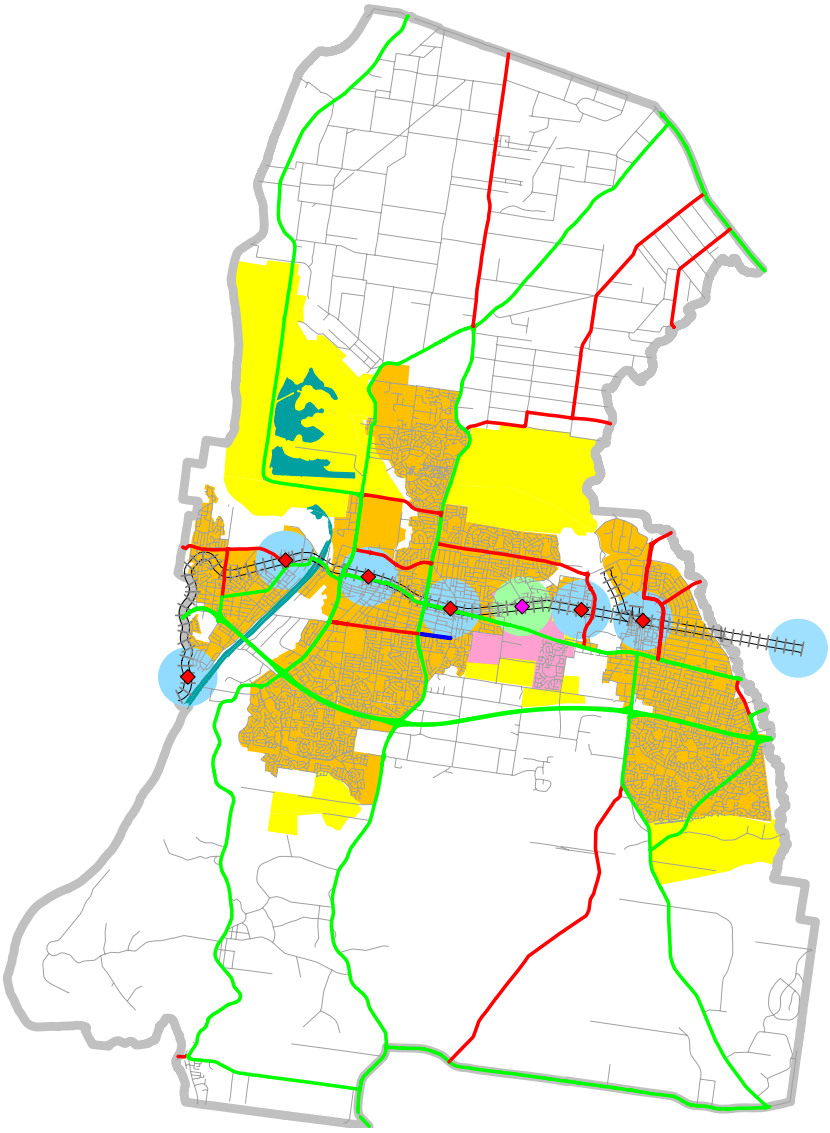
Penrith LGA is primarily serviced by the two-track Western Railway line, the line was duplicated between St Marys and Blacktown in 1990. The effectiveness of rail services to Penrith is limited by the two-track operation. Council's position is that the existing constraints of the two railway lines should be upgraded by **quadruplification of the lines between St Marys and Penrith**. RailCorp has not provided any formal commitment to the quadruplification. Such works should be brought forward to ensure that effective services can be provided from Penrith.

Rail Catchment

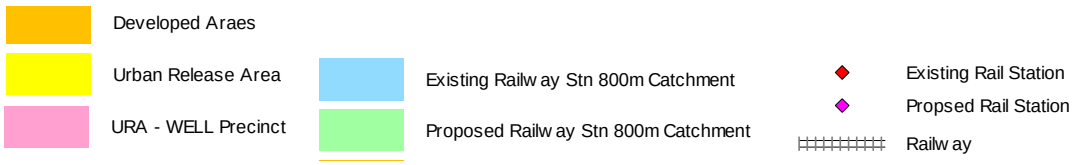
An 800m radius has been used to establish the extent of walkable catchments to the railway stations in the LGA. These walking catchments are shown in Figure 5.5, they account for 10.5 sqkm – which is 4% of the LGA or 9% of the urban SLAs. Overall only 10.7% of the developed areas within the LGA are within the 800m Rail Station Catchment Areas (RSCA). This will increase to 12.3% if we include the proposed UWS station.

Refer Appendix 5-F Rail Station Catchment detail.

Figure 5.5 Rail Station 800m Walking Catchments



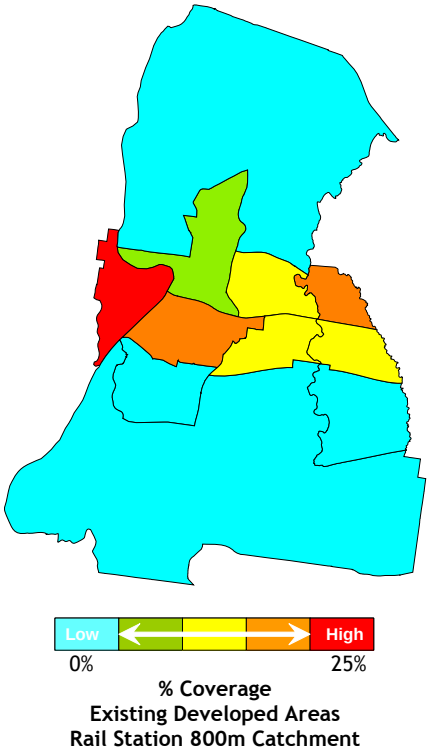
Legend

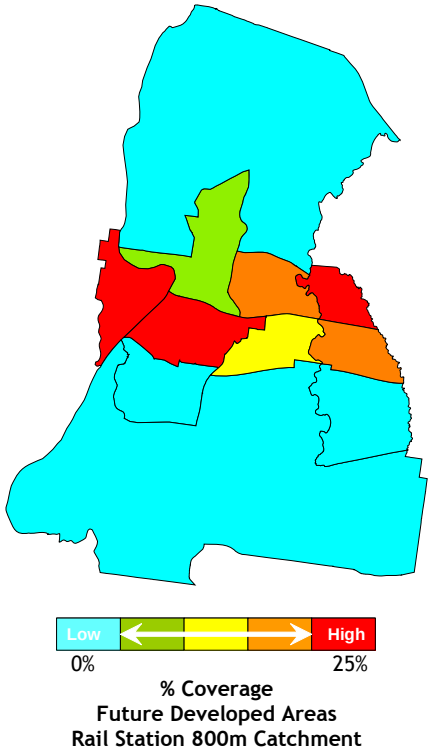


The above map demonstrates that there significant gaps in the walking catchments along the rail line. This is particularly evident between Kingswood and Werrington, and St Marys and Mt Druitt Stations. In August 2007, a review of the proposed railway station between Kingswood and Werrington Stations on the Western Line was announced. The station has been locally known as the proposed UWS Station and will fill the former gap well.

The review will clarify conflicting advice on the proposed railway station and ensure that efficient and effective public transport access is provided to the local community. The review will include examination and evaluation of all information, a public consultation process and provide recommendations to the Government.

The following maps highlight how much of the developed area within each SLA lies within the RSCA. Over 20% of the developed areas within Emu Plains (25%) and North St Marys (20%) SLAs lie within in the RSCA. Glenmore Park and St Clair urban developed areas are remote from all rail stations and do not fall with the RSCA.





Rail Catchment Utilisation

It is important to note that over 26% (2.8sqkm) of the rail station walking catchment (RSWC) within the LGA falls within undeveloped land. In the future with the URAs this will decrease to 20%. However, there will still remain 2.2 sqkm (216Ha) of rail station walking catchment area that is not being utilised. Much of this land may be undevelopable due to topography, a study should be undertaken to establish if any areas are able to be developed, and where developed which areas are appropriate for higher density development. Table 5.1 shows the utilisation or RSWC within each relevant SLA.

Table 5.1 Rail Station Walking Catchment Utilisation

SLA	Total RSWC (sqm) in SLA	Existing Developed Areas			Future Developed Areas (includes URA)		
		RSWC within (sqm)	RSWC Utilisation (%)	Un-utilised RSWC (sqm)	RSWC within (sqm)	RSWC Utilisation (%)	Un-utilised RSWC (sqm)
St Marys CBD	1.0	0.9	87.1%	0.1	0.9	87.1%	0.1
Emu Plains	2.7	2.0	71.5%	0.8	2.0	71.5%	0.8
North Werrington	1.5	1.0	67.2%	0.5	1.0	67.2%	0.5
South Werrington	1.0	0.4	44.2%	0.5	0.6	63.9%	0.4
Penrith CBD	2.0	2.0	100.0%	0.0	2.0	100.0%	0.0
Cranebrook	1.5	0.7	45.9%	0.8	1.2	79.1%	0.3
North St Marys	1.0	0.9	90.6%	0.1	0.9	90.6%	0.1
Total	**10.8**	**7.9**	**73.6%**	**2.8**	**8.6**	**79.9%**	**2.2**

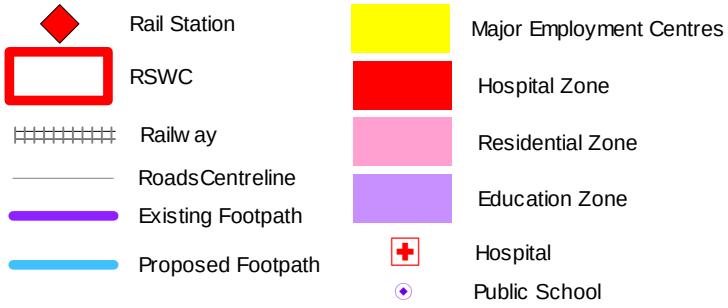
This assessment is somewhat simplified and considers land as utilised if it is generally developed. It does not comment on the applicability of development within the land. Hence at Penrith Station the utilisation is shown to be 100%, when the use of the land to the north of the railway line is not considered a good utilisation of the land. Council needs to do a detailed study to understand the intensity of uses within the RSWC.

Access to Stations

Within the rail station 800m catchment areas, the target mode is walking. An assessment of the footpath provisions within these catchment areas follows.

The following legend applies to the rail station catchment access figures:

Legend

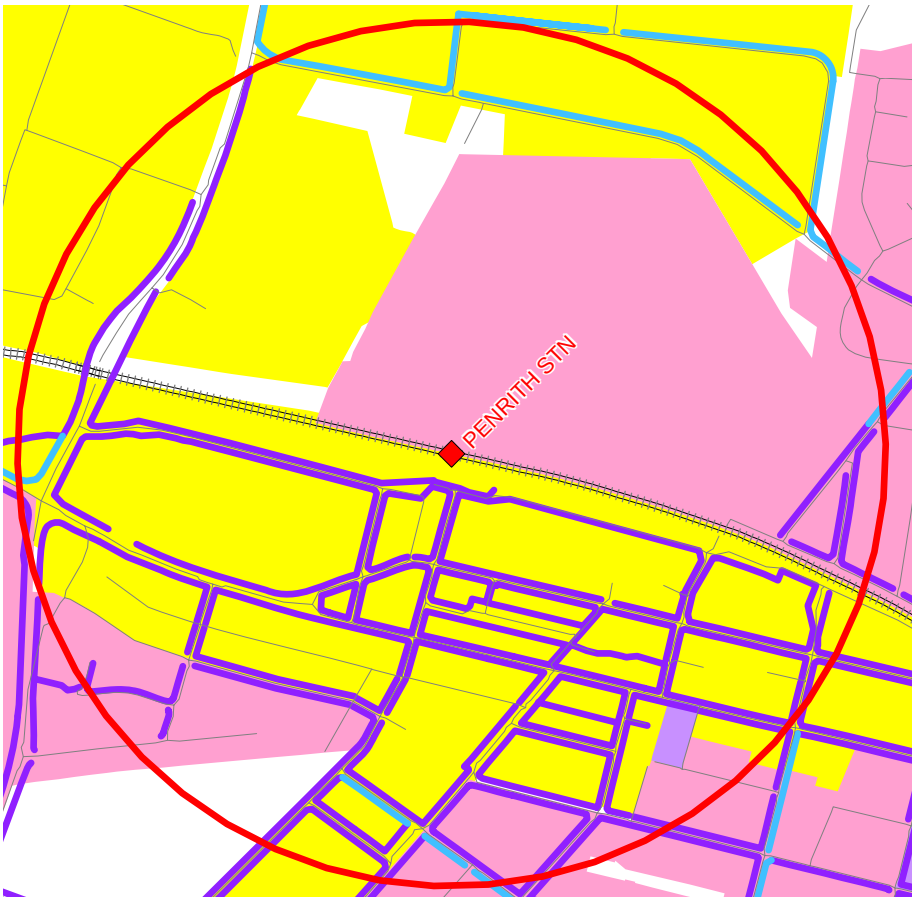


Emu Plains RSWC

This figure highlights the limited number of footpaths available within the Emu Plains RSWC. The streets immediately adjacent to the rail station and some connecting routes have limited footpaths.

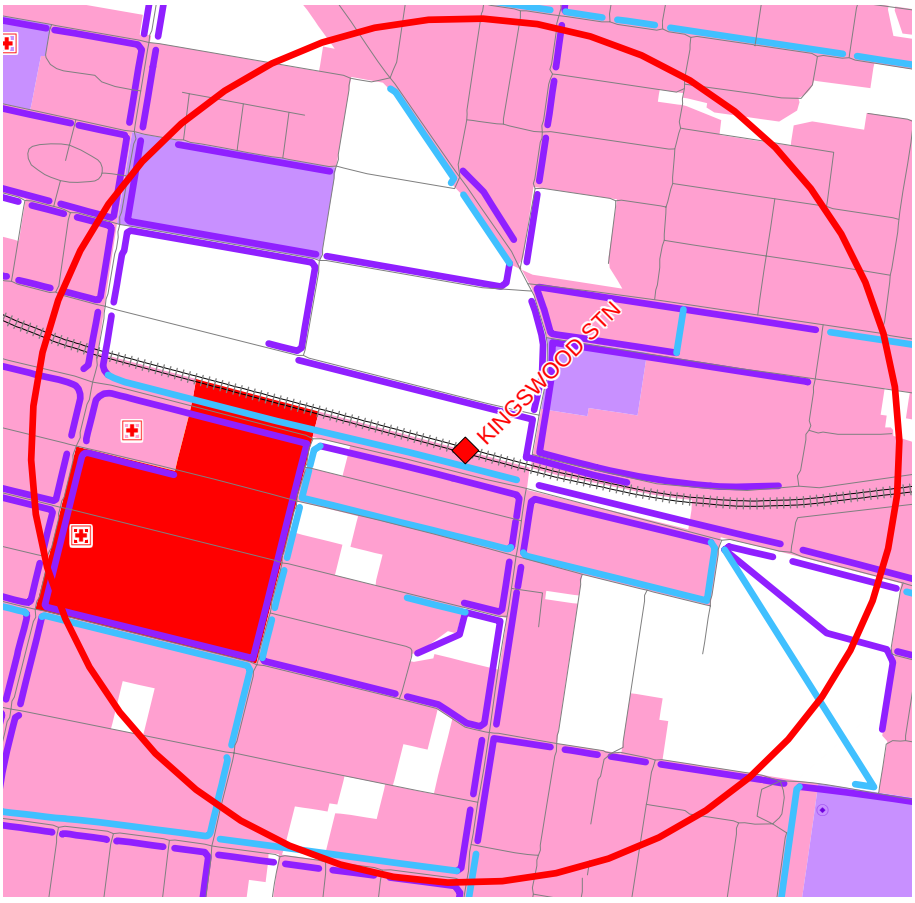
Penrith RSWC

The majority of streets within the Penrith RSWC have footpaths.



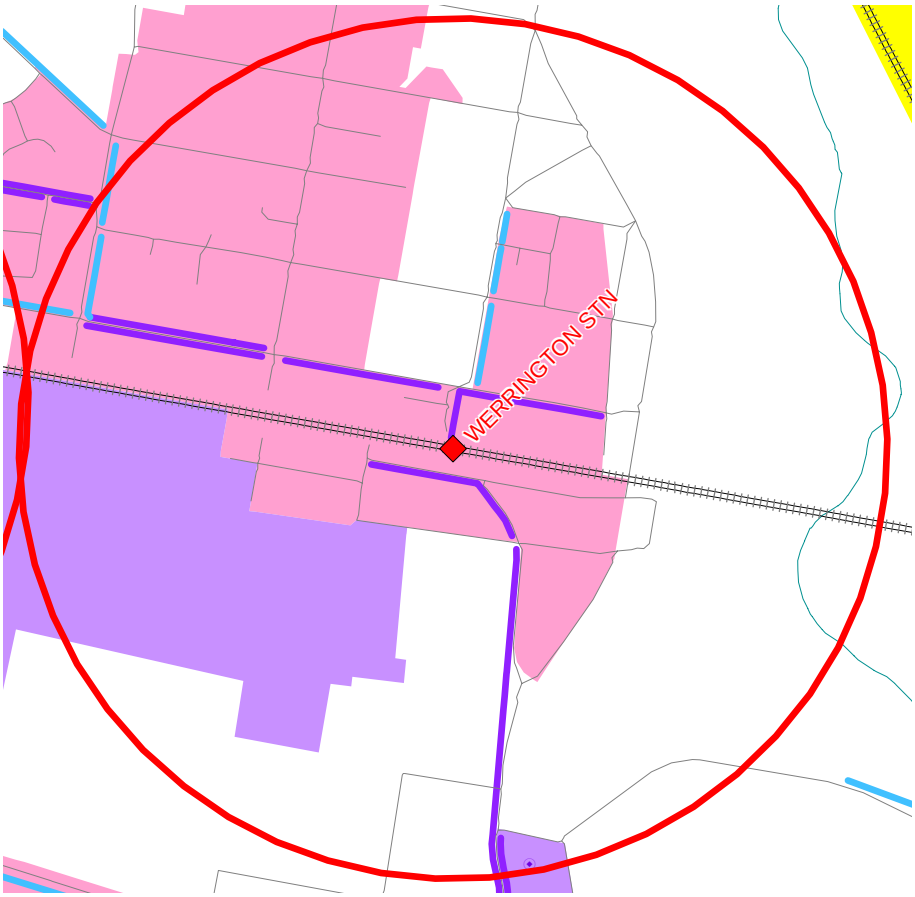
Kingswood RSWC

The streets immediately adjacent to the station and a good proportion of connecting routes have limited footpaths. There are still a considerable number of streets within the Kingswood RSWC with no footpaths.



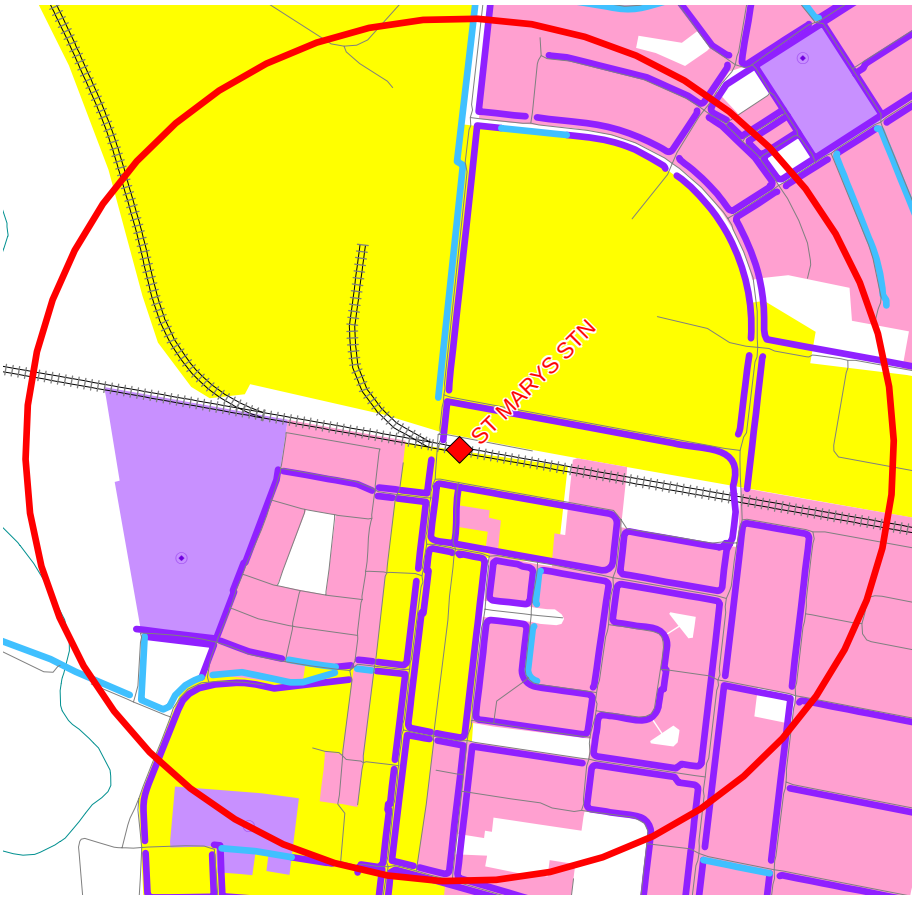
Werrington RSWC

This figure highlights that the majority of streets within the Werrington RSWC do not have footpaths. Minimum provisions are found immediately adjacent to the station.



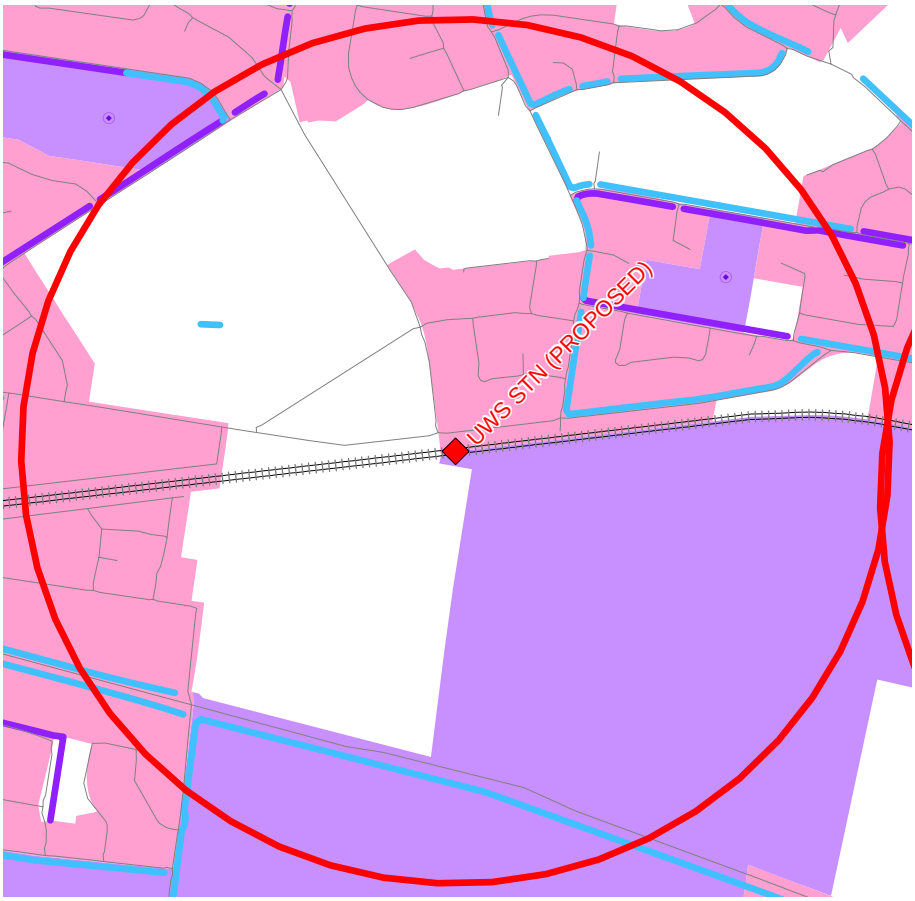
St Marys RSWC

The majority of streets within the St Marys RSWC have footpaths. However there are pockets of residential areas with limited or no footpaths.



Proposed UWS RSWC

Although this rail station currently does not exist, this figure shows the extent of facilities that will need to be provided in this area by Council to facilitate the proposed station access.



Frequency of Service

Rail services on the Western and Blue Mountains line start at Penrith from 3:00am on weekdays, running until 1:09am (or 2:23am on Fridays). On weekends, the first service departs Penrith Station at 3:51am and the last service arrives at 1:10am (2:19am on Saturday nights).

The following frequencies are achieved on the rail line through Penrith:

- AM peak period (Emu Plains to North Sydney) – average of 6 minute service frequency (based on number of services within a two hour peak period);
- PM peak period (North Sydney to Emu Plains) – average of 6.5 minute service frequency (based on number of services within a two hour peak period);
- weekends – generally 12-18 minutes between services travelling to Sydney City and 11 minutes or 30 minutes between services travelling to Penrith.

The rail services are well patronised by commuters. Station utilisation information (i.e. barrier counts) was supplied by RailCorp for Penrith, Kingswood, St Mary's and Werrington Stations along the rail line for 2005. The results showed that the daily barrier counts (in and out) were:

- Penrith – 18,490;
- Kingswood – 7,600;
- Werrington – 2,210; and
- St Marys - 8710.

A total of 18,510 people entered these four stations on one day with the same number exiting. The data showed that Penrith Station experienced the highest number of visitors out of the four stations (i.e. approximately 50% of all visitors using the stations). A total of 9,250 entered the station over a 24 hour period, with the same number exiting the station. The busiest periods were between 6:00am and 9:30am (3,500 visitors entering) and from 3:00pm to 6:30pm (3,710 visitors exiting).

Anecdoelty trains are considered to be at or near capacity, with overcrowding commonplace. More frequent rail services are required particularly at Penrith Station.

Future Rail Planning

The State Infrastructure Strategy identified that 122 new rail cars will be purchased for the lower Blue Mountains, Central Coast & Illawarra. The State Infrastructure Strategy identified Werrington Station as part of the on-going 'Easy Access' program.

RailCorps Capacity & Service Improvement Initiatives identified the following initiatives:

- 2011 - upgrade of the Western Line Corridor (St Marys to Westmead); and
- 2012 – Penrith yard upgrade, extra tracks between St Marys and Penrith & corridor upgrade/re-signalling (Source: RailCorp Urban Transport Statement)

There is a proposal to introduce a high speed rail link between Penrith and the Sydney CBD, known officially as the **Western FastRail**, the project has been dubbed the Penrith High Speed Link. Western FastRail is a proposed $2 billion privately funded underground and above-ground train line that would link central Sydney with Western Sydney. Two 26 kilometre underground tunnels would link Sydney CBD with Parramatta, with high-speed trains traversing across the distance in eleven minutes at speeds of up to 160 km/h. The line would then continue above-ground to Blacktown in six minutes, and onwards to Penrith in a further eleven minutes.

To expand and improve commuter car parking at railway stations the Government has identified approximately 4000 additional car parking spaces. The project will bring forward to 2009 completion of facilities at Wentworthville and, by 2011, facilities at Blacktown, Glenfield, Seven Hills and St Marys. There will be further investigation of other potential sites as well as a review of opportunities for private sector investment in commuter car parks generally. The North Penrith Master Plan sets out the services and facilities which include a 600-space commuter car park

Key Transport Issues:

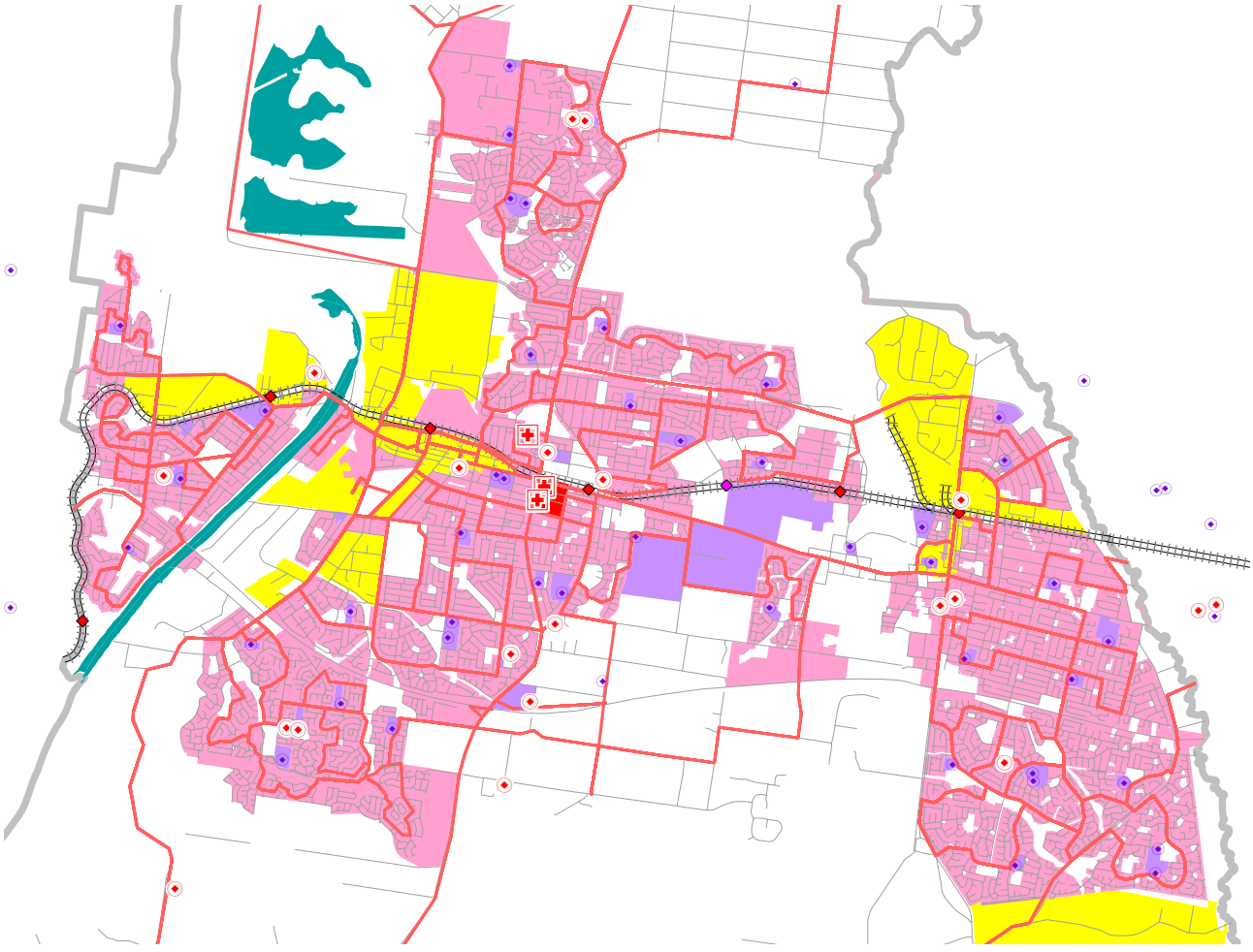
T21) The Western line is a twin track between St Marys and Penrith
T22) Rail Services are at capacity on this section of the line due to the twin track
T23) There is no commitment from RailCorp for the quadruplification of the rail line between St Marys and Penrith
T24) The proposal for the Western FastRail, will provide additional high speed rail services between Penrith and the city and including other key regional centres such as Blacktown and Parramatta
T25) Station upgrades ('Easy Access') have been undertaken at Penrith and St Marys, plans are in place for upgrades to Werrington Station in 2008. There are no plans for upgrade works at Kingswood or Emu Plains Stations.
T26) The proposed UWS station is required to fill a gap in the RSWC along the rail line between Kingswood and St Marys Stations
T27) There is a very significant gap in the RSWC along the rail line between St Marys Stations and Mt Druitt Stations
T28) There is an observed under utilisation of RSWC, around 26% of the catchment falls on undeveloped land within the LGA
T29) There is a need to understand the land uses around station in the RSWC
T30) Many stations have poor footpath provisions in the RSWC
T31) Penrith station is the most highly utilised station and requires additional services

5.3.2 BUS

2 Private Bus Operators, under contract to the NSW Ministry of Transport (MOT) provide bus services, in the Penrith Local Government area. These contracts grant bus operators exclusive rights to operate bus services within a defined catchment area. Bus services within the area must meet minimum conditions in terms of service frequency and coverage. The MoT oversees the designation of routes and frequencies along these routes. There are 26 routes operating within the Penrith LGA.

There is a balance required in determining bus routes and frequency between corridor services and coverage services. Corridor services operate along trunk routes and generally connect across regions, the routes offer directness and high frequency and offer opportunities to capitalise on land use intensification. Coverage services offer good coverage of areas but are often less frequent and circuitous. The ability to provide coverage to all areas is particularly difficult in Penrith due to the low residential densities. A realistic balance between these types of services is required. Figure 5.6 shows the current bus network.

Figure 5.6 Bus Network



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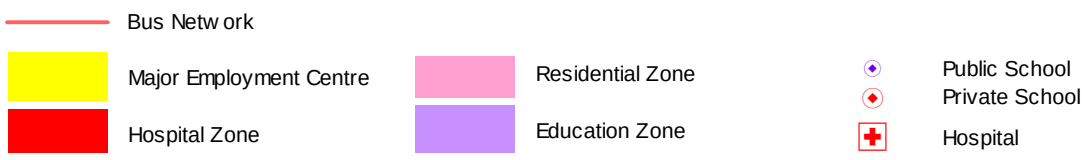


Transport Availability Indicators

Understanding the quality, level of service or availability of an overall public transport system relies on a range of aspects or features of that system. For example, a system or service may only be available at certain times or may not serve the destinations those wishing to travel require. A service may be rapid and direct or it may be slow. In addition, these features may vary significantly from place to place. The Transport Availability Indicators used draw upon some of the more recognised service quality factors.

The current changes being developed and implemented through the bus transport reforms require bus service providers to report on service levels and negotiate with the Ministry of Transport in regard to these. The adopted base levels of service according to the Ministry of Transport's Service Planning Guidelines during the commuter peak are:

- Strategic Corridors (Grade A) 10 minutes freq. or better
- Strategic Corridors (Grade B) 15 minutes freq. or better
- Strategic Corridors (Grade C) 20 minutes freq. or better
- Primary Feeders 20 minutes freq. or better
- Local Services 60 minutes freq. or better

Penrith City Council's *Bus Service Analysis Study Stage 3 Report (2Plan, February 2006)* provided a detailed assessment of the bus frequencies and directness of routes in the Penrith LGA. As bus routes in the Penrith LGA were not classified by type of route (eg strategic corridor Grade A) it was assumed that all the routes were classified as *Local Services* (the least rigorous classification).

The indicators address bus and train services. Taxi services or other public transport modes were not considered to warrant development and measurement of Availability Indicators within the context of Penrith's public transport network and system. Transport services have been described using the following attributes and these have been used either directly or together to derive the Transport Availability Indicators:

- Frequency of Service;
- Walking Distance to Transport Service;
- Area Served by Public Transport;
- Area Served by Frequency;
- Directness of Route.

Refer to Appendix 5-G for definitions of the Transport Availability Indicators.

Values for the indicators have also been derived for two comparison areas in other outer Sydney LGAs. These comparison areas were located in the Narellan and Parklea areas of Sydney. The comparison areas are of a scale similar to the eleven survey areas in the Penrith LGA. The results for these areas are therefore useful in comparing transport use and availability for the eleven areas of Penrith. The findings are summarised following, d*etailed results of the Transport Availability Indicator is found in Appendix 5-H*

Table 5.2 Areas Served by Bus or Train (within walking distance)

Study Area	Served by Bus and/or Train		Without Service		Total Area
	ha	%	ha	%	ha
Penrith LGA	17445	42.6%	23487	57.4%	40932
Narellan	1707	55.9%	1344	44.1%	3051
Parklea	2043	84.7%	368	15.3%	2411

Table 5.1 demonstrates that Penrith does not compare favourably with Parklea or Narellan in terms of area served, over 57% of Penrith has no service. When considering individual SLA's, as would be expected, the rural SLA's had the lowest coverage. For the urban areas North St Marys, Cranebrook and St Clair had less than 70% coverage.

Table 5.3 Areas Served by Bus Frequency

Study Area	Freq≤15 min	15 min<Freq≤ 30 min	30 min<Freq≤ 60 min	60 min<Freq	No service
Penrith LGA	4.5%	13.6%	10.7%	13.1%	58.2%
Narellan	0.0%	47.2%	0.0%	8.7%	44.1%
Parklea	9.6%	73.4%	0.8%	0.0%	16.3%

Table 5.3 demonstrates that Penrith does not compare favourably with Parklea or Narellan in terms of higher frequency services (less than 30 minutes) and in terms of areas with no service. In the urban areas St Clair stood out has having even fewer higher frequency services than the rural areas.

Table 5.4 Frequency and Directness of Bus Route

SLA	Bus Route	Commuter Peak * Frequency (mins)	Directness of Route**
St Clair	772	32	1
	773	32	1.51
	835	3 services	1.03
Emu Plains	688	30	1.5
	689	41	1.06
Nth Werrington	673	83	1.11
	677	43	1
	782	28	1.08
	783	38	1.46
	785	30	1.31
Sth Werrington	781	4 services	1.24
	789	1 service	1.04
	790	28	1.33
	798	36	1.17
	835	3 services	1.03
Penrith	673	83	1.11
	677	43	1
	688	Na	1.5
	781	4 services	1.24
	782	28	1.08
	789	1 service	1.04
	790	28	1.33
	791	26	1
	794	30	1
	795	51	1.19
	797	30	1.17
	798	36	1.17
	835	3 services	1.03
Nth St Marys	769	31	1
	782	28	1.08

SLA	Bus Route	Commuter Peak * Frequency (mins)	Directness of Route**
Glenmore Pk	789	1service	1.04
	795	51	1.19
	797	30	1.17
	798	36	1.17
Cranebrook	673	83	1.11
	677	43	1
	678	29	1
	782	28	1.08
	784	35	1.08
	785	30	1.31
	786	27	1.14
North LGA rural	673	83	1.11
	674	3 services	1.23
	677	43	1
	678	29	1
South LGA rural	781	4 services	1.24
	789	1 service	1.04
	795	51	1.19
	798	36	1.17
	835	3 services	1.03
	836	3 services	1
St Marys	769	31	1
	770	48	1.15
	771	28	1.11
	772	32	1
	773	32	1.51
	781	4 services	1.24
	782	28	1.08
	790	28	1.33

* Commuter Peak frequency indicates the average frequency during peak periods in minutes, no of services is shown where frequencies are low.
**1= Direct Route >1 = less direct route

Table 5.4 indicates that many routes have lower frequencies.

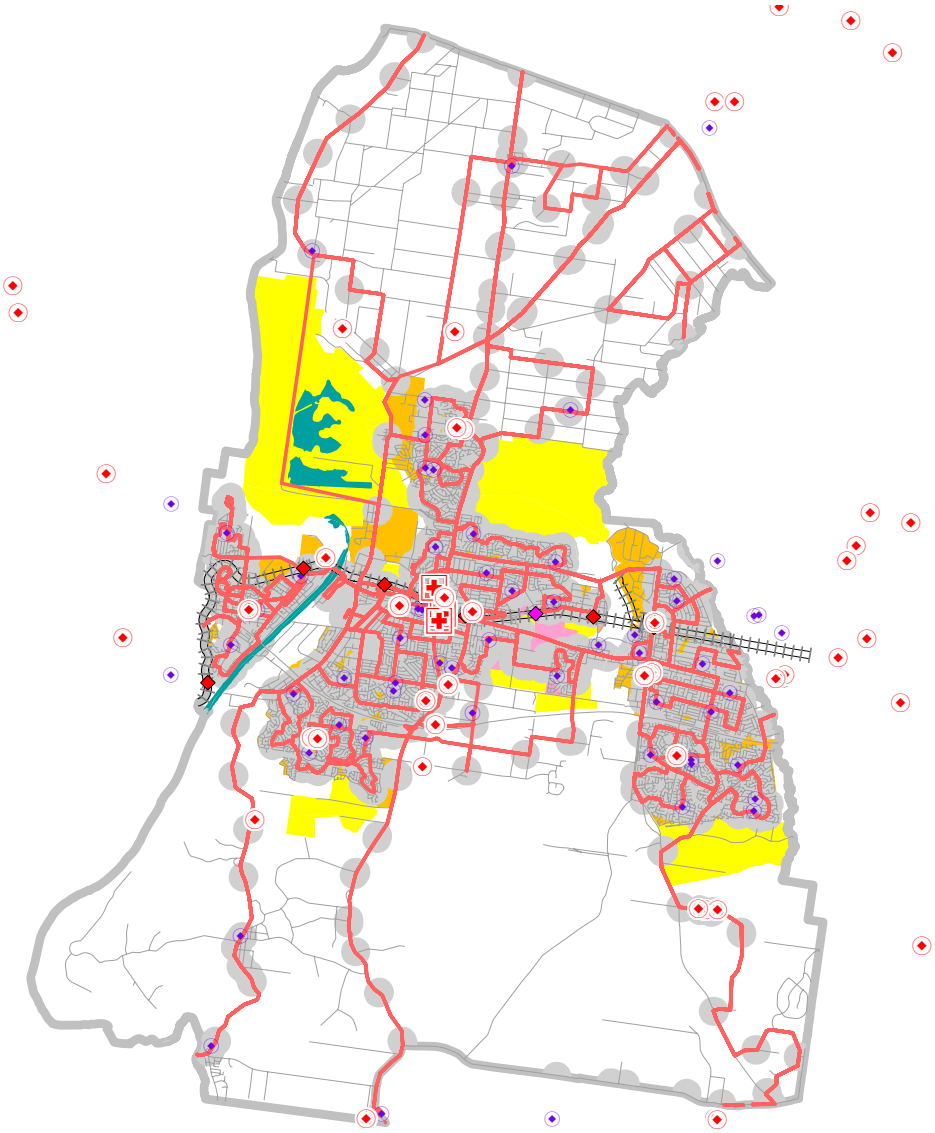
The method for deriving the Directness of Route indicator is to divide the route length by the length of what is determined as being the most direct route. The result is a "directness of route" value for each bus route with the most direct route having a value of 1.00 and less direct routes having a higher value. It is noted that none of the routes in the Penrith LGA meet the base level of service for the *Primary Feeder* or higher classifications. The routes shown shaded in Table 5.4 could be assumed to not meet the base level of service:

- Route 773 - St Marys to St Clair via West St Clair;
- Route 783 - Kingswood to Cambridge Gardens via Cambridge Park and Werrington Downs;
- Route 688 - Penrith to Glenleigh and Emu Heights

BUS CATCHMENT

Further to the work done by 2Plan in the Bus Analysis Study, a 400m radius has been used to establish the extent of walkable catchments to the bus stops on each of the bus routes in the LGA. The bus stops are based on the Ministry of Transports GIS databases, which are maintained on a regular basis. The 400m bus stop walking catchments (BSWC) are shown in Figure 5.7.

Figure 5.7 Bus Stop Walking Catchment (400m)



Legend

- Bus Network
- Bus Stop 400m Catchment
- Developed Area
- URA
- URA - WELLPrecinct
- Public School
- Private School
- Hospital

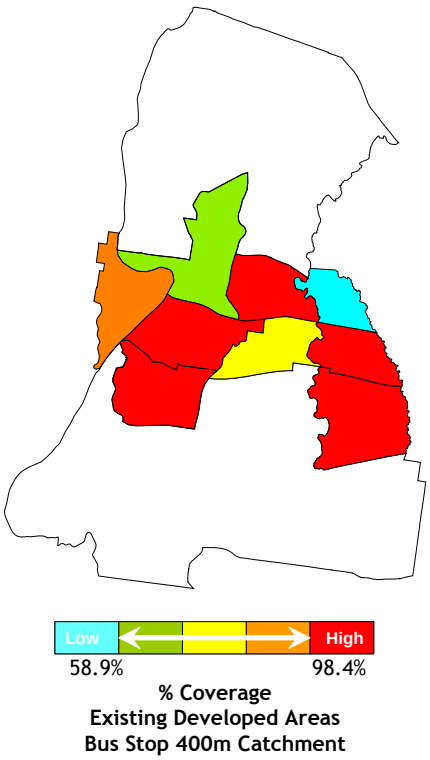
Refer Appendix 5-I Bus Stop Catchment detail.

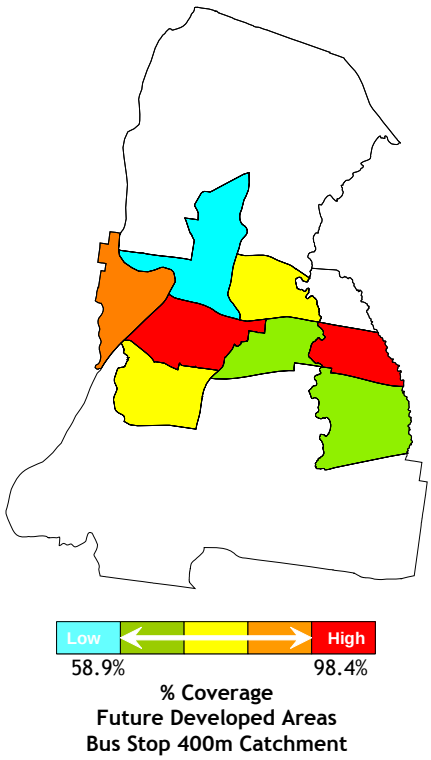
Taken as a whole, only **28% of the LGA falls within the bus stop walking catchments (BSWC)**. The very low coverage in the rural areas brings the average down. It is acknowledged that the coverage in the LGA is inadequate for the residents, but difficult to change due to the low densities. The rural SLAs have only 12% of area within the BSWC. For this reason in the following analyses, we consider the 9 urban SLAs alone, excluding the northern and southern rural SLAs.

66% of the urban SLAs by area fall within the BSWC. However, this reflects the total SLA area, parts of the urban SLA's are still zoned rural, or have large portions of as yet undeveloped land. It is more important to compare BSWC to developed areas, places where housing and work places exist.

88% of the urban developed areas fall within the BSWC. If bus routes were to remain as they are today, with the URAs the overall developed area within the BSWC coverage would reduce to 75%. It is assumed that bus routes will be provided in these new release areas, but this highlights the magnitude of the increase that will be required.

Individual SLA's ranged from 59% to 98%. The following figures show the proportion of developed areas within the BSWC, now and with URAs. The figures represent the coverage for urban SLA's only, rural areas are not considered to have developed areas.





North St Marys and Cranebrook stand out as having only 58% and 74% of developed area within the BSWC. Significant additional bus routes and hence stops will be required in St Clair, Cranebrook, Glenmore Park and North and South Werrington to maintain existing levels of coverage.

Future Bus Planning

Bus Network Reviews

The NSW Government is undertaking a program of bus reform. This means that the Government, through the Ministry of Transport, now directly pays for public passenger services provided by buses. The bus reform process will deliver new and redesigned bus services that:

- reflect community needs;
- provide consistent service standards, clear performance requirements and sustainable funding;
- link key regional centres;
- provide fast, frequent, direct services; and
- integrate with other corridors & modes to perform multiple-purpose trips (work /shopping/leisure/school/personal business etc).

The result is that land use planning is a key issue in relation to provision of bus services. The Ministry of Transport is particularly concerned about ensuring the provision of efficient public transport networks. Penrith generally falls within Contract Region 4. The network review process for Region 4 is underway and is expected to be exhibited for consultation by the end of 2007. Council and the general public will be able to make comment on the plans.

The State Infrastructure Strategy identified that 412 new buses will be purchased for private bus contractors under the remaining 7 years of the contract term.

Strategic Bus Corridors

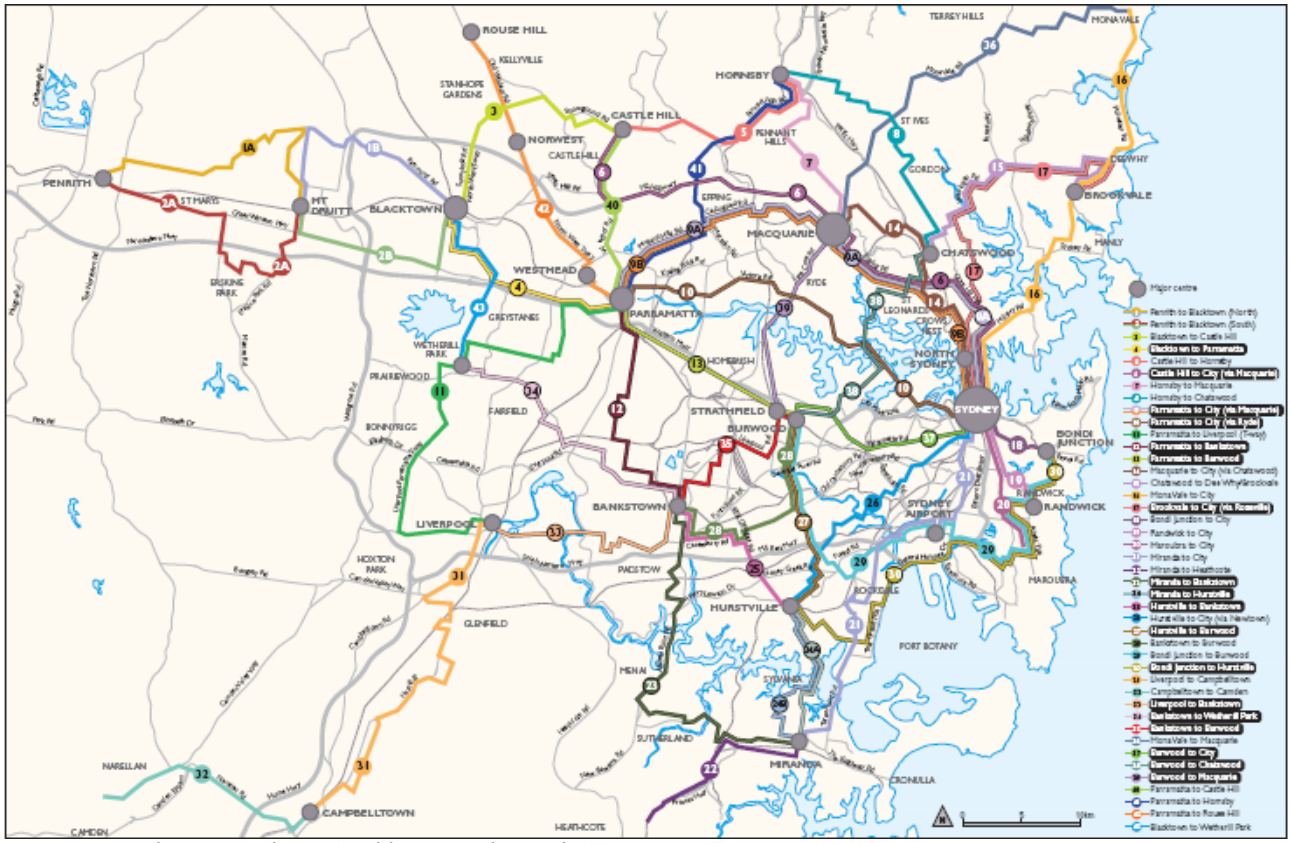
The Metropolitan Strategy has identified 43 strategic bus corridors for the Sydney region. The Strategic Bus Network links regional cities, major centres, railways stations, hospitals, education facilities and other facilities across the entire Sydney region. Two strategic bus corridors will serve the Penrith LGA: Route 1 Penrith to Blacktown (north) and Route 2 Penrith to Blacktown (south), see Figure 5.8. To improve bus travel times and reliability on these strategic bus corridors the Government will fast track for completion by 2012 more than 80 individual bus priority works across the network. This initiative will deliver bus priority across the network ahead of schedule and will improve bus travel times and reliability on strategic corridors, encouraging use of public transport and relieving road congestion.

Both routes effectively connect Penrith CBD with other key regional centres that are already connected via the railway i.e. St Marys, Mt Druitt and Blacktown. Route 1 will also connect the St Marys Release area and connect to parts of the north-west growth sector. Route 2 also connects to the Erskine Park Release area. Neither route provides key linkages to the growth sectors or the WSEH.

Regional Bus Routes

This Preliminary Infrastructure Report was prepared to provide preliminary detail on what infrastructure will be provided based on the planning outcomes for the North West and South West growth centres. It provides justification for the $7.8 billion infrastructure list and the development contributions and data and information to the Growth Centres Commission who will finalise the Infrastructure Report. The report recommended Regional bus routes: Penrith – St Marys Release Area; and St Marys Release Area – Rouse Hill be implemented over the next 25-30 years.

Figure 5.8 Strategic Bus Corridors Linking Strategic Centres



Source: RTA Sydney Strategic Bus Corridor Network, March 2007

Integrated Ticketing

The State Infrastructure Strategy identified that an integrated ticketing system for the greater metropolitan public transport system will be gradually phased in starting in 2006-07 (yet to be implemented). This will provide commuters with the convenience of a single card for travel on all Government and privately operated rail, bus and ferry services. Many residents of Penrith have to undertake multi-modal trips to utilise public transport in Penrith. The implementation of an integrated ticketing system will make purchasing public transport tickets easier and provide financial incentives.

North Penrith Masterplan

The North Penrith Master Plan sets out the services and facilities planned for the area which include bus priority measures from the bus interchange and St Marys Release Area.

Key Transport Issues:

T32) There is a need to balance coverage services with corridor services in the LGA
T33) Only 42.6% of the Penrith LGA (including rural areas) is served by a bus or train, this is lower than comparable LGAs
T34) North St Marys, Cranebrook and St Clair had less than 70% area served by a bus or train
T35) Around 18% of the LGA is served by buses with a frequency of 30 minutes or less, 24% has a 30-60minute frequency and the balance 58% has no service. This is poor in comparison with comparable LGAs
T36) St Clair had fewer higher frequency services than the rural areas
T37) 3 bus routes in the LGA had very indirect routes with a greater than 1.4
T38) Several bus routes operated very infrequent services
T39) 28& of the LGA is within 400m of a bus stop
T40) 66% of urban SLA's are within 400m of a bus stop
T41) 88% of developed areas in the LGA are within 400m of a bus stop
T42) BSWC coverage of developed urban areas is varied across the SLAs - North St Marys and Cranebrook stand out as having comparably less coverage.
T43) Bus coverage will need to increase in St Clair, Cranebrook, Glenmore Park and North and South Werrington due to the URAs
T44) 2 new strategic bus corridors are proposed, these need to be implemented as a priority
T45) Neither route provides key linkages to the growth sectors or the WSEH
T46) The need for regional bus routes between Penrith and the St Marys URA and Rouse Hill have been identified

5.3.3 INTERCHANGES

Significant bus and rail interchanges are provided at Penrith and St Marys Train Stations. There are 18 routes that service the Penrith Rail Station/Interchange, including the four regional routes to Liverpool, Windsor and Richmond and services from the west. There are 8 routes that service the St Marys Rail Station/Interchange, plus the regional route to Liverpool passes through the southern end of the Town Centre.

The quadruplification of the western line will have implications for the bus interchange at Penrith. Railcorp have advised that additional tracks would be preferred to be located on the southern side of the railway line. This will have major implications for the existing interchange. Council should see this as an opportunity to provide improved facilities at the interchange. The Ministry of Transport is undertaking a series of scoping studies at bus-rail interchanges around Sydney, and has recently announced a study of the Penrith Interchange.

Key Transport Issues:

T47) quadruplification of the western line will have implications for the Penrith interchange
T48) Penrith Interchange study to commence
T49) There is a lack of bus and rail interchanges within the LGA(with the exception of Penrith and St Marys)

5.4 PERSONAL PUBLIC TRANSPORT

Penrith City Council makes available two community buses to non-profit community groups based in the Penrith LGA. The community bus service relies on the help of volunteer drivers. This service enables community groups to provide transport services for their members. These buses carry 25 and 14 passengers (including driver) and the smaller vehicle is wheelchair accessible.

Community groups must apply to be eligible to hire out these buses. Applications are reviewed quarterly at Council's access bus meetings. A number of criteria are used to determine whether or not community groups can hire out the vehicles and conditions are imposed, including:

- groups are non-profit, based in the Penrith LGA;
- groups must provide a licensed driver with a Light Rigid license;
- payment for use of the vehicle is made in advance;
- all damages to the vehicle are reported immediately;
- vehicles are returned clean and with a full tank of diesel.

Other community transport operators are located in the area, which have more community-based management structures. This includes Great Community Transport (an amalgamation of Mountains Community Transport Inc. and Nepean Community Transport Inc.). This service operates in Penrith and the Blue Mountains LGAs, targeting transport disadvantaged, Home and Community Care (HACC) eligible clients/groups for transport to medical appointments/hospital. Client eligibility is assessed on an individual basis, and contributions are also negotiated individually. Services provided by this group to eligible clients include:

- fortnightly door-to-door shopping services (mini-bus);
- fortnightly one on one shopping assistance for high need clients with individual carers/companions (Volunteer Individual Shopping with Transport Assistance);
- local and out of the area hospital and medical appointments;
- social and respite outings;
- centre-based meals;
- other services depending on resources available.

Conventional bus services have fixed routes and fixed times. They have bus stops and the bus turns up according to the published timetable. In a sparsely populated area, for example in rural area, this means the bus has to go round every village that it is meant to serve even when no-one wants to travel. This can lead to long routes, low frequencies and poorly used services.

In response to such problems in both rural and urban areas, a more flexible form of bus travel has been devised which matches the service more closely to the customers' needs. It has been given the name demand responsive transport - DRT for short. The taxi is perhaps the simplest form of demand responsive transport. With DRT buses a customer telephones a call centre from their home and requests a single or return trip to go to a nearby town, interchange or local facility. The call centre communicates with the driver of the bus, and the passenger is fitted on to a service round. These may be regular (for example hourly) or entirely according to demand. A pick up point and time are agreed and the bus collects the passenger within a 'time window'. The bus is shared with other passengers with similar requests within a given zone. Council has been considering an initiative to develop a demand-responsive bus program.

Key Transport Issues:

T50) Personal Public Transport opportunities are limited in the LGA
T51) There is a need for a demand responsive bus system to service transport disadvantaged people.

5.5 TAXI

Taxi services are important, especially in that their availability can make lower levels of car ownership possible. Taxi services are flexible, demand driven and have many of the same characteristics as private vehicles. Taxi services, as public use vehicles, complement public transport networks and extend access beyond centres.

A number of operators provide taxi services within the Penrith City area. These operators include:

- South Western District Taxi Cabs;
- Legion Taxis;
- Western District Premier Cabs;
- South Western Radio Cabs.

Taxi ranks are provided at the following locations:

- Emu Plains Station;
- Penrith Station;
- St Mary's Station;
- Penrith Post Office (High Street);
- Station Street;
- Westfield Penrith Shopping Centre;
- St Mary's Village Shopping Centre.

Free taxi phones are also provided, including at Penrith Leagues Club, St Mary's Leagues Club, Emu Plains Station, Lennox Shopping Village and Emu Plains/Penrith RSL Club.

It was reported during the stakeholder consultation that there is only a very limited number of taxis available in the area and there is a need for more accessible/wheelchair taxis.

A State government review of the taxi industry in NSW was conducted in 2004, with the result that the following options to improve taxi services are being examined (as stated in the Sydney Metropolitan Strategy):

- encouraging the shared use of taxis;
- alternative fare structures that may increase demand and revenue, such as 'loyalty pricing';
- increased numbers of taxi vehicles;
- better integration with public transport services.

These options are considered pertinent to the Penrith area, particularly as there is limited public transport beyond the key centres.

Key Transport Issues:

T52) There is not enough taxis servicing the LGA
T53) There is a need for more accessible/wheelchair taxis
T54) More taxi ranks are required

5.6 PARKING

Parking in centres is considered in chapter 6 in the discussion of issues in Penrith City Centre (6.3.1) and St Marys Town Centre (6.3.2). Car parking is available for commuters at the railway stations:

- Emu Plains – 75 spaces;
- Penrith – 875 spaces;
- Kingswood – 250 spaces;
- Werrington – 40 spaces; and
- St Marys – 420 spaces.

The Penrith City Centre Parking Strategy was developed to provide a strategic direction for Council to pursue in terms of parking supply and demand within Penrith City Centre. The Draft Penrith City Centre Strategy recommended over the next 25 years a reduction in the average amount of parking per sqm of development of 18% for retail, 30% for commercial and 24% for residential apartments.

This would be consistent with a steady growth in the use of walking, cycling and public transport to access the city. The report recommended that Council take a number of actions to achieve this strategy. In order to implement the proposed policy, it was suggested that a Parking and Access Management Plan be developed, which:

- Identifies proposed locations and designs for shared-use parking structures to provide equitable access across the city centre whilst minimising corresponding traffic impacts
- Establishes specific maximum on-site parking limits for specific sites
- Reviews the provision and utilisation of on-street parking, and investigates the options for charging for on-street parking over time as the centre grows and the value of this resource increases.
- Identifies proposed improvements to pedestrian, cycling and public transport provisions which can be funded from the Access Fund.
- Manages the funds in the Parking and Access Fund.

It was further identified that the following actions would be necessary:

- Monitor the supply and utilisation of parking in the Centre on a regular basis
- Review the policy periodically to take account of developments in the Centre and elsewhere, changes in Government policies, improvements in public transport, changes in petrol prices etc.
- Undertake detailed traffic modelling to test the adequacy of the local road system and the impact on pedestrian and bus movements of the increased traffic generated by City Centre redevelopment and broader growth in the region.

Consultation with stakeholders identified a need for more accessible parking in centres and at key locations in the LGA. Furthermore standards for the provision of disabled, cycle and motorcycle parking are required.

Key Transport Issues:

T55) There is a need for a strategic Parking and Access Management Plan
T56) There is a need for greater understanding of parking in the LGA, i.e. data regarding length of stay, turn over, occupancy/utilisation etc
T57) Reduction in parking rates in the centres
T58) Need for more accessible parking in the LGA
T59) Need for disabled, bicycle, motorcycle parking standards

5.7 EXISTING AND FUTURE TRAVEL PATTERNS

Travel patterns of Penrith residents and visitors to Penrith were analysed in detail in the *Working Paper*. The information contained in the *Summary of Travel Patterns of Penrith Residents, Transport & Population Data Centre (TPDC), Revised 2004* was used to inform the analysis. In addition to the report, the data tables used to prepare the report were also provided. The report was prepared using the Journey to Work data set (JTW), which is derived from the 5 yearly Census of Population and Housing and additional information on non-work travel was drawn from the TPDC Household Travel Survey (HTS) data. The broad impact of the urban release areas in terms of journey to work trips was also estimated in the Working Paper.

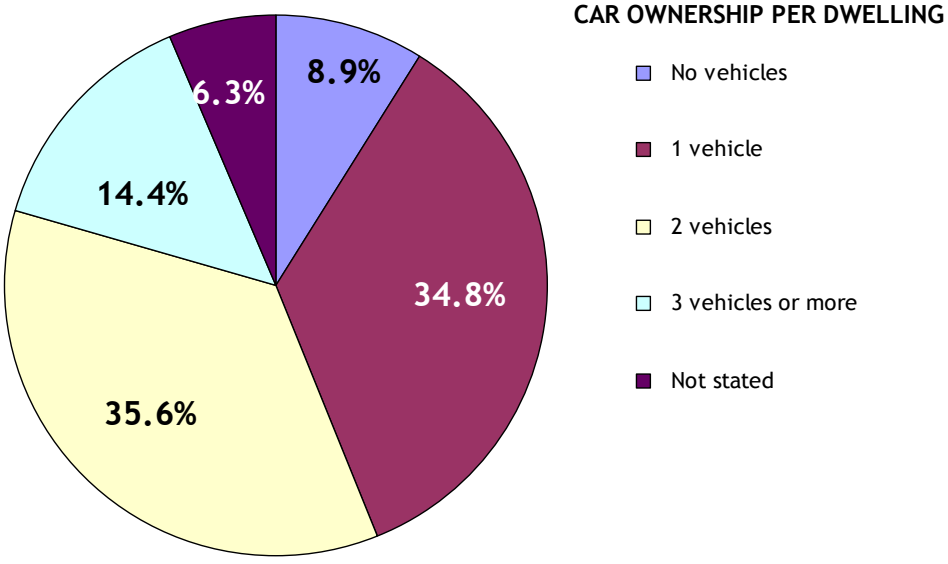
In November 2002 Council engaged the Transport and Population Data Centre (TPDC) to provide updated travel pattern information for Penrith residents and for people traveling to Penrith from outside the LGA. The travel data is derived from two different sources namely Journey to Work (JTW) and Household Travel Survey (HTS).

The results of Penrith LGA travel patterns study indicate that there is an imbalance between the sizes of the LGA employed resident population and the number of jobs located within Penrith LGA. The car was the most common means of travel to work and for non-work related activities for residents of all areas across Penrith. The public transport usage varied across the LGA, reflecting proximity and the problems associated with the existing public transport services.

For analysis the Penrith LGA has been grouped into eleven study areas (SLA's described in chapter 4) and in some instances analysis has been undertaken on small areas, known as travel zones.

5.7.1 CAR OWNERSHIP

In Penrith LGA 50% of dwellings have 2 or more vehicles, whilst less than 9% of dwellings have no motor vehicle. Compared to the Sydney Statistical Division, car ownership is higher, with the number of vehicles per household also higher. There are a larger proportion of dwellings with no motor vehicle owned in Penrith CBD and North St Marys. The following chart summarises the car ownership per household in the Penrith LGA.



Key Transport Issues:

T60) Car ownership in Penrith is higher than the Sydney average

5.7.2 BIKE OWNERSHIP

No information is known about bike ownership in the LGA.

Key Transport Issues:

T61) There is a lack of information on bike ownership in the LGA

5.7.3 TRIP PURPOSE

It should be noted that trips refer to people trips and not just car trips. Travel patterns take into consideration how people move from one place to another. This can take many forms and could be a 2 minute walk to post a letter at a local post box or a train trip to the city for work. These are all person trips, and the HTS considers all of the trips that people make for all different purposes.

Understanding the purpose of a trip is a key element to assessing the choices people make as to the mode of travel they select. When considering this it is also important to distinguish between trips made internally within Penrith, trips leaving Penrith and trips entering Penrith.

The Transport and Population Data Centre (TPDC) 2001 Household Travel Surveys (HTS) reveal that work related trips (journey to work and other work related business) represent only a very small proportion of all trips that people make in a day. A summary of the HTS data for the Penrith LGA was undertaken to establish what proportion of all trips are work related. Work related trips are defined as trips to/from work and trips that are work related. Figure 5.9 indicates the proportion of trips by purpose by time period. On an average day, work trips (including work related trips) account for only 27% of all trips.

Figure 5.9 Purpose of Trips (2001 HTS)

Source: Travel Patterns Report

Figure 5.10, Figure 5.11 and Figure 5.12 following, identify the proportion of trips made by private vehicle (car driver and car passenger), public transport (bus and taxi) and other (all other modes including walking & cycling) for:

- Internal trips – within Penrith LGA;
- Entering Penrith; and
- Exiting Penrith

Figure 5.10 Purpose of Household Trips by Mode - INTERNAL

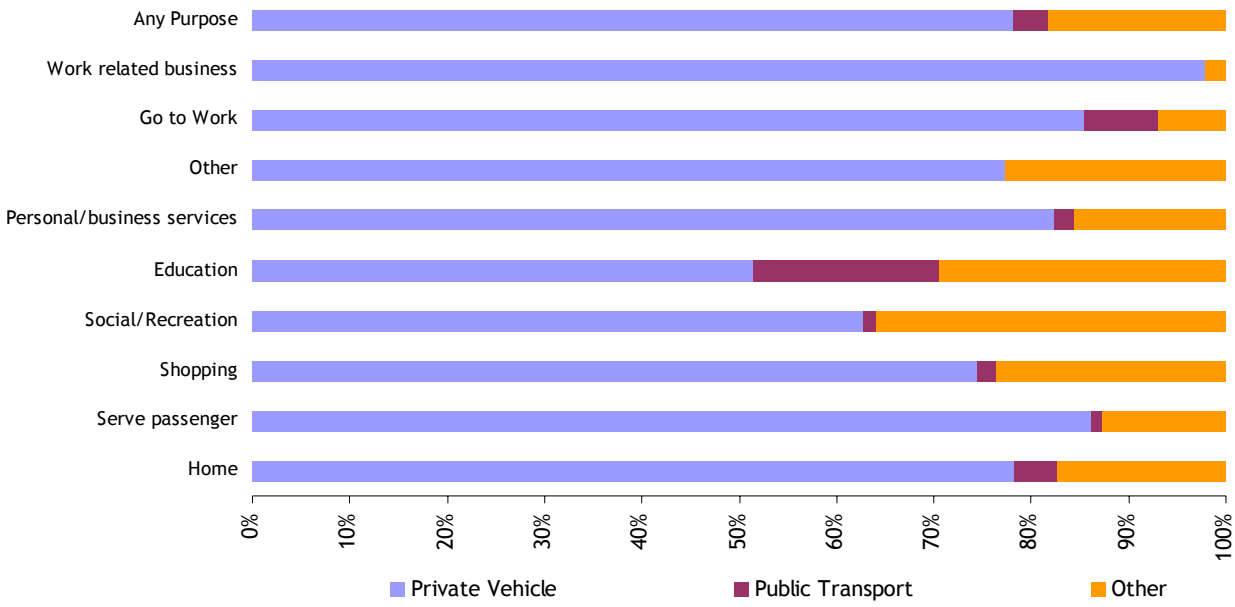


Figure 5.11 Purpose of Household Trips by Mode - ENTERING PENRITH LGA

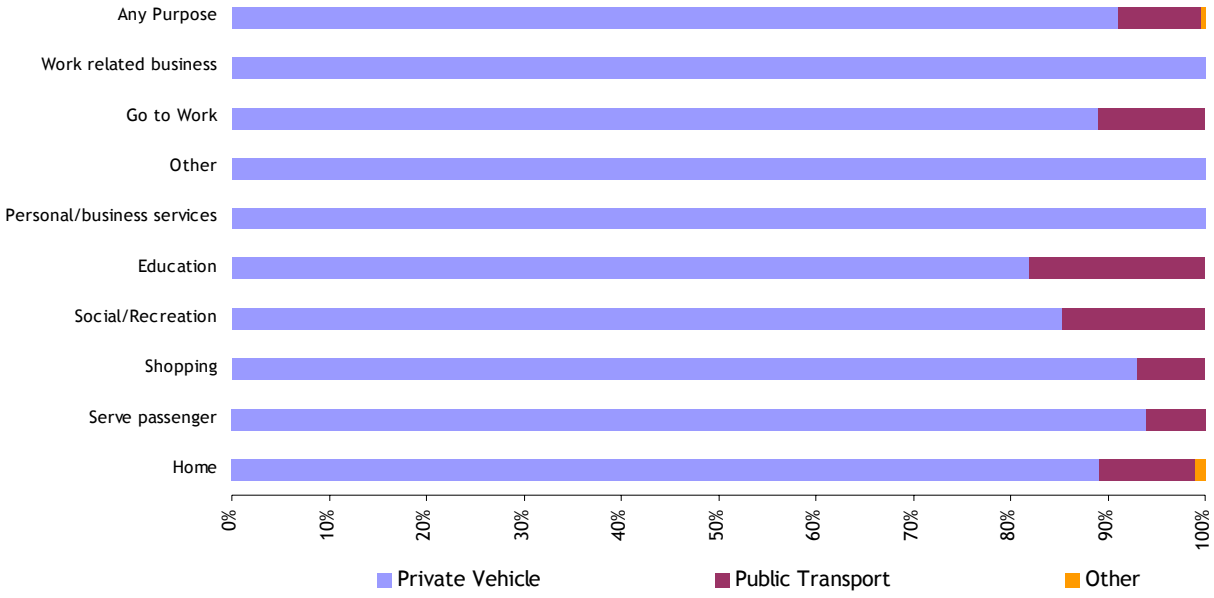
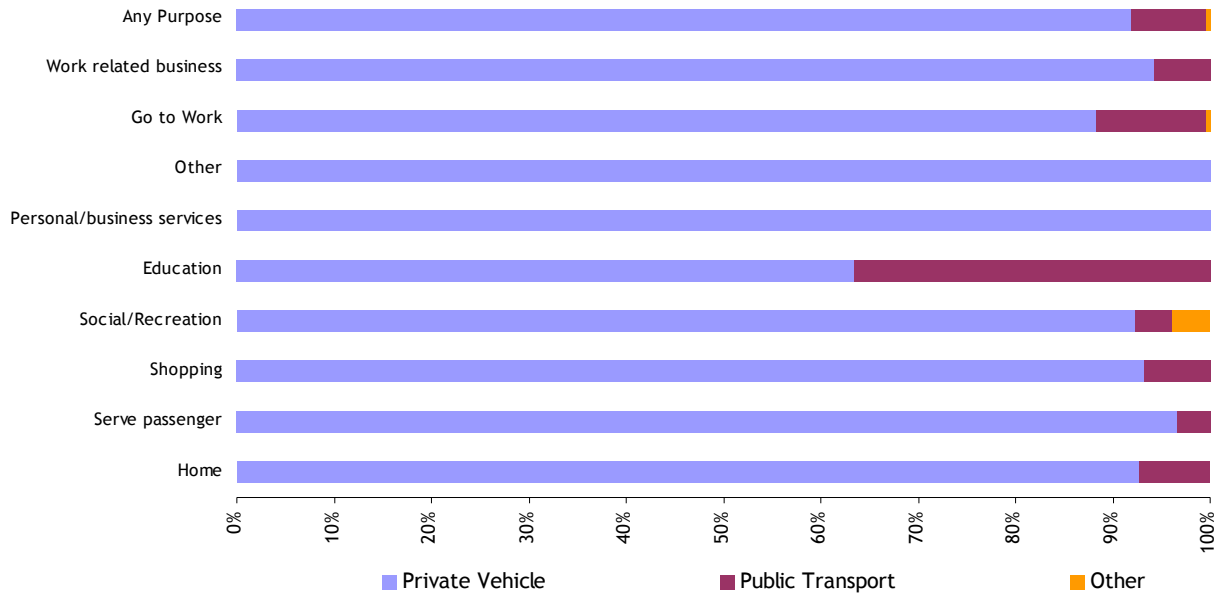


Figure 5.12 Purpose of Household Trips by Mode - LEAVING PENRITH LGA

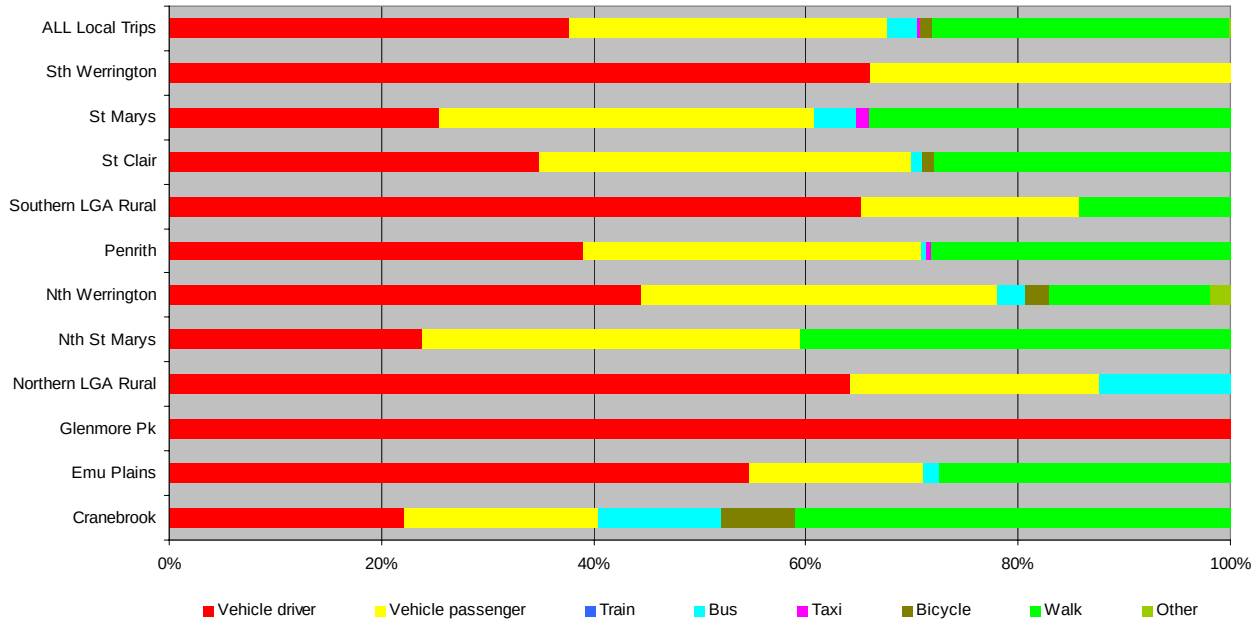


The above figures outline the predominance of the car for all purposes of trips, however internal trips generate much greater 'active transport' trips (walking & cycling). Internal Trips (within Penrith) can be further broken down into:

- 'local' trips - defined as trips that occur wholly within the local areas (SLAs); and
- 'other' internal trips - those trips that originate within the SLA area and travel to other parts of the Penrith LGA

It is expected that a much greater proportion of people will walk and cycle to carry out these activities which are typically shorter distances. Figure 5.13 and Figure 5.14 following, outline the mode of travel of internal trips from the 11 SLAs within the LGA (for Penrith residents only) for 'local' and 'other' internal trips.

Figure 5.13 Mode of Travel by Penrith Residents within SLA (non-work trips)*

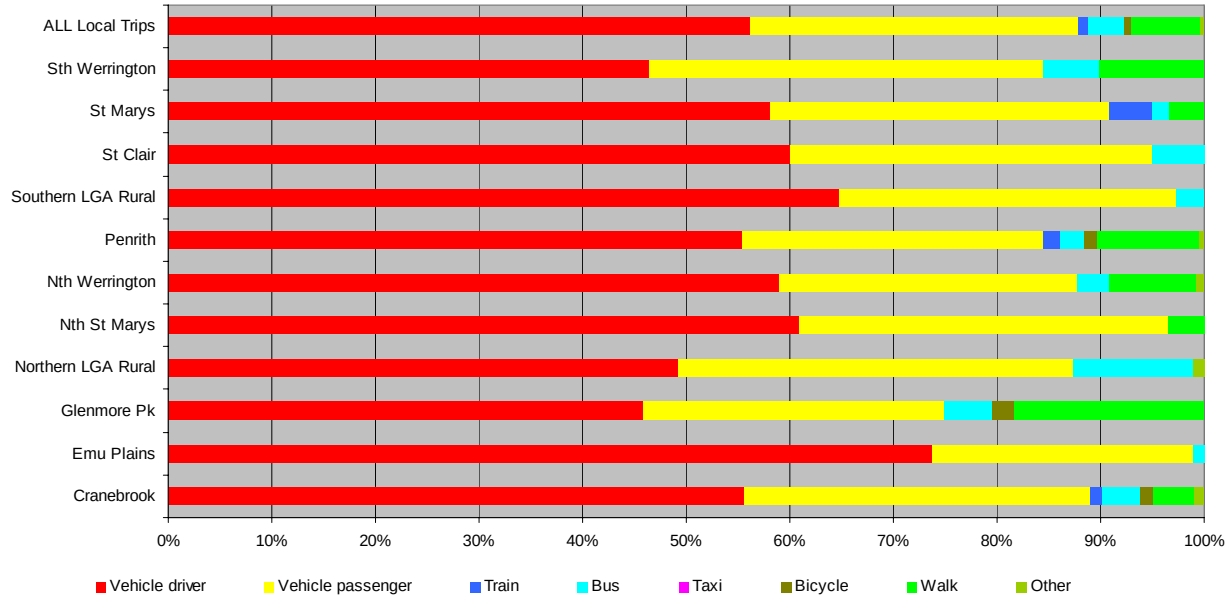


The results for Glenmore Park indicate that all trips are made by car driver, it is considered that the results are an anomaly due to a small sample size in this area.

The predominance of car as driver particularly in South Werrington and the rural areas is clearly evident. Overall bus represented less than 3% of all local trips and as expected train does not feature as a local trip mode. Cranebrook had a high proportion of bus trips, 11.6%, and it is interesting to note that the northern rural areas were the only area to exceed this figure with 12.4%. The southern areas did not fair well in terms of bus use.

Walking & cycling account for 29% of all local trips, with the vast majority of these being walk trips (96%). Only Cranebrook had a good representation of cyclist trips, 6.9%. The distances travelled to local facilities and the lack of cycling and walking infrastructure would contribute to these results.

Figure 5.14 Mode of Travel by Penrith Residents within the LGA (non-work trips)



The 'other' internal trips tend to be longer than 'local' trips so we see a decrease in the mode share towards bike/cycle. There is an overall increase in bus mode share from 2.9% to 3.4% when comparing 'local' trips to 'internal' trips.

The car is very much the predominant mode and the mode share rises to 88% from 68%. For these internal type trips within Penrith, but outside the immediate local area St Clair, North St Marys, Emu Plains and the southern rural areas are the most dependent on the private motor vehicle.

Rail features in these types of trips with an overall 1% mode share. St Marys had the highest proportion of rail trips (4.1%), with 1.7% for Penrith and around 1% for Cranebrook.

Overall bus represented 3.4% of all local trips and again the northern rural areas had a substantially higher mode share of 11.6%. The next highest areas for bus mode share were Glenmore Park, St Clair and South Werrington. The worst areas were Emu Plains and St Marys.

Walking & cycling account for around 7% of these internal trips, Glenmore Park is an exception having an 18% mode share for walking. North & South Werrington and Penrith were the next best areas. No areas had a good representation of cyclist trips.

Key Transport Issues:

T62) The predominance of car trips for all types of trips

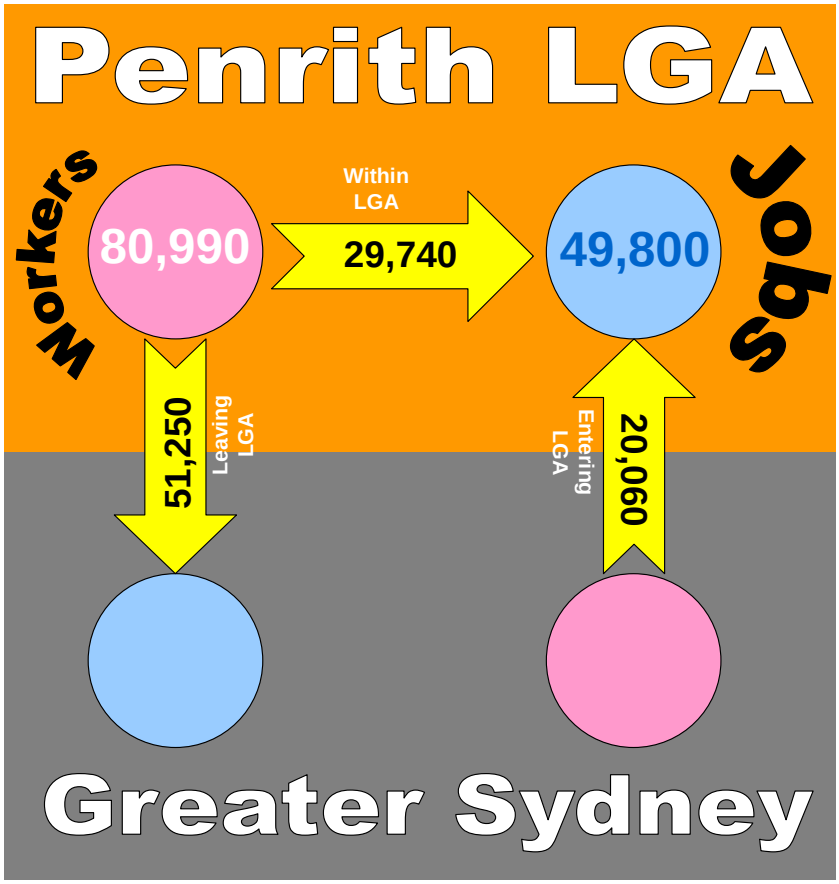
5.7.4 WORKFORCE & EMPLOYMENT FLOWS

The workforce in Penrith in 2001 was estimated to be approximately 80,990 people. Of the workforce, around 29,740 (37%) work in the Penrith LGA whilst 51,250 (63%) work outside the LGA.

There are estimated to be 49,800 jobs in the LGA, 29,740 (60%) jobs are filled by Penrith LGA residents and 20,060 (40%) of jobs are filled by non-Penrith residents. This creates a flow of people travelling to work into, out of and within the LGA.

There is an overall flow of around 71,300 workers into and out of the LGA. The 2001 flow of workforce to jobs is represented in Figure 5.15.

Figure 5.15 2001 Employment and Workforce Flows

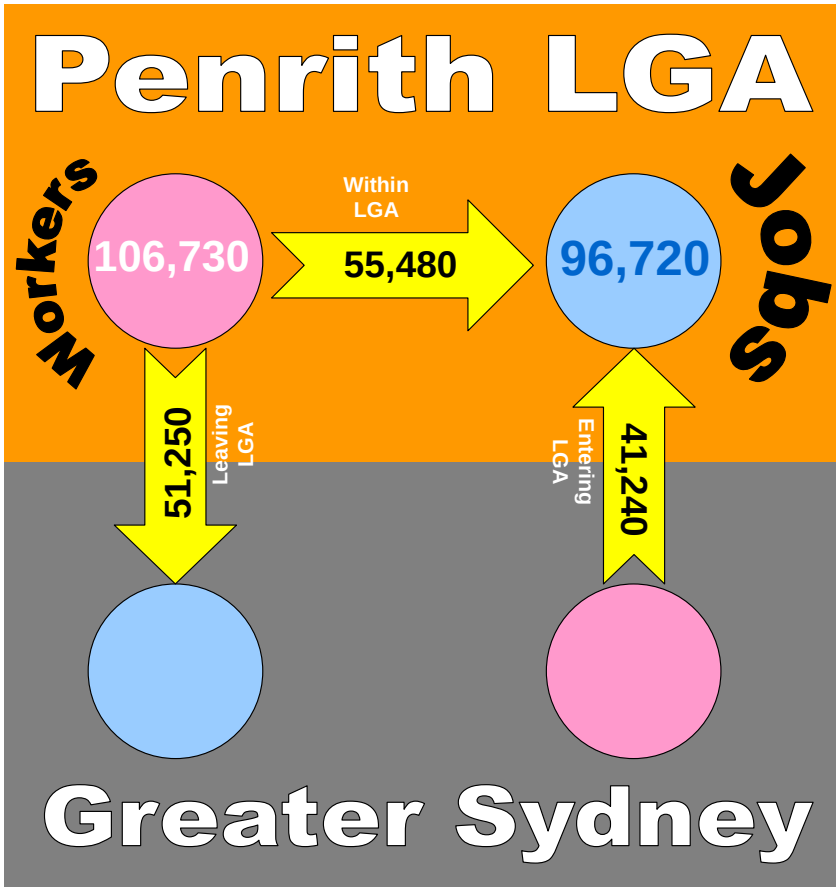


There is expected to be an increase of 46,910 jobs in the Penrith LGA by 2016 (based on the PARS study). This represents an almost doubling in the total employment within the LGA to 96,720.

In 2001, on average there were 1.37 workers per dwelling. If we assume that this remains the same then we can estimate the 2016 workforce based on the proposed increase in dwellings. Hence with a growth of 18,750 dwellings (to 2016 based on the PARS Study) then the 2016 Penrith workforce is expected to increase by 25,730. Hence the total 2016 workforce will be 106,730. The proposed increase in employment is greater than the increase in workforce so this will somewhat redress the imbalance to around a deficit of some 10,000.

Assumptions have been made on the resulting flow of workforce to employment into and out of the LGA to achieve equilibrium of the two. If we assume that a similar number of workers continue to leave the LGA for work (51,250) as in 2001, we can estimate that that there will be 55,480 workers who remain within the LGA for employment in 2016. The balance of jobs must be filled from outside the LGA, 41,240. This will lead to an overall flow of around 92,490 workers into and out of the LGA. The estimated equilibrium of future employment versus workforce flows is represented in Figure 5.16Figure 5.15.

Figure 5.16 2016 Employment and Workforce Flows



Whilst there has been an emphasis on the importance of LGA workplace self containment, it is also important to note that there will still be a considerable number of Penrith residents who work outside the LGA. The introduction of a large number of jobs in Penrith's "Front Yard" in the employment lands in the Western Sydney Employment Hub (WSEH) will be of great benefit.

The WSEH will be an important source of 'out of LGA employment'. Figure 5.17 shows the location of 10 key sites in the WSEH. It is anticipated the above sites have the potential to yield 36,000 jobs (including 5000 in the Erskine Park Employment Area), refer to Table 5.5. Almost 30,000 jobs will be located west of the M7 motorway, within close proximity of Penrith.

Figure 5.17 Key Sites in Western Sydney Employment Hub

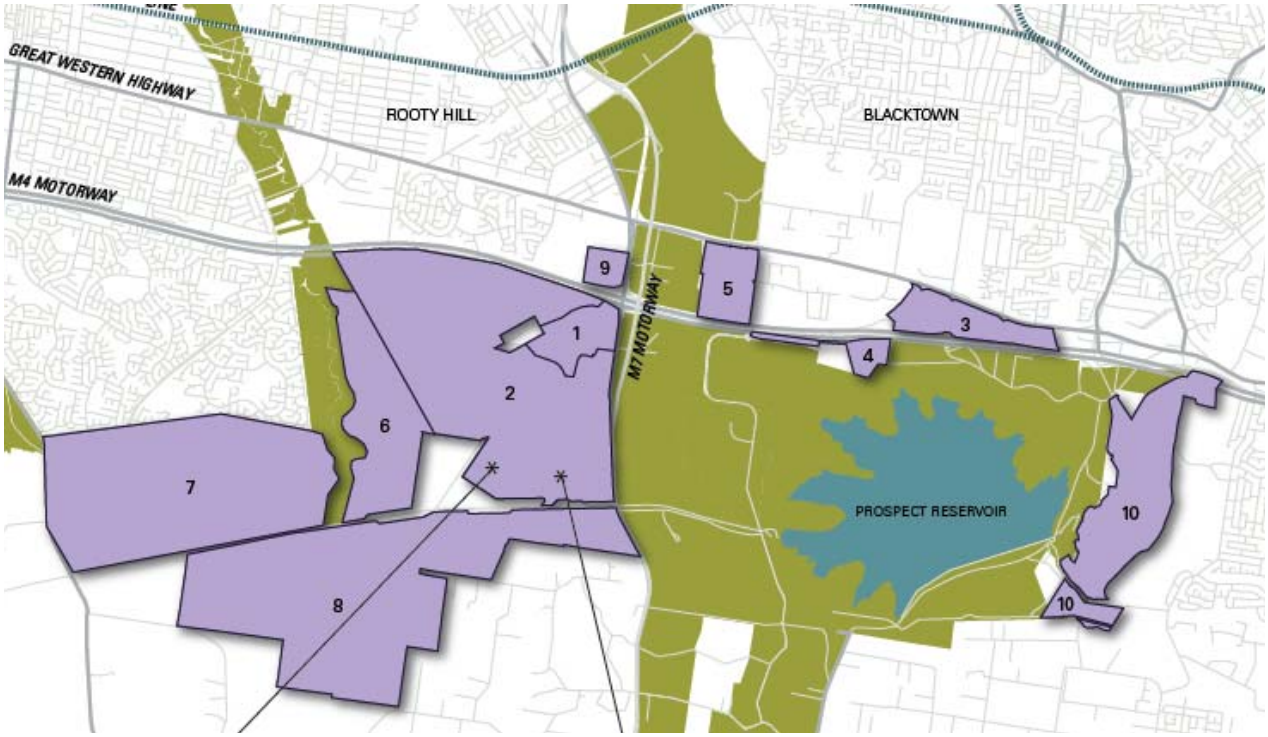


Table 5.5 Employment Potential at Key Sites in WSEH

Site		Area (ha)	Employment Potential
1	Former Wonderland Precinct	59	3000
2	Eastern Creek Precinct	645	12000
3	Huntingwood Precinct	76	1000
4	The Raceway Precinct	26	350
5	Huntingwood West	61	750
6	Ropes Creek Precinct	190	1600
7	Erskine Park Employment Area	500	5000
8	Lands South of Sydney Water Pipeline	656	8000
9	Quarantine Station	22	300
10	Grey Stanes Employment Lands	215	4000
	Total	**2450**	**36000**

Key Transport Issues:

T63) In 2001 over 51,000 workers leave the LGA and over 20,000 employees enter the LGA for work
T64) There is expected to be an increase in 46,910 jobs and 25,730 workers in the LGA by 2016
T65) The workforce employment deficit will decrease from 31,100 to 10,000
T66) In 2016 over 51,000 workers could leave the LGA and 41,000 employees enter the LGA for work
T67) New job opportunities will be presented in the WSEH

5.7.5 JOURNEY TO WORK TRIPS

An analysis of the 2001 Census Journey to Work data set (JTW) reveals that the Penrith LGA workforce, of 81,000 people, generates approximately 69,820 JTW trips each day, this is because not every worker travels to work each day. Correspondingly the 2016 Penrith LGA workforce, of 107,000 people, will generate approximately 92,000 JTW trips each day. Furthermore the 49,800 jobs in Penrith in 2001 attracted 40,840 JTW trips each day. Similarly the 96,720 jobs in Penrith in 2016 will attract 79,310 JTW trips each day.

The workforce and employment journey to work trips for each SLA are presented in Table 5.6 and Table 5.7 respectively. Workforce journey to work trips represent the trips Penrith workers make going to work, whilst employment trips are the trips to employment in Penrith. It is important to note that there is an overlap of these trips as much of Penrith workforce work in Penrith jobs.

Table 5.6 Penrith Workforce Journey to Work Trips by SLA

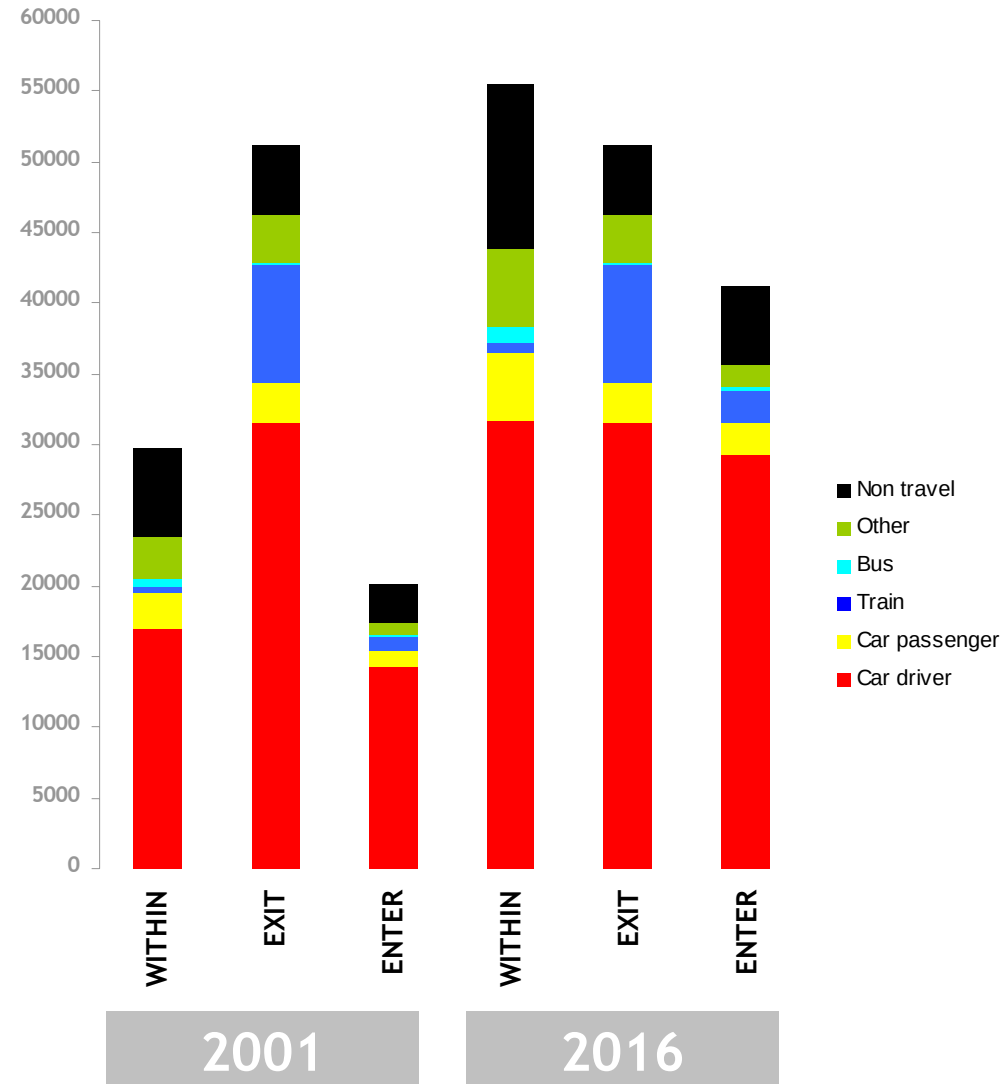
SLA Name	2001 JTW trips (internal & external)		2016 JTW trips (internal & external)	
St Clair	12,169	17.4%	12,719	13.8%
St Marys	7,104	10.2%	7,928	8.6%
Emu Plains	6,088	8.7%	6,617	7.2%
North Werrington	8,670	12.4%	10,579	11.5%
South Werrington	2,223	3.2%	4,533	4.9%
Penrith	10,774	15.4%	12,987	14.1%
Glenmore Park	8,701	12.5%	9,200	10.0%
Cranebrook	7,458	10.7%	10,027	10.9%
North St Marys	1,244	1.8%	1,438	1.6%
Southern LGA Rural	2,412	3.5%	3,966	4.3%
Northern LGA Rural	2,981	4.3%	12,026	13.1%
Total	**69,824**	100.0%	**92,020**	100.0%

Table 5.7 Penrith Employment Journey to Work Trips by SLA

SLA Name	2001 JTW trips (internal & external)		2016 JTW trips (internal & external)	
St Clair	1689	4.1%	8049	10.1%
St Marys	3237	7.9%	3237	4.1%
Emu Plains	2588	6.3%	2588	3.3%
North Werrington	950	2.3%	2590	3.3%
South Werrington	1611	3.9%	26212	33.0%
Penrith	17192	42.1%	17192	21.7%
Glenmore Park	1396	3.4%	1396	1.8%
Cranebrook	4673	11.4%	5225	6.6%
North St Marys	4905	12.0%	4905	6.2%
Southern LGA Rural	1073	2.6%	1073	1.4%
Northern LGA Rural	1530	3.7%	6847	8.6%
Total	**40844**	**100.0%**	**79314**	**100.0%**

The overall journey to work trips by mode for the LGA is represented in Figure 5.18 for both 2001 and 2016. For the sake of this assessment we have assumed that the mode split for journey to work trips remains as it currently is. This is in contrast to the objectives of the PITLUS to achieve a mode shift of 10% away from the private motor vehicle. The aim of this assessment is to consider the quantum increases in person trips. The mode share assumptions have been assumed to remain as is to firstly present a picture of Penrith in the future if the current situation continues and people's behaviour does not change. In a sense it is a 'do nothing scenario.

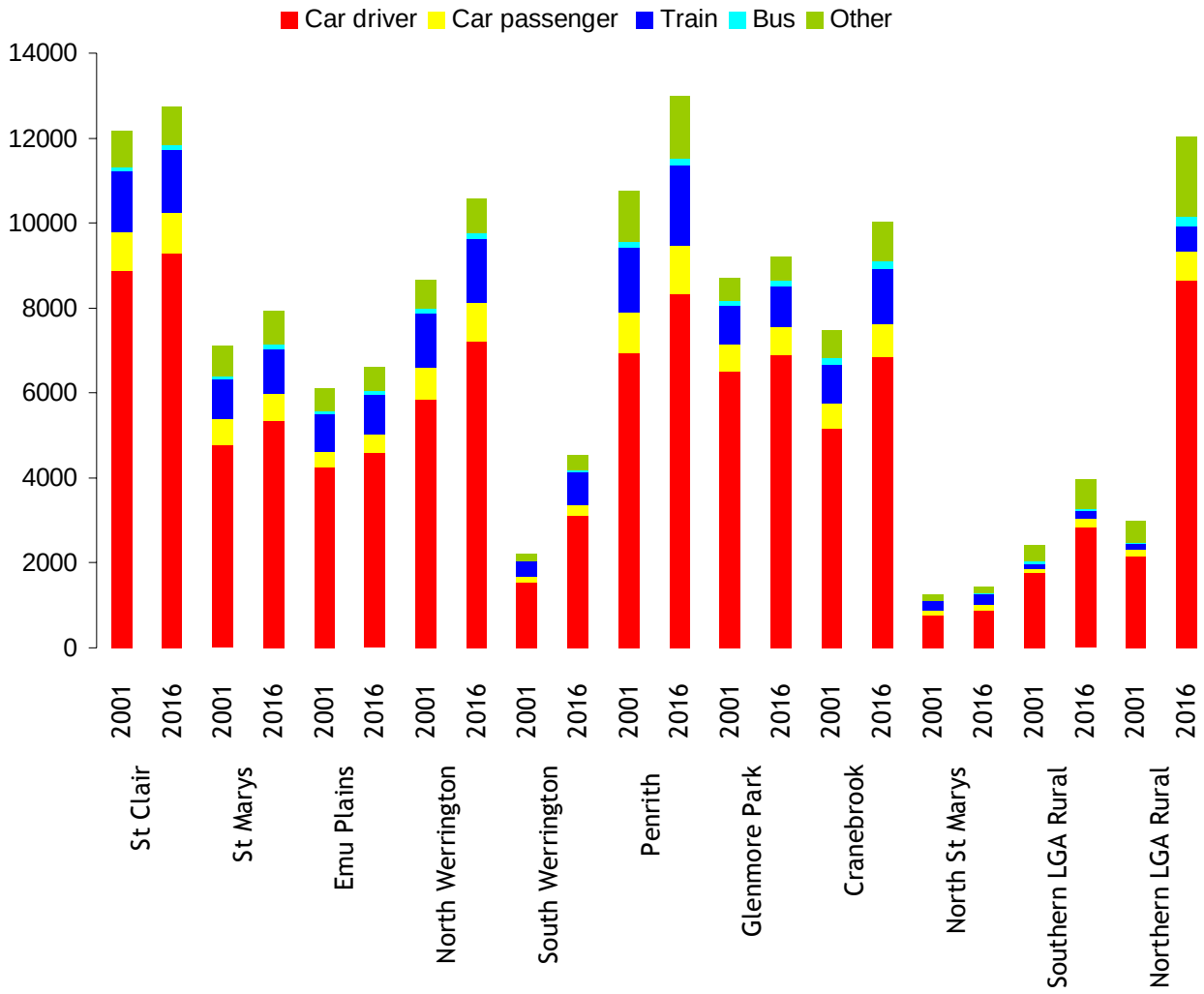
Figure 5.18 LGA Journey to Work Trips by Mode



From this we can see a dramatic increase in the internal and entering trips in the LGA.

The 2001 Penrith LGA workforce of 80,990 is distributed over the whole LGA. Individual SLAs have differing numbers of workers and travel patterns. The 2016 workforce of 106,720 is expected to be distributed differently due to concentrated growth in the URAs. A summary of the JTW trips by mode of travel generated by the workforce (2001 & 2016) within each of the 11 identified SLAs is provided in Figure 5.19.

Figure 5.19 SLA Workforce Journey to Work Trips by Mode

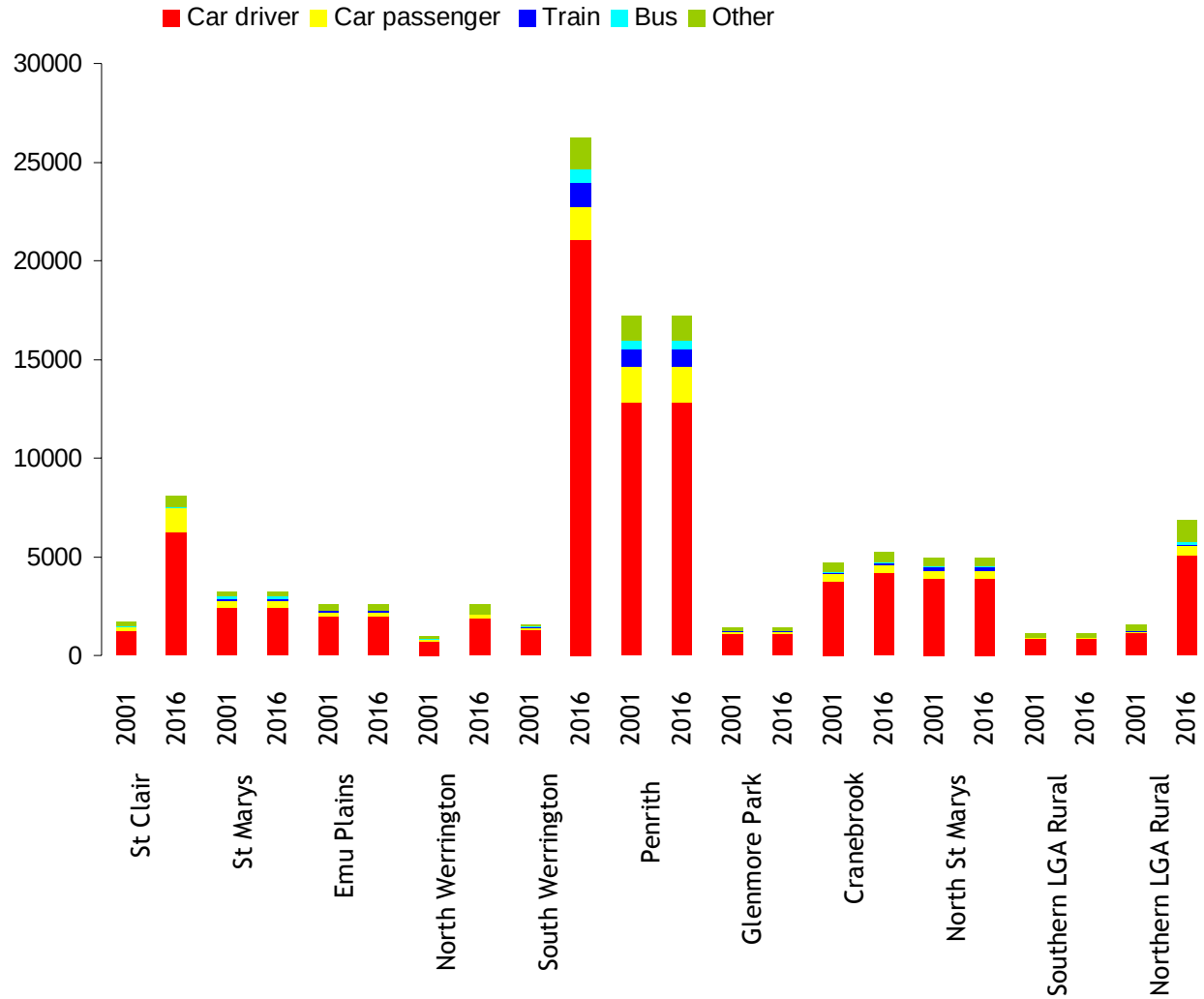


This shows us that the currently St Clair and Penrith areas generate the most trips to work in the LGA. In the future the St Clair and Penrith areas will continue to generate, proportionally, the largest number of trips to work in the LGA. However, there will be significantly more trips in the Northern Rural area and North Werrington, Cranebrook will also experience notable growth.

The 2001 Penrith LGA workforce of 80,990 is distributed over the whole LGA, w. Individual SLAs have differing numbers of workers and travel patterns. The 2016 workforce of 106,720 is expected to be distributed differently due to concentrated growth in the URAs. A summary of the JTW trips by mode of travel generated by the workforce (2001 & 2016) within each of the 11 identified SLAs is provided in Figure 5.19.

The Penrith LGA offers employment for some 49,800 workers (2001), distributed over the whole LGA, but with concentrated areas of employment at key locations. In 2016 the Penrith LGA will offer employment for some 96,700 workers. The JTW trips by mode of travel to these employment areas are presented in Figure 5.20.

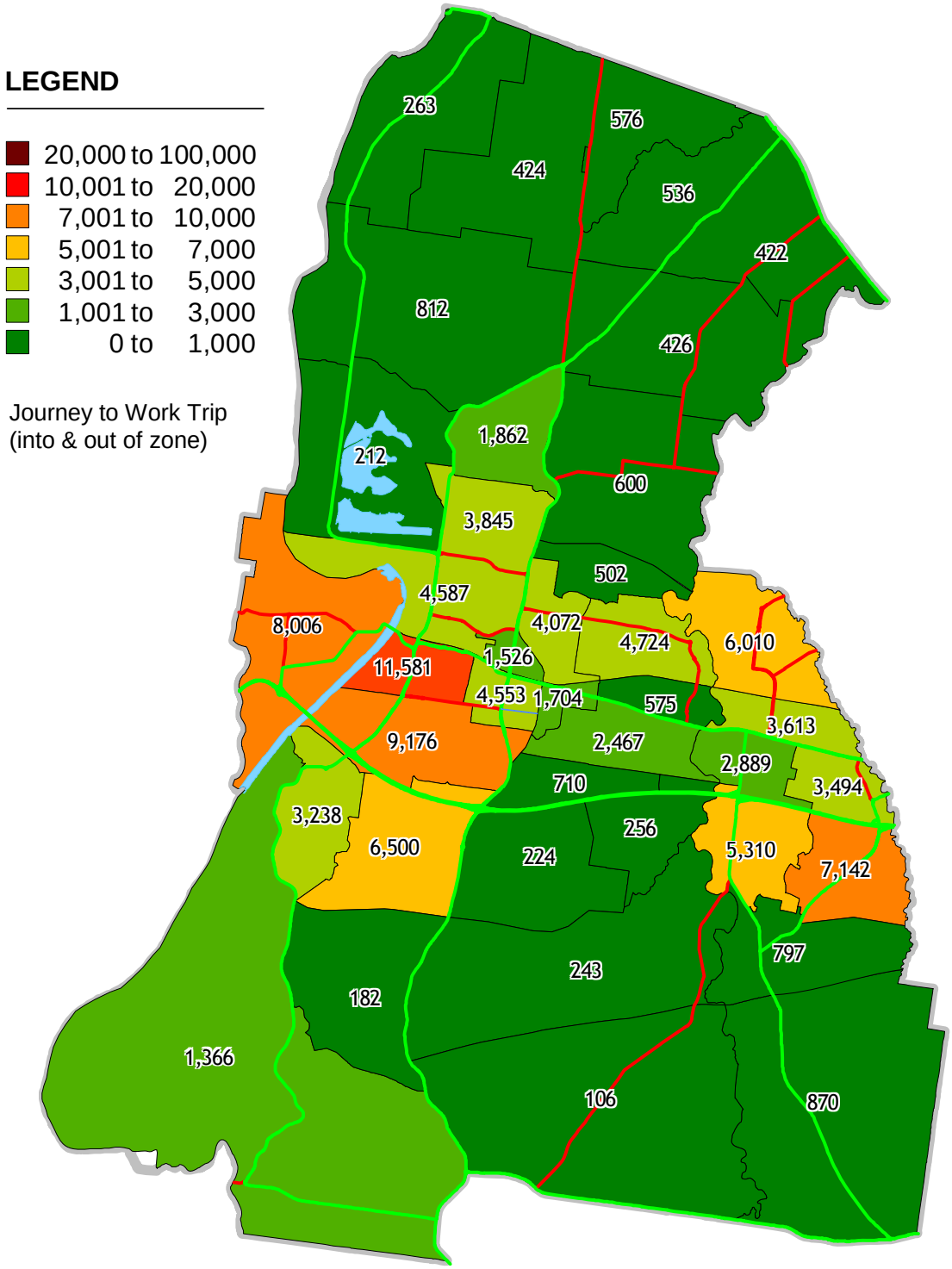
Figure 5.20 SLA Employment Journey to Work Trips by Mode



From this it is evident that the Penrith CBD is by far the largest employment destination within the LGA, with over one quarter of all employment trips. The Dunheved Industrial area in North St Marys is also a significant employment destination. We can see that the Penrith CBD will no longer be the most significant employment destination within the LGA, as the TAFE and UWS in South Werrington will attract considerably more employment trips if tertiary students are considered as employees for the purposes of estimating travel patterns. Erskine Park in the St Clair SLA will also be a significant employment destination.

To consider journey to work trips in and around Penrith LGA in more detail, we analyse the total trips into and out of small areas, known as travel zones. The results for 2001 JTW trips is presented in Figure 5.21 This figures highlights the local areas that have the most journeys to work activity, as a combination of trips into, out of and within each zone.

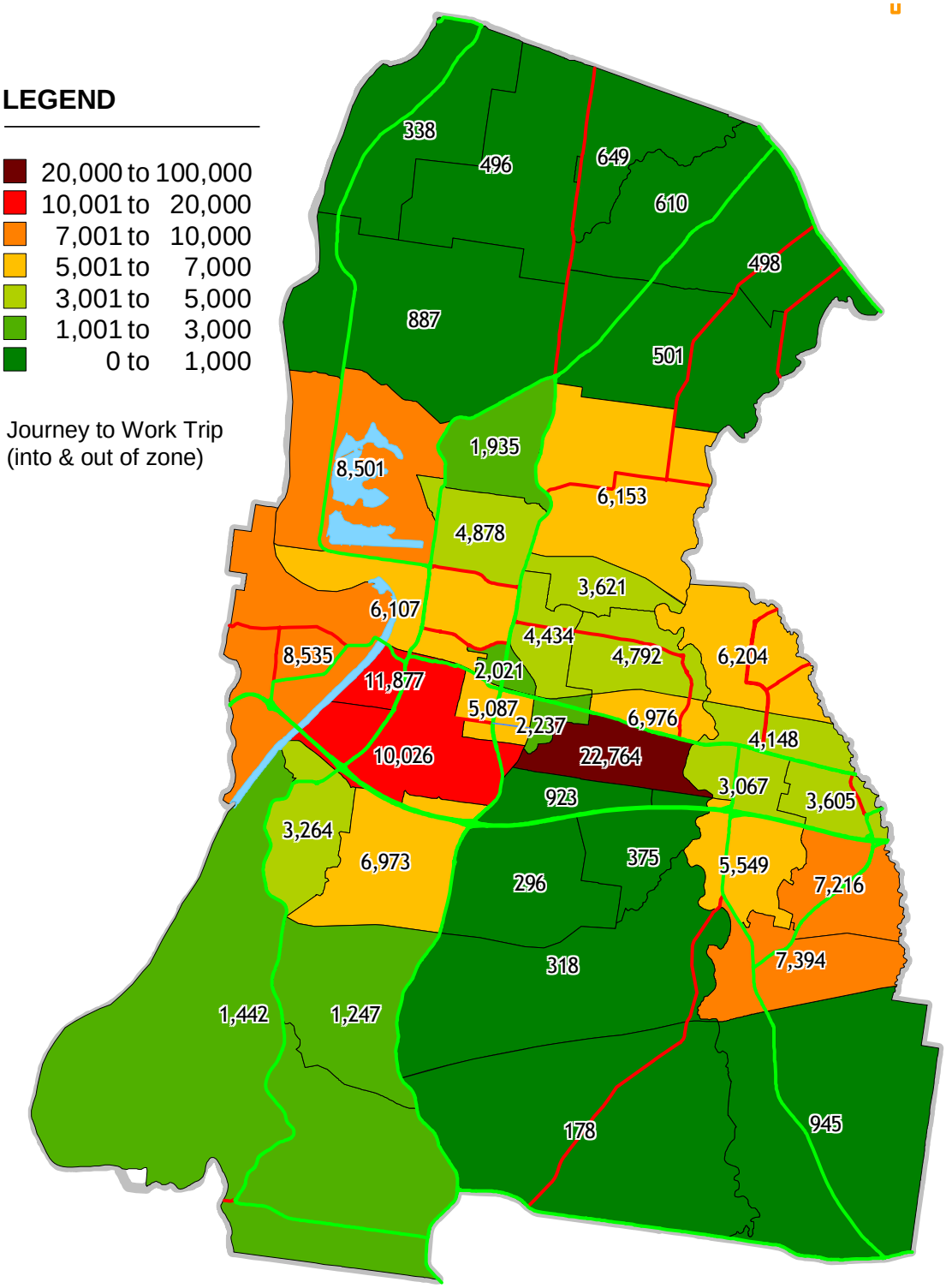
Figure 5.21 2001 Journey to Work Trips by Travel Zone



This shows that the 'busiest' areas for the existing journey to work trips are Penrith CBD, South Penrith, Jamisontown, Emu Plains and St Clair.

The potential 2016 JTW trips as a combination of trips into, out of and within each travel zone is presented in Figure 5.22.

Figure 5.22 2016 Journey to Work Trips by Travel Zone



The 2016 figure shows a distinct change when compared to the existing situation, where the spread of trips to the north is most prominent with densification of trips in some existing areas. Of particular note is the dramatic increase in trips to/from the WELL Precinct experiencing the most intensive JTW trips and a nearly 10 fold increase in movements. Penrith Lakes, St Marys Release Area and Erskine Park Employment area will also cause dramatic growth in thrips to these areas.

Key Transport Issues:

T68) Workforce JTW trips will increase from 69,820 to 92,020 by 2016
T69) Employment JTW trips will increase from 40,840 to 79,310 by 2016
T70) In 2001 the St Clair and Penrith areas generated the most workforce JTW trips
T71) In 2016 the St Clair and Penrith areas will continue to generate, proportionally, the largest number of workforce JTW trips in the LGA.
T72) There will be significantly more workforce JTW trips generated in the Northern Rural area, North Werrington and Cranebrook
T73) Currently Penrith CBD is by far the largest employment destination within the LGA, with over one quarter of all employment trips. The Dunheved Industrial area in North St Marys is also a significant employment destination.
T74) By 2016 the Penrith CBD will no longer be the most significant employment destination within the LGA
T75) The WELL precinct in South Werrington will attract considerably more employment trips in 2016. Erskine Park in the St Clair SLA will also be a significant employment destination.
T76) There will be a dramatic increase in JTW trips to/from the WELL Precinct
T77) Penrith Lakes, St Marys Release Area and Erskine Park Employment area will also cause dramatic growth in trips to these area

5.8 MODE SHIFT & TRIP REDUCTION

As discussed previously, with a projected increase in 18,750 dwellings and 46,910 jobs, this will equate to an additional 22,200 workforce journey to work trips and 38,470 employment journey to work trips. Using the current mode share pattern for journey to work trips the proposed growth would generate the following daily trip increases by 2016:

- 15,400 car driver trips for workforce leaving residential areas;
- 30,300 car driver trips to employment destinations;
- 2,200 rail trips for the workforce;
- 1,300 rail trips to employment destinations;
- 300 bus trips for the workforce; and
- 700 bus trips to employment destinations.

This increase would have a substantial impact on the demand for public transport and roadspace:

- An additional 1000 daily bus trips would equate to over 15 buses running fully occupied.
- 3500 additional rail trips is a 32% increase in the total barrier count figures for the four key stations in Penrith during the morning peak period.
- Currently 65% of car driver journey to work trips are leaving the Penrith LGA. If this was to continue then of the additional 15,400 car driver trips generated by the increase in workforce, around 10,200 would leave the LGA. If no change in mode share is achieved then this will have a significant impact on the operation of the road network in Penrith.

Household trips in the future are harder to predict, if we assume a proportional increase in trips based on population growth (33%, 2001 to 2016) we can get an indication of future trips. Using the current mode share pattern for household (non-journey to work) trips the proposed growth would generate the following trip increases by 2016:

- 83,300 household car driver trips;
- 64,700 household car passenger trips;
- 3,500 household rail trips;
- 6,600 household bus trips;
- 28,700 household other trips.

Increases in traffic will result in increases in congestion, which in turn adds a greater additional friction to other modes. This would result in an even greater need for higher level and separate infrastructure for buses, cycles and pedestrians.

5.8.1 MODE SPLIT SHIFT

Council aim to achieve a minimum 10% reduction in the use of single-occupant motor vehicles and to achieve an increase in the mode share to public transport of at least 10% above current levels.

Journey to work trips represent about 27% of all household trips made in the Penrith LGA. 70% of the total workforce trips are car driver trips, whilst for employment trips 76% are car driver.

To address Council's aims, trips other than just journey to work trips need to be considered. The HTS (2001) indicates that 24% of trips are for the purposes of transporting (serving a passenger), 17% are for social/recreation, 15% are for shopping, 9% is for education and 6% is for personal business. These types of trips account for more than 70% of trips every day in PCC.

Figure 5.23 indicates the purpose of all trips within, to & from the LGA by the trip type (exiting, entering and internal). It also outlines the trip purposes for all trips within, to and from each SLA.

From this it is evident that work related trips are much higher for exiting Penrith trips than entering. Hence a greater flow out of the area than into the area for work trips, and a greater proportion of non-work related trips for internal trips.

When considering individual SLAs North St Marys has the highest proportion of work trips and South Werrington has a predominance of education trips.

Each trip type & purpose has different characteristics for mode of travel. Figure 5.24 details the mode of travel profiles for all trips in Penrith LGA.

Figure 5.23 Trip Purpose by SLA

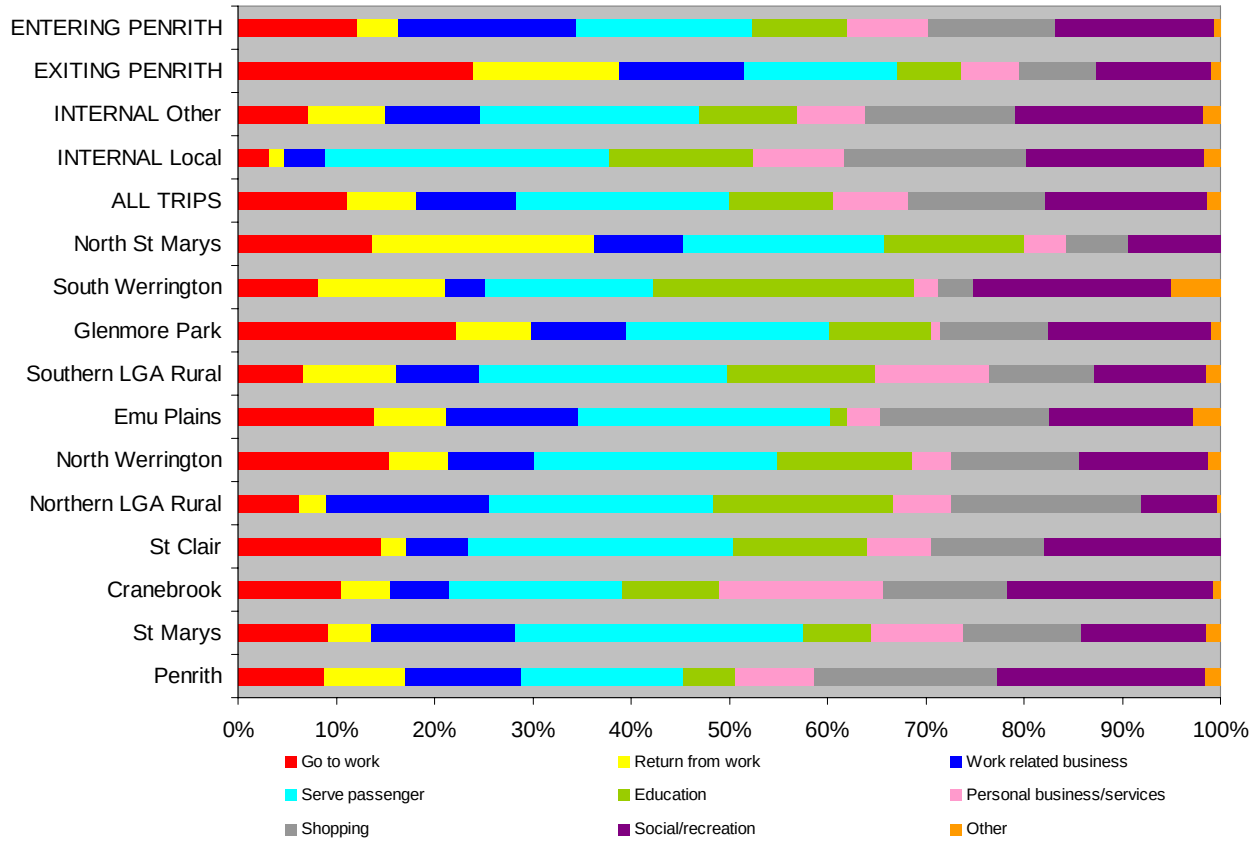
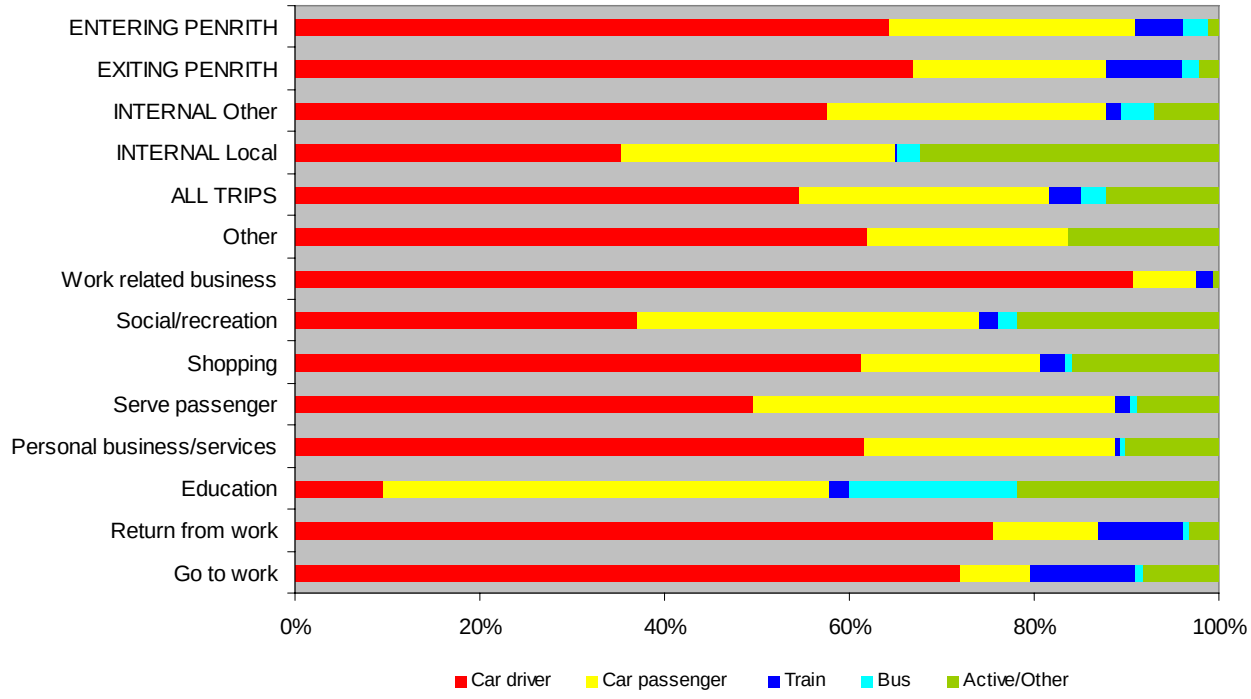


Figure 5.24 Mode of Travel by Trip Purpose

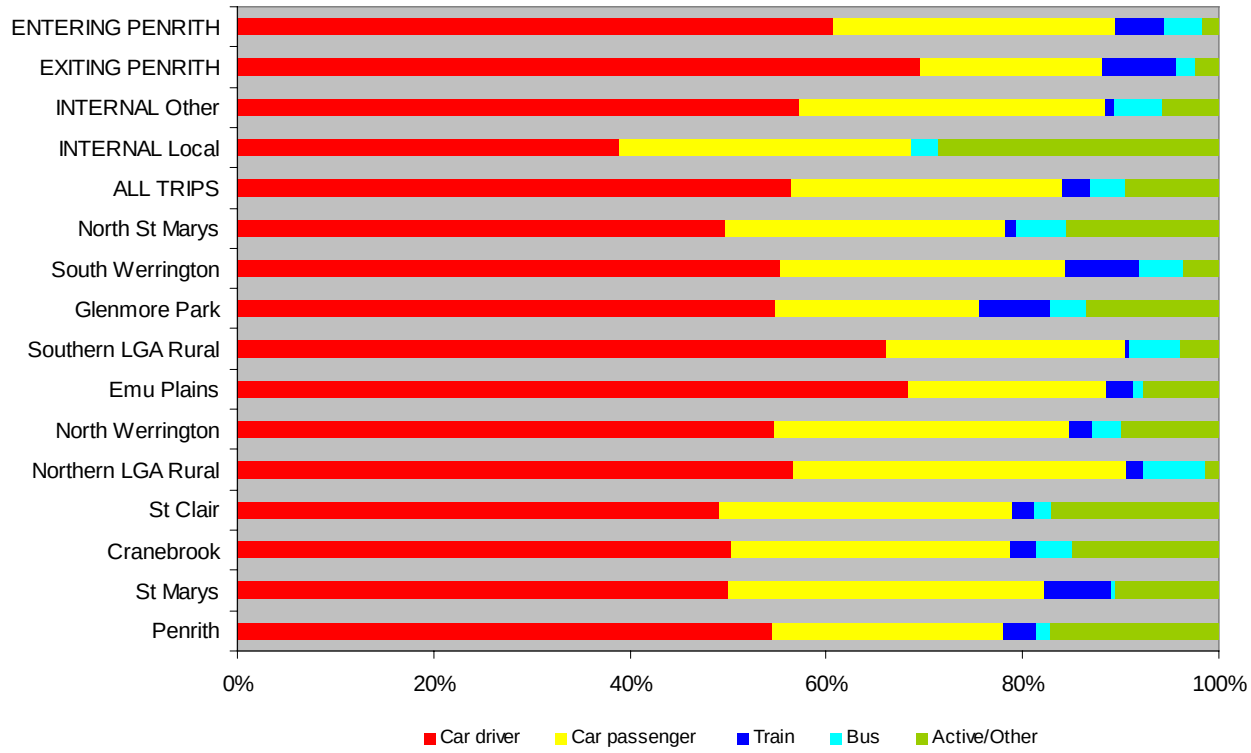


Based on trip type the car (driver & passenger) is by far the most dominant mode of travel for entering Penrith (91%) & exiting Penrith (88%) trips. A reduction in car as mode of choice is expected when examining internal trips, which is true for local trips (65%) but other internal trips remain high (88%). It is worthy to note the very high proportion of trips by car passenger for education trips, this reflects the issue of children being driven to school.

As would be expected journey to/from work trips (79%/87%) and work related trips (98%) have a high mode share for private car use. The trips for non-work purposes also rely heavily on the car. With the exception of education they range between 74% and 89% mode share for private vehicle use, education is lower at 58%.

Different characteristics for mode of travel within different SLA's are evident. Figure 5.25 following details the mode of travel profiles for each SLA.

Figure 5.25 Mode of Travel by SLA



There are subtle differences in mode share for car ranging between 76% in Glenmore Park and 91% in the northern rural LGA.

To demonstrate the magnitude of change in existing travel patterns alone if we are to achieve a 10% reduction in the use of single-occupant motor vehicles a re-assignment of these trips was undertaken. This re-assignment considered the most likely potential shift to other modes eg Public Transport or Active Transport. This was undertaken on a suburb by suburb basis considering the current transport accessibility. It also considered the type of trips (external versus internal or local) and the trip purposes.

The results of the assessment show a decrease in single-occupant motor vehicle trips and corresponding increases in other transport modes. This is demonstrated in Figure 5.26 and Figure 5.27, which summarise potential changes by SLA and Trip Purpose.

Figure 5.26 Existing mode shift changes by SLA

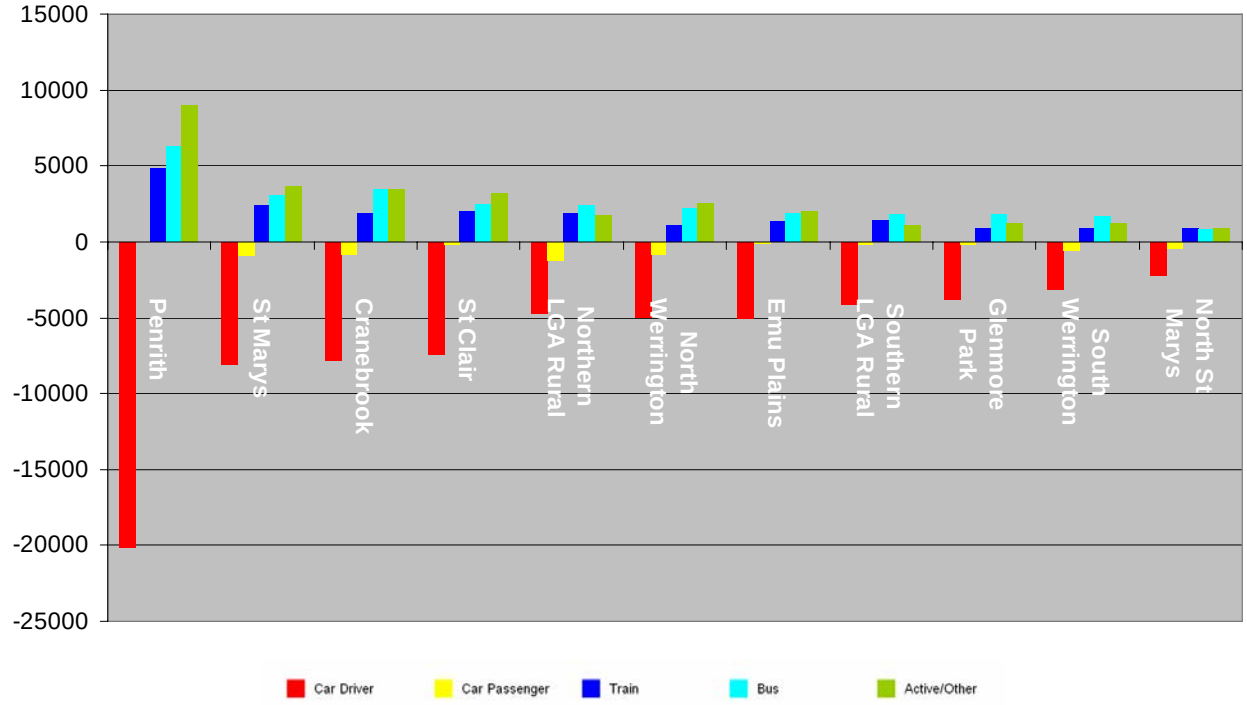
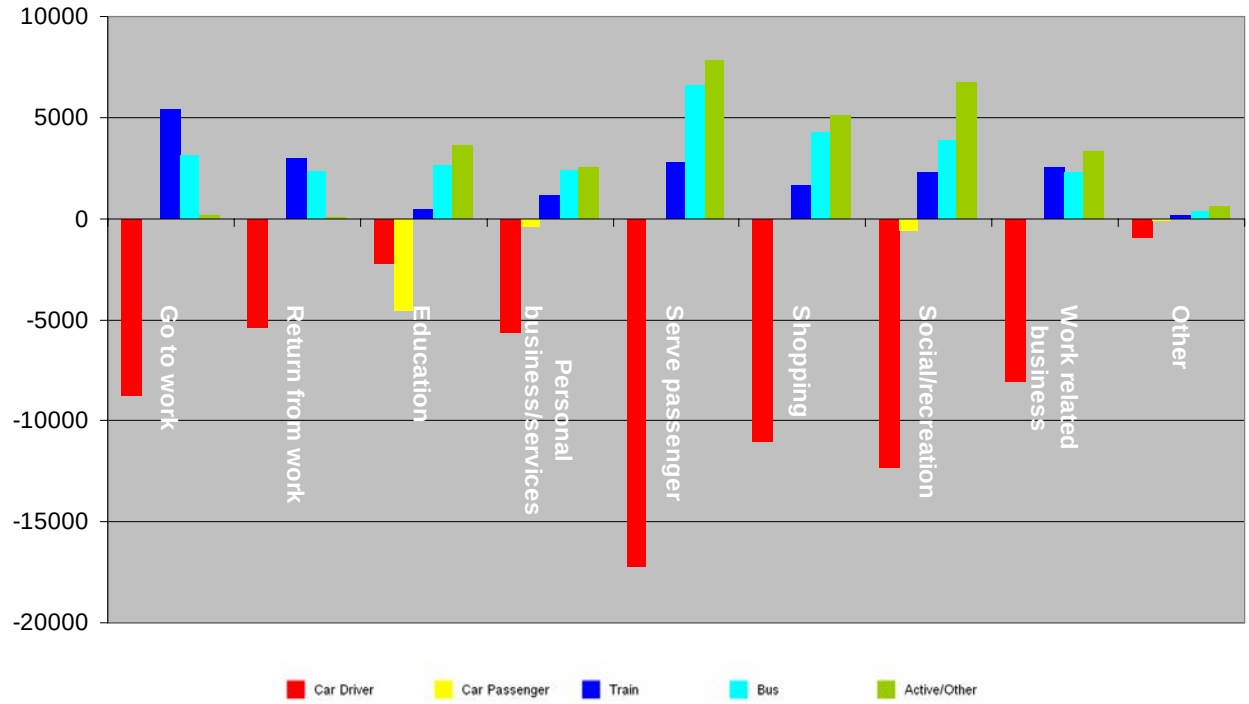


Figure 5.27 Existing mode shift changes by Trip Purpose



From these charts it is evident that the greatest potential for change in mode of travel when considering areas is within the Penrith SLA. Here we see that to achieve a 10% reduction in single-occupant motor vehicle trips (over 20,000 trips), we must shift around 4900 trips to train, 6300 to bus and almost 9000 to active transport modes. In the whole LGA we must reduce motor vehicle trips by over 77,000 trips per day with corresponding daily increases in the following modes:

- 19,400 train trips;
- 27,800 bus trips; and
- 29,900 walk/cycle trips.

This increase would have a substantial impact on the demand for public transport and roadspace:

- An additional 27,800 bus trips would equate to over 410 buses running fully occupied.
- 19,400 additional rail trips would increase the total barrier count figures for the four key stations in Penrith during the morning peak period by 3-fold.

It is also evident that whilst journey to work trips are significant we must also achieve dramatic changes in the mode of travel people use for passenger, shopping and social reasons. Although this seems like an enormous task, changes can be made over time if Council adopt a holistic approach to integrating transport and land use and works with all levels of government to effect a change.

Key Transport Issues:

T78) There is a very high proportion of trips by car passenger for education trips
T79) Increased trips in the future will result in a significant demand for additional buses, trains and road space
T80) A 10% reduction in the use of single-occupant motor vehicles will could result in demand for additional 19,400 train trips, 27,800 bus trips and 29,900 walk and cycle trips

5.8.2 TRIP REDUCTION

To accompany the goal of mode shift it is important to aim to reduce the total trip numbers and the length of individual trips. Trip numbers can be reduced by grouping key destinations together to facilitate trip combining. Trip lengths can be reduced by bringing homes and destinations such as businesses, schools and shops closer together, creating more direct routes between them and providing and promoting the use of local facilities. Railway park and ride car parks can provide an ideal place for more clustering activity e.g.childcare and personal needs.

Much of Penrith's workforce finds employment outside the LGA. There is consequently considerable scope to reduce trip lengths by increasing the number of jobs within Penrith and increasing the proportion of Penrith residents employed in these jobs. These jobs would need to be located in highly accessible locations within Penrith.

Existing destinations within Penrith cannot be easily moved or duplicated closer to where people live, as they are generally well established and located where they are for economic reasons. Instead, homes and destinations can be brought closer together by increasing the number – or density – of homes close to the destinations.

The fewer or shorter the trips people have to make, the easier it is for them, the less they add to congestion on roads, trains or other forms of travel. This in turn improves liveability and environmental sustainability. Shorter trips are also more likely to be made on foot or bicycle, magnifying these benefits.

The number of trips people make is influenced by the ability to combine two or more purposes in a single trip. For instance, combining a shopping trip with travelling to or from work or school. 'Trip combining' is enabled by grouping key travel destinations together. Travel distances are primarily determined by the proximity of key travel destinations to people's homes.

New residential and employment development within the Penrith LGA needs to provide for the opportunity for viable multiple mode choices and to provide opportunities for shorter and less trips through the effective location of services and facilities. Therefore, the location of housing and other services must be well planned and the infrastructure and services provided up front, or at a minimum at the early stages of the development phase.

This will require strategies which involve Council, developers, the PCC community as well as State Government cooperation to ensure that access to more sustainable transport is the norm.

Key Transport Issues:

T81) Strategies involving Council, developers, the PCC community as well as State Government cooperation are required to ensure that access to more sustainable transport is the norm

chapter 6
area overview

6 AREA OVERVIEW

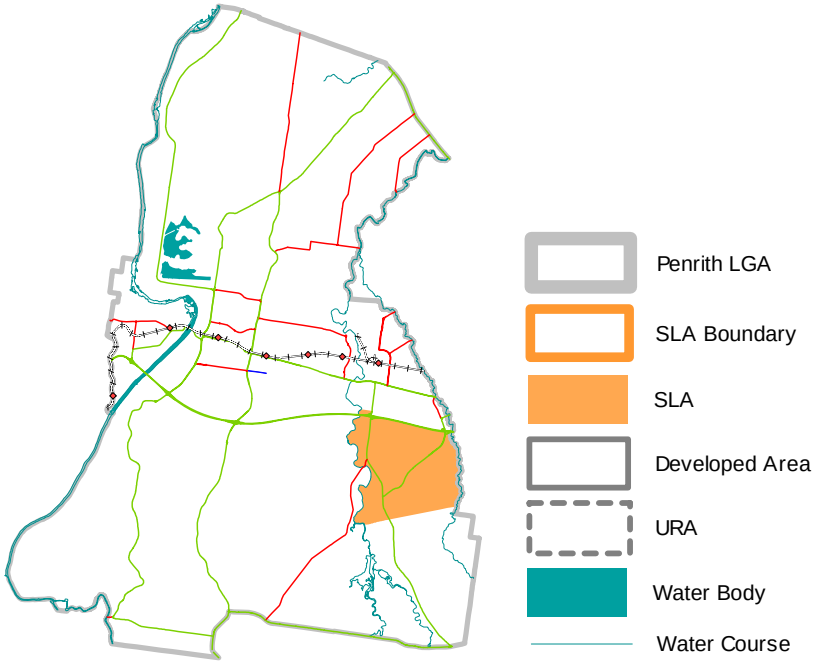
To analyse the land use & transport in Penrith LGA we consider the Statistical Local Areas (SLAs) that were identified in Section 4. This way we can gain a better understanding of the local issues in these SLAs and in the main commercial centres. This chapter reviews the unique issues in the suburban, rural and commercial local areas.

6.1 SUBURBAN AREAS

6.1.1 ST CLAIR

The St Clair SLA incorporates the suburbs of St Clair and Erskine Park. St Clair and Erskine Park are relatively recent residential areas (1970s to 1990s), with industrial land usage in the south (Erskine Park). The area is generally bounded by the M4 Motorway in the north, Ropes Creek in the east, the water supply pipeline in the south and Mamre Road in the west.

St Clair experienced a relatively stable population between 1996 and 2001, the result of little change in dwelling stock and a decline in the average number of persons living in each dwelling. Erskine Park has experienced an increase in population between 1996 and 2001 as a result of new dwellings being added to the area.



Features:

Major features of the area include:

- 6 primary schools, St Clair High School and Erskine Park High School;
- St Clair and Erskine Park Village Shopping Centres;
- St Clair Youth Centre and Public Library;
- Mamre Homestead;
- St Clair Leisure Centre and Mark Leece Sport Complex;
- Dorothy Radford, Peter Kearns, Peppertree, Champel, Cook and Banks Reserves, and
- Erskine Park Landfill & Recycling Centre

Age:

St Clair and Erskine Park have a large number of persons aged 25-49, with comparatively fewer children than Penrith City.

Income:

There was a considerably larger percentage of households with high income levels in St Clair & Erskine Park than Penrith City in 2001 and a smaller share of low income households. The higher income levels in St Clair/Erskine Park may be indicative of the gaining exclusivity of the area and its attractiveness to affluent households due to the larger lot sizes, larger houses, and less medium density than elsewhere. It may also be due to the higher age group.

Car Ownership:

St Clair and Erskine Park had a substantially higher share of households owning motor vehicles compared to Penrith City in 2001. This is indicative of a preference (or need) to use private mobility options over public transport options.

Households:

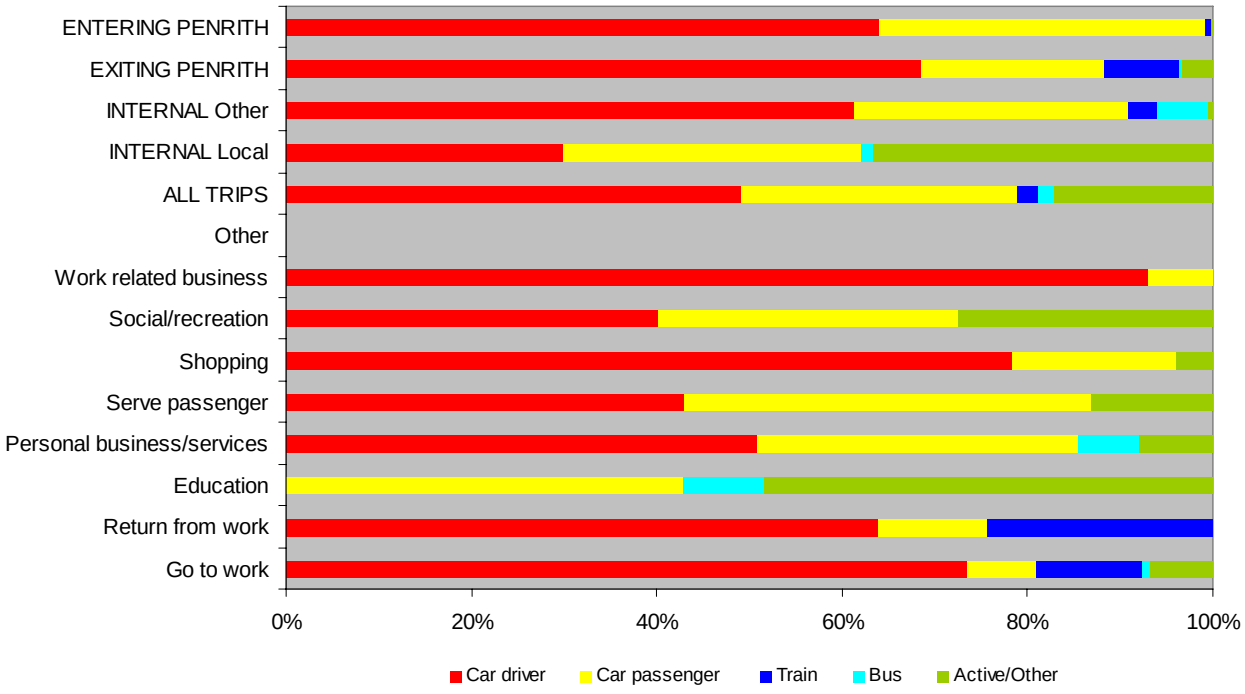
The household structure of St Clair in 2001 was overwhelmingly concentrated in traditional household types (couple and one parent families with children) with 72.5% and 75.3% of all households including a parent (or parents) and either dependent or non-dependent children.

Dwellings:

There is a significant concentration of detached dwellings in St Clair and Erskine Park, which is consistent with a greater degree of similarity in residential land uses. St Clair and Erskine Park had a significantly greater share of detached dwellings (98.5% / 99.5%) compared to Penrith City (85.3%) in 2001. The share of semi-detached dwellings was smaller in the area.

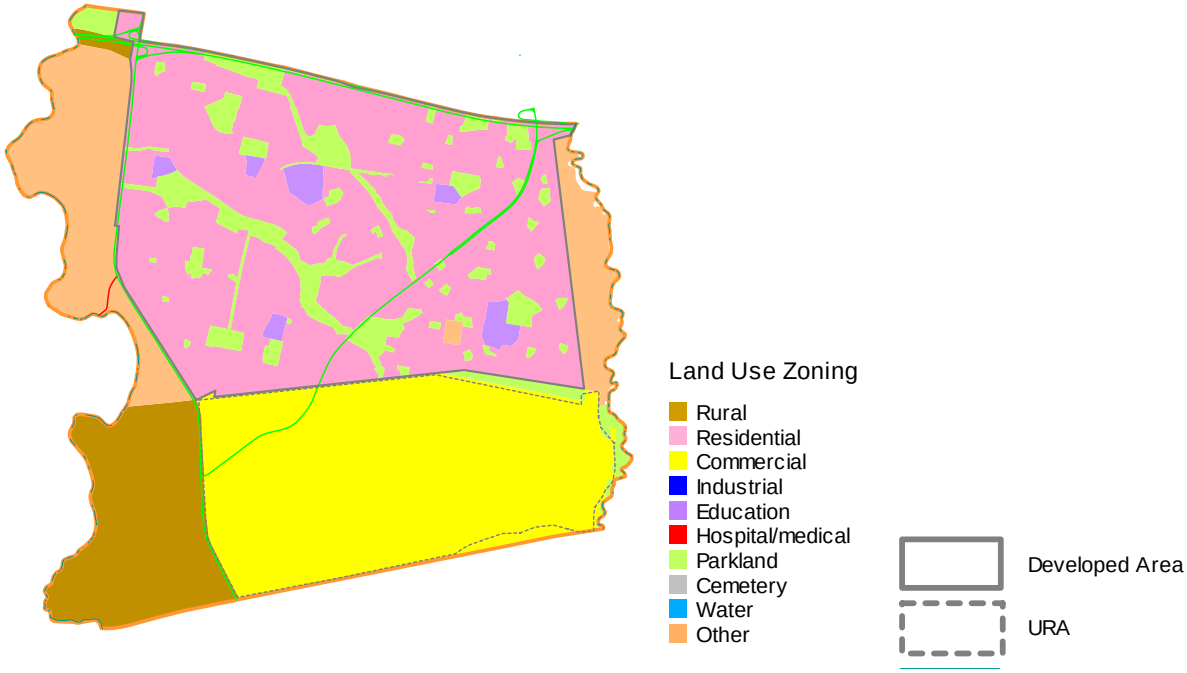
Mode of Travel:

The mode of travel for St Clair is reflective of the need for change in this area, with over 97% of shopping trips undertaken by car.



Land Use:

The figure below shows the different land use zones in the St Clair SLA. We can see the predominance of residential lands (40%) in the north east, this is on par with the Urban SLA average of 43%. There is a major commercially zoned area to the south, accounting for over one quarter of the SLA area. This commercial area is targeted as the Erskine Park Employment area, which is part of the Western Sydney Employment Hub (WSEH). A small portion of land is zoned rural (11%) in the south west corner.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	19.7	-
Residential	7.8	40%
Employment	5.5	28%
Developed Area	9.6	49%
URA	5.0	26%
Future Developed Area	14.6	74%

Less than half (49%) of the SLA is currently developed.

Urban Release Areas:

The Erskine Park Employment Area is located in the southern part of the SLA, and will provide employment for up to 6000 people. This area adjoins the land south of the pipeline also being considered as key land in the WSEH.

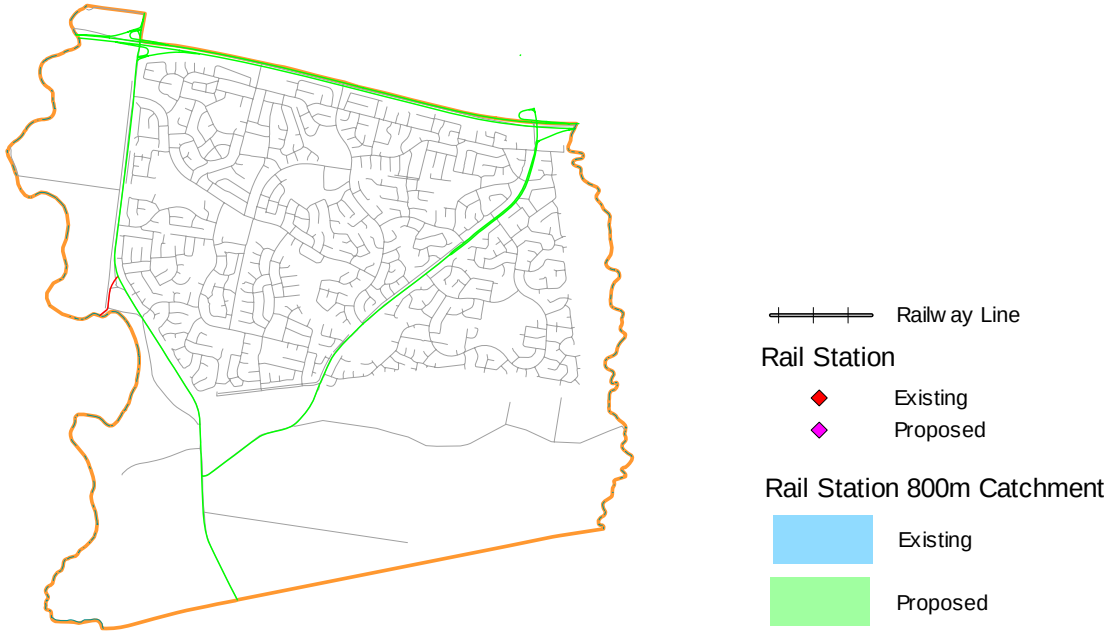
Population, Employment & Workforce:

The population is expected to remain fairly static, with a significant increase in employment in the area the employment: workforce ratio changes from 0.2 to 0.7.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	28,551	1,451	29,957	1,523
Resident Workforce	13,910	707	14,547	740
Employment	2,270	115	10,026	510
Workforce Ratio	0.2		0.7	

Rail Catchment Areas:

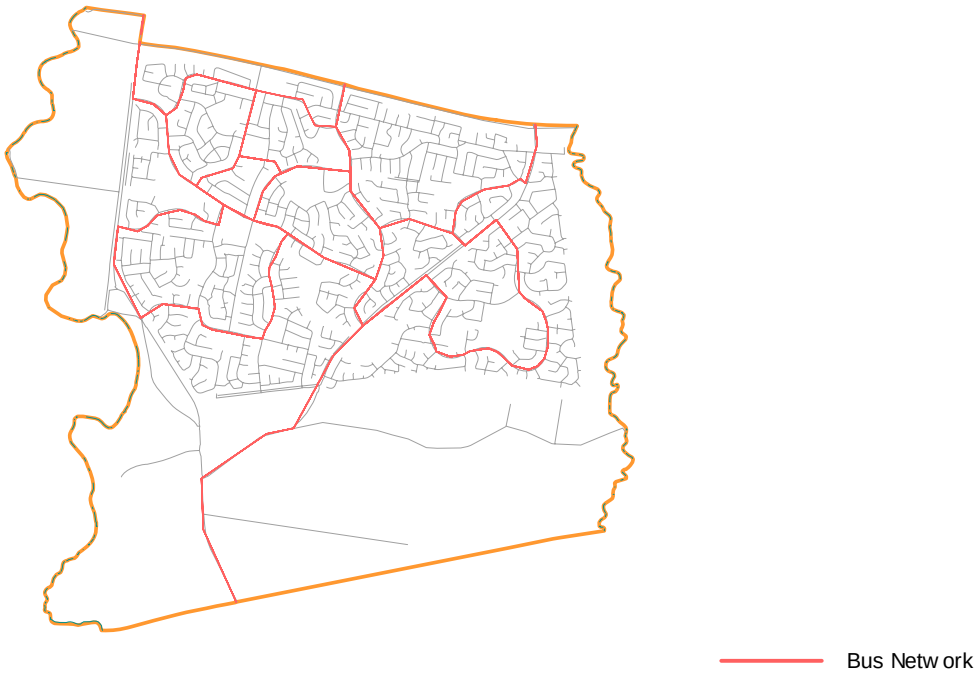
Due to the distance of St Clair SLA from the Main Western Railway Line, no part of the SLA is located within the pedestrian catchment of a railway station. St Clair residents must rely on buses for public transport needs.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	0.0	0%
Developed Areas	0.0	0%

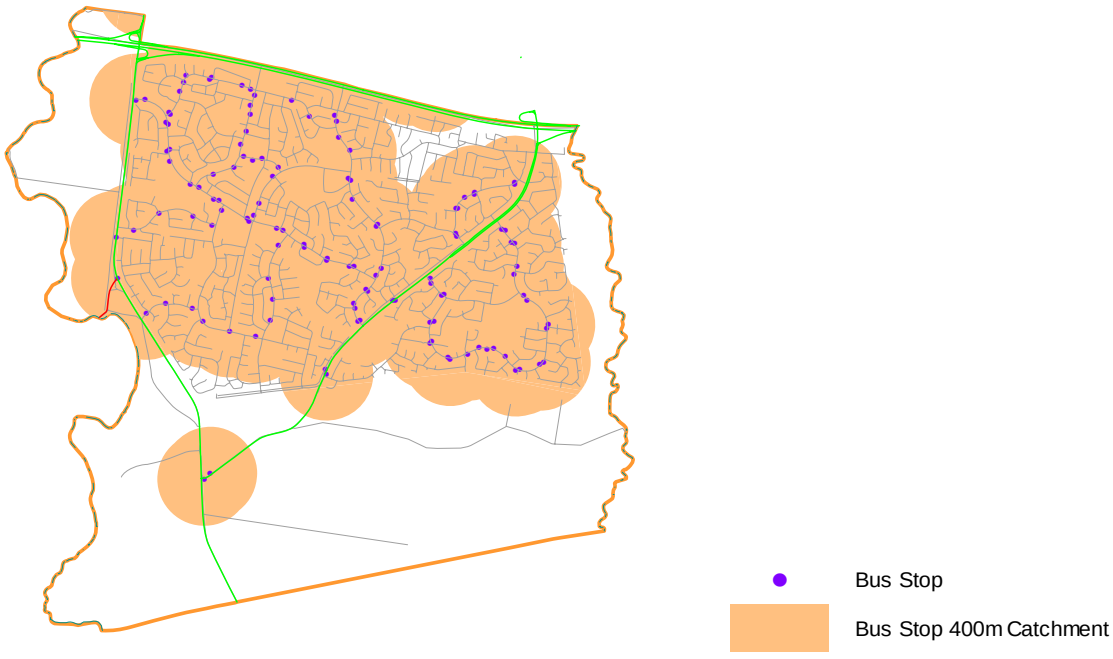
Bus Network:

The figure below shows the layout of bus services within St Clair SLA.



Bus Catchment Areas:

The figure below shows the areas of St Clair SLA which are within the 400m catchment of a bus stop. The developed area has excellent coverage (94%), however there is a portion of developed area in the north which lacks access to bus services. With the expansion of employment in the area, bus services must be enhanced.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	10.8	55%
Developed Areas	9.0	94%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for St Clair SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

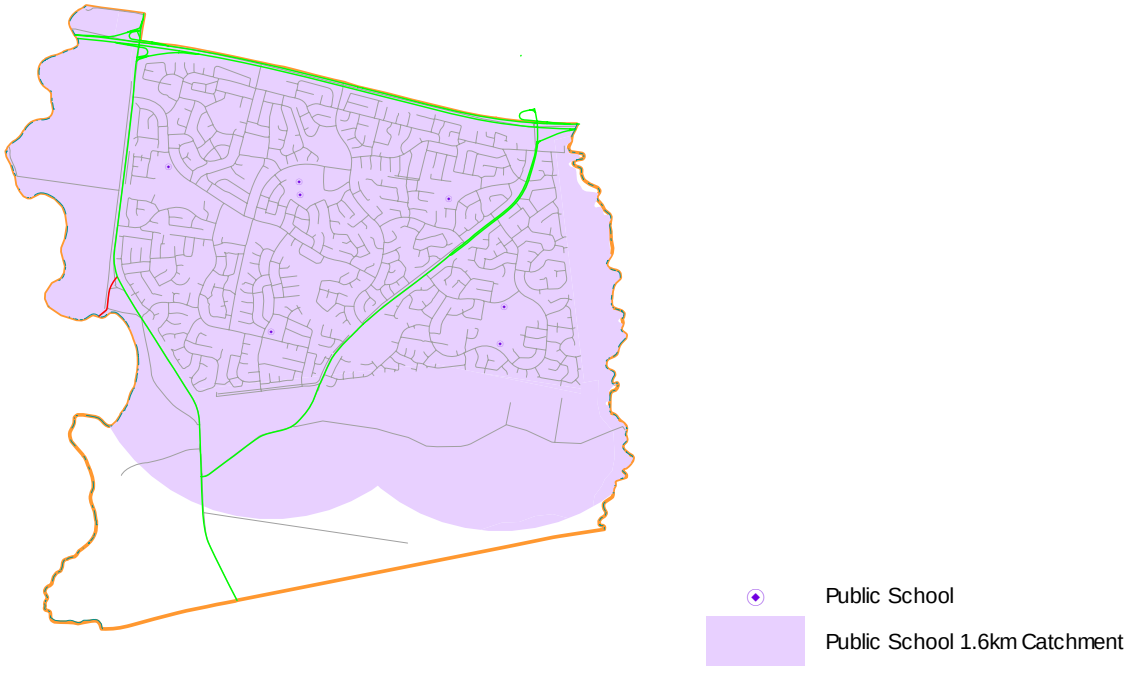
Buses and/or trains serve 65.5% of the St Clair SLA while the remaining 34.5% of the area does not have services. The majority of the area (47.5%) is served by buses with 30-60 minutes frequencies. Buses are running at a frequency of > 60 minutes for 11.3% of the SLA while buses with 15-30 minutes frequencies serve 6.7% of St Clair SLA. The study also indicated no bus services are available for 34.5% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. St Clair has 3 different bus routes serving the SLA:

- 2 of the bus routes serve the SLA during pre peak, peak, daytime and night time periods and on weekends;
- 1 bus route meets the standard for route directness by having a factor of 1.00;
- the remainder of the bus routes had factors of 1.03 and 1.53.

Public School Catchment Area:

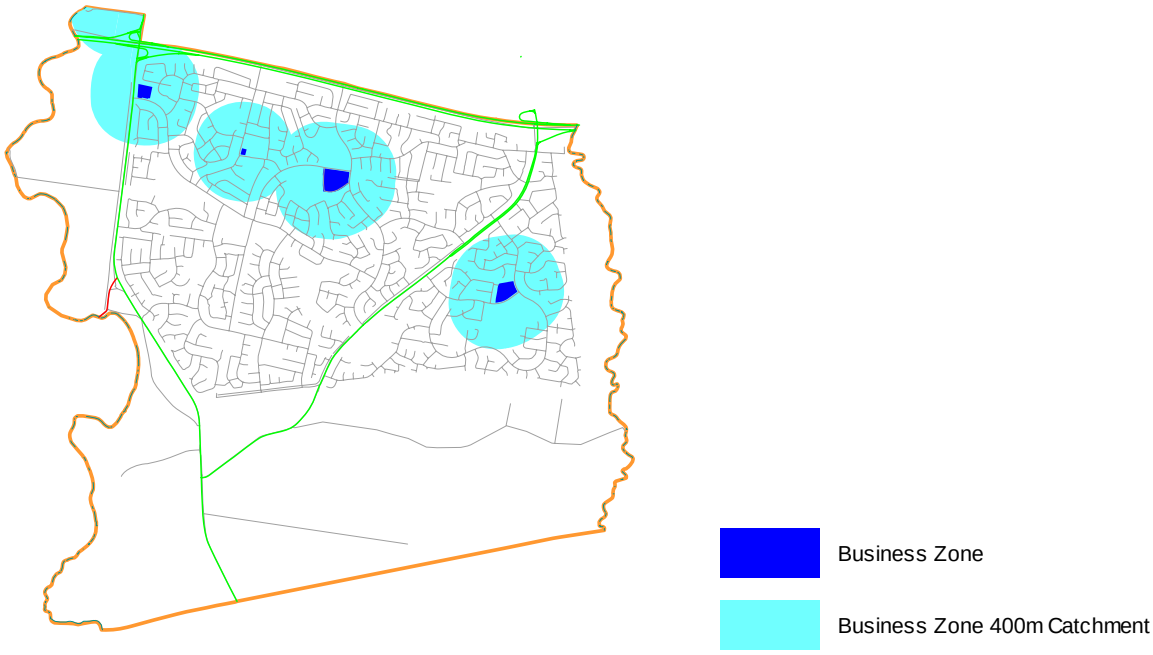
The figure below shows the areas of St Clair SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools, however, if all school children were to attend their local school most would therefore be ineligible for a state issued bus pass. Requiring them to walk or be driven to school. Many parents opt for the latter.



Catchment within 1.6km of Public School in:	Area in km²	Coverage (%)
SLA	16.6	84%
Developed Areas	9.4	98%

Local Shopping Centre Catchment Area:

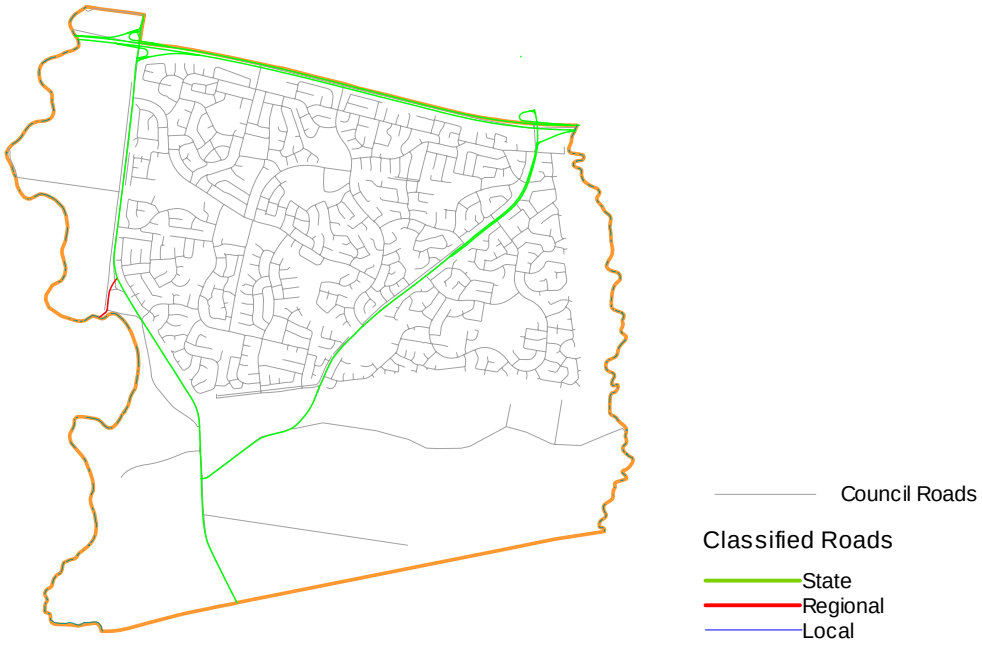
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within St Clair SLA. Less than 30% of the developed areas are within these catchment areas. This means that over 70% of the area is more likely to choose to drive rather than walk to the shops due to the distances. Cycle networks must be enhanced as an alternative to driving these longer distances.



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	3.0	15%
Developed Areas	2.6	28%

Road Infrastructure:

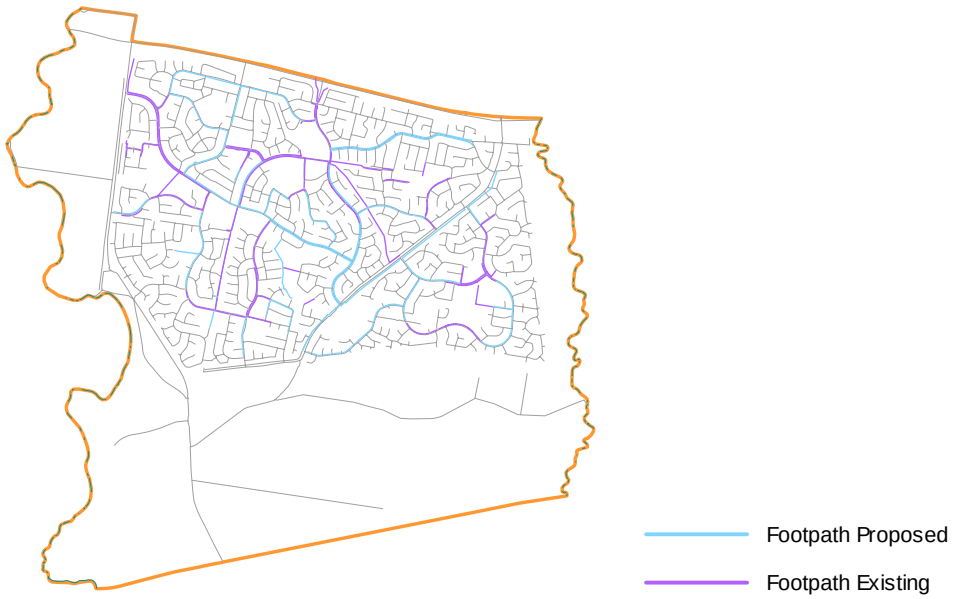
The figure below shows the location of State, Regional and Local roads within the St Clair SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	14.5	0.7
Local Roads	125.0	6.4
All Roads	139.4	7.1

Footpath Networks

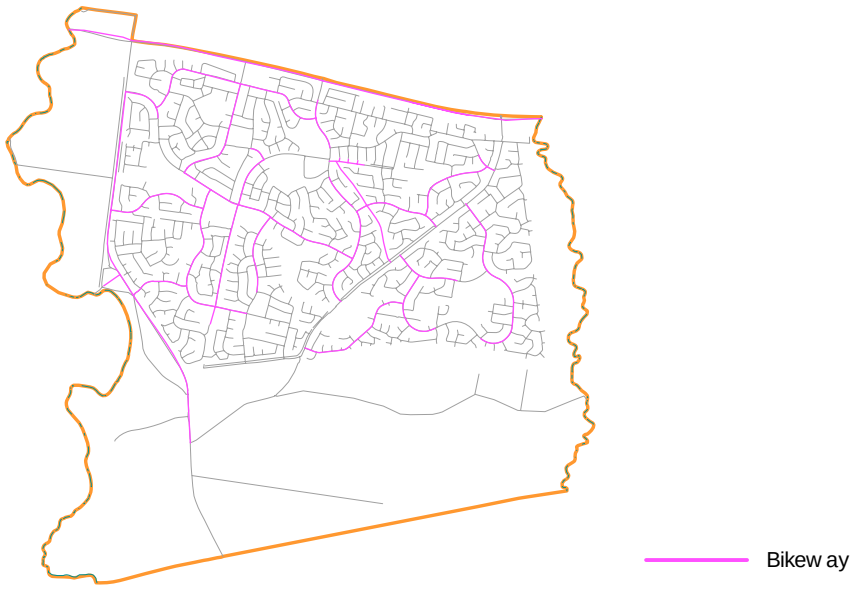
The figure below shows the extent that footpaths are provided within St Clair SLA. Only 6% of all roads within the SLA have footpaths.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	0.4	1%	0.0	2.8	10%	0.1
Local Roads	17.3	7%	0.9	35.3	14%	1.8
All Roads	17.8	6%	0.9	38.1	14%	1.9

Bikeways

The figure below shows the bikeways that are provided within St Clair SLA, there is a lack of continuity leading to shopping centres and other key locations.



Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	8.4	58%	0.4
Local Roads	20.2	16%	1.0
All Roads	28.6	21%	1.5

Key Suburban SLA Issues:

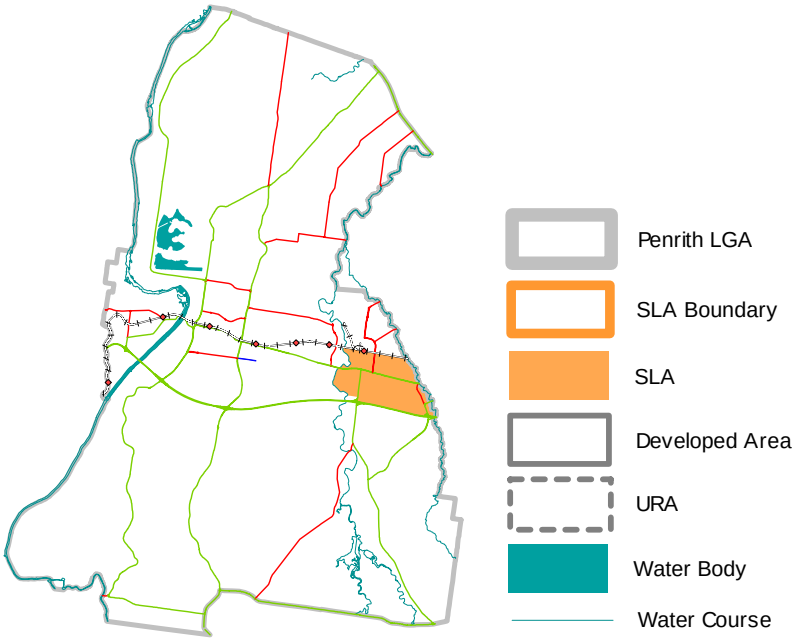
S1) Access to services, shopping and employment centres by public and active transport is limited
S2) Improved housing choice is required
S3) Only 6% of all roads have footpaths
S4) There are a high number of car journeys to schools/education
S5) Safer Routes to Schools program requires to be implemented
S6) Missing bikeways links throughout the SLA, for example at Erskine Road
S7) New residential and employment areas require to be linked by good cycle and walkways to ensure integration
S8) Lack of public transport on Mamre Rd from the proposed Erskine Park employment area to St Marys Station

6.1.2 ST MARYS

The St Marys SLA incorporates the suburbs of St Marys, Oxley Park and Colyton. The area is bounded by the Western Railway line in the north, Ropes Creek in the east, the M4 Motorway in the south and South Creek in the west. The area is bi-sected into north & south areas by the Great Western Highway.

The suburb of St Marys is a mixed use area with industrial areas to the north of the railway line (outside the SLA), residential areas to the south of the railway line and a commercial area surrounding Queen Street. St Marys is the major industrial, commercial and residential centre for the east of the Penrith LGA. Oxley Park and Colyton are established residential areas. There is a small industrial area along Roper Road in Colyton.

St Marys and Colyton have experienced a relatively stable population between 1996 and 2001, the result of little change in dwelling stock and a decline in the average number of persons living in each dwelling. Oxley Park has experienced a small increase in population between 1996 and 2001.



Features:

Major features of the area include:

- Five primary schools, St Marys Senior High School and Colyton High School,
- St Marys Railway Station;
- St Marys General Cemetery;
- Station Plaza, The Village Shopping Centre, the St Marys Central Business District and Colyton Shopping Centre;
- Ripples Leisure Centre, Life Education Centre and Public Library; and
- Blair Athletic Field, Bennett Park, Cook Park, Monfarville Reserve, Ridge Park and Cec Blinkhorn Oval, Potter Field, Roper Road Soccer Fields, Shepherd Street Park, Lang Park, Victoria Park and South Creek Park.

Age:

St Marys and Oxley Park had a notable share of its population in the 'empty-nester' and retiree age (50-69), whose children would have already left the family home. There was a large share of persons in the young family age groups in Oxley Park in 2001. The most significant age groups included persons in their late twenties and thirties, as well as their preteen children. This age structure is indicative of large amounts of recent housing development.

The age structure of Colyton in 2001 was represented by large numbers of persons in both young and more mature family age groups, with 76.8% of the population aged 0-49, which is indicative of new residential development in the area over a number of decades.

Income:

There was a notably greater proportion of households with low income levels in St Marys, Oxley Park & Colyton than Penrith City in 2001 and, as a result, a smaller share of households with high income. The lower income levels may relate to higher unemployment rates and the greater share of the population aged 60 and over, many of whom would rely on old-aged pensions for income.

Car Ownership:

Compared with Penrith City, St Marys and Oxley Park had a significantly lower share of motor vehicle ownership compared to Penrith City in 2001. This may be related to the relatively greater proportion of low income and the proportion of elderly in households in the area and the lesser ability for some households to afford to own and run a motor vehicle or it may be indicative of a greater share of small households (one and two persons), with a consequently lower need for a large number of motor vehicles per household. In Colyton the share of motor vehicle ownership was similar to Penrith City. The most prominent categories in this area were households with 1 vehicle (St Marys 41.6, Oxley Park 41.4% and Colyton 37.9%).

Households:

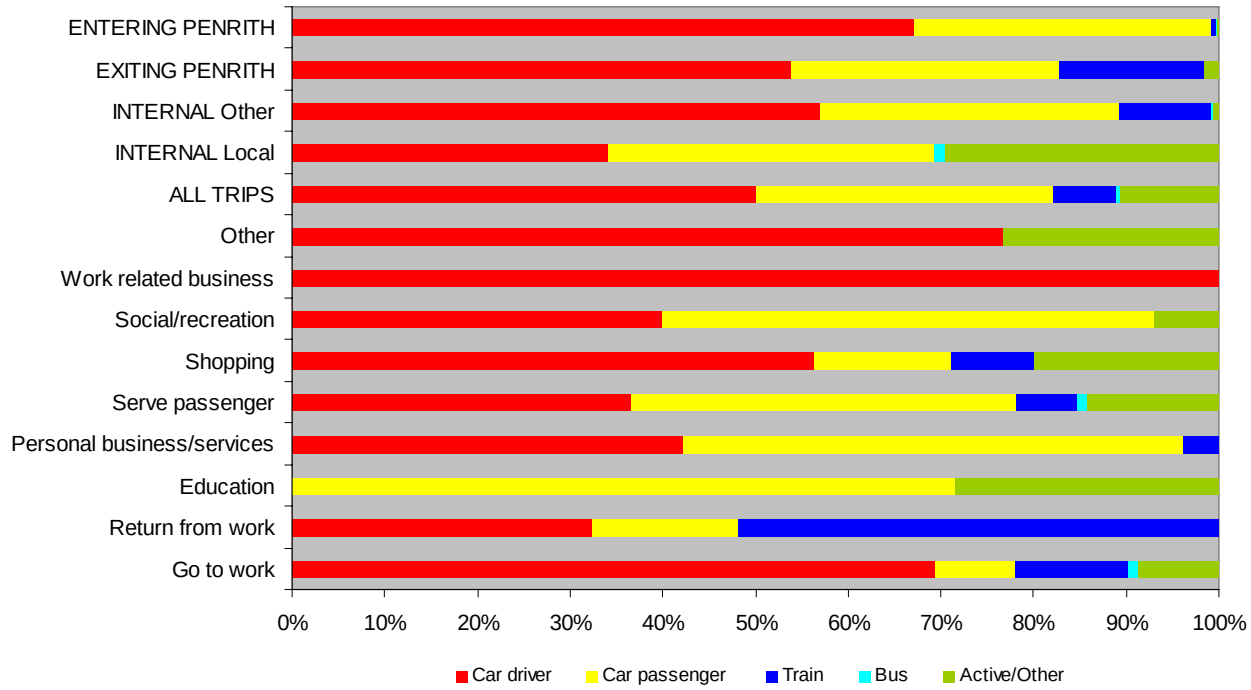
The combination of traditional and non-traditional (couples without children, lone person, group, and other families and households) household types in St Marys and Oxley Park is indicative of the diverse household structure of the area in 2001. The basis for the mix of household types relates to the broad spread of the population in a number of age groups. There was a significant share of family households in Colyton, which is illustrative of the role that the area plays in the regional housing market.

Dwellings:

There is a significant concentration of detached dwellings in St Marys, Oxley Park and Colyton, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families. The proportion of detached dwellings in St Marys and Oxley Park was significantly smaller (71.6% and 80.9%) than Penrith City (85.3%) in 2001. Colyton had a significantly greater share of detached dwellings (95.8%). The share of flats and apartments was notably larger in St Marys, the percentage of semi-detached etc. dwellings was notably larger in Oxley Park yet smaller in Colyton.

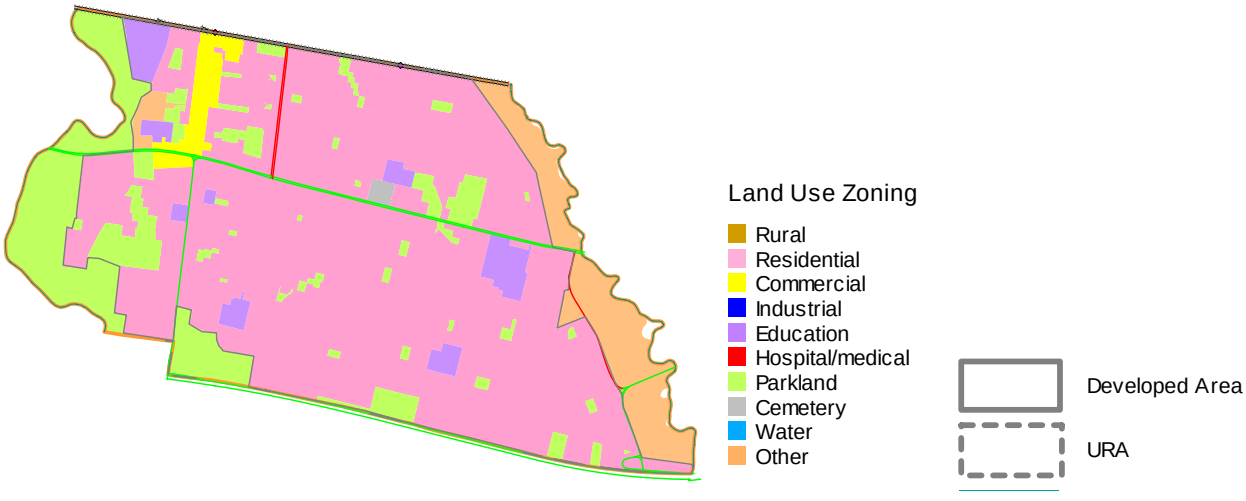
Mode of Travel:

The mode of travel for the St Marys SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the St Marys SLA. We can see the predominance of residential lands (68%) throughout, this is on above the Urban SLA average of 43%. There is a major commercially zoned area to the south, accounting for over one quarter of the SLA area. This key commercial area in the north of the SLA, the St Marys Town Centre, represents 2% of the SLA.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	9.9	-
Residential	6.7	68%
Employment	0.6	6%
Developed Area	8.0	82%
URA	0.0	0%
Future Developed Area	8.0	82%

Over 80% of the SLA is currently developed.

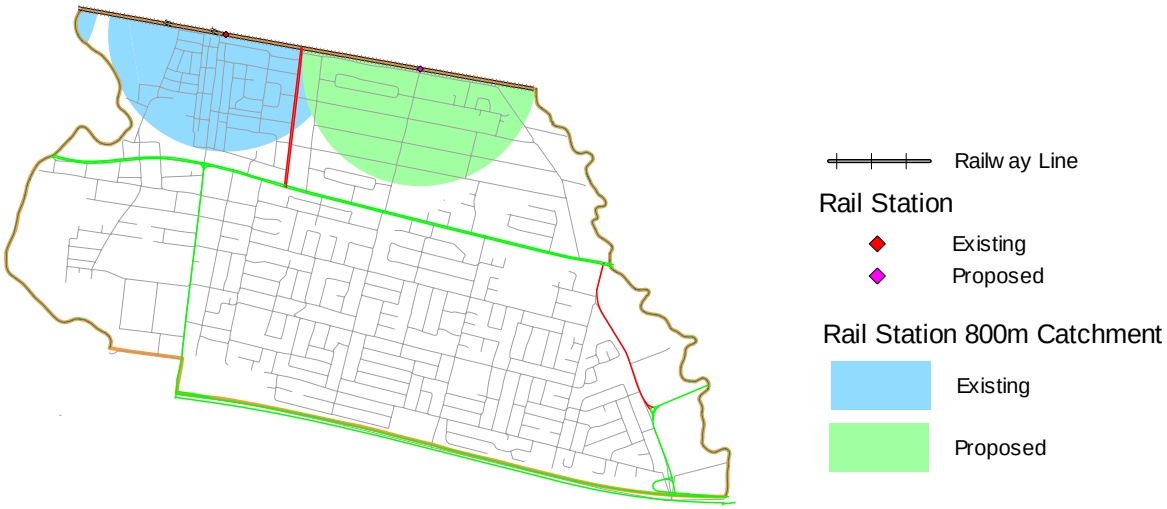
Population, Employment & Workforce:

The population is expected to increase slightly with no increase in employment in the area the employment: workforce ratio will remain fairly similar at 0.5.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	19,598	1,988	21,704	2,201
Resident Workforce	8,034	815	8,988	912
Employment	4,073	413	4,073	413
Workforce Ratio	0.5		0.5	

Rail Catchment Areas:

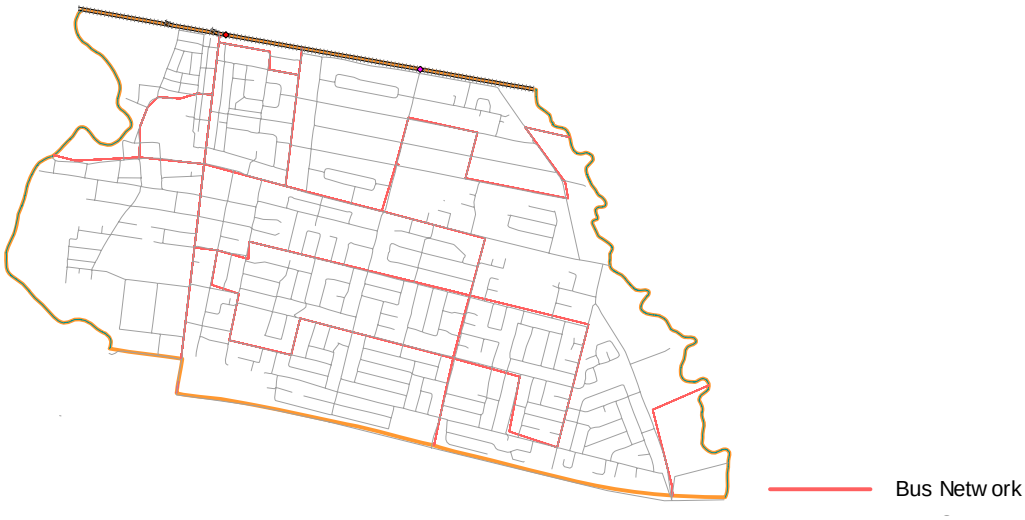
The figure below shows the location of pedestrian catchments for railway stations within the St Marys SLA. We can see that only 11% of the developed area of St Marys is within the walking catchment of the existing rail station.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	1.0	10%
Developed Areas	0.9	11%

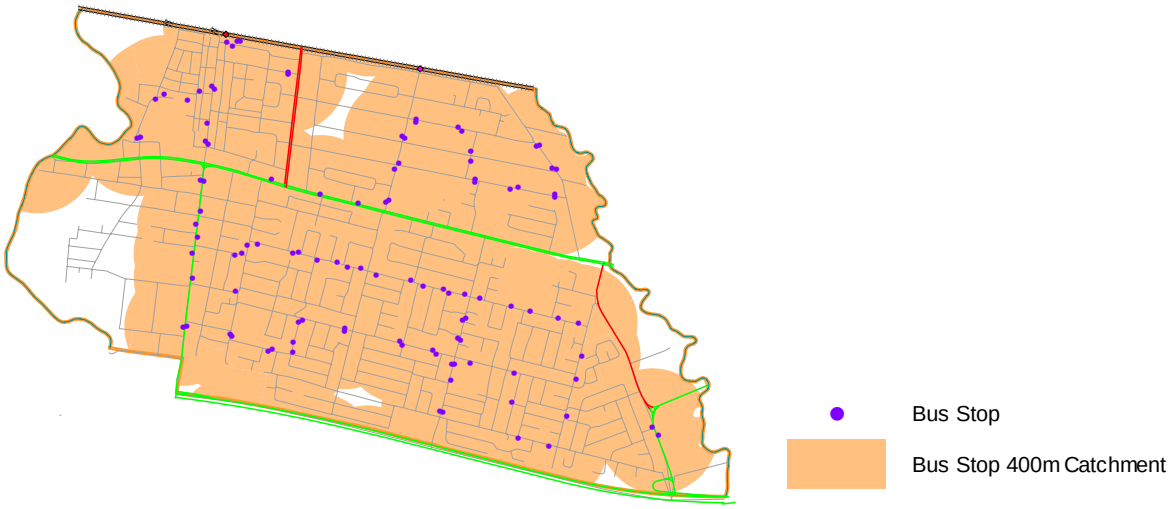
Bus Network:

The figure below shows the layout of bus services within St Marys SLA.



Bus Catchment Areas:

The figure below shows the areas of St Marys SLA which are within the 400m walking catchment of a bus stop. It shows that the developed areas largely (95%) have good access to bus stops. A small portion of land to the south west lacks coverage.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	8.7	88%
Developed Areas	7.6	95%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for St Marys SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

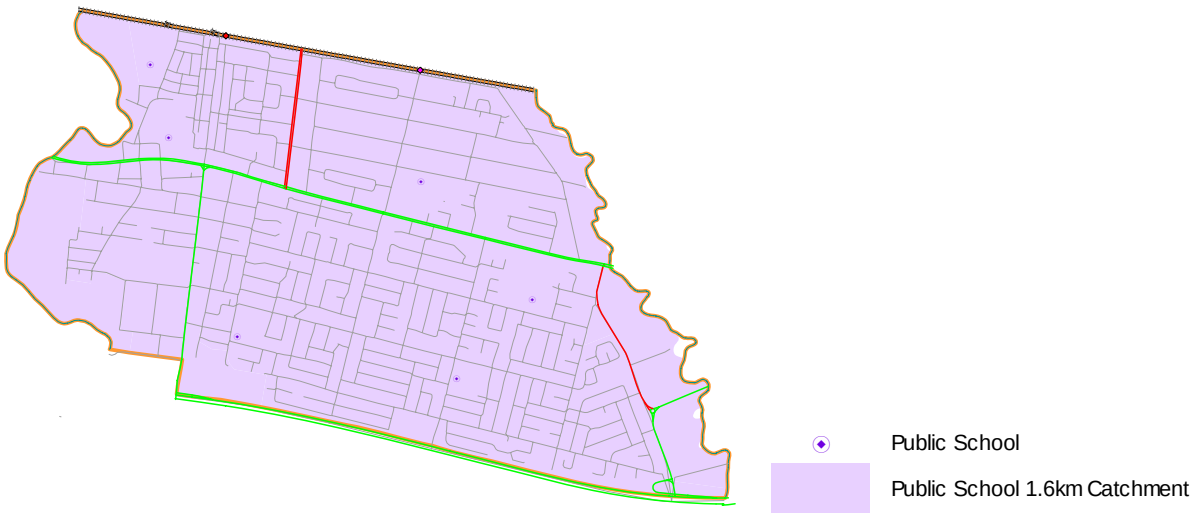
Buses and/or trains serve 94.0% of the St Marys SLA while the remaining 6.0% of the area does not have services. The majority of the area (54.1%) is served by buses with <15 minutes frequencies. Buses are running at a frequency 30-60 minutes for 27.9% of the SLA while buses with 15-30 minutes frequencies serve 10.4% of St Marys SLA. The study also indicated no bus services are available for 7.5% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. St Marys has 8 different bus routes serving the SLA:

- 4 bus routes serve the SLA during pre peak periods;
- 7 routes are in services on weekends;
- 5 routes serve the study area during night time periods;
- 2 bus routes meet the standard for route directness by having a factor of 1.00;
- the remainder of the bus routes recorded factors ranging from 1.08 – 1.51.

Public School Catchment Area:

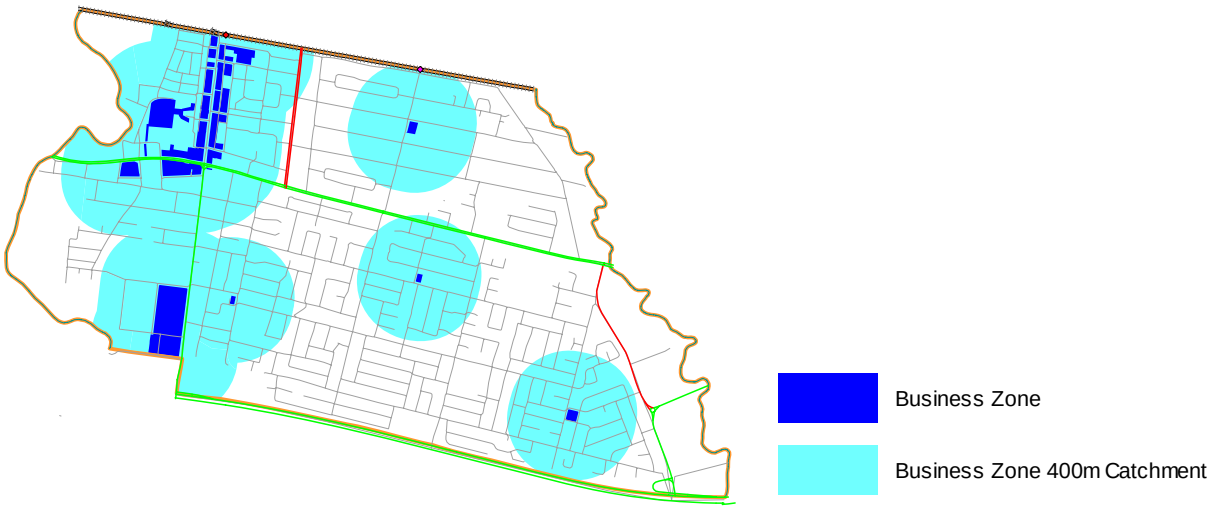
The figure below shows the areas of St Marys SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools, however, if all school children were to attend their local school most would therefore be ineligible for a state issued bus pass requiring them to walk/cycle or be driven to school.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	9.8	100%
Developed Areas	8.0	100%

Local Shopping Centre Catchment Area:

The figure below shows the 400m walking catchment areas for business zones (shopping centres) within St Marys SLA. Over 50% of the developed areas are within these catchment areas. This is better than the LGA average of 37%. Walking facilities such as footpaths should be enhanced throughout these catchment areas, with cycle networks focused on in the area less connected to shops.



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	4.6	47%
Developed Areas	4.2	52%

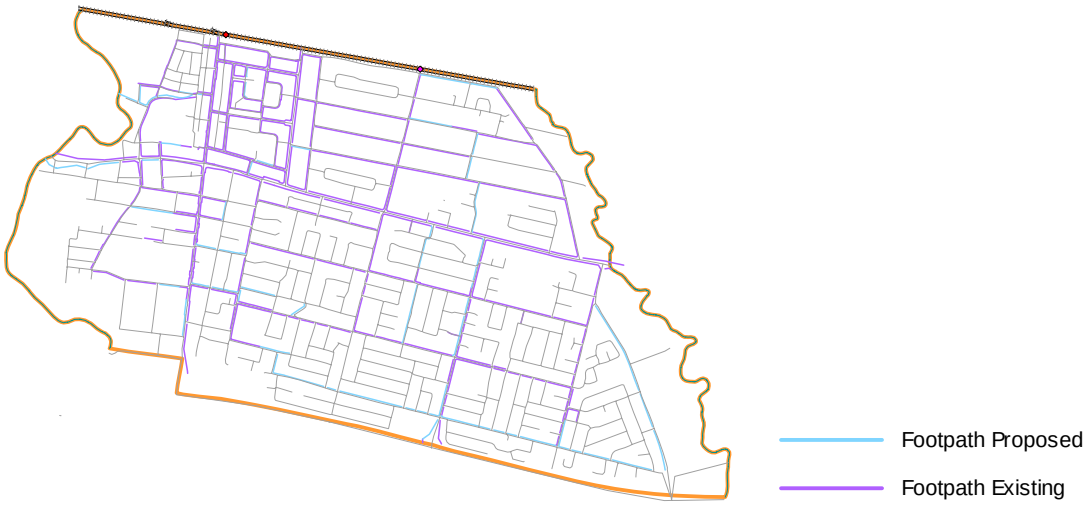
Road Infrastructure:

The figure below shows the location of State and Regional Roads within the St Marys SLA.

Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	12.0	1.2
Local Roads	91.2	9.2
All Roads	103.2	10.5

Footpath Networks

The figure below shows the extent that footpaths are provided within St Marys SLA. 20% of all roads within the SLA have footpaths, with over 50% of state and regional roads covered. Emphasis should be placed on completing footpath links to shopping facilities and schools. More detail on footpaths in the city centre is provided in Section 6.3.2.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	10.5	44%	1.1	12.5	52%	1.3
Local Roads	31.3	17%	3.2	40.3	22%	4.1
All Roads	41.8	20%	4.2	52.9	26%	5.4

Bikeways

The figure below shows the bikeways that are provided within St Marys SLA, there is a lack of continuity leading to shopping centres and other key locations.

Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	4.4	36%	0.4
Local Roads	15.1	17%	1.5
All Roads	19.5	19%	2.0

Key Suburban SLA Issues:

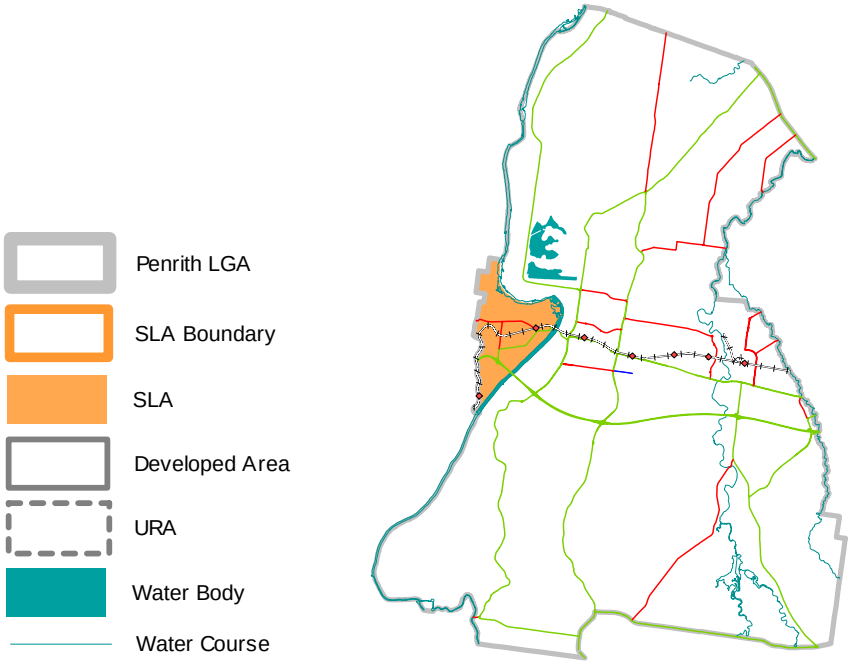
S9) Lack of active and public transport links to St Marys CBD
S10) Increase aged housing provision and medium/high residential density
S11) Need for a railway station in Oxley Park to serve the community
S12) Traffic management issues in Colyton and Oxley Park need to be addressed
S13) More footpaths required to encourage active transport use
S14) High levels of car use for school/educational journeys
S15) Lack of bike facilities in Oxley Park and missing links on cycle network to St Marys town centre

6.1.3 EMU PLAINS

The Emu Plains SLA incorporates the suburbs of Emu Heights, Emu Plains and Leonay. The area is bounded by the Nepean River in the north, east and south, the Blue Mountains City and the railway line form the western border.

Emu Plains is an established residential area with an industrial area in the north and commercial areas along the Great Western Highway. Emu Heights is a predominantly residential area with industrial land usage in the south-east corner and some rural land (Prison Farm) in the north. Leonay is an established residential area.

Emu Plains and Leonay experienced a small decrease in population between 1996 and 2001, the result of few dwellings being added and a decline in the average number of persons living in each dwelling. Emu Heights experienced a relatively stable population between 1996 and 2001.



Features:

Major features of the area include:

- Four primary schools and two high schools;
- Railway Station;
- Lennox and Emu Plains Shopping Centres;
- Emu Plains Community Centre, Blue Emu Community Centre and Library;
- Emu Plains Cemetery;
- Penrith Regional Art Gallery and Arms of Australia Inn Museum;
- Caravan Park;
- Emu Plains Correctional Centre;
- Leonay Golf Club, Emu Plains Sporting & Recreation Club, Eva Bory Swimming Centre,;
- Dukes Oval, Emu Park, Hollier Reserve, Huntington Reserve, Regatta Park, Leonay Oval, River Road Reserve, Emu Green, Clissold Reserve, Hunter Fields and Darcy Smith Oval..

Age:

The age structure of Emu Plains and Leonay in 2001 was characterised by older families with children in their late teens and twenties, many of whom would have already left home, as well as those expected to leave home in coming years, as well as their parents in their late forties and fifties. Emu Heights in 2001 was represented by large numbers of persons in both young and more mature family age groups, with 71.9% of the population aged 0-17 and 25-49, which is indicative of new residential development in the area over a number of decades.

Income:

A comparison of household income between Emu Plains and Penrith City in 2001 indicated similar income levels. In Emu Heights and Leonay there was a considerably larger percentage of households with high income levels than Penrith City in 2001 and a smaller share of low income households. This is indicative of the exclusivity of these areas and its attractiveness to affluent households.

Car Ownership:

The share of motor vehicles per household in Emu Plains was similar to the overall rate in Penrith City in 2001. There was a greater percentage of households in Emu Heights and Leonay that owned 2 or more motor vehicles compared to Penrith City in 2001.

Households:

The combination of traditional and non-traditional household types in Emu Plains is indicative of the diverse household structure of the area in 2001. The basis for the mix of household types relates to the broad spread of the population in a number of age groups.

There was a significant share of family households in Emu Heights and Leonay, which is illustrative of the role that the area plays in the regional housing market. It also indicates at the likely changes over time as children grow up and leave the family home.

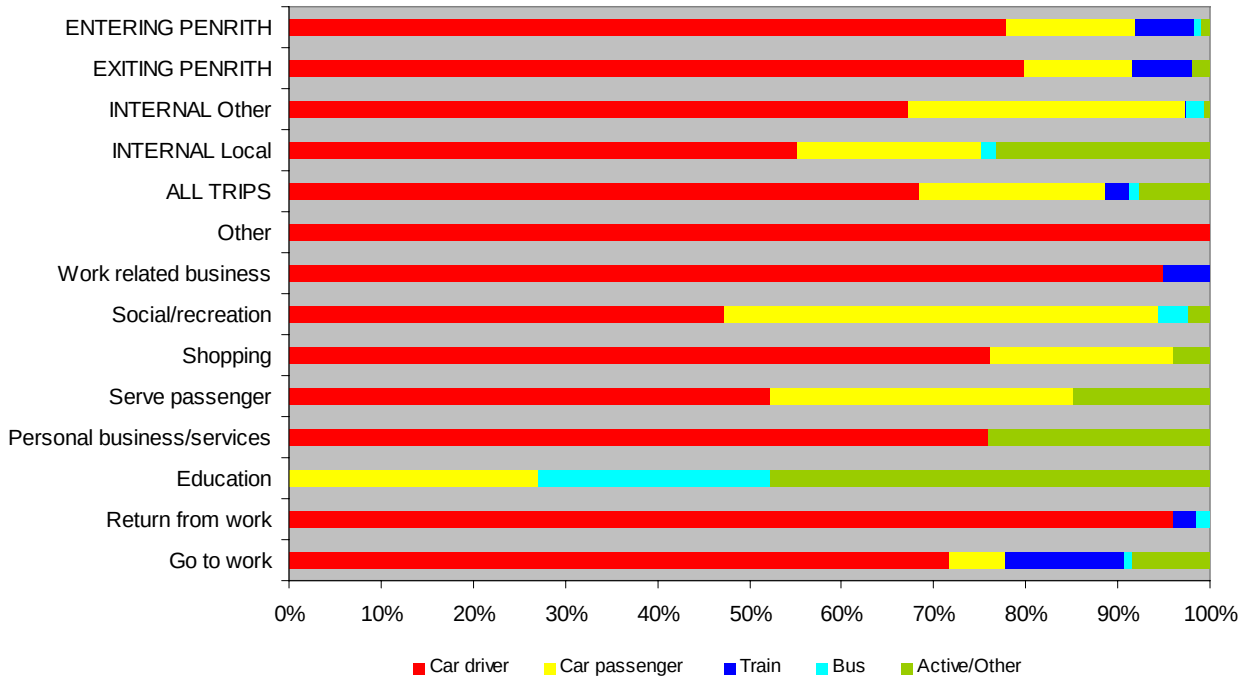
Dwellings:

There is a significant concentration of detached dwellings in Emu Plains, Emu Heights and Leonay, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families.

Emu Plains had a similar share of detached dwellings compared to Penrith City at approximately 83% of all dwellings in 2001, with a greater number of flats and apartments compared to semi-detached dwellings. In 2001, the percentage of detached dwellings in Emu Heights and Leonay was significantly higher (97.2%/97.8%) than Penrith City (85.3%), while the proportion of semi-detached dwellings was smaller.

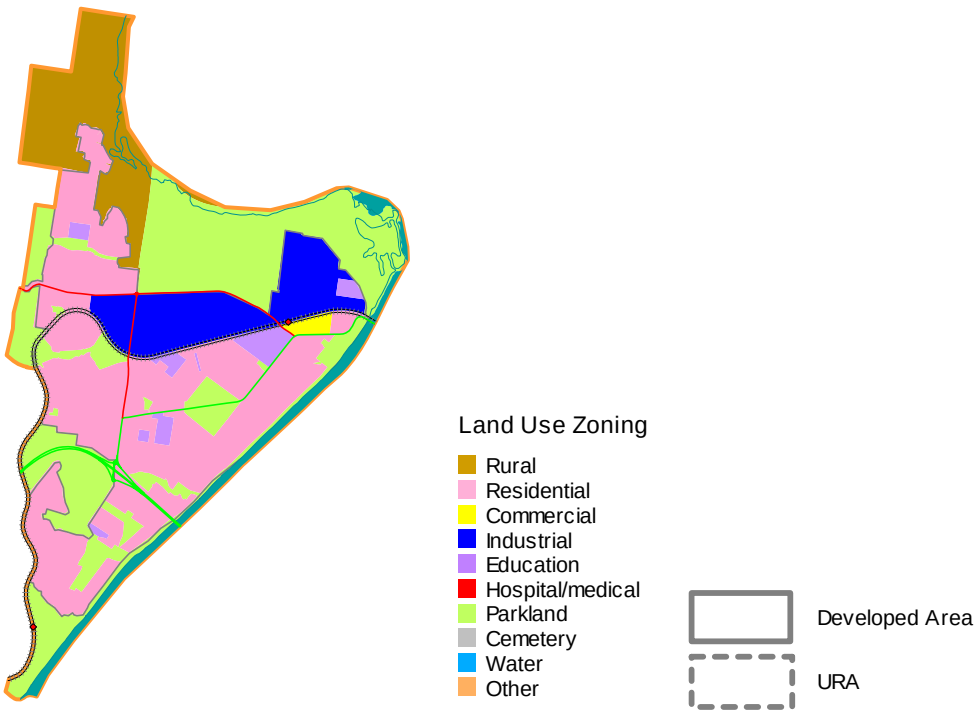
Mode of Travel:

The mode of travel for the Emu Plains SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the Emu Plains SLA. We can see that there is approximately one third of land zoned for residential lands (36%) and there is an almost equally large proportion of land zoned parkland (33%), this includes key land to the north of the railway station. There is a significant portion of land zoned for industrial (11%) use, which is greater than the LGA average of 7%.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	13.5	-
Residential	4.9	36%
Employment	1.9	14%
Developed Area	7.7	56%
URA	0.0	0%
Future Developed Area	7.7	56%

Just over half (56%) of the SLA is currently developed.

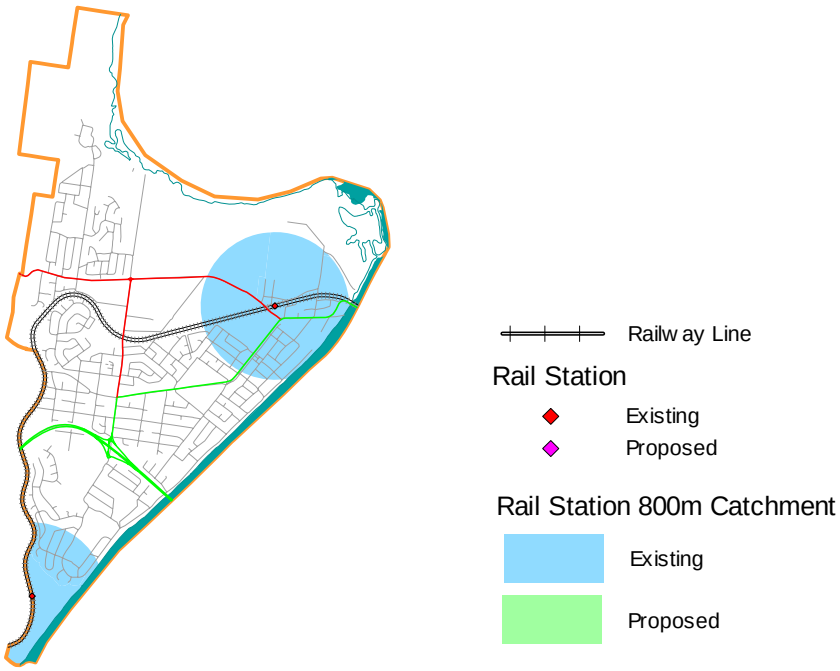
Population, Employment & Workforce:

The population is expected to increase slightly with no increase in employment in the area the employment: workforce ratio will decrease slightly to 0.4.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	13,982	1,034	15,333	1,134
Resident Workforce	7,129	527	7,741	573
Employment	3,217	238	3,217	238
Workforce Ratio	0.5		0.4	

Rail Catchment Areas:

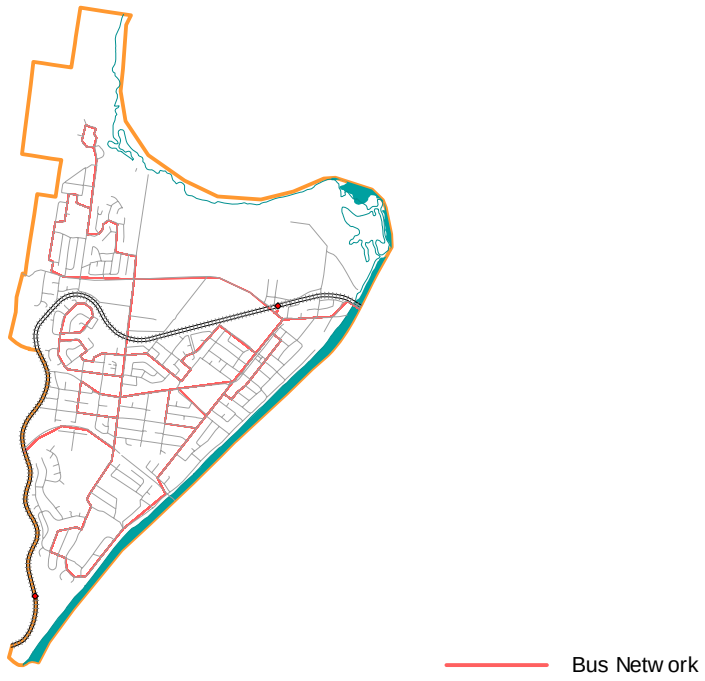
The figure below shows the location of pedestrian catchments for railway stations within the Emu Plains SLA. We can see that 25% of the developed area of Emu Plains is within the walking catchment of the existing rail stations.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	2.7	20%
Developed Areas	2.0	25%

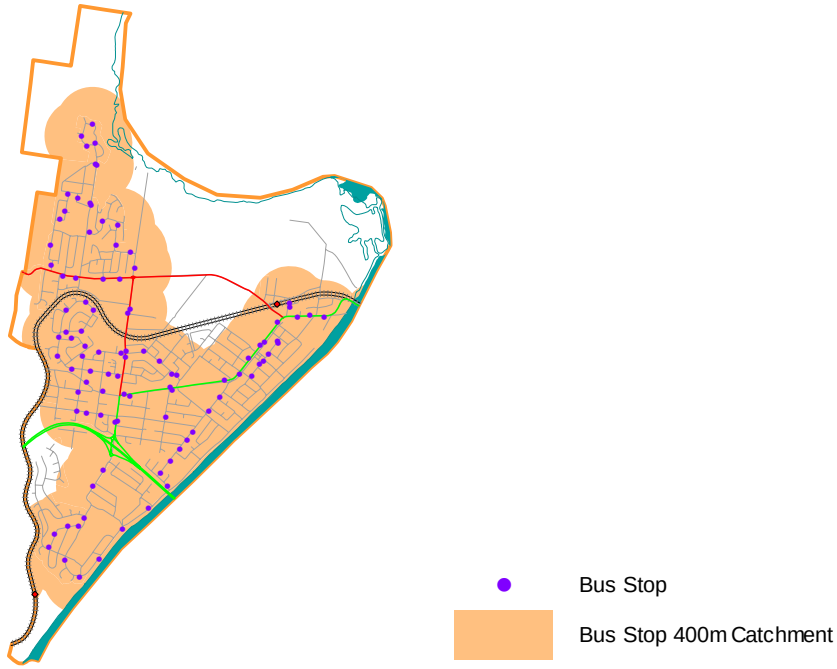
Bus Network:

The figure below shows the layout of bus services within Emu Plains SLA.



Bus Catchment Areas:

The figure below shows the areas of Emu Plains SLA which are within the 400m catchment of a bus stop. The developed areas generally have good coverage (87%).



Catchment within 400m of Bus Stop in:	Area in km²	Coverage (%)
SLA	9.0	67%
Developed Areas	6.7	87%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for Emu Plains SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

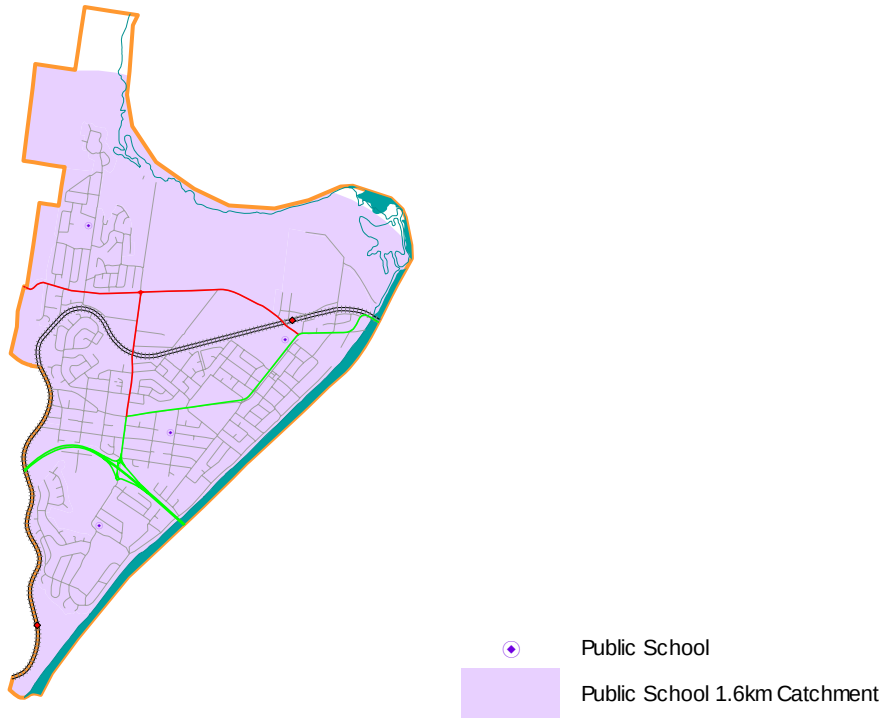
Buses and/or trains serve 73.8% of the Emu Plains SLA while the remaining 26.2% of the area does not have services. The majority of the area (45.7%) is served by buses with 15-30 minutes frequencies while buses with 30-60 minutes frequencies serve 19.6% of Emu Plains SLA. The study also indicated no bus services are available for 34.7% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. Emu Plains SLA has 2 different bus routes serving the SLA:

- both the bus routes serve the SLA on Saturdays;
- only 1 bus route serves the SLA during night time periods and Sundays;
- The bus routes recorded route directness factors of 1.06 and 1.50.

Public School Catchment Area:

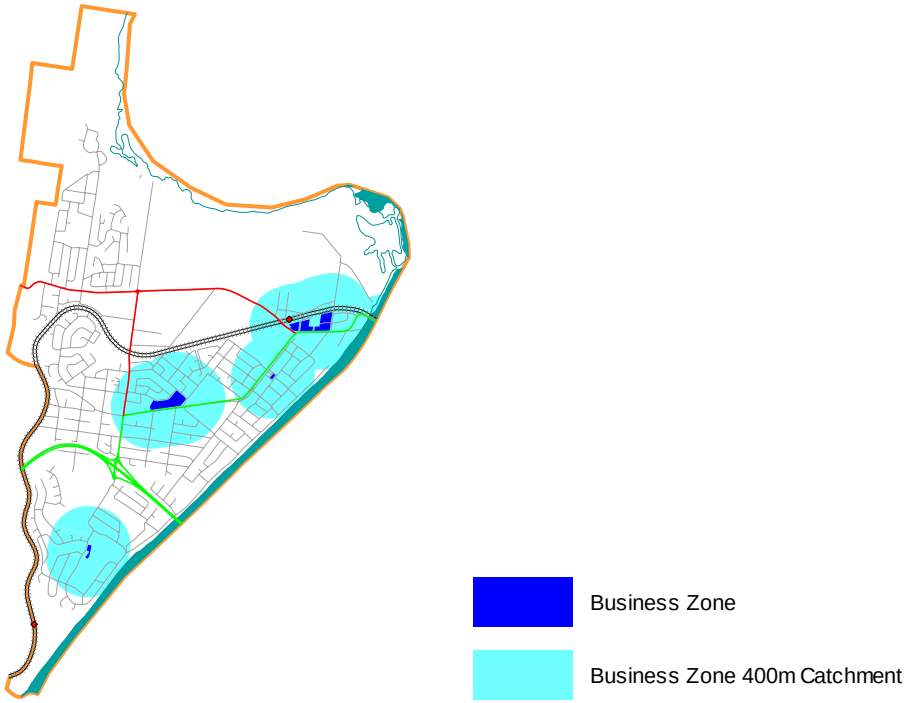
The figure below shows the areas of Emu Plains SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	13.0	96%
Developed Areas	7.7	100%

Local Shopping Centre Catchment Area:

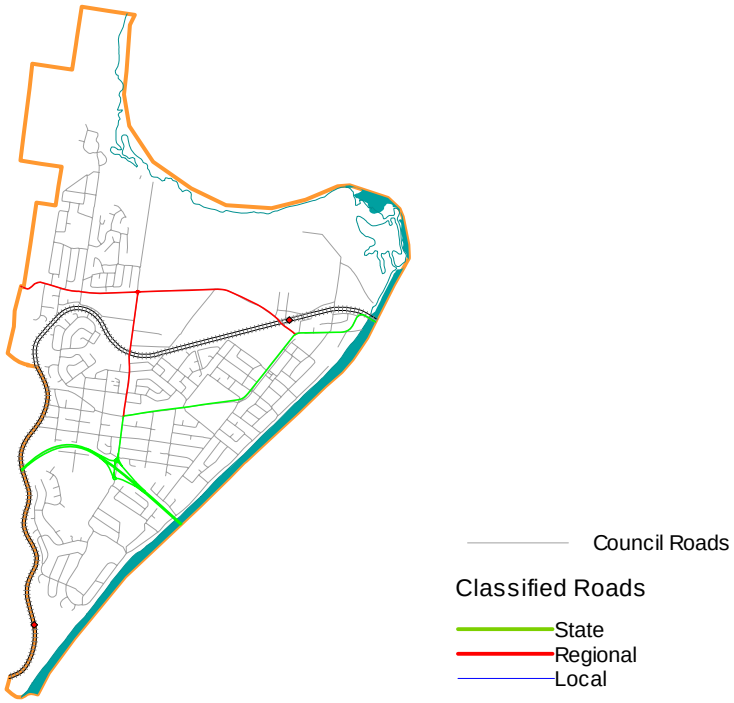
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within Emu Plains SLA. 36% of the developed areas are within these catchment areas. Cycle networks must be enhanced as an alternative to driving to these centres where the topography permits.



Catchment within 400m of shopping centre in:	Area in km²	Coverage (%)
SLA	3.0	22%
Developed Areas	2.7	36%

Road Infrastructure:

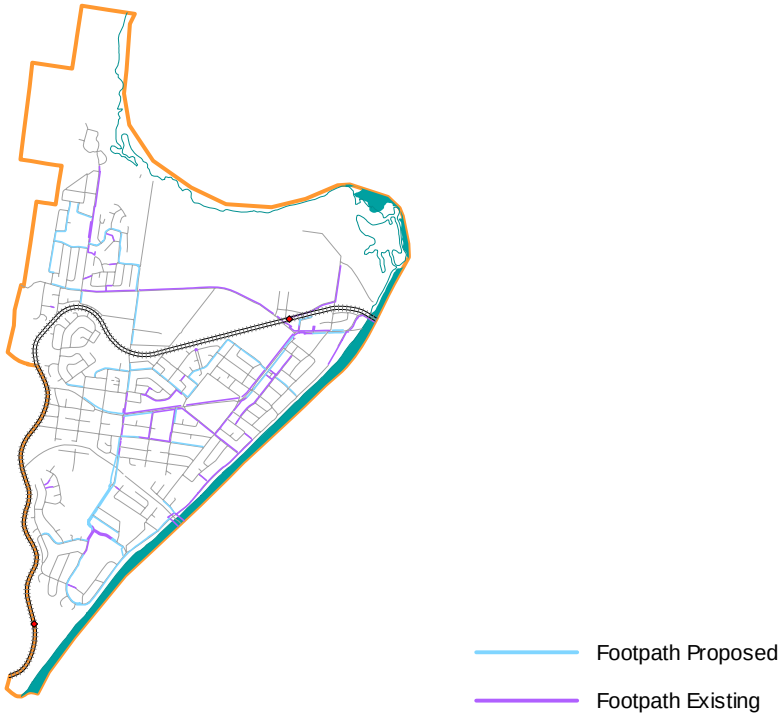
The figure below shows the location of State and Regional Roads in Emu Plains SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	9.9	0.7
Local Roads	72.8	5.4
All Roads	82.7	6.1

Footpath Networks

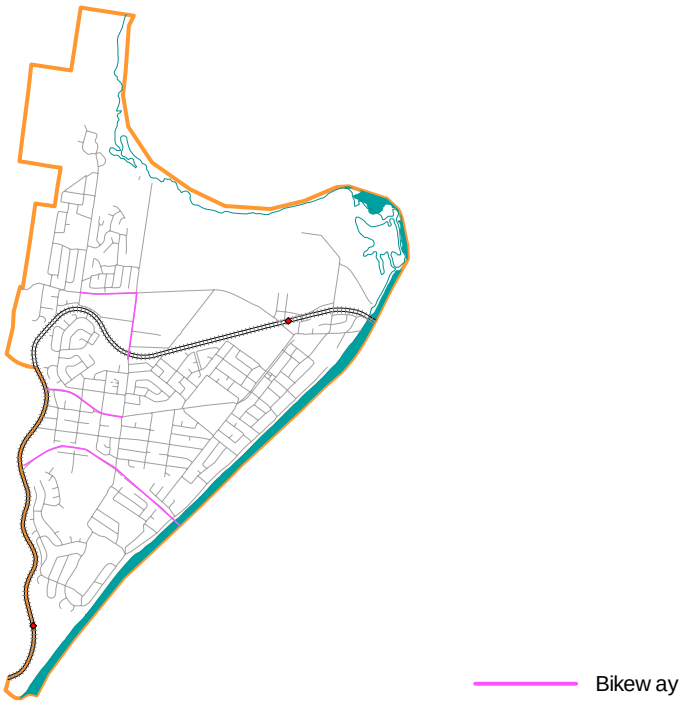
The figure below shows the extent that footpaths are provided within Emu Plains SLA. Only 9% of all roads within the SLA have footpaths, footpaths must be provided as a priority in walking catchments to shopping centres.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	6.3	32%	0.5	9.1	46%	0.7
Local Roads	9.1	6%	0.7	20.2	14%	1.5
All Roads	15.4	9%	1.1	29.3	18%	2.2

Bikeways

The figure below shows the bikeways that are provided within Emu Plains SLA, there is a distinct lack of a continuous cycle network.



Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	3.2	32%	0.2
Local Roads	0.9	1%	0.1
All Roads	4.1	5%	0.3

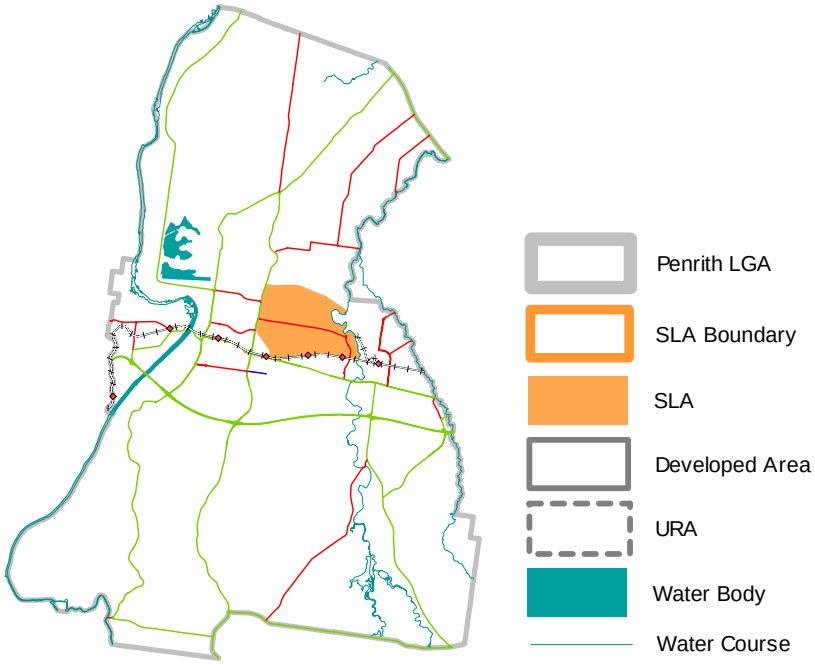
Key Suburban SLA Issues:

S16) Well positioned for increased residential densities yet need to retain character
S17) Need for aged housing provision
S18) Lack of commuter parking at Emu Plains railway station
S19) Footpath improvements identified in the PAMP require to be implemented
S20) Walking and cycling catchments to the railway station and local shops need to be improved
S21) Lack of cycle facilities in the area particularly around the railway station and shops

6.1.4 NORTH WERRINGTON

The North Werrington SLA incorporates the suburbs of Werrington Downs, Cambridge Park and North Kingswood. Werrington Downs-Werrington County-Cambridge Gardens and Cambridge Park are established residential areas. Kingswood is an established residential area with institutional/educational land use in the east, an industrial area in the north and a small commercial area along the Great Western Highway. The area is bounded by the locality of Llandilo in the north, South / Wianamatta Creek in the east, the Western Railway line in the south and The Northern Road and Richmond Road in the west.

Werrington Downs-Werrington County-Cambridge Gardens and Cambridge Park have experienced a small decrease in population between 1996 and 2001, the result of few dwellings being added and a decline in the average number of persons living in each dwelling. Kingswood has experienced a relatively stable population between 1996 and 2001.



Features:

Major features of the area include:

- 5 public schools, Cambridge Park High School and Kingswood High School;
- Werrington County Shopping Village.
- the University of Western Sydney – Penrith Campus, St Dominic's College, Western Sydney Institute of TAFE;
- Nepean Hospital;
- Western Sydney International Hockey Centre and Penrith Sports Stadium;
- Chapman Gardens, Kanangra Reserve, Kingswood Park, Peppermint Reserve Cambridge Park, Devon Park, Lincoln Park, Shaw Park, Werrington Lakes Flora & Fauna Reserve and Werrington Oval.
- Penrith General Cemetery.

Age:

There was a significant share of persons in the family age groups in Werrington-Werrington County-Cambridge Gardens in 2001, most notably children in school age groups (5-17) and their parents in their thirties and forties. The age structure of Kingswood was diverse with significant numbers of persons in most young adult and mature adult age groups (18-49). There were comparatively fewer children compared to adults, showing that the birth rates of the area are relatively low and that many of the households are non-family. The age structure of Cambridge Park in 2001 was represented by large numbers of persons in both young and more mature family age groups, with 75.1% of the population aged 0-49, which is indicative of new residential development in the area over a number of decades.

Income:

There was a considerably larger percentage of households with high income levels in Werrington-Werrington County-Cambridge Gardens than Penrith City in 2001 and a smaller share of low income households. This is indicative of the exclusivity of the area and its attractiveness to affluent households.

There was a notably greater proportion of households with low income levels in Kingswood and Cambridge Park than Penrith City in 2001 and, as a result, a smaller share of households with high income.

Car Ownership:

Werrington-Werrington County-Cambridge Gardens had a substantially higher share of households owning motor vehicles compared to Penrith City in 2001. Compared with Penrith City, Kingswood and Cambridge Park had a significantly lower share of households owning motor vehicles in 2001.

Households:

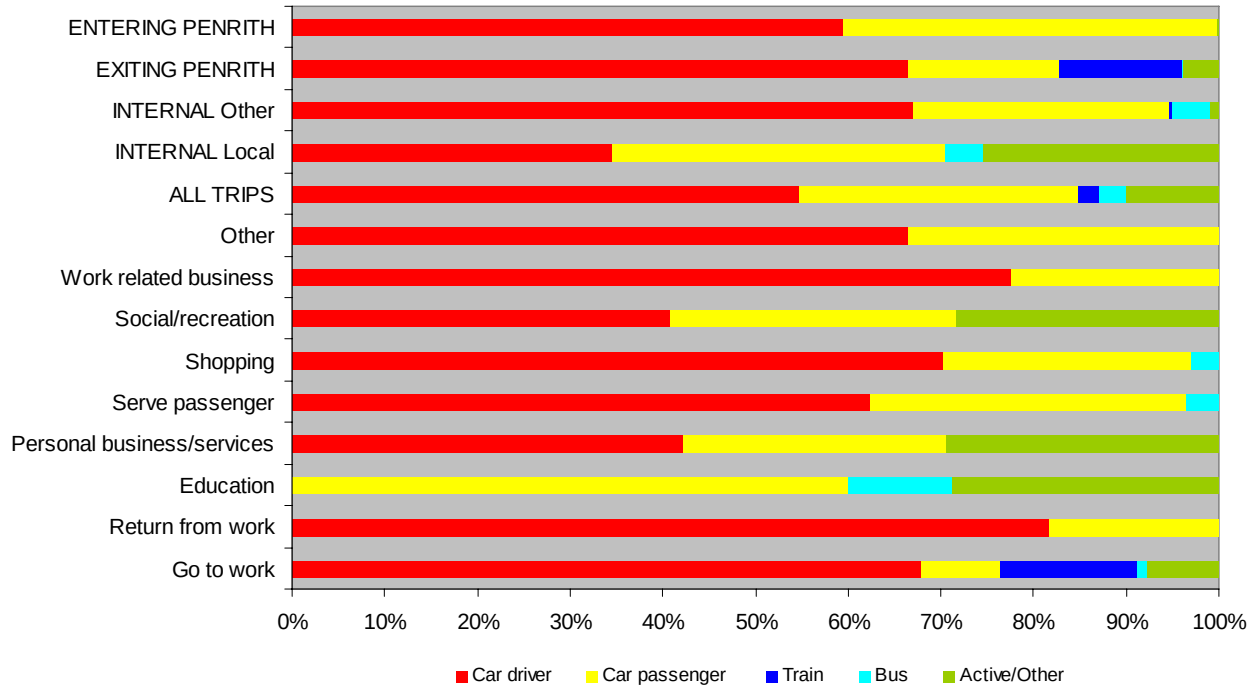
The household structure of Werrington Downs-Werrington County-Cambridge Gardens in 2001 was overwhelmingly concentrated in traditional household types with 68.6% of all households including a parent (or parents) and either dependent or non-dependent children. There was a significant share of family households in Cambridge Park, which is illustrative of the role that the area plays in the regional housing market. The combination of traditional and non-traditional household types in Kingswood is indicative of the diverse household structure of the area in 2001.

Dwellings:

There is a significant concentration of detached dwellings in Werrington-Werrington County-Cambridge Gardens and Cambridge Park, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families. There is a mix of different housing types in Kingswood, which is indicative of a variety of residential land uses. The combination of housing types lends itself to a youthful age structure, although the proportion of detached dwellings in the area means that a substantial share of families would still be expected.

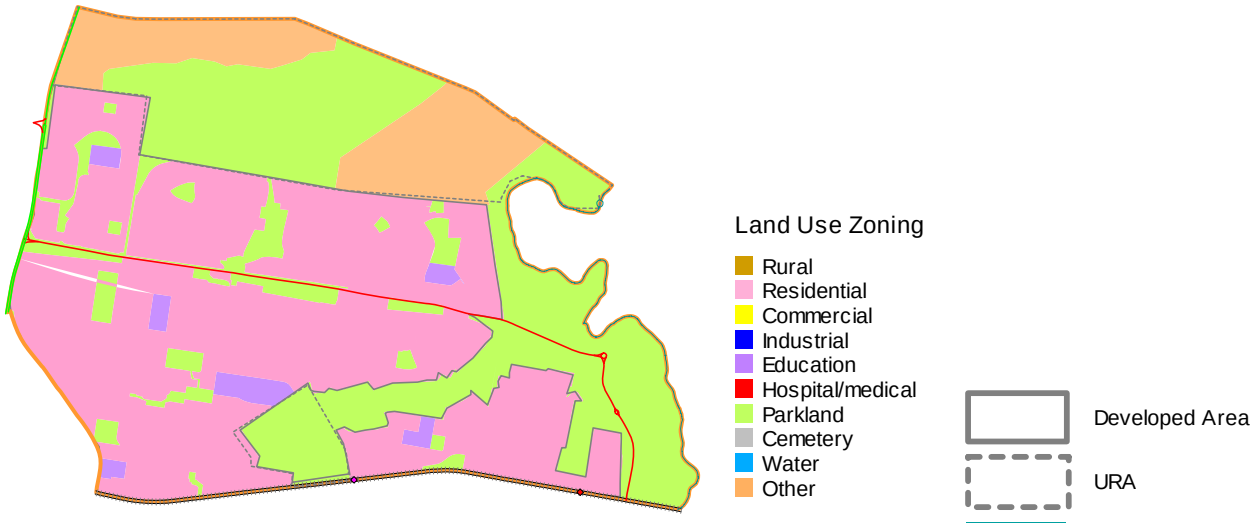
Mode of Travel:

The mode of travel for the North Werrington SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the North Werrington SLA. We can see the predominance of residential lands (51%) in the south west, higher than the Urban SLA average of 43%. There is currently no industrial or commercially zoned land, and hence employment. There is however a large proportion of land zoned parkland (36%).



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	12.0	-
Residential	6.1	51%
Employment	0.2	2%
Developed Area	7.0	58%
URA	3.3	28%
Future Developed Area	10.3	86%

Just over half (58%) of the SLA is currently developed.

Urban Release Areas:

The Werrington Mixed Use Area, is within the North Werrington SLA, and will provide some 190 dwellings for 520 people and approximately 30 jobs. The developed land area will increase dramatically to 86% with the URAs.

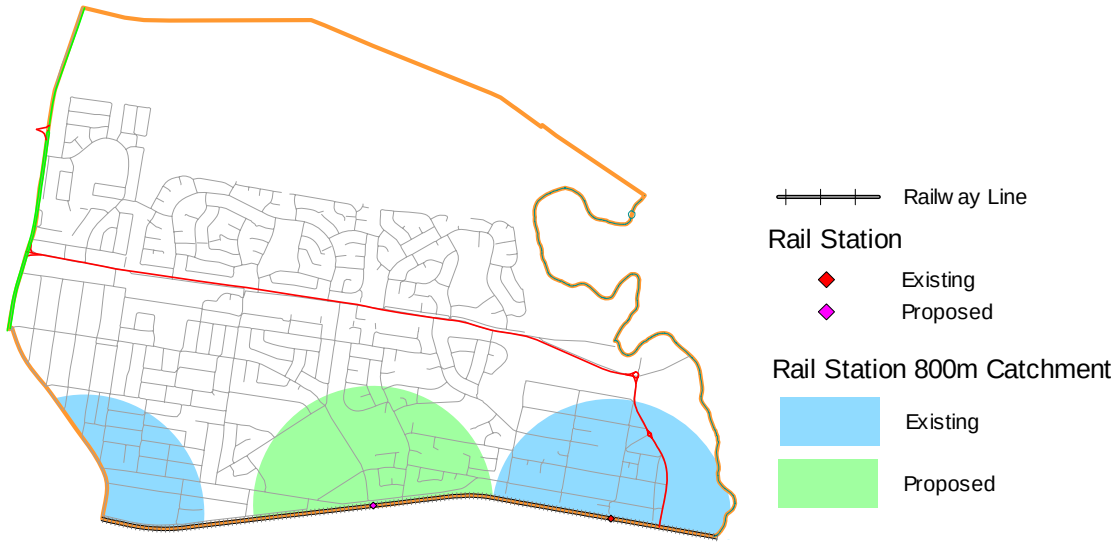
Population, Employment & Workforce:

The population and employment within the SLA is expected to experience significant increases, with a noticeable change in the employment: workforce ratio changes from 0.1 to 0.3.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	20,327	1,688	25,220	2,095
Resident Workforce	9,991	830	12,208	1,014
Employment	1,270	105	3,270	272
Workforce Ratio	0.1		0.3	

Rail Catchment Areas:

The figure below shows the location of pedestrian catchments for railway stations within the North Werrington SLA. We can see that only 15% of the developed area of North Werrington is within the walking catchment of the existing rail station. There is a proposal for a new Railway station to be located between Werrington and Kingswood Station. This will increase the proportion of the developed area within the catchment to 22%.

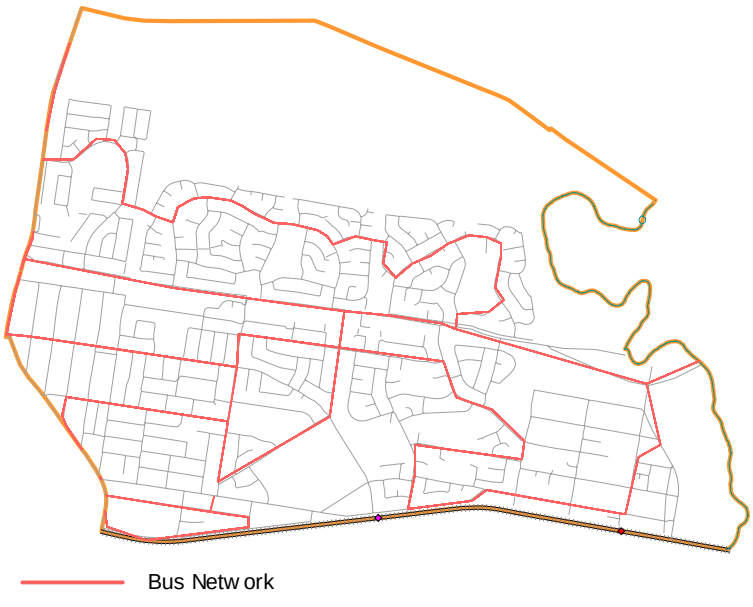


Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	1.5 (2.5)	13% (20%)
Developed Areas	1.0 (1.5)	15% (22%)

(X) Represent the figures if UWS Station is included.

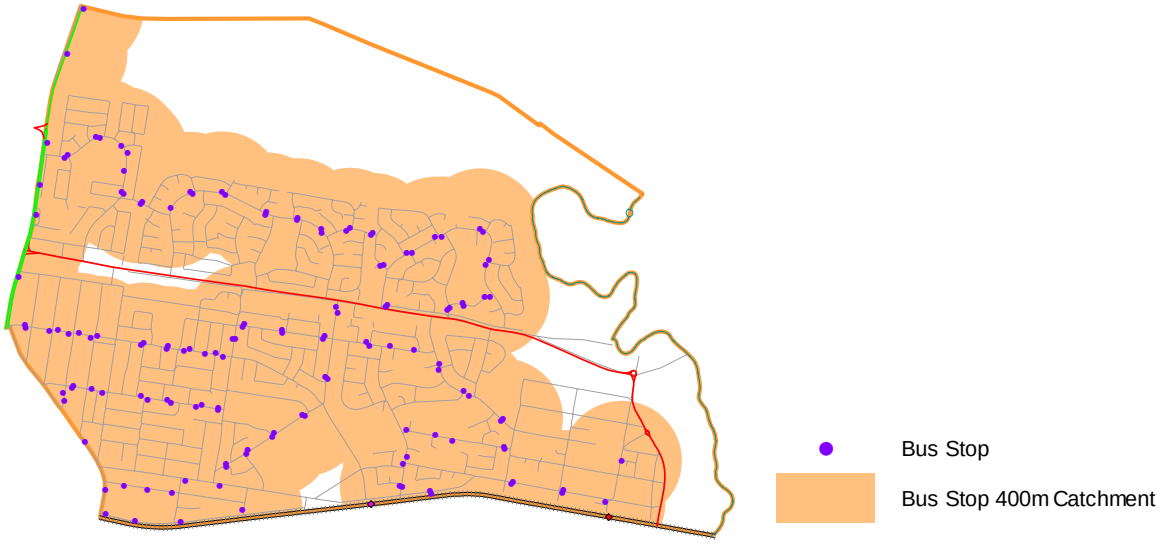
Bus Network:

The figure below shows the layout of bus services in North Werrington SLA.



Bus Catchment Areas:

The figure below shows the areas of North Werrington SLA which are within the 400m walking catchment of a bus stop. It shows that the developed areas largely (97%) have good access to bus stops. Coverage will need to be increased to cover the St Marys Release Area in the future.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	8.7	72%
Developed Areas	6.8	97%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for North Werrington SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

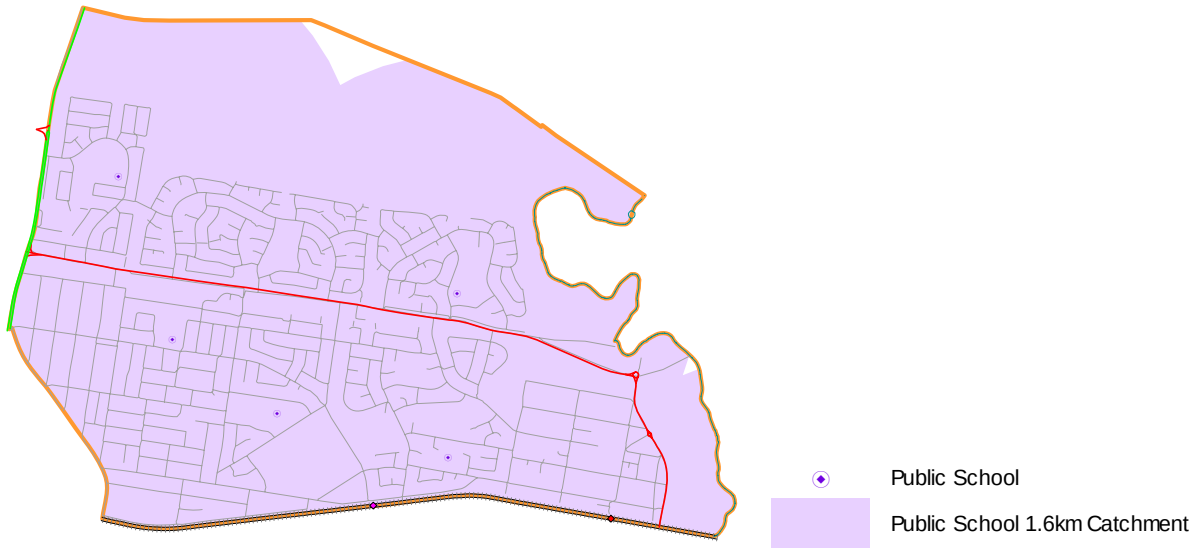
Buses and/or trains serve 77.5% of the North Werrington SLA while the remaining 22.5% of the area does not have services. The majority of the area (44.2%) is served by buses with < 15 minutes frequencies while buses are running at a frequency of 15-30 minutes for 32.1% of the SLA. The study also indicated no bus services are available for 23.7% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. North Werrington has 5 different bus routes serving the SLA:

- 2 bus routes serve the SLA during pre peak periods and on weekends;
- 3 routes serve the study area during daytime periods;
- 1 bus route meets the standard for route directness by having a factor of 1.00;
- the remainder of the bus routes recorded factors ranging from 1.08 – 1.46.

Public School Catchment Area:

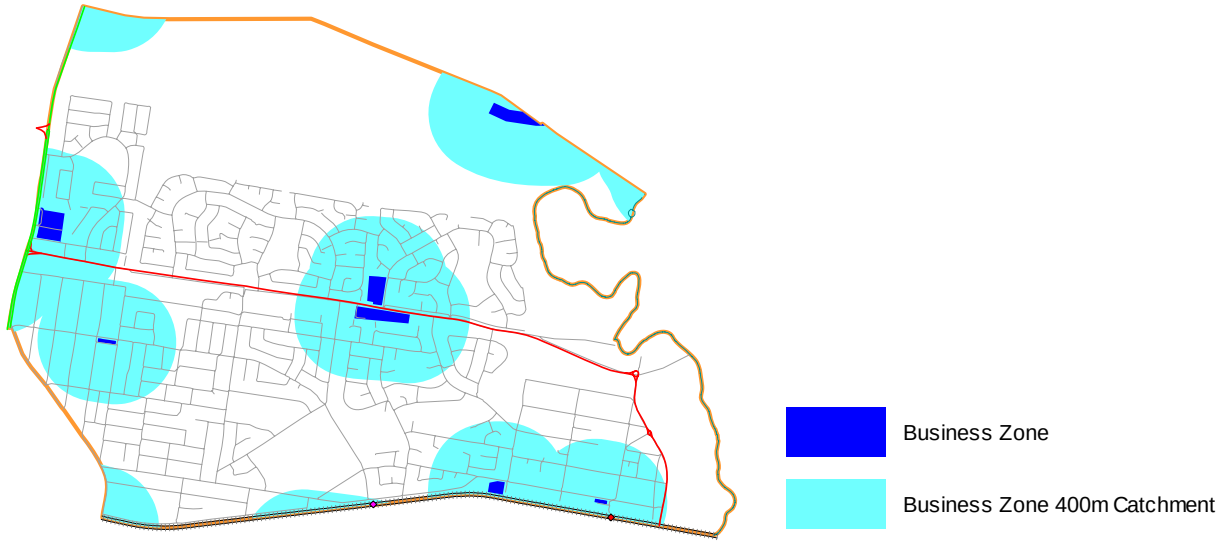
The figure below shows the areas of North Werrington SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	11.9	99%
Developed Areas	7.0	100%

Local Shopping Centre Catchment Area:

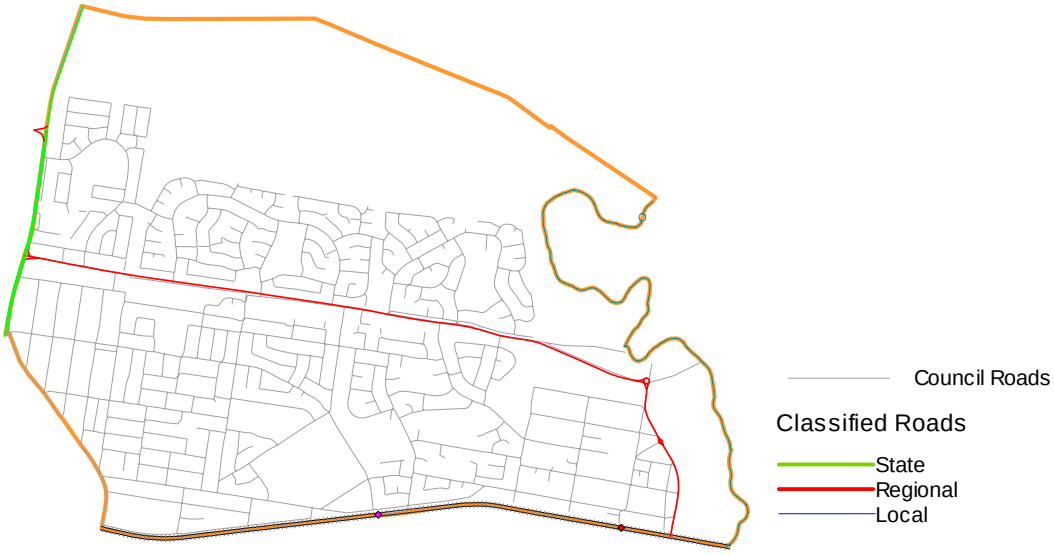
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within Werrington North SLA. Over 42% of the developed areas are within these catchment areas. This is better than the LGA average of 37%. Walking facilities such as footpaths should be enhanced throughout these catchment areas, with cycle networks focused on in the area less connected to shops.



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	3.8	31%
Developed Areas	2.9	42%

Road Infrastructure:

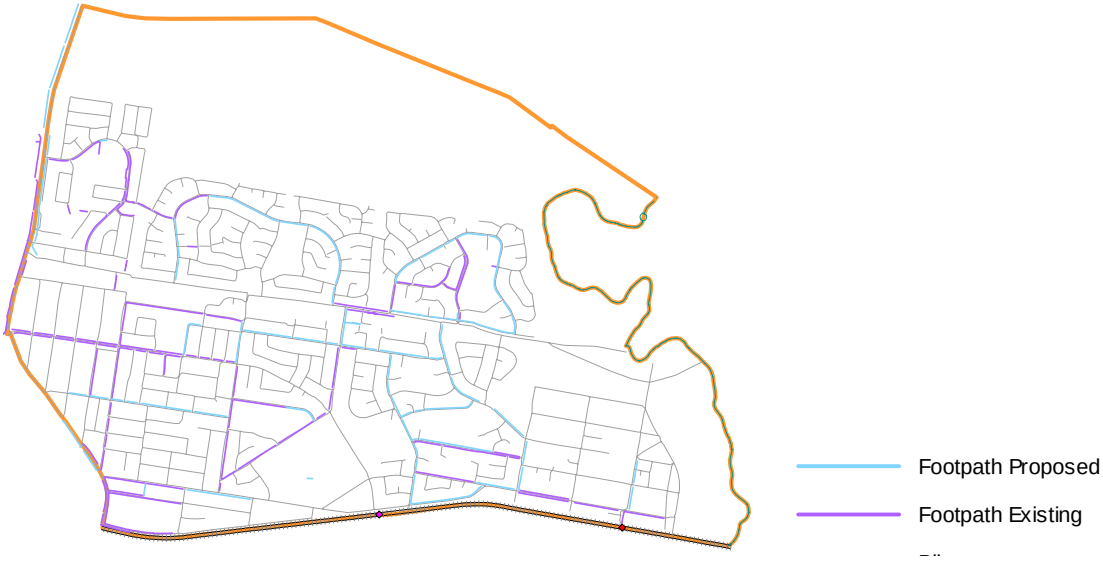
The figure below shows the location of State and Regional Roads in Werrington North SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	7.6	0.6
Local Roads	89.0	7.4
All Roads	96.6	8.0

Footpath Networks

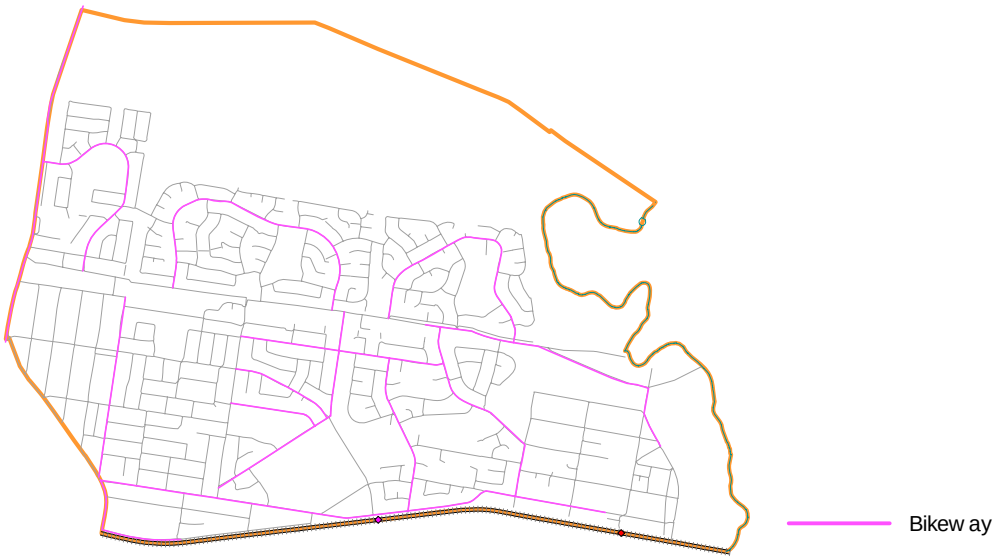
The figure below shows the extent that footpaths are provided within North Werrington SLA. Only 9% of all roads within the SLA have footpaths, there is a notable absence of existing and proposed footpaths surrounding the existing railway stations.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	2.2	14%	0.2	4.5	30%	0.4
Local Roads	15.6	9%	1.3	26.6	15%	2.2
All Roads	17.8	9%	1.5	31.1	16%	2.6

Bikeways

The figure below shows the bikeways that are provided within North Werrington SLA, bike routes do not provide continuous links, this is particular evident at the approaches to Werrington Station.



Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	4.7	62%	0.4
Local Roads	16.7	19%	1.4
All Roads	21.4	22%	1.8

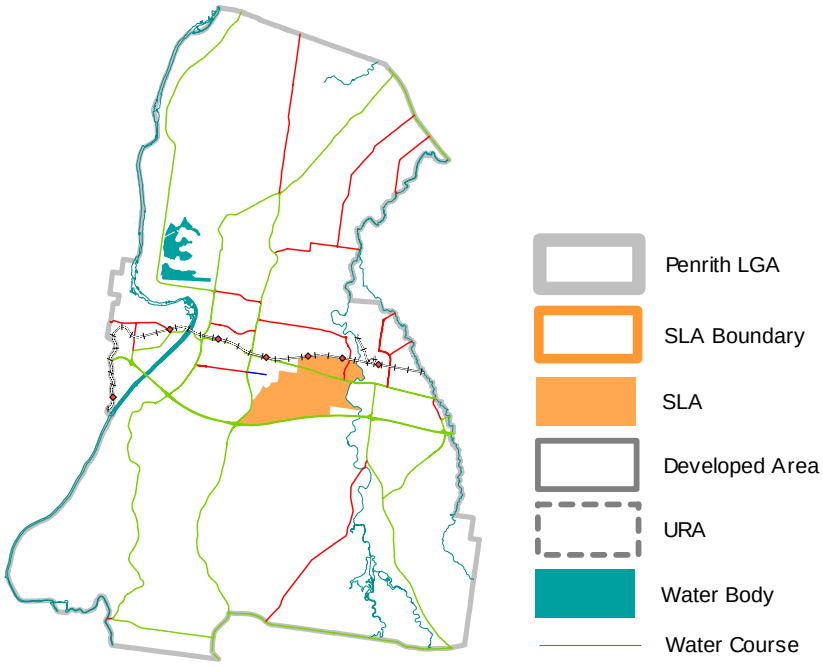
Key Suburban SLA Issues:

S22) Increase public and active transport links from residential to employment (industrial) which will benefit from facilities at ADI site
S23) Need for a rail link to serve the community and the University (UWS)
S24) Direct north-south links to the rail stations required on the bus network
S25) Footpaths identified in the PAMP require to be implemented
S26) Missing links on the cycle network between Dunheved Rd and existing routes, to Werrington Station
S27) Need to identify traffic management improvements in Cambridge Park to create residential amenity

6.1.5 SOUTH WERRINGTON

The South Werrington SLA incorporates the suburbs of Claremont Meadows parts of Werrington and. Kingswood and a small part of Orchard Hills. Werrington and Kingswood are established residential areas whilst Claremont Meadows has been developed more recently. South Werrington is bounded by The Western Railway in the north, South / Wianamatta Creek in the east and the M4 Motorway in the south. To the west the boundary generally follows Bringelly Road, Peppermint Crescent, Manning Street, Second Avenue and O'Connell Street.

Werrington and Claremont Meadows have experienced an increase in population between 1996 and 2001, associated with construction of additional dwellings.



Features:

Major features of the area include:

- Werrington Public School, Kurrambee School, Thorndale School and Claremont Meadows Primary School, Penrith Christian School;
- Cobham Remand Centre;
- SES Training Complex and Myrtle Street Fields;
- State records;
- Ellison Reserve, Kingsway Playing Fields, South Creek Park.

Age:

The age structure of Werrington in 2001 was represented by large numbers of persons in both young and more mature family age groups, with 79.5% of the population aged 0-49, which is indicative of new residential development in the area over a number of decades. There was a large share of persons in the young family age groups in Claremont Meadows in 2001. The most significant age groups included persons in their late twenties and thirties, as well as their pre-teen children. This age structure is indicative of extensive amounts of recent housing development.

Income:

There was a notably greater proportion of households with low income levels in Werrington than Penrith City in 2001 and, as a result, a smaller share of households with high income. Claremont Meadows relative to Penrith City showed a greater proportion of high income households and a lesser share at the low income end. Claremont Meadows has traditionally been a more affordable suburb with young first home buyers.

Car Ownership:

Compared with Penrith City, Werrington had a significantly lower share of households owning motor vehicles in 2001. The share of motor vehicles per household in Claremont Meadows was similar to the overall rate in Penrith City in 2001.

Households:

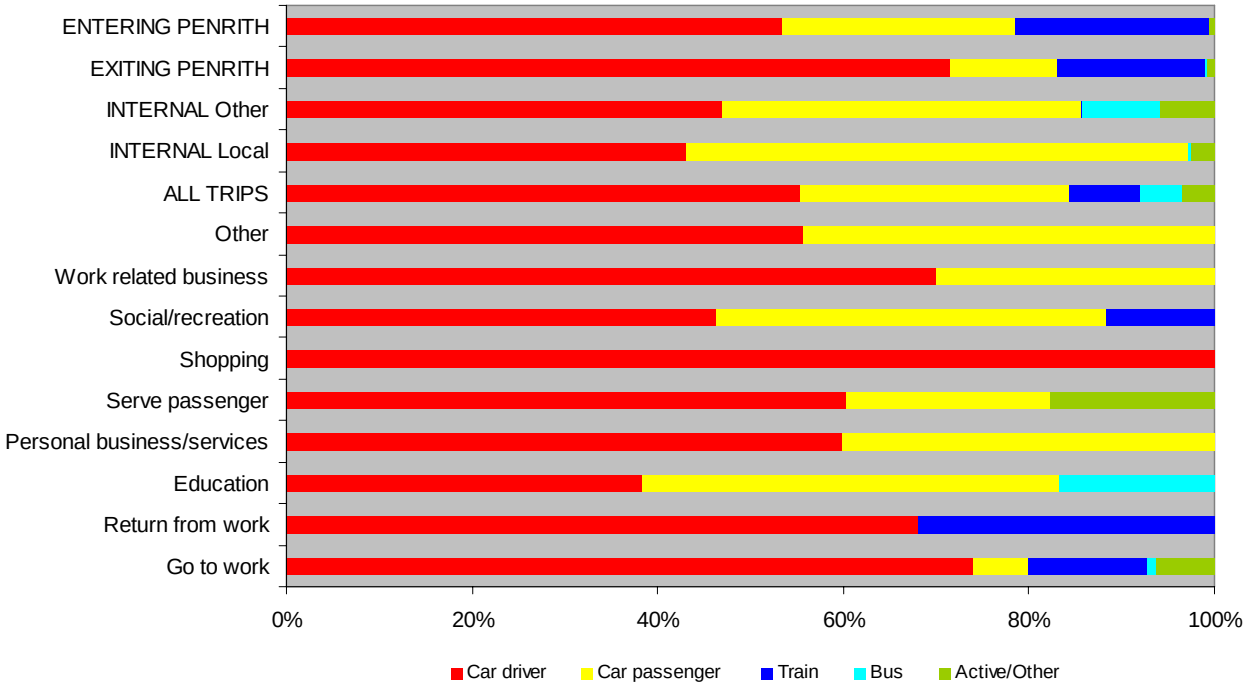
The combination of traditional and non-traditional household types in Werrington is indicative of the diverse household structure of the area in 2001. The basis for the mix of household types relates to the broad spread of the population in a number of age groups. The household structure of Claremont Meadows in 2001 was overwhelmingly concentrated in traditional household types with 69.5% of all households including a parent (or parents) and either dependent or non-dependent children.

Dwellings:

There is a mix of different housing types in Werrington, which is indicative of a variety of residential land uses with the share of semi-detached (multi-unit housing) etc. dwellings notably larger in the area. The dominance of purchasers as opposed to renters in Claremont Meadows in 2001 indicated the importance of the area to new and upgrade homebuyers and the fact that the area is recently settled. Compared with Penrith LGA, Claremont Meadows had significantly lower shares of home owners, while the proportion of purchasers was considerably higher and the overall percentage of renters was substantially lower. There was also a greater share of private renters than public renters in Claremont Meadows in 2001. There is a significant concentration of detached dwellings in Claremont Meadows, which is consistent with a greater degree of similarity in residential land uses.

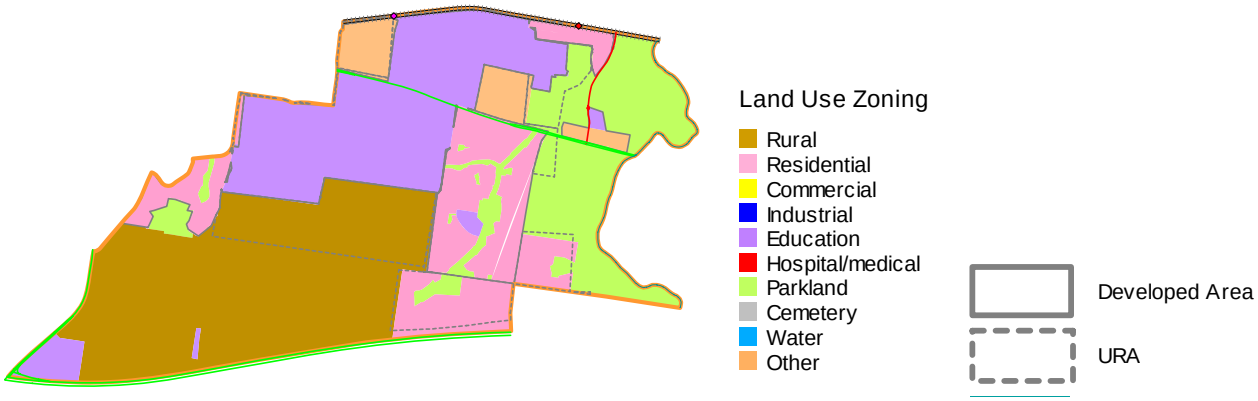
Mode of Travel:

The mode of travel for the South Werrington SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the South Werrington SLA. We can see the predominance of education (25%) and rural (35%) lands in the west. To the east we see more residential – in total residential lands only currently represent 18% of the SLA area. There is currently no industrial or commercially zoned land. There is however a large proportion of land zoned parkland (19%).



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	11.0	-
Residential	1.3	18%
Employment	2.8	25%
Developed Area	4.0	37%
URA	2.4	22%
Future Developed Area	6.4	58%

Only 37% of the SLA is currently developed.

Urban Release Areas:

The Werrington Enterprise, Living and Learning (WELL) Precinct will provide a range of land uses and has the potential to generate up to around 7,800 jobs, including up to 6,000 jobs in the WELL Technology Park (currently the UWS land north of Great Western Highway) and around 350 jobs in the Precinct Centre. Included within the WELL Precinct are:

- Claremont Meadows Stage 2 – will provide 500 dwellings for around 1500 people;
- Caddens Release Area – is expected to provide 1300 dwellings for around 3900 people; and
- South Werrington Urban Village - is expected to provide 380 dwellings for around 1000 people. The number of jobs is yet to be determined.

The developed land area will increase significantly to 58% with the URAs.

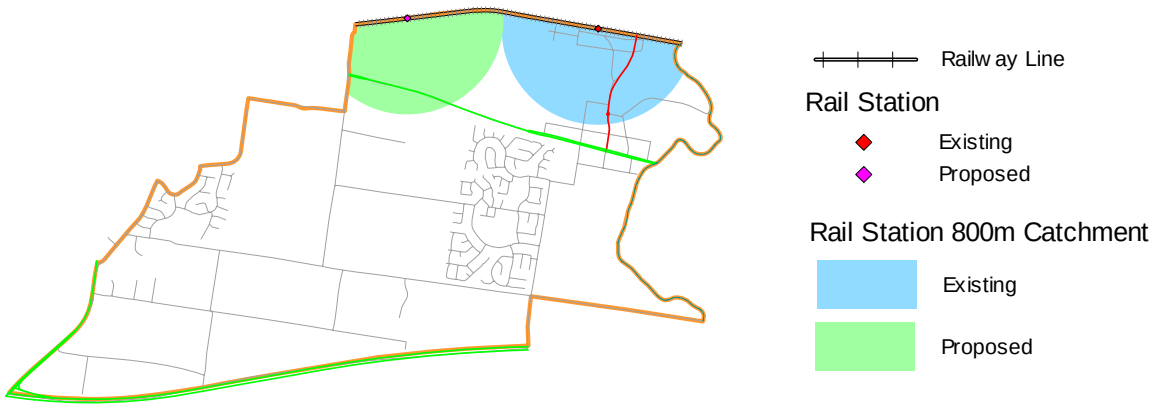
Population, Employment & Workforce:

South Werrington will see significant increases in residential population and enormous growth in employment when including tertiary students. Opportunities to maximise development around the existing and proposed rail stations must be taken.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	5,405	494	11,320	1,034
Resident Workforce	2,558	234	5,237	478
Employment	1,913	175	31,913	2,914
Workforce Ratio	0.7		6.1	

Rail Catchment Areas:

The figure below shows the location of pedestrian catchments for railway stations within the South Werrington SLA. We can see that only 11% of the developed area of South Werrington is within the walking catchment of the existing rail station. There is a proposal for a new Railway station to be located between Werrington and Kingswood Station. This will increase the proportion of the developed area within the catchment to 27%.

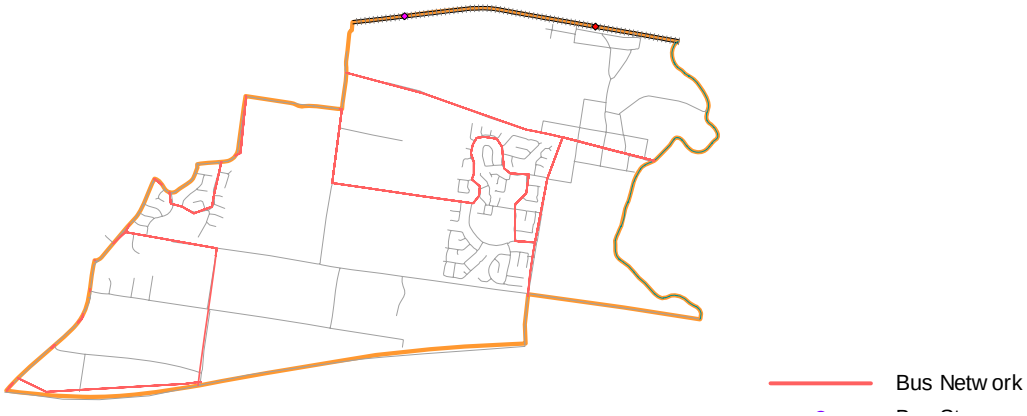


Catchment within 800m of Train Station in:	Area (sqm)	Coverage (%)
SLA	1.0 (1.9)	9% (17%)
Developed Areas	0.4 (1.1)	11% (27%)

(X) Represent the figures if UWS Station is included.

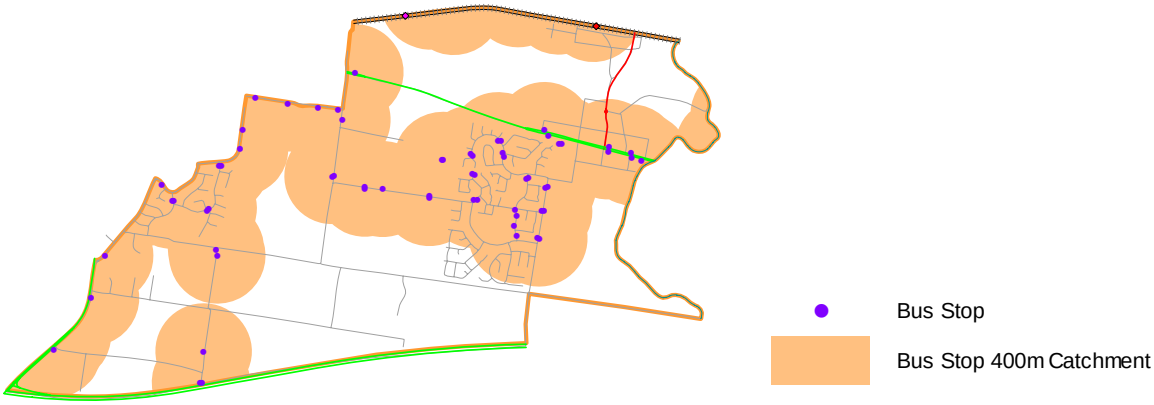
Bus Network:

The figure below shows the layout of bus services in South Werrington SLA.



Bus Catchment Areas:

The figure below shows the areas of Emu Plains SLA which are within the 400m catchment of a bus stop. The developed areas have a lower than average coverage (81%) compared to the urban areas of the LGA (88%). Bus stop coverage will need to increase to serve the expanding education and residential areas on this SLA.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	6.7	61%
Developed Areas	3.3	81%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for South Werrington as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

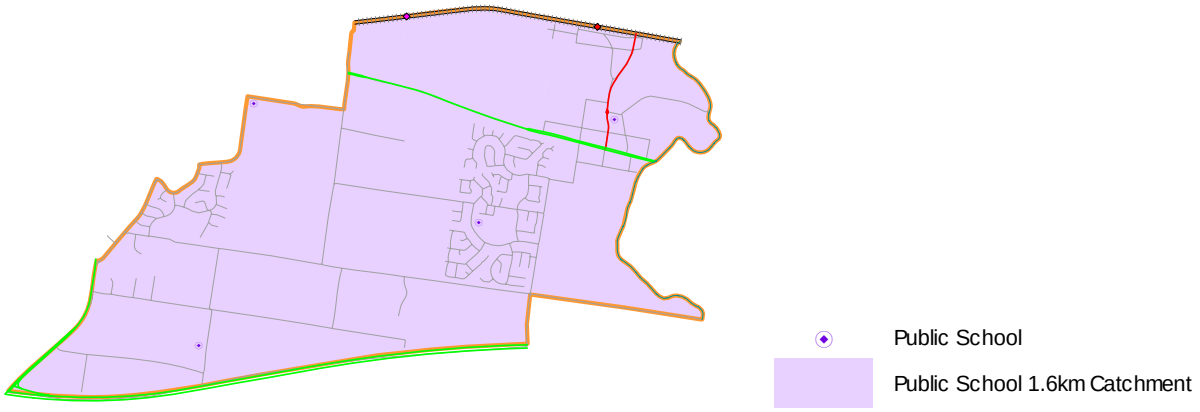
Buses and/or trains serve 73.4% of the South Werrington SLA while the remaining 26.6% of the area does not have services. The majority of the area (43.4%) is served by buses with 15-30 minutes frequencies. Buses are running at a frequency > 60 minutes for 17.1% of the total study area while buses with 30-60 minutes frequencies serve 5.9% of South Werrington. The study also indicated no bus services are available for 33.6% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. South Werrington has 5 different bus routes serving the SLA:

- 2 bus routes serve the SLA during daytime periods and on weekends;
- only 1 bus route is in service for the study area during night time periods;
- the bus routes recorded factors for route directness ranging from 1.03 – 1.33.

Public School Catchment Area:

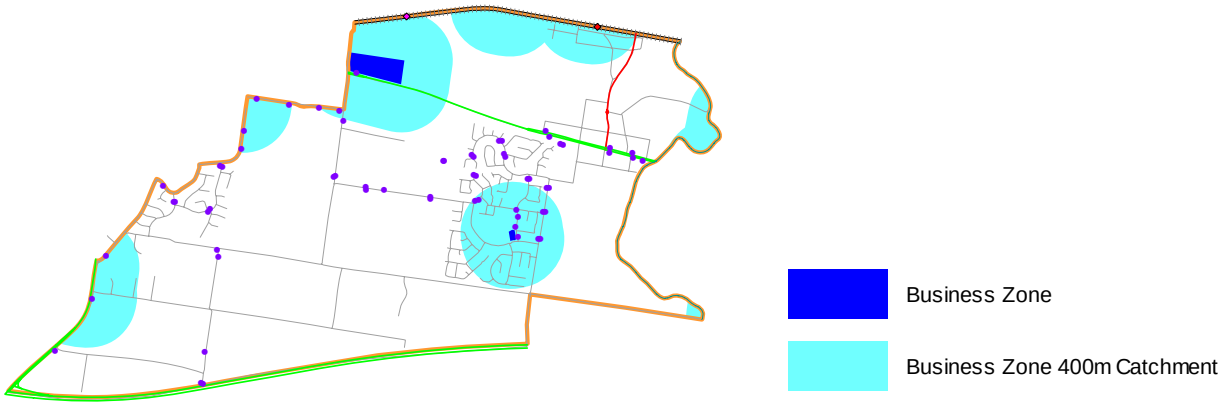
The figure below shows the areas of South Werrington SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	11.0	100%
Developed Areas	4.0	100%

Local Shopping Centre Catchment Area:

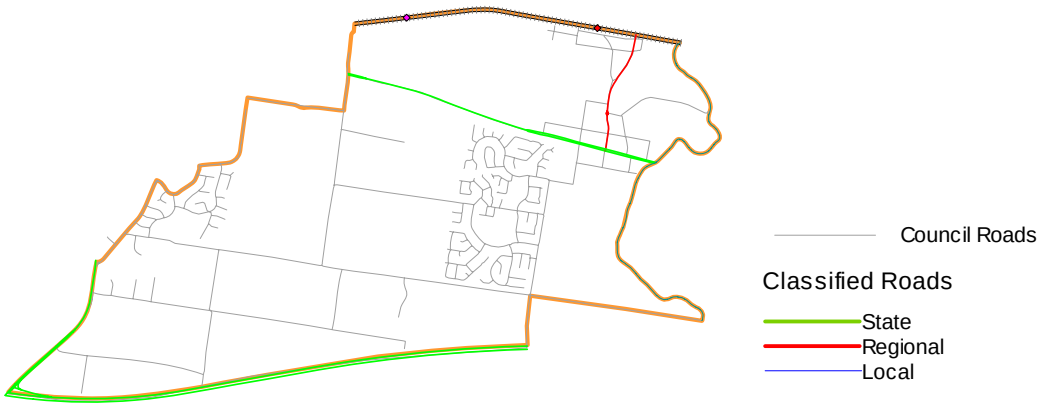
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within South Werrington SLA. Around 38% of the developed areas are within these catchment areas, which is similar to the urban area average of 37%. .



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	2.4	22%
Developed Areas	1.5	38%

Road Infrastructure:

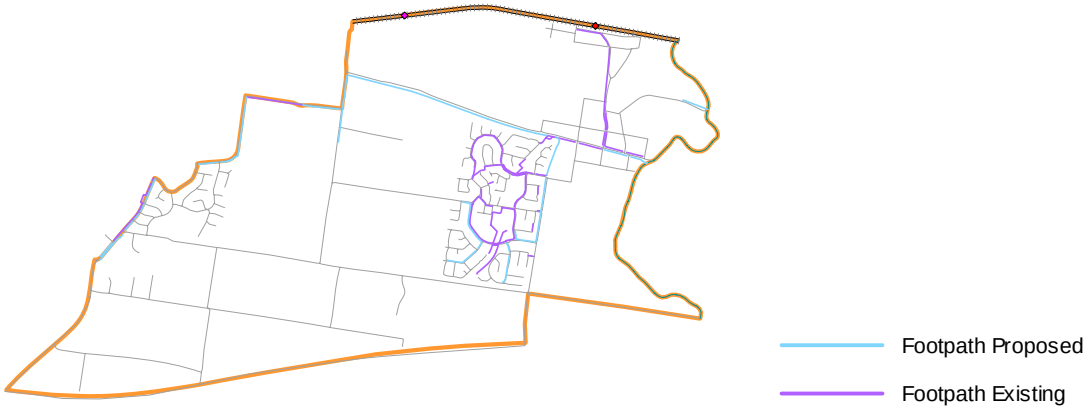
The figure below shows the location of State and Regional Roads in South Werrington SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	9.3	0.9
Local Roads	42.1	3.8
All Roads	51.5	4.7

Footpath Networks

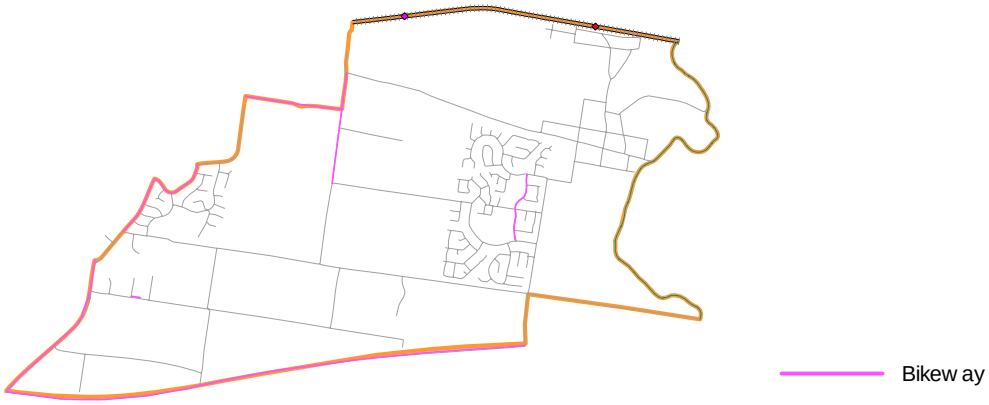
The figure below shows the extent that footpaths are provided within South Werrington SLA. Only 8% of all roads within the SLA have footpaths.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	1.5	8%	0.1	3.6	19%	0.3
Local Roads	6.4	8%	0.6	11.3	13%	1.0
All Roads	7.9	8%	0.7	14.9	14%	1.4

Bikeways

The figure below shows the bikeways that are provided within South Werrington SLA, there are no bike routes connecting the Werrington Station to the southern areas.



Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	5.7	61%	0.5
Local Roads	3.4	8%	0.3
All Roads	9.1	18%	0.8

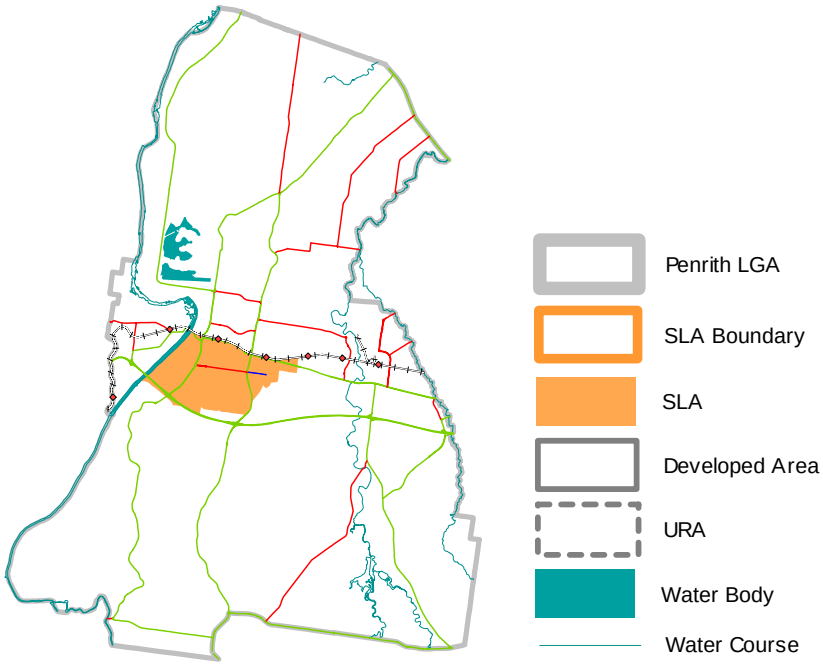
Key Suburban SLA Issues:

S28) New urban areas at Caddens/ Claremont Meadows to support and link to WELL precinct developments
S29) Railway station required to UWS and community at Werrington
S30) Missing transport network links to TAFE
S31) Cycle network needs to be further established to link URA, Werrington and Kingswood Stations

6.1.6 PENRITH

The Penrith SLA incorporates the suburbs of Penrith, Jamisontown, South Penrith and Kingswood. Penrith is a mixed use area with industrial and commercial areas in the north and west, commercial areas in the central section and residential areas in the east and south. Jamisontown is a mixed use area, including residential, industrial and commercial land use. Most of the south-eastern corner is residential. South Penrith is an established residential area. The SLA is bounded by the Great Western Highway in the north, Werrington to the east, the M4 Motorway to the south and the Nepean River to the west.

Penrith has experienced a small increase in population between 1996 and 2001, a result of additional dwelling construction in the area whilst Jamisontown and South Penrith have experienced a small decrease, the result of a decline in the average number of persons living in each dwelling.



Features:

Major features of the area include:

- Six public schools, Penrith High School, St Nicholas of Myra School, Jamison High School;
- the Penrith Central Business District, Nepean Square Shopping Centre, Penrith Plaza Shopping Centre, Southlands Shopping Centre;
- Nepean Hospital;
- Western Sydney Institute of TAFE, Penrith Panthers Club, Joan Sutherland Performing Arts Centre, the Council offices, Nepean Shores Resort, public library, Q Theatre;
- Penrith Stadium, Penrith Showground, Penrith Raceway, Penrith Swimming Centre;
- Wouduff Gardens & Tennis complex;
- Sir John Jamieson Cemetery:
- Various sports centres and complexes, Hickeys Reserve, Parker Street Reserve, Penrith Park, Spence Park, Weir Reserve, Robinson Park, Jim Scott Park and Jamison Park.

Age:

The age structure of Penrith was notable in that there was a spread of population across most age groups. The largest age groups in the SLA included the 35-49 year olds and 25-34 year olds. This age structure is unusual in the Australian context, with a relatively even spread of population in each age group.

The age structure of Jamisontown was diverse with significant numbers of persons in most young adult and mature adult age groups (18-49). There were comparatively fewer children compared to adults, showing that the birth rates of the area are relatively low and that many of the households are non-family.

The age structure of South Penrith in 2001 was characterised by older families. The largest age groups included teenagers and children in their early twenties and their parents in their forties and fifties. This age structure is indicative of an ageing family area, where large numbers of children would be expected to leave home over the coming years.

Income:

There was a notably greater proportion of households with low income levels in Penrith than Penrith City in 2001 and, as a result, a smaller share of households with high income. A comparison of household income between Jamisontown / South Penrith and Penrith City in 2001 indicated similar income levels.

Car Ownership:

Compared with Penrith City, Penrith and Jamisontown had a significantly lower share of households owning motor vehicles in 2001. This may be indicative of the comparatively greater use of public and non-motorised transport in the area. The share of motor vehicles per household in South Penrith was similar to the overall rate in Penrith City in 2001.

Households:

Penrith had a notable proportion of its population in non-traditional households, especially single person (33.8%) and couple only households (37.0%). The basis for the greater concentration of these household types relates to a number of things, such as the much stronger share of flats, apartments and other higher density dwelling types, which tends to attract smaller households.

The combination of traditional and non-traditional household types in Jamisontown is indicative of the diverse household structure of the area in 2001. The basis for the mix of household types relates to the broad spread of the population in a number of age groups.

There was a significant share of family households in South Penrith, which is illustrative of the role that the area plays in the regional housing market. It also hints at the likely changes over time as children grow up and leave the family home.

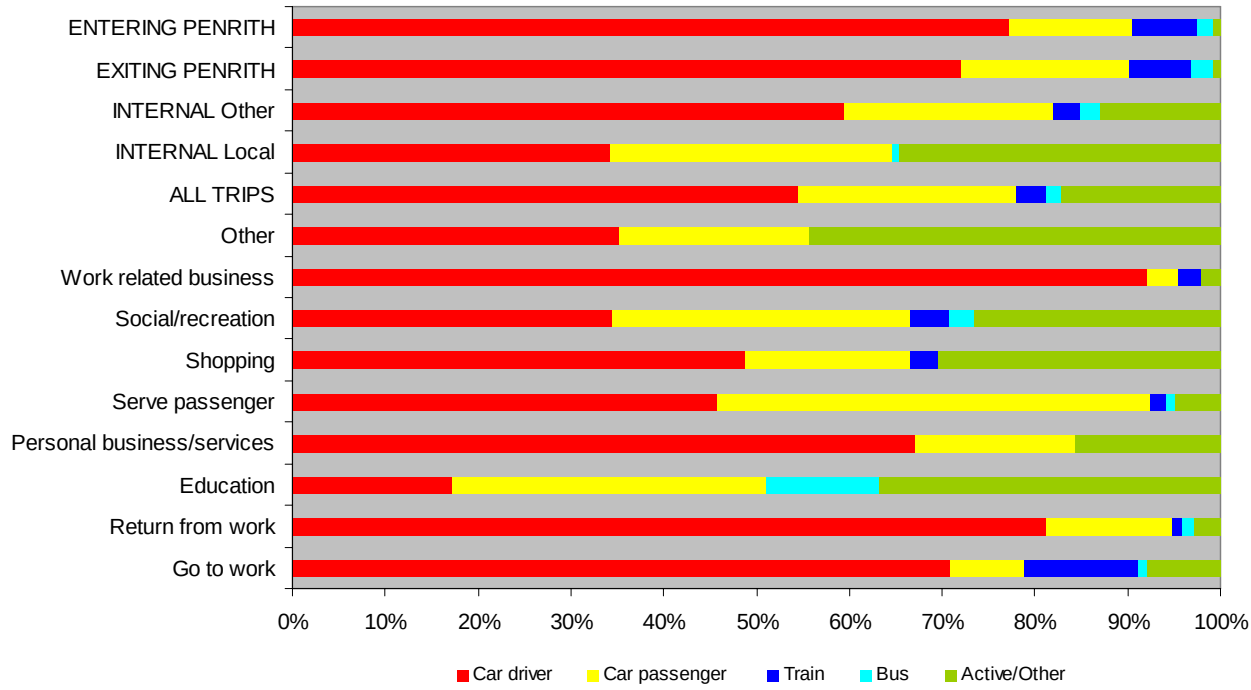
Dwellings:

There is a mix of different housing types in Penrith, which is indicative of a variety of residential land uses. In 2001, the percentage of detached dwellings in Penrith was significantly lower (51.9%) than Penrith City (85.3%), while the percentage of flats and apartments was notably larger.

There is a significant concentration of detached dwellings in Jamisontown and South Penrith, which is consistent with a greater degree of similarity in residential land uses. Jamisontown had a significantly smaller share of detached dwellings (70.7%) compared to Penrith City (85.3%) in 2001, while the proportion of flats and apartments was notably larger. In 2001, the percentage of detached dwellings in South Penrith was higher (94.2%) than Penrith City (85.3%), while the percentage of flats and apartments was smaller.

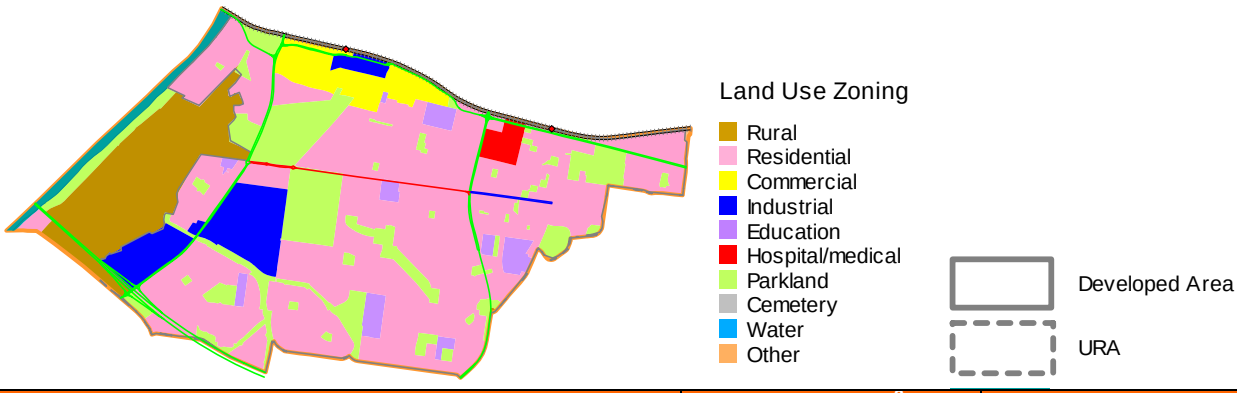
Mode of Travel:

The mode of travel for the Penrith SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the Penrith SLA. We can see the predominance of residential lands (55%) in the east, this is above the Urban SLA average of 43%. There is a major commercial zoned area to the north-west, accounting for 4% of the SLA area, this area represents Penrith CBD. There is a significant portion of land zoned industrial (7%) and hospital and education zoned land is observed. A large area of land to the west is still zoned rural. This area represents an opportunity to provide additional housing and employment in an area close to facilities and public transport.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	15.9	-
Residential	8.6	55%
Employment	2.4	15%
Developed Area	13.3	84%
URA	0.0	0%
Future Developed Area	13.3	84%

84% of the land is currently developed, this will remain unchanged based on the current identified URAs.

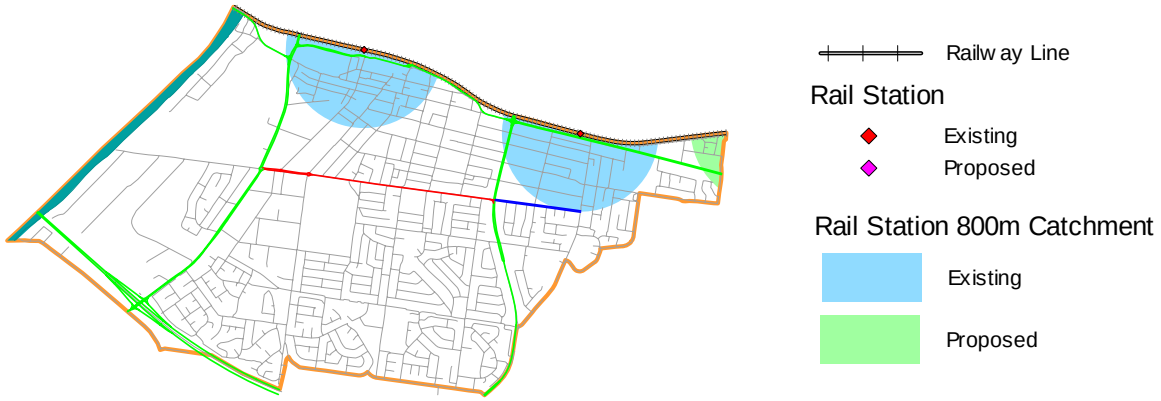
Population, Employment & Workforce:

The population is expected to increase due to infill opportunities in the SLA.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	27,154	1,713	32,814	2,070
Resident Workforce	12,528	790	15,093	952
Employment	20,869	1,317	20,869	1,317
Workforce Ratio	1.7		1.4	

Rail Catchment Areas:

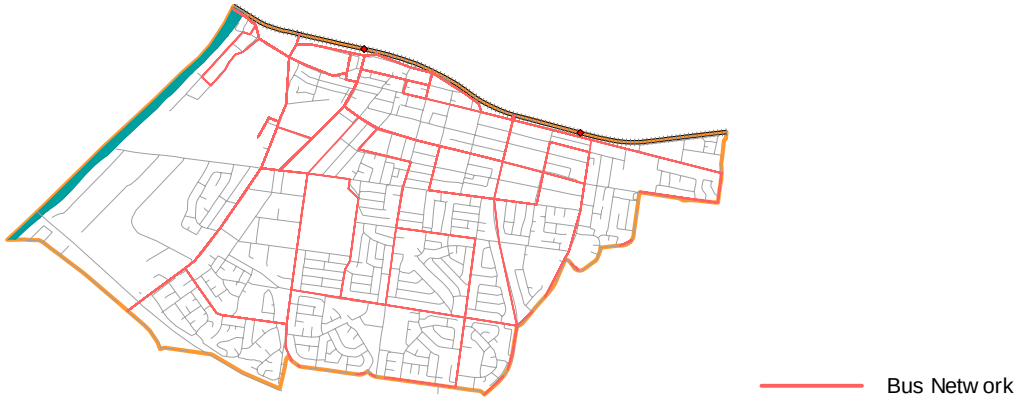
The figure below shows the location of pedestrian catchments for railway stations in Penrith SLA. We can see that 16% of the developed area of Penrith is within the walking catchment of the existing rail station. Opportunities to maximise development density around Penrith Station must be considered.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	2.0	13%
Developed Areas	2.1	16%

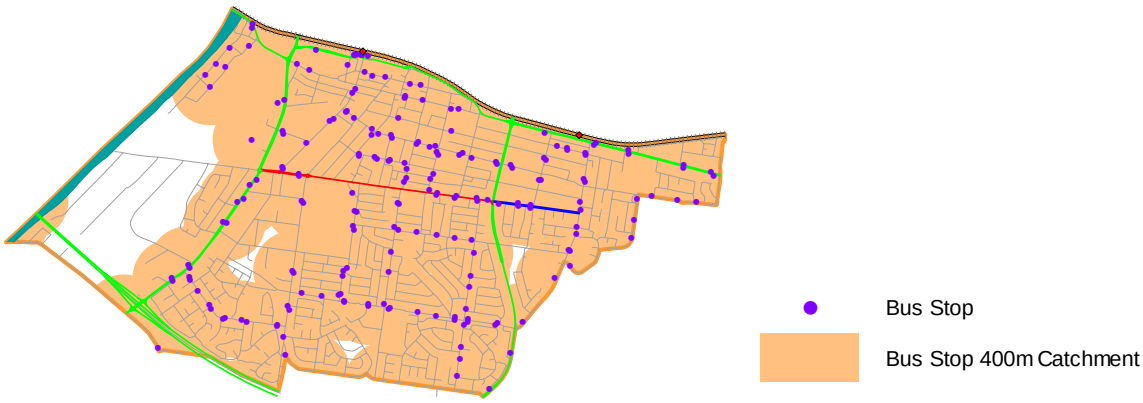
Bus Network:

The figure below shows the layout of bus services in Penrith SLA.



Bus Catchment Areas:

The figure below shows the areas of Penrith SLA which are within the 400m catchment of a bus stop. The developed area has excellent coverage (98%).



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	13.9	87%
Developed Areas	13.1	98%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for Penrith SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

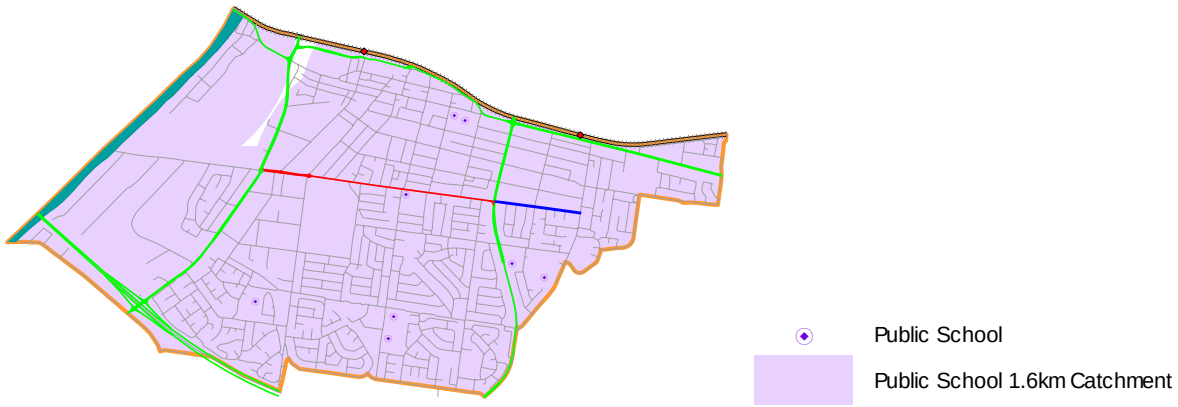
Buses and/or trains serve 94.6% of the Penrith SLA while the remaining 5.4% of the area does not have services. The majority of the area (56.9%) is served by buses with 15-30 minutes frequencies. Buses are running at a frequency of less than 15 minutes for 22% of the SLA while buses with > 60 minutes frequencies serve 10.2% of Penrith SLA. The remainder area (5.4%) has buses serving at 30-60 minutes intervals. The study also indicated no bus services are available for 5.4% of the SLA.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. Penrith has 13 different bus routes serving the SLA:

- 3 bus routes serve the SLA during pre peak periods;
- 6 routes are in service on weekends;
- 4 routes serve the study area during night time periods
- 3 bus routes meet the standard for route directness by having a factor of 1.00;
- the remainder of the bus routes recorded factors ranging from 1.03 – 1.50.

Public School Catchment Area:

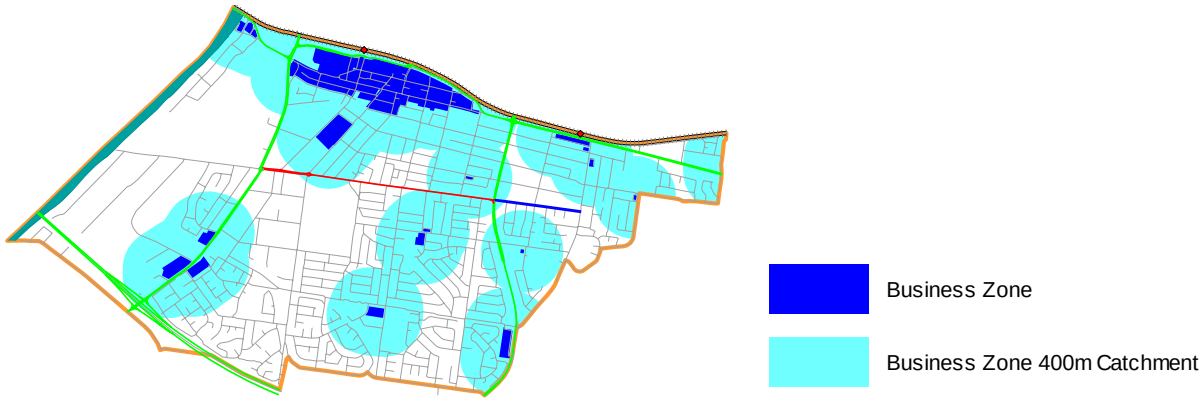
The figure below shows the areas of Penrith SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools (99% coverage).



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	15.9	100%
Developed Areas	13.2	99%

Local Shopping Centre Catchment Area:

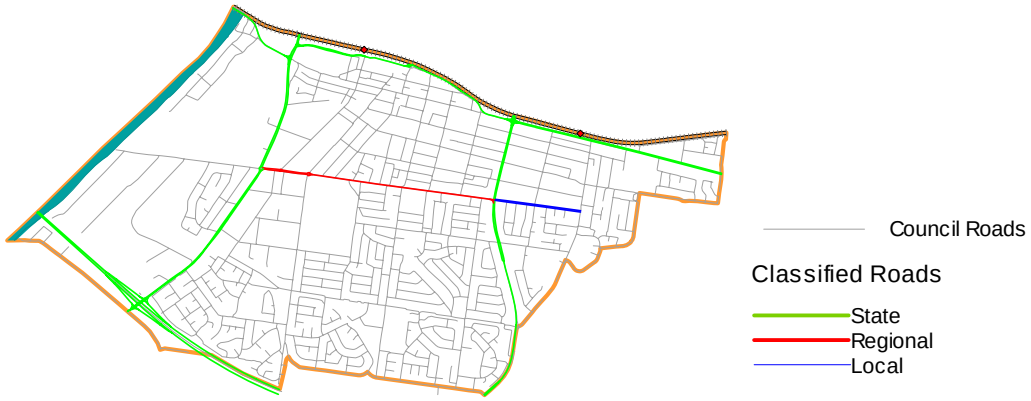
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within Penrith SLA. Over 60% of the developed areas are within these catchment areas. This is better than the LGA average of 37%. Walking facilities such as footpaths should be enhanced throughout these catchment areas, with cycle networks focused on in the area less connected to shops.



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	8.4	53%
Developed Areas	8.1	61%

Road Infrastructure:

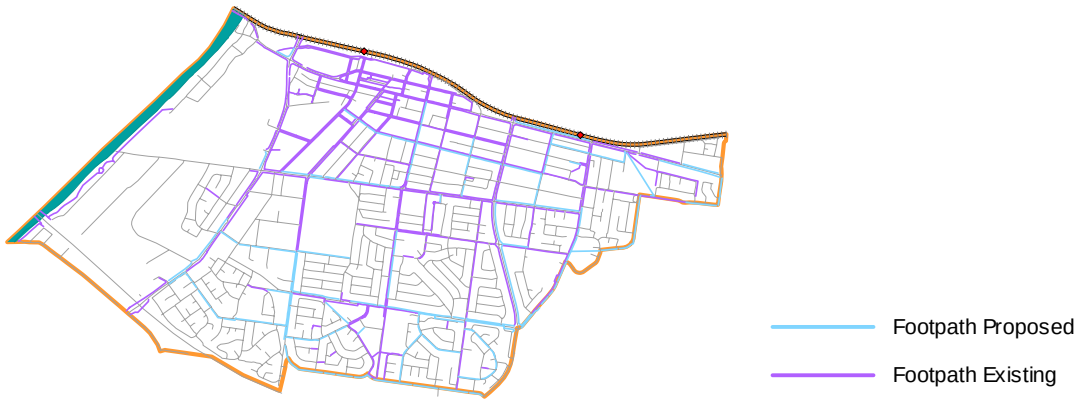
The figure below shows the location of State and Regional Roads in Penrith SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	18.4	1.2
Local Roads	138.2	8.7
All Roads	156.6	9.9

Footpath Networks

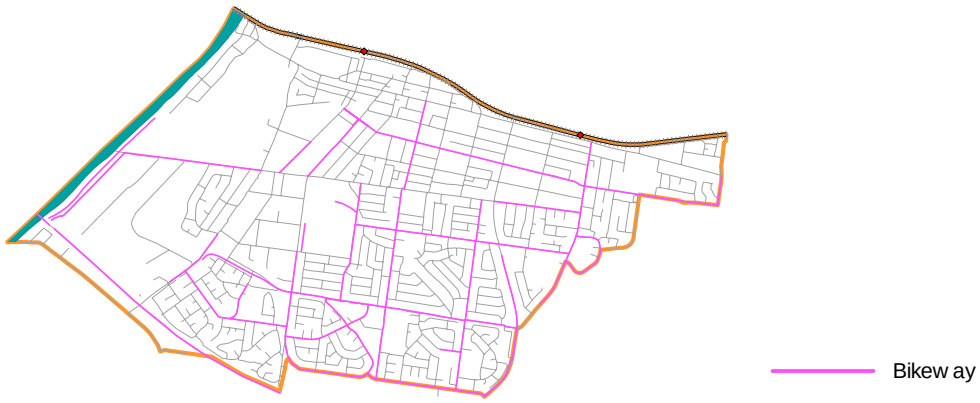
The figure below shows the extent that footpaths are provided within Penrith SLA. 20% of all roads within the SLA have footpaths. More detail on footpaths in the city centre are provided in Section 6.3.1.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	17.0	46%	1.1	23.5	64%	1.5
Local Roads	46.9	17%	3.0	68.5	25%	4.3
All Roads	63.9	20%	4.0	92.0	29%	5.8

Bikeways

The figure below shows the bikeways that are provided within Penrith SLA, there is a lack of continuity leading to shopping centres, railway stations and other key locations.



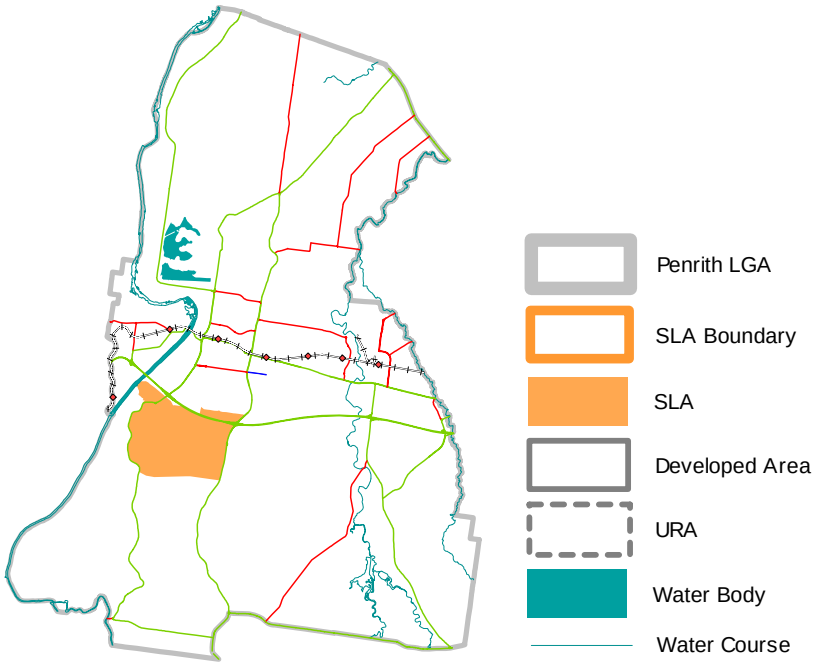
Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	6.5	35%	0.4
Local Roads	31.3	23%	2.0
All Roads	37.9	24%	2.4

Key Suburban SLA Issues:

S32) Infill development and increased residential density locations to compliment CBD, and improve viability of CBD
S33) Gaps in the bus network on Mulgoa Road to serve the residential population
S34) Missing links in the cycle network both on and off road
S35) Need for future cycling connections to employment release areas
S36) Recommendations for improvements to footpaths contained in the PAMP need to be implemented
S37) Consider improving links to Panthers Stadium and Panthers Club

6.1.7 GLENMORE PARK

The Glenmore Park SLA incorporates the suburb of Glenmore Park and a small part of Regentville. Glenmore Park is a recent and relatively self-contained residential area. The SLA is bounded by the Western Motorway in the north, The Northern Road in the east, Mulgoa Road in the west and Bradley Street/the southern boundary of Mulgoa Nature Reserve in the south. Glenmore Park has nearly doubled in population between 1996 and 2001, a result of the staging of development within the area.



Features:

Major features of the area include:

- Four primary schools and two high schools;
- Glenmore Park Shopping Centre;
- Glenmore Heritage Valley Golf Club;
- Penrith Golf Club; and
- Blue Hills Wetland, Glenmore Loch, Laguna Lake, Apple Gum Reserve, Blue Hills Park, Ched Towns Reserve, Forest Redgum Reserve, Mulgoa Nature Reserve, Rotary Park, Surveyors Creek Recreation Area and Windmill Park.

Age:

There was a large share of persons in the young family age groups in Glenmore Park in 2001. The most significant age groups included persons in their late twenties and thirties, as well as their preteen children. This age structure is indicative of large amounts of recent housing development.

Income:

There was a considerably larger percentage of households with high income levels in Glenmore Park than Penrith City in 2001 and a smaller share of low income households. This is indicative of the exclusivity of the area and its attractiveness to affluent households.

Car Ownership:

There was a greater percentage of households in Glenmore Park that owned 2 or more motor vehicles compared to Penrith City in 2001. This indicates a preference for private transport over public transport and the relative isolation of the area. The most prominent categories in this area were households with 2 vehicles (49.3%) and 1 vehicle (29.3%).

Households:

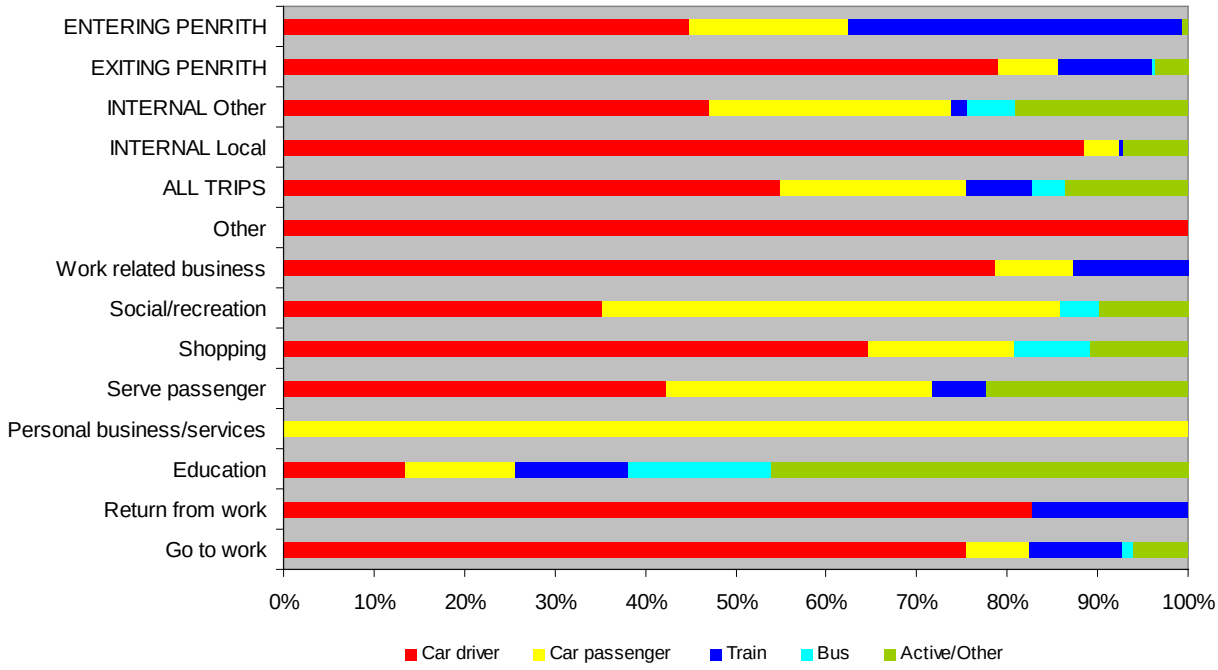
There was a significant share of family households in Glenmore Park, which is illustrative of the role that the area plays in the regional housing market.

Dwellings:

There is a significant concentration of detached dwellings in Glenmore Park, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families. The proportion of detached dwellings in Glenmore Park was greater (92.2%) than Penrith City (85.3%) in 2001, while the percentage of flats and apartments was smaller.

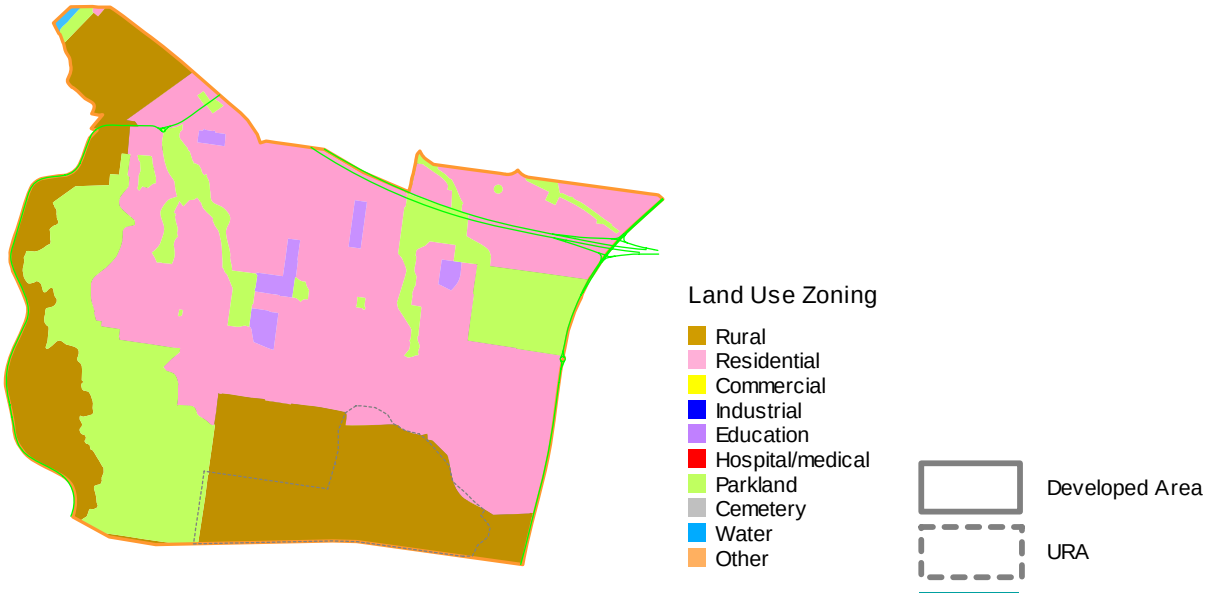
Mode of Travel:

The mode of travel for the Glenmore Park SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zone in the Glenmore Park SLA. We can see the predominance of residential lands (48%) in the north east, this is above par compared with the Urban SLA average of 43%. There are no commercial or industrial zoned lands. There is a large proportion of land zoned for rural (27%) and parkland (23%).



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	15.3	-
Residential	7.3	48%
Employment	0.2	2%
Developed Area	8.3	55%
URA	1.7	11%
Future Developed Area	10.0	65%

Just over half (55%) of the land is currently developed.

Urban Release Areas:

The Glenmore Park Stage 2 Release Area is expected to provide around 1,750 dwellings for approximately 4700 people. The number of jobs is yet to be determined. The developed land area will increase significantly to 65% with the URAs.

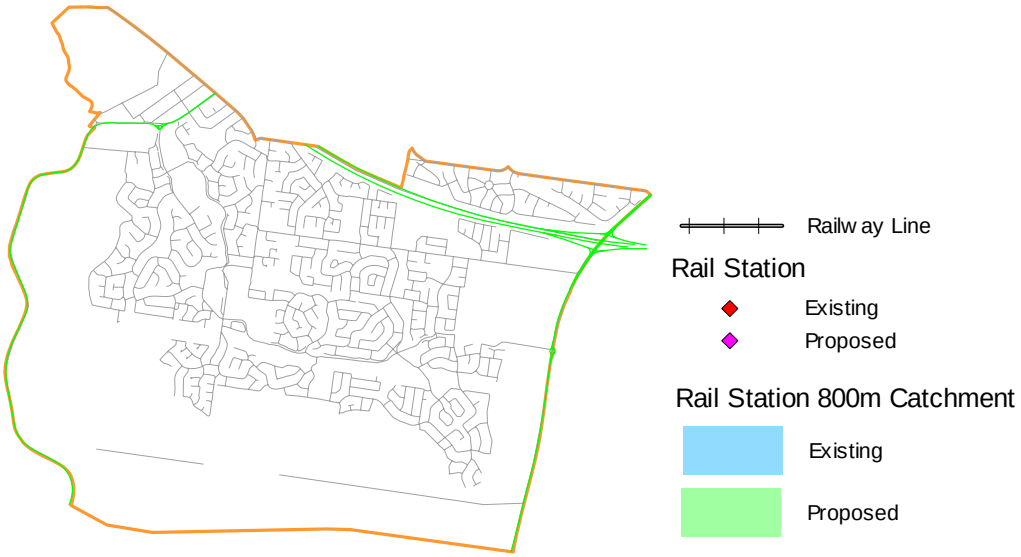
Population, Employment & Workforce:

The population is expected to increase slightly with an increase in employment in the area the as yet undetermined.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	19,545	1,277	20,824	1,361
Resident Workforce	10,136	662	10,715	700
Employment	1,914	125	1,914	125
Workforce Ratio	0.2		0.2	

Rail Catchment Areas:

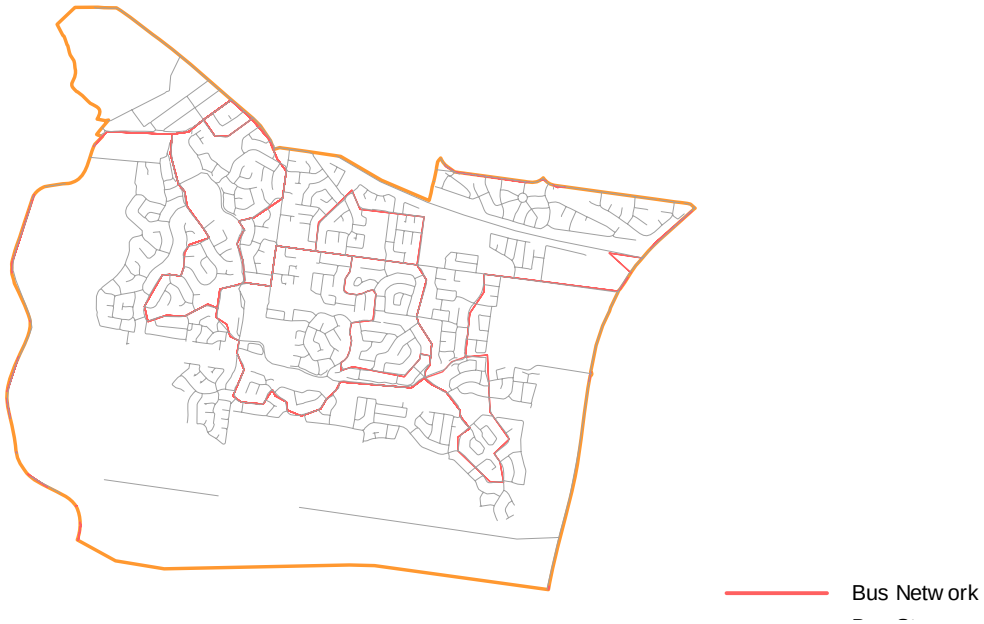
Due to the distance of Glenmore Park SLA from the Main Western Railway Line, no part of the SLA is located within the pedestrian catchment of a railway station. Glenmore Park residents must rely on buses for public transport needs.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	0.0	0%
Developed Areas	0.0	0%

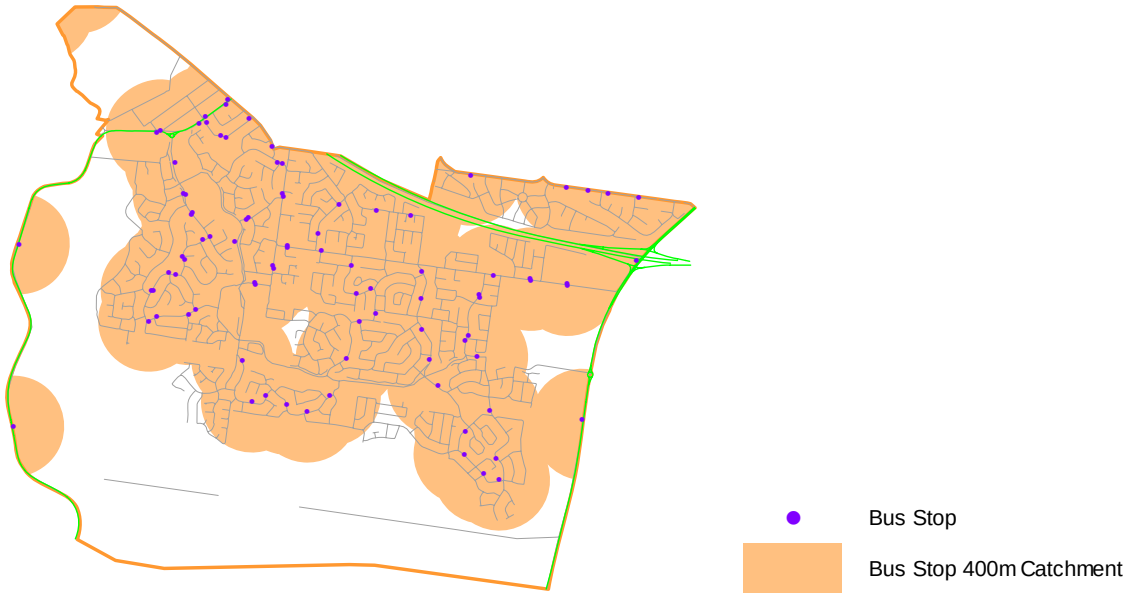
Bus Network:

The figure below shows the layout of bus services in Glenmore Park SLA.



Bus Catchment Areas:

The figure below shows the areas of Glenmore Park SLA which are within the 400m walking catchment of a bus stop. It shows that the developed areas largely (95%) have good access to bus stops. Small pockets of land in the SLA lack coverage.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	9.7	64%
Developed Areas	7.9	95%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for Glenmore Park SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

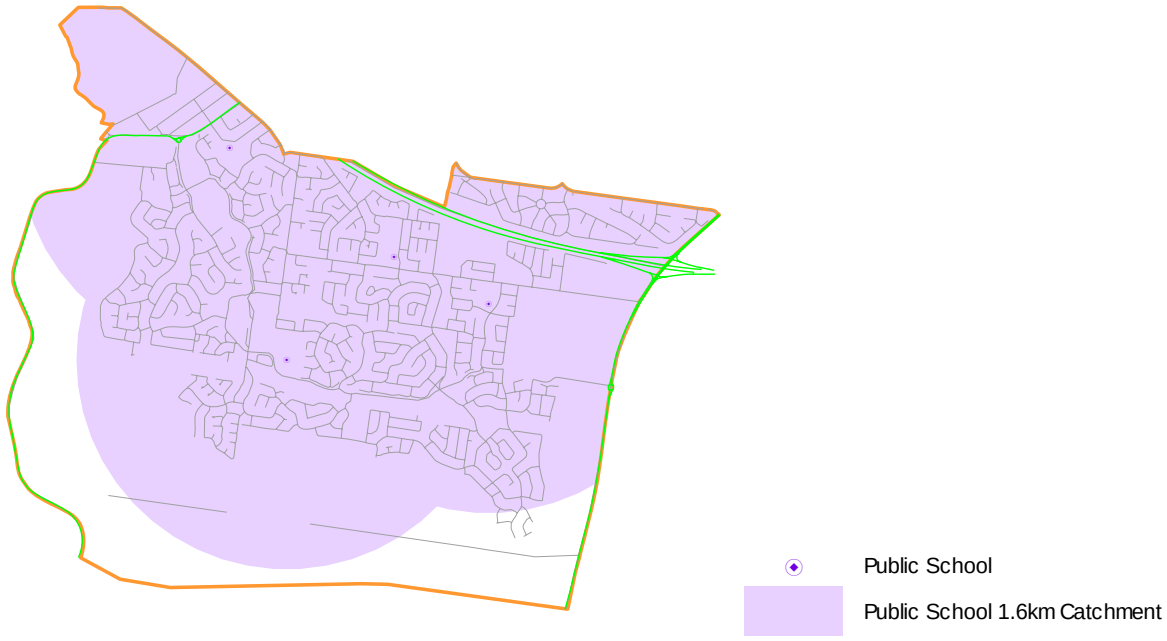
Buses and/or trains serve 73.7% of the Glenmore Park SLA while the remaining 26.3% of the area does not have services. The majority of the area (37.6%) is served by buses with 15-30 minutes frequencies. Buses are running at a frequency 30-60 minutes for 34.6% of the total study area while buses with >60 minutes frequencies serve 1.6% of Glenmore Park. The study also indicated no bus services are available for 26.3% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. Glenmore Park SLA has 4 different bus routes serving the SLA:

- 3 bus routes serve the SLA on weekends;
- only 1 route is in service during pre peak and night time periods; and
- the bus routes recorded route directness factors ranging from 1.04 – 1.17.

Public School Catchment Area:

The figure below shows the areas of Glenmore Park SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	12.7	83%
Developed Areas	8.1	97%

Local Shopping Centre Catchment Area:

The figure below shows the 400m walking catchment areas for business zones (shopping centres) within Glenmore Park SLA. Only 9% of the developed areas are within these catchment areas. This is considerable lower than the urban area average of 26%, and has the least coverage of all urban SLAs. This means that over 90% of the area is more likely to choose to drive rather than walk to the shops due to the distances. Cycle networks must be enhanced as an alternative to driving these longer distances. Consideration should be given to providing more shopping facilities within existing areas and capitalising on opportunities with the URAs.

Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	0.8	5%
Developed Areas	0.8	9%

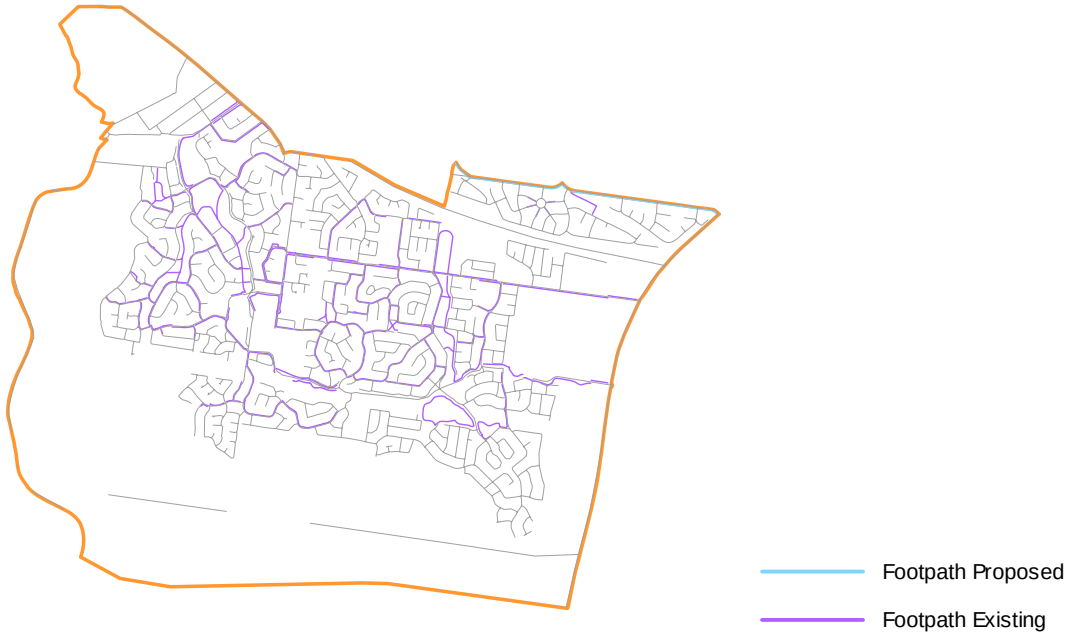
Road Infrastructure:

The figure below shows the location of State and Regional Roads in Glenmore Park SLA.

Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	10.9	0.7
Local Roads	105.0	6.9
All Roads	115.8	7.6

Footpath Networks

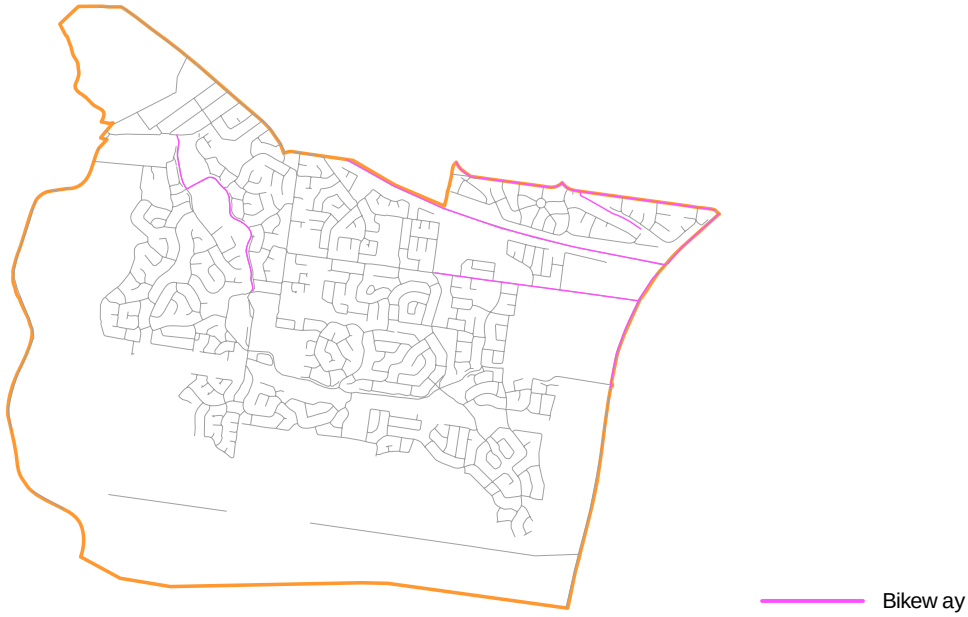
The figure below shows the extent that footpaths are provided within Glenmore Park SLA. Only 14% of all roads within the SLA have footpaths.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	0.7	3%	0.0	0.7	3%	0.0
Local Roads	32.8	16%	2.1	34.7	17%	2.3
All Roads	33.5	14%	2.2	35.4	15%	2.3

Bikeways

The figure below shows the bikeways that are provided within Glenmore Park SLA, there is total lack of cycle provisions in the SLA. Given the lack of shopping within walking distances, cycle networks must be provided to broaden the opportunity for residents to gain access to key areas by other active transport means such as cycling.



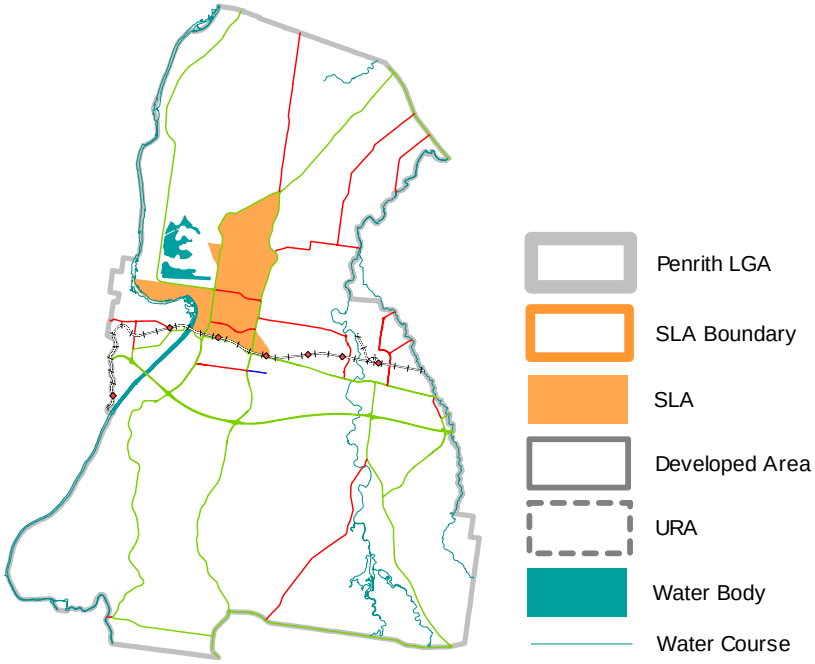
Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	4.1	38%	0.3
Local Roads	5.8	6%	0.4
All Roads	9.9	9%	0.6

Key Suburban SLA Issues:

S38) Links to southern expansion area and facilities required
S39) Improved access to Penrith and bus stops on the M4 required
S40) Ensure continued expansion and viability of Glenmore Park shopping centre
S41) Express bus required on Mulgoa Rd to Penrith Station to serve the residential community
S42) Pedestrian crossing and recommendations in PAMP require to be implemented
S43) Traffic management concerns on residential collector roads
S44) Minimal provision of cycling facilities in the SLA

6.1.8 CRANEBROOK

The Cranebrook SLA incorporates the suburbs of Cranebrook and parts of Mount Pleasant. Cranebrook is a developing residential area, with rural land in the north and residential land mainly in the south. The SLA is bounded by The Northern Road/Richmond Road in the east, The Great Western Highway/North Street/Belmore Street/Jane Street/railway line in the south, Castlereagh Road/Cranebrook Road/Nepean River in the west. Cranebrook has experienced an increase in population between 1996 and 2001, a result of new dwellings being added to the area, particularly in Mount Pleasant.



Features:

Major features of the area include:

- Five primary schools, Cranebrook High School and St Dominic's College;
- Penrith Railway station;
- Mt Pleasant Shopping Centre;
- Museum of Fire;
- Penrith Sewerage Treatment Works;
- Army Base; and
- Nepean Rowing Club, Nepean Rugby Park;
- Hickeys Park, Parker Street Reserve, Weir Reserve, Andromeda Drive Reserve, Cranebrook Park and Greygums Oval.

Age:

There was a large share of persons in the young family age groups in Cranebrook in 2001. The most significant age groups included persons in their late twenties and thirties, as well as their preteen children. This age structure is indicative of large amounts of recent housing development.

Income:

A comparison of household income between Cranebrook and Penrith City in 2001 indicated similar income levels.

Car Ownership:

The share of motor vehicles per household in Cranebrook was similar to the overall rate in Penrith City in 2001. The most prominent categories in this area were households with 2 vehicles (40.9%) and 1 vehicle (34.8%).

Households:

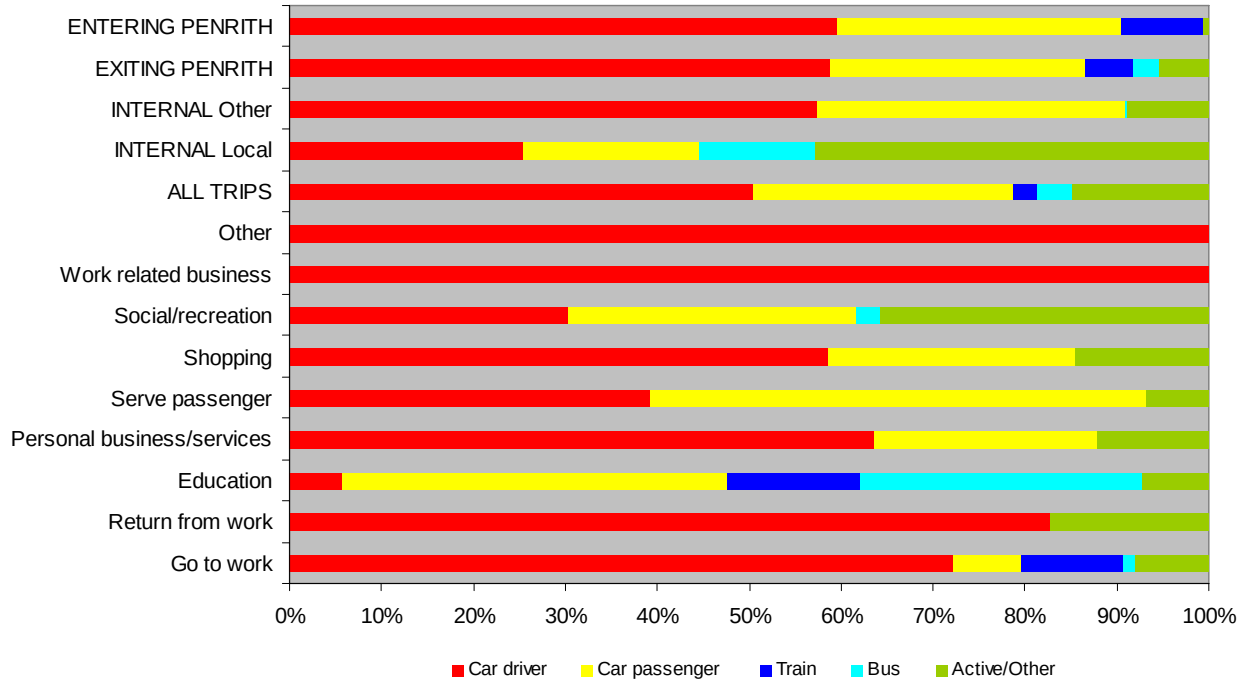
The household structure of Cranebrook in 2001 was overwhelmingly concentrated in traditional household types with 66.1% of all households including a parent (or parents) and either dependent or non-dependent children.

Dwellings:

There is a significant concentration of detached dwellings in Cranebrook, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families. The proportion of detached dwellings in Cranebrook was greater (89.2%) than Penrith City (85.3%) in 2001, while the percentage of flats and apartments was smaller.

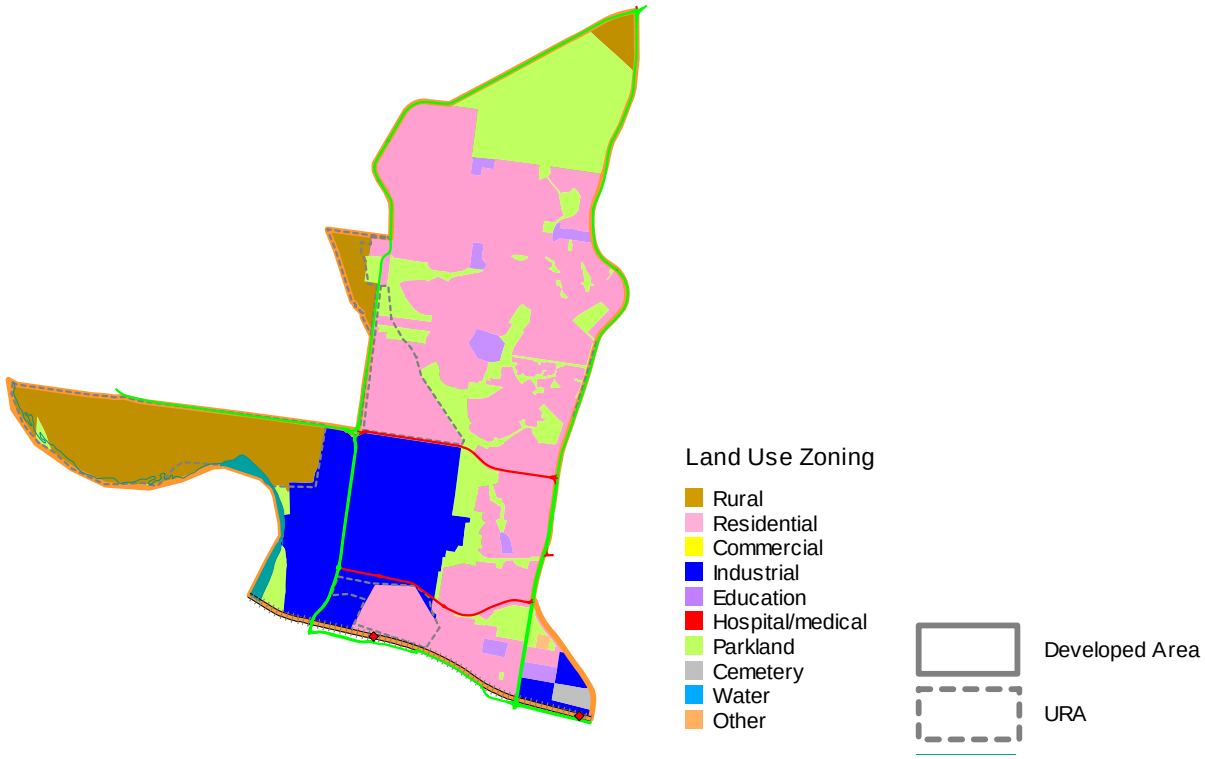
Mode of Travel:

The mode of travel for the Cranebrook SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the Cranebrook SLA. We can see the predominance of residential lands (48%) in the north and east, slightly above the Urban SLA average of 43%. There is a major area of land zoned industrial land (17%) in the south west. There is a large proportion of land zoned for rural (14%) in the west and parkland (23%) in the north.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	19.5	-
Residential	7.5	46%
Employment	3.4	19%
Developed Area	12.2	63%
URA	3.9	20%
Future Developed Area	16.1	83%

Currently 63% of the land is developed.

Urban Release Areas:

The North Penrith Urban Area will provide 850 dwellings for around 2000 people and approximately 950 jobs. The Waterside (Lakes Environs) Release Area will yield almost 700 dwellings for some 2150 people, the number of jobs is yet to be determined. The developed land area will increase significantly to 83% with the URAs.

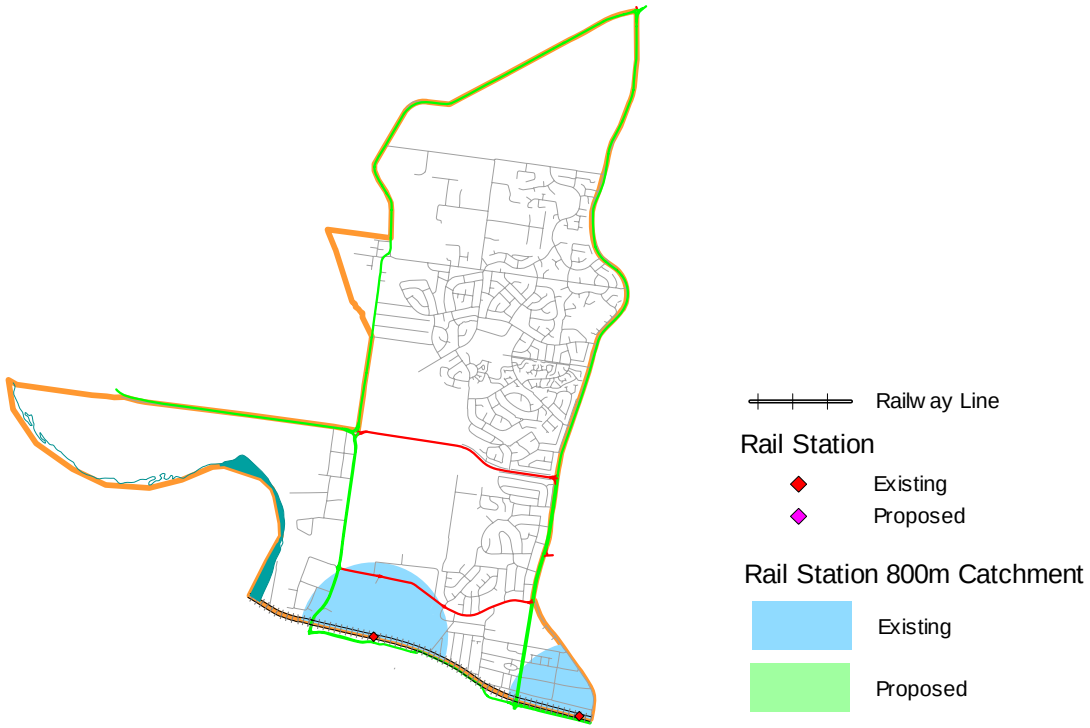
Population, Employment & Workforce:

The population is expected to increase in greater proportion to the increase in employment in this SLA. Hence the employment: workforce ratio will decrease to 0.5 from 0.6.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	19,611	1,008	26,186	1,346
Resident Workforce	8,627	443	11,606	596
Employment	5,388	277	6,060	311
Workforce Ratio	0.6		0.5	

Rail Catchment Areas:

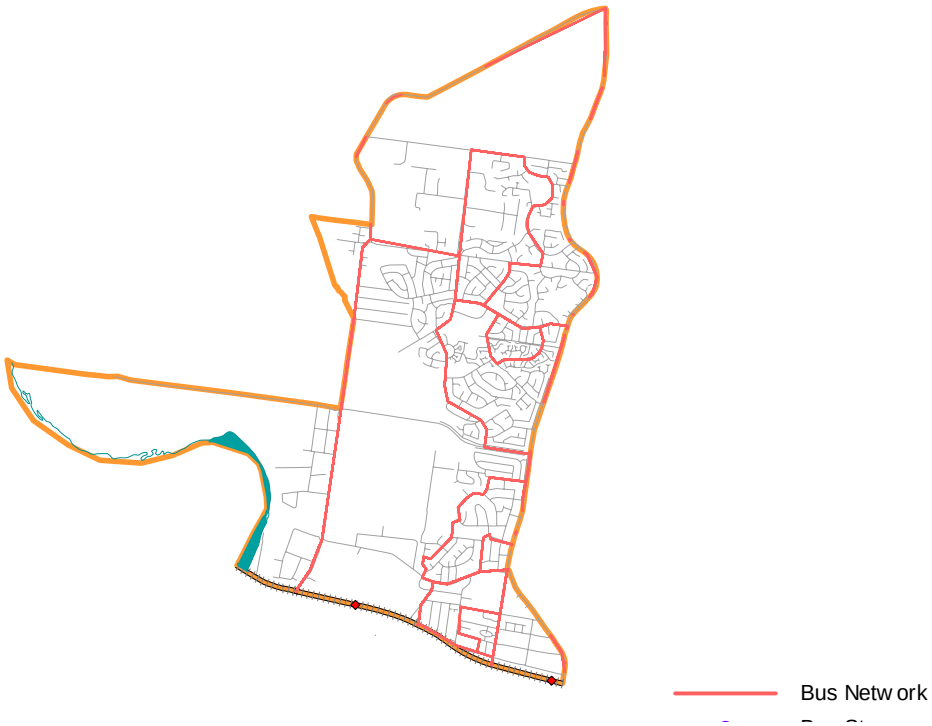
The figure below shows the location of pedestrian catchments for railway stations within the Cranebrook SLA. We can see that only 5% of the developed area of Cranebrook is within the walking catchment of the existing rail stations.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	1.5	8%
Developed Areas	0.7	5%

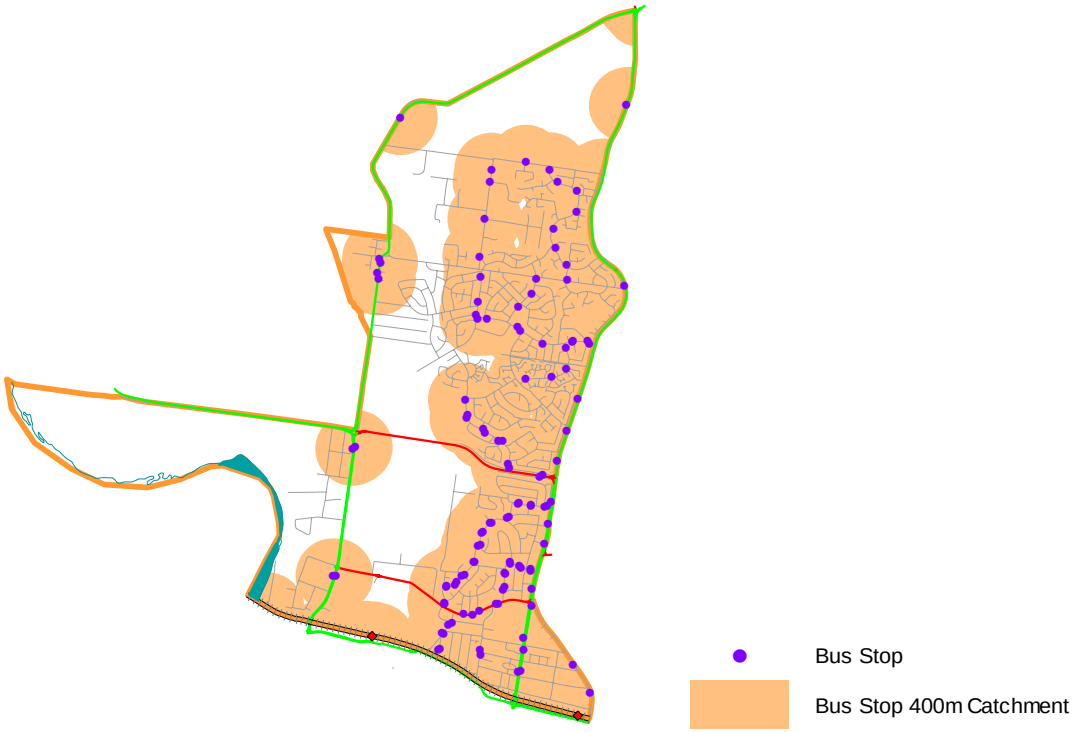
Bus Network:

The figure below shows the layout of bus services in Cranebrook SLA.



Bus Catchment Areas:

The figure below shows the areas of Cranebrook SLA which are within the 400m walking catchment of a bus stop. It shows that 74% of the developed areas fall within this catchment, this is significantly lower than the urban average of 88%. Bus network coverage should be increased in the Cranebrook area to cover the majority of the existing developed areas.



Catchment within 400m of Bus Stop in:	Area (sqm)	Coverage (%)
SLA	11.5	59%
Developed Areas	9.0	74%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for Cranebrook SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

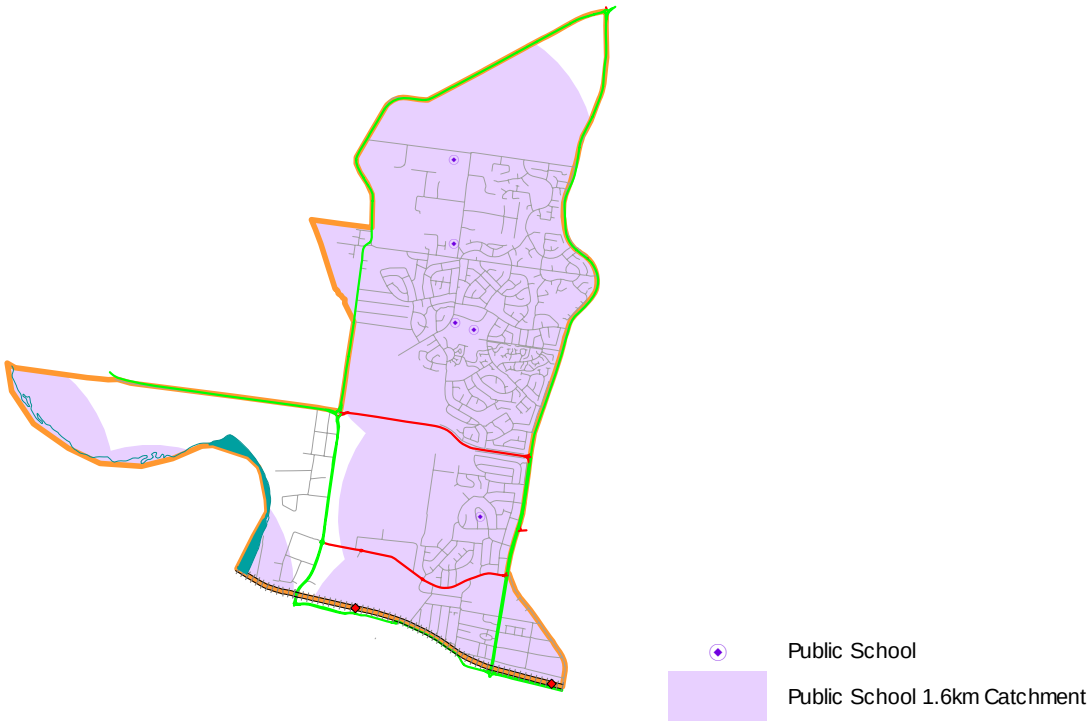
Buses and/or trains serve 69.9% of Cranebrook SLA while the remaining 30.1% by area do not have ay services. The majority of the SLA (44.2%) is served by buses with 15-30 minutes frequencies. Buses are running at a frequency of less than 15 minutes for 19.6% of the total SLA area while buses with 30-60 minutes frequencies serve 4.2% of Cranebrook. The study also indicated that no bus services are available for 32% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. Cranebrook SLA has 7 different bus routes serving the SLA:

- 3 bus routes serve the SLA during pre peak periods and on weekends;
- 2 routes serve the study area during night time periods;
- 2 bus routes meet the standard for route directness by having a factor of 1.00;
- while the remainder of the bus routes recorded factors ranging from 1.08 – 1.31.

Public School Catchment Area:

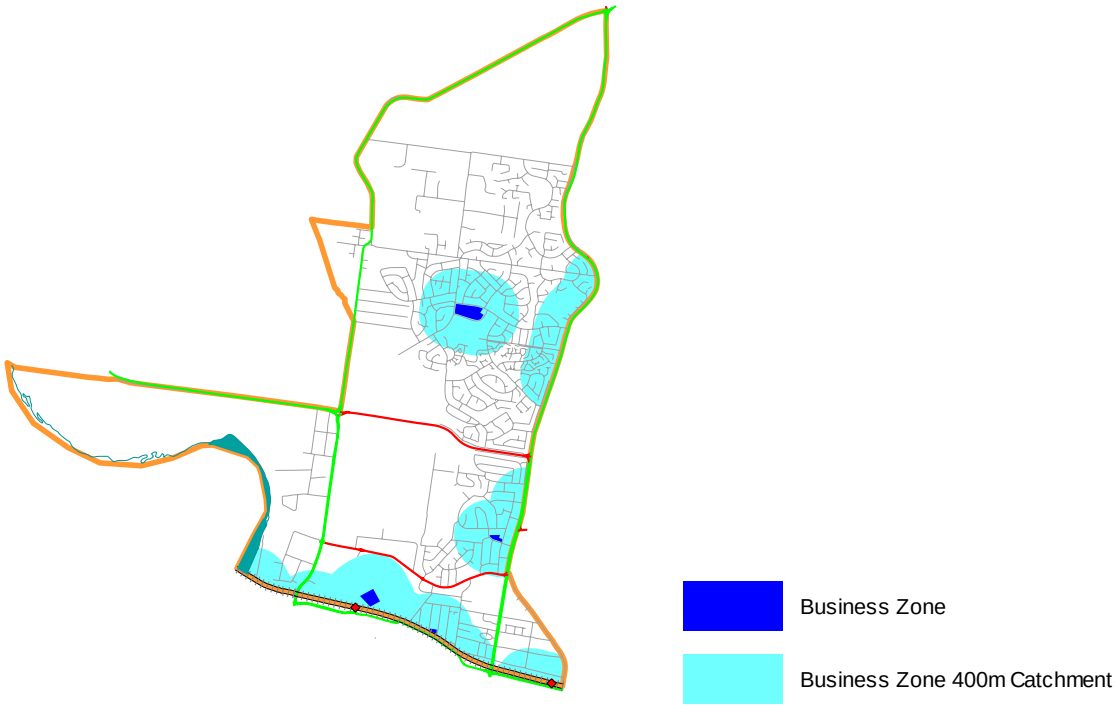
The figure below shows the areas of Cranebrook SLA that are within the 1.6km public school catchment. It shows that the 91% of the developed areas are within these catchments. Children outside these areas are eligible for free bus travel passes.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	16.0	82%
Developed Areas	11.1	91%

Local Shopping Centre Catchment Area:

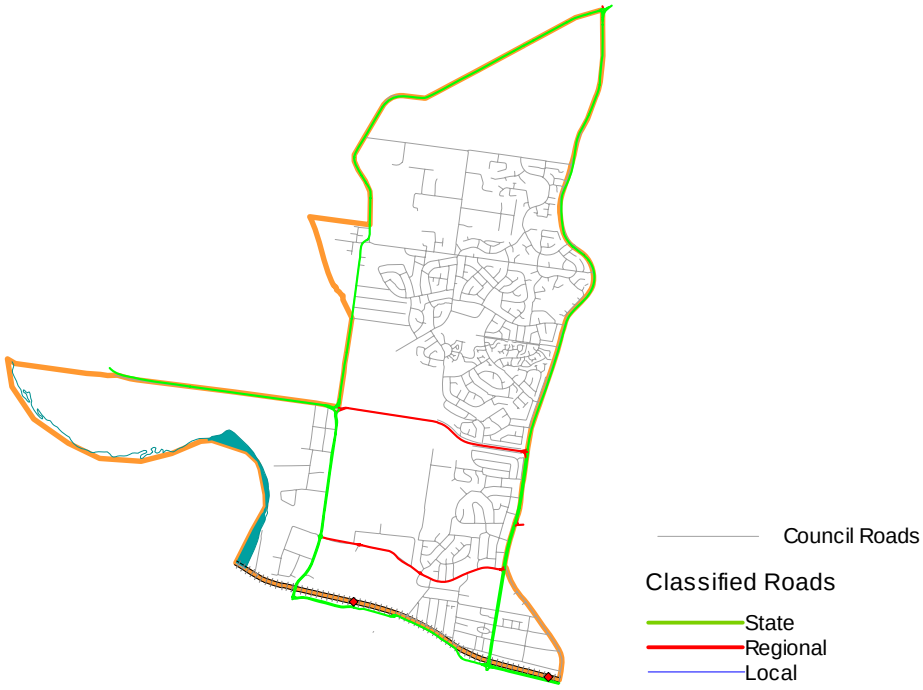
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within Cranebrook SLA. 23% of the developed areas are within these catchment areas, lower than the urban area average of 26%, and has the second lowest coverage of all urban SLAs. This means that over 75% of the area is more likely to choose to drive rather than walk to the shops due to the distances. Cycle networks must be enhanced as an alternative to driving these longer distances. Consideration should be given to providing more shopping facilities within northern parts of the existing areas and capitalising on opportunities with the URAs.



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	3.6	19%
Developed Areas	2.8	23%

Road Infrastructure:

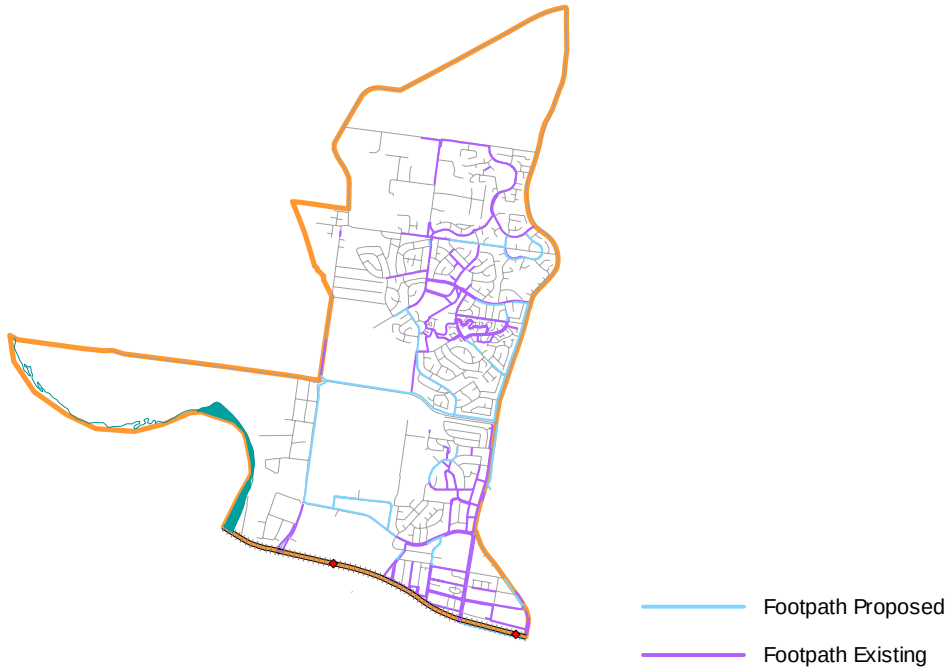
The figure below shows the location of State and Regional Roads in Cranebrook SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	27.0	1.4
Local Roads	103.7	5.3
All Roads	130.7	6.7

Footpath Networks

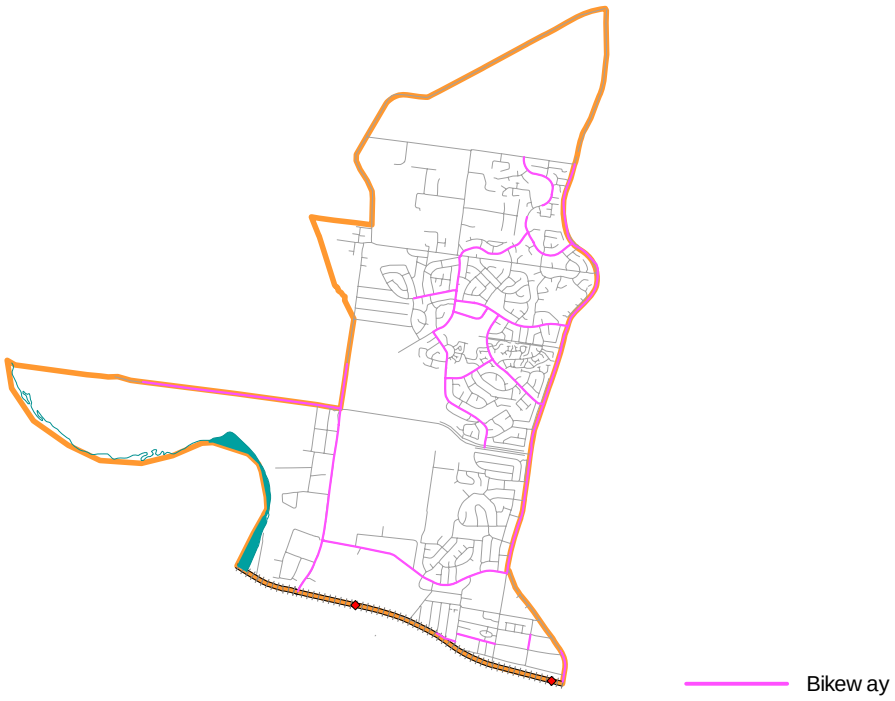
The figure below shows the extent that footpaths are provided within St Marys SLA. 13% of all roads within the SLA have footpaths. There is a significant quantity of proposed footpaths within the area, these should be implemented as a priority with a focus on linking the activity centres to the residential areas.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	6.3	12%	0.3	14.3	27%	0.7
Local Roads	28.2	14%	1.4	35.3	17%	1.8
All Roads	34.5	13%	1.8	49.6	19%	2.5

Bikeways

The figure below shows the bikeways that are provided within Cranebrook SLA, there is a lack of connections east-west and poor connectivity with the rail stations.



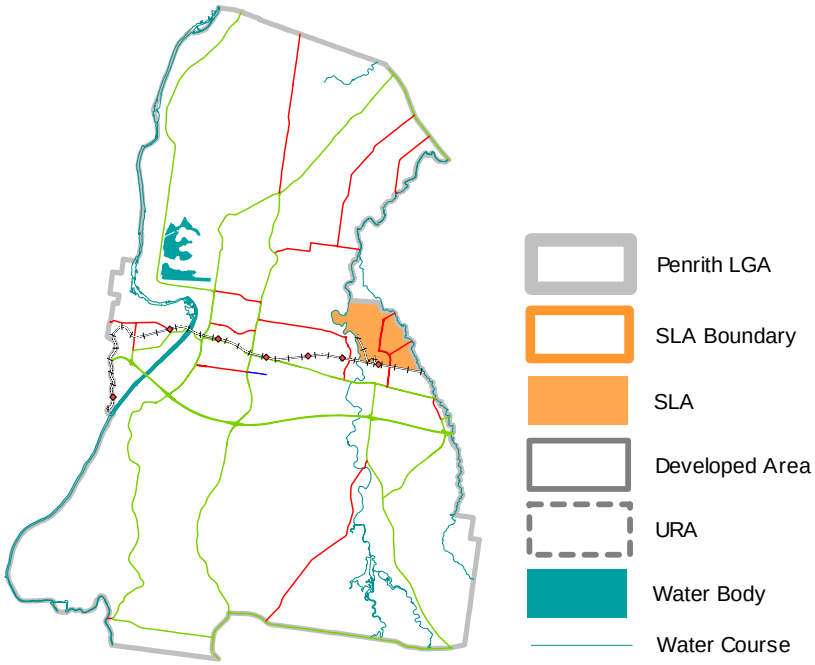
Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	12.4	46%	0.6
Local Roads	10.3	10%	0.5
All Roads	22.6	17%	1.2

Key Suburban SLA Issues:

S45) Well positioned to benefit from facilities/employment in new release area (ADI and Penrith Lakes) and industrial areas
S46) Implementation of PAMP recommendations required
S47) Missing links in bus network coverage into industrial areas and Penrith station
S48) Cycle links required in residential areas and throughout the de-facto collector road network
S49) Traffic management concerns on de-facto residential collector roads

6.1.9 NORTH ST MARYS

The North St Marys SLA incorporates the suburbs of North St Marys and parts of St Marys (Dunheved). North St Marys is an established residential area with an industrial area in the south and west and a small commercial area around Parklawn Place. The SLA is bounded by the LGA boundary/Ropes Creek in the north and east, The Western Railway line in the south and South/Wianamatta Creek in the west. North St Marys experienced a small decrease in population between 1996 and 2001, the result of a decline in dwelling stock and the average number of persons living in each dwelling.



Features:

Major features of the area include:

- St Marys Railway Station;
- North & South ADI Precincts;
- St Marys North Public School & Chifley College;
- Dunheved Golf Club;
- St Marys Rugby League Club;
- Sports Stadium; and
- Boronia Park and Poplar Park; and
- Proposed regional Park.

Age:

The age structure of North St Marys in 2001 was represented by large numbers of persons in both young and more mature family age groups, with 64.5% of the population aged 0-17 and 25-49, which is indicative of continued new residential development in the area over a number of decades. North St Marys also had a notable share of its population in the 'empty-nester' and retiree age groups (50-69), whose children would have already left the family home.

Income:

There was a notably greater proportion of households with low income levels in North St Marys than Penrith City in 2001 and, as a result, a smaller share of households with high income. The lower income levels may relate to higher unemployment rates, the greater share of the population aged 60 and over, many of whom would rely on old-aged pensions for income and the greater share of persons employed in lower skill jobs and a smaller percentage of professional and skilled workers.

Car Ownership:

Compared with Penrith City, North St Marys had a significantly lower share of households owning motor vehicles in 2001. The most prominent categories in this area were households with 1 vehicle (43.1%) and 2 vehicles (25.2%).

Households:

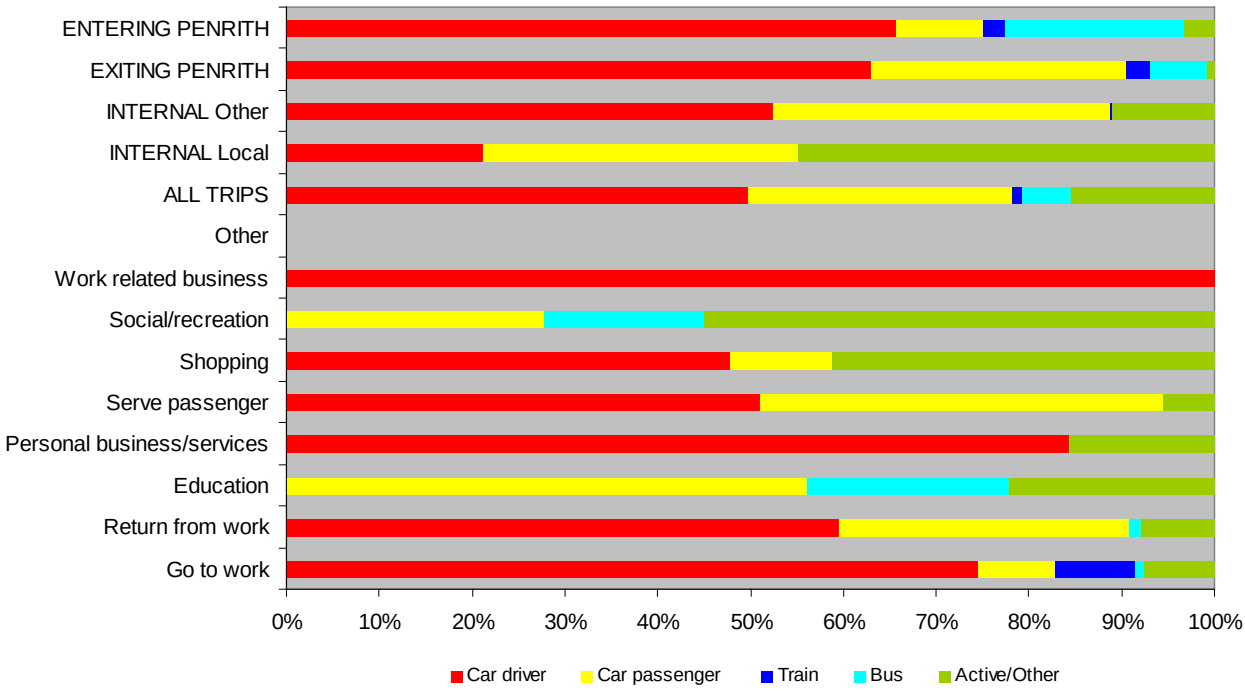
There was a significant share of family households in North St Marys, which is illustrative of the role that the area plays in the regional housing market.

Dwellings:

There is a significant concentration of detached dwellings in North St Marys, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families. The proportion of detached dwellings in North St Marys was significantly greater (96.8%) than Penrith City (85.3%) in 2001, while the percentage of semi-detached etc. dwellings was smaller.

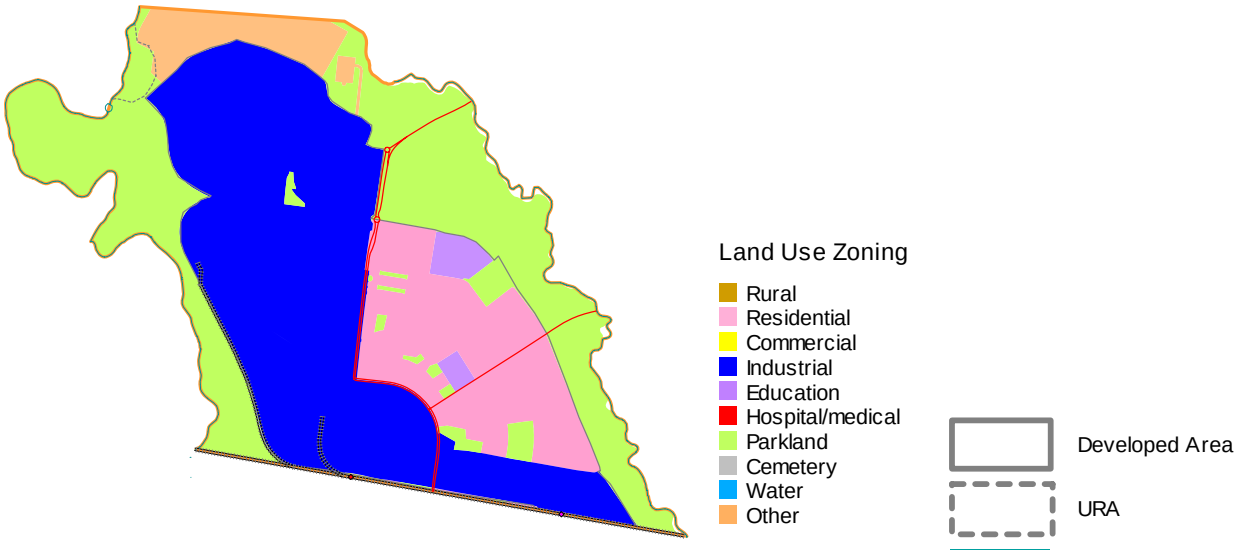
Mode of Travel:

The mode of travel for the North St Marys SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the North St Marys SLA. We can see the predominance of industrial lands (42%) – this represents the SLA with the largest proportion of industrial land in the LGA. Correspondingly North St Marys has the lowest proportion of residential zoned land (6%) in the urban area. The majority of the remaining land is zoned parkland (35%). Opportunities to intensify land uses around the existing railway station should be considered.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	7.5	-
Residential	1.2	16%
Employment	3.3	44%
Developed Area	4.6	62%
URA	0.1	1%
Future Developed Area	4.7	63%

62% of the land is currently developed, a small portion of land in the north forms part of the St Marys Release area.

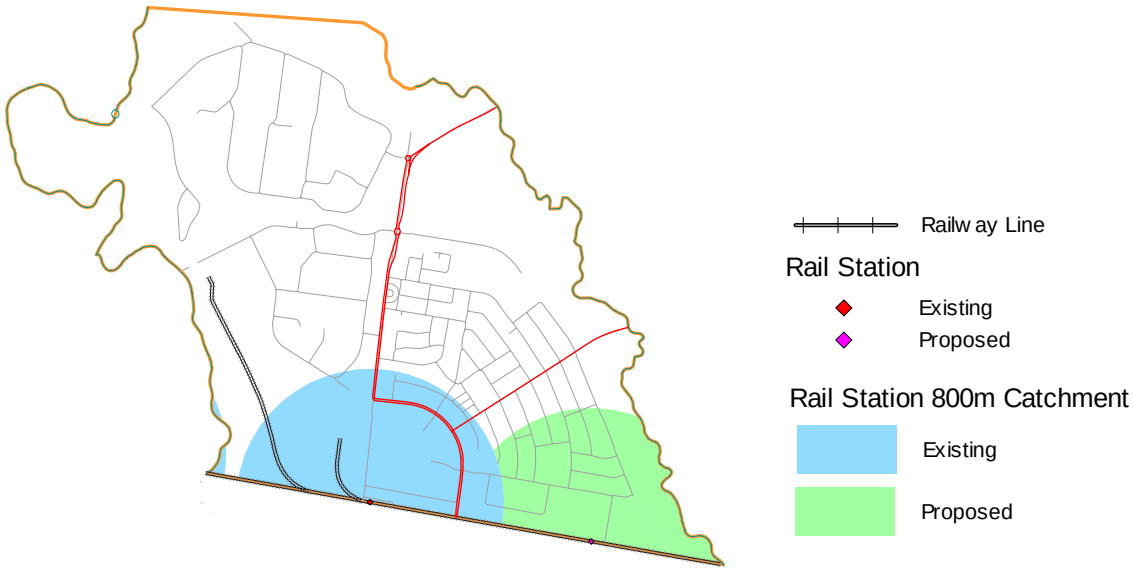
Population, Employment & Workforce:

The population is expected to increase slightly with no increase in employment in the area, the employment: workforce ratio will remain reduce from 3.8 to 3.2.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	3,972	532	4,469	598
Resident Workforce	1,407	188	1,632	219
Employment	5,262	705	5,262	705
Workforce Ratio	3.7		3.2	

Rail Catchment Areas:

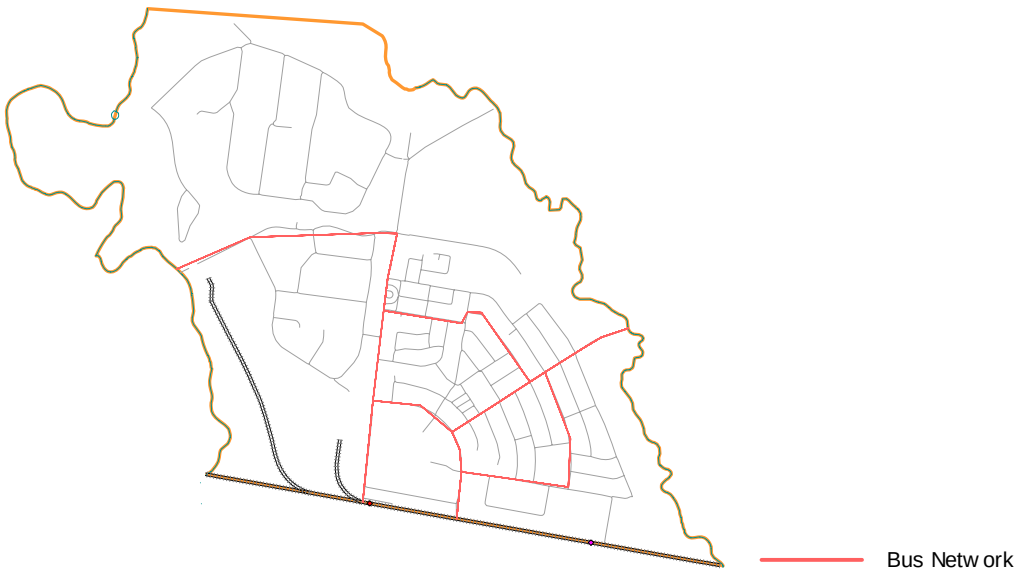
The figure below shows the location of pedestrian catchments for railway stations within the North St Marys SLA. We can see that only 20% of the developed area of North St Marys is within the walking catchment of the existing rail station, this is predominantly in the industrial areas.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	1.8	24%
Developed Areas	0.9	20%

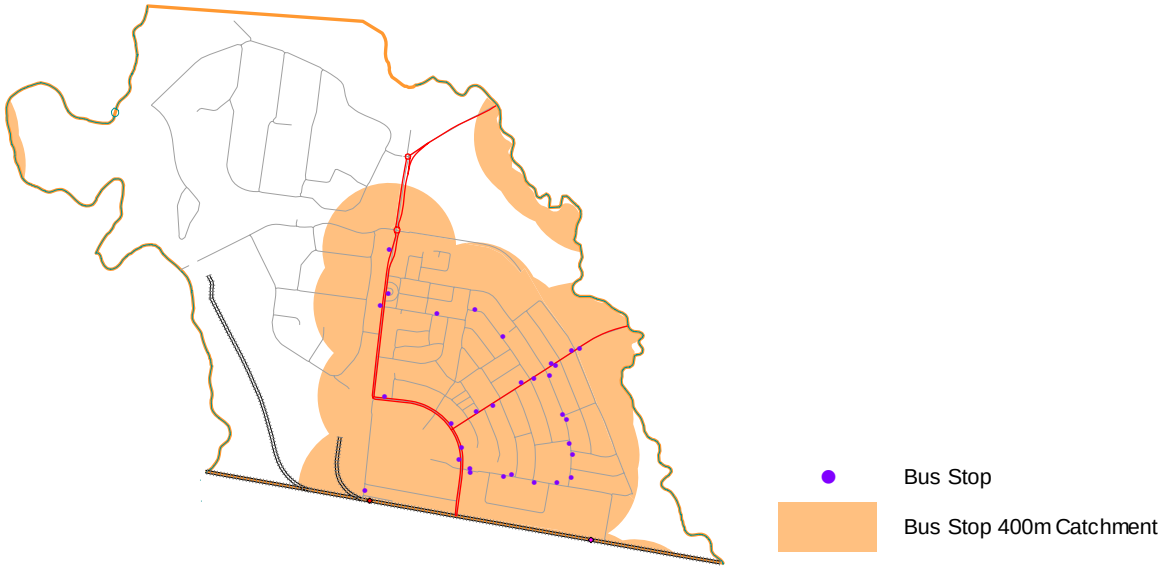
Bus Network:

The figure below shows the layout of bus services in North St Marys SLA.



Bus Catchment Areas:

The figure below shows the areas of North St Marys SLA which are within the 400m catchment of a bus stop. The developed residential area has good coverage, however there is a large portion of developed industrial area in the north which lacks access to bus services. Bus services must be enhanced in the employment areas to improve access to the rail station.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	3.3	44%
Developed Areas	2.7	59%

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for North St Marys SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

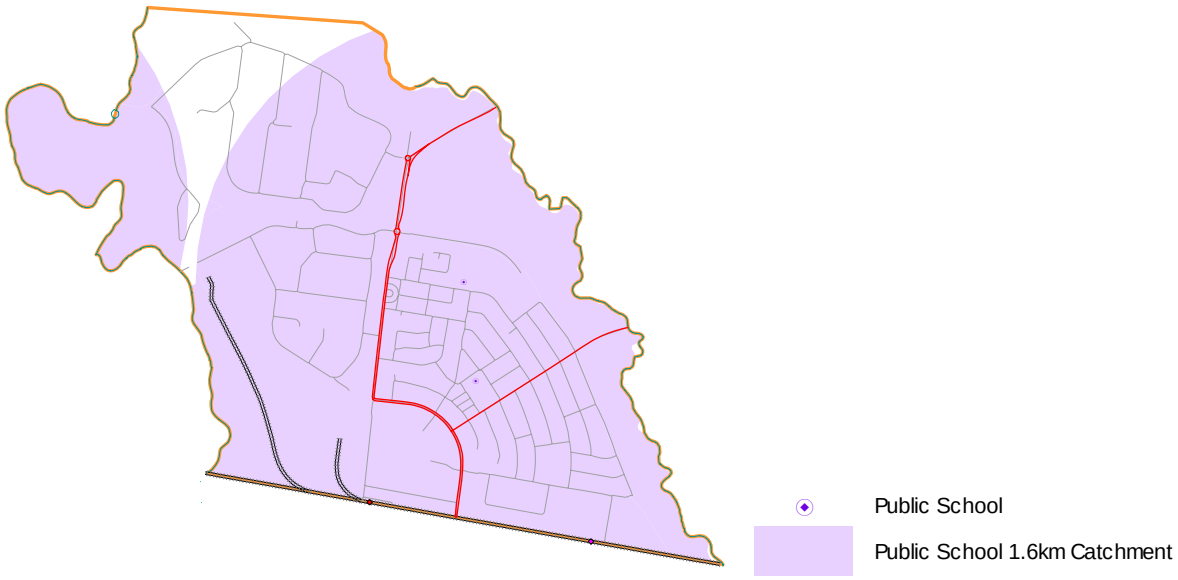
Buses and/or trains serve 57.8% of the North St Marys SLA while the remaining 42.2% of the area does not have services. The majority of the area (47.4%) is served by buses with 15-30 minutes frequencies while buses are running at a frequency of 30-60 minutes for 3.1% of the area. The study also indicated no bus services are available for 49.5% of the area.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. North St Marys SLA has 2 different bus routes serving the SLA:

- both the bus routes serve the SLA on Saturdays;
- only 1 bus route serves the SLA during night time periods and Sundays; and
- the bus routes recorded route directness factors of 1.00 and 1.08.

Public School Catchment Area:

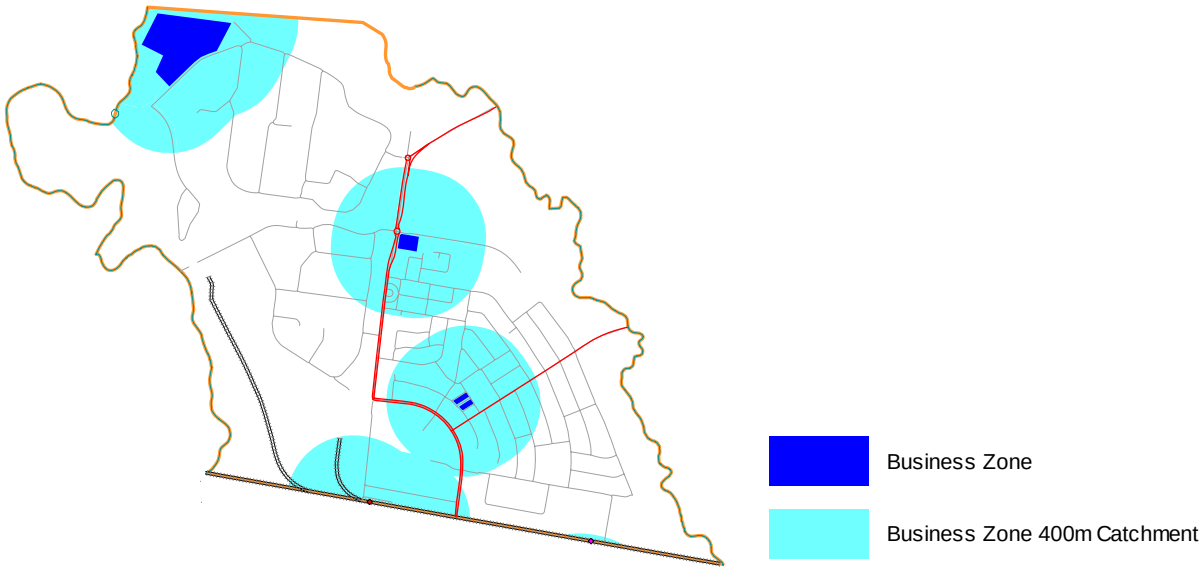
The figure below shows the areas of North St Marys SLA that are within the 1.6km public school catchment. It shows that the residential areas are well served by public schools.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	6.7	89%
Developed Areas	4.2	92%

Local Shopping Centre Catchment Area:

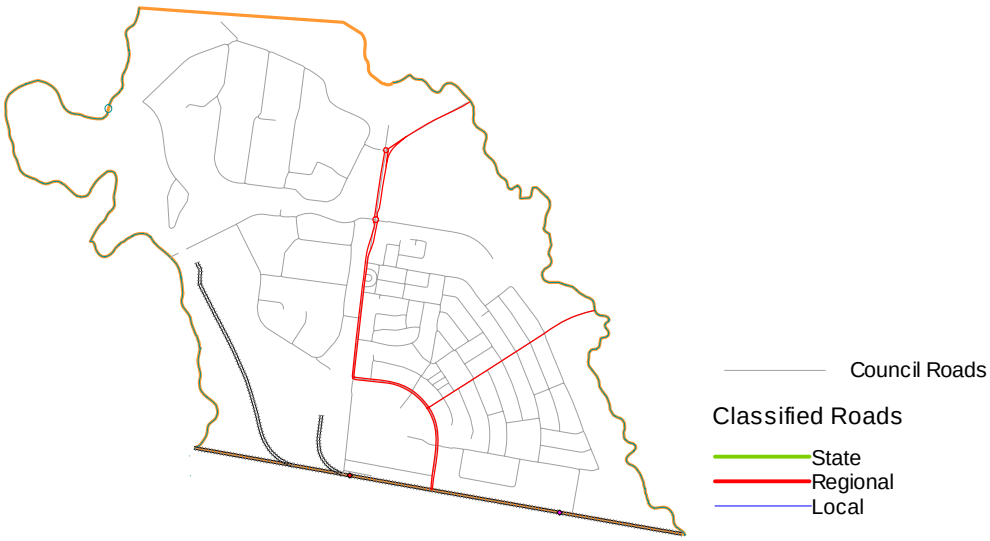
The figure below shows the 400m walking catchment areas for business zones (shopping centres) within North St Marys SLA. 37% of the developed areas are within these catchment areas. Walking facilities such as footpaths should be enhanced throughout these catchment areas, with cycle networks focused on in the area less connected to shops.



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	2.3	31%
Developed Areas	1.7	37%

Road Infrastructure:

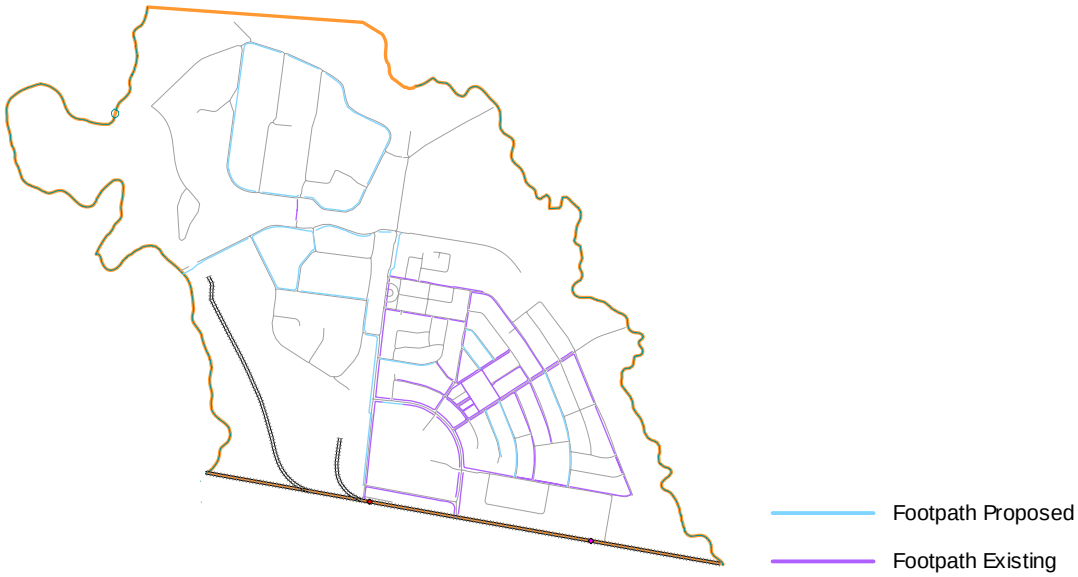
The figure below shows the location of State and Regional Roads in North St Marys SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	4.3	0.6
Local Roads	33.2	4.4
All Roads	37.6	5.0

Footpath Networks

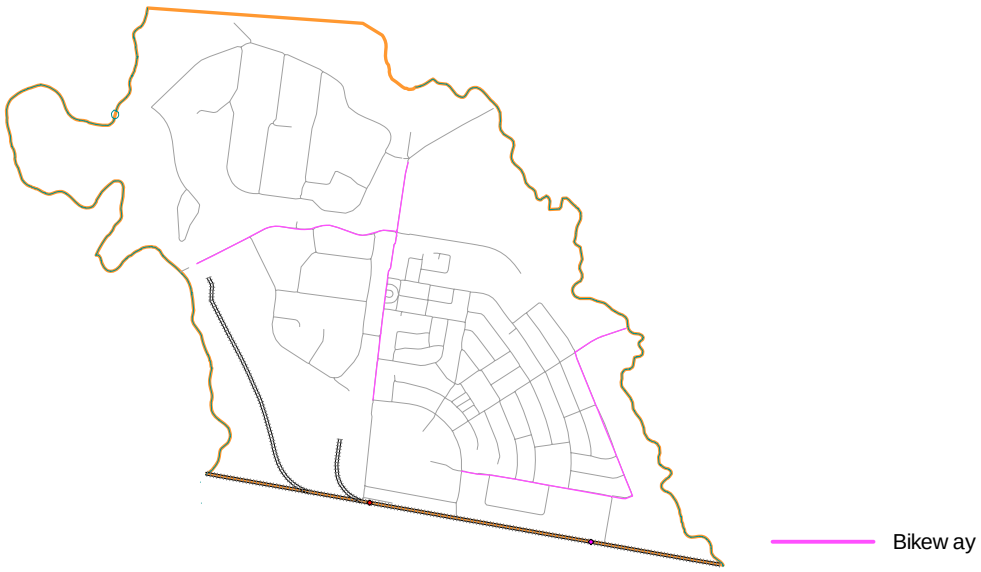
The figure below shows the extent that footpaths are provided within North St Marys SLA. 17% of all roads within the SLA have footpaths, with over 44% of state and regional roads covered. Emphasis should be placed on completing footpath links to industrial area to the north and west.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	3.9	44%	0.5	4.6	53%	0.6
Local Roads	9.1	14%	1.2	17.6	26%	2.4
All Roads	13.0	17%	1.7	22.2	30%	3.0

Bikeways

The figure below shows the bikeways that are provided within North St Marys SLA, there is a lack of continuity and no connections to the industrial areas and rail station.



Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	1.8	41%	0.2
Local Roads	3.2	10%	0.4
All Roads	5.0	13%	0.7

Key Suburban SLA Issues:

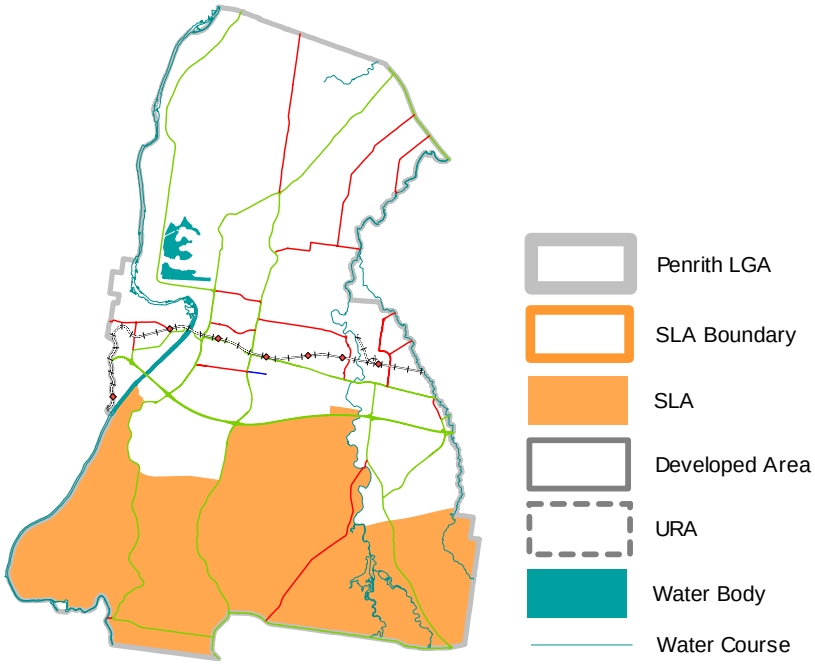
S50) Need to link public transport and active transport infrastructure in new release area (ADI site) and industrial areas
S51) Lack of pedestrian and cycle links in industrial and residential areas
S52) Bus network needs to be extended in the industrial estates to connect with St Marys Station

6.2 RURAL AREAS

6.2.1 SOUTHERN RURAL

The Southern Rural SLA incorporates the suburbs of Mulgoa, Orchard Hills, Badgerys Creek, Luddenham, Regentville, Wallacia, Mount Vernon and Kemps Creek. The southern rural SLA is all the remaining land to the south of the previous urban SLAs. This SLA comprises predominantly rural areas with residential areas in the villages of Mulgoa and Wallacia and with defence force land usage in the north.

All areas experienced an increase in population between 1996 and 2001, a result of new dwellings being added to the area.



Features:

Major features of the area include:

- Public schools - Nepean Christian School, Penrith Anglican College, Trinity Catholic Primary School, Emmaus Catholic College and Mamre Christian College;
- Hopewood Health Centre;
- Winbourne Edmund Rice Retreat;
- The Bill Spilstead Complex for Canine Affairs;
- CSIRO Research Station;
- University of Sydney Fleurs Radio Observatory and Veterinary Facilities;
- Waste Services Depot;
- Luddenham Croatia Soccer Club & Croatian Culture Association;
- Twin Creeks Golf Club, Wallacia Golf Course and Luddenham Showgrounds;
- Rileys Mountain Lookout, The Rock Lookout, Blue Mountains National Park (the portion east of the Nepean River), Nepean Gorge, the Mulgoa Valley, Nepean Gorge Walking Trail & Picnic Area, Warragamba Park and Samuel Marsden Reserve.

Age:

There was a significant share of persons in the family age groups in all areas in 2001, most notably children in school age groups (5-17) and their parents in their thirties and forties. Regentville-Mulgoa-Wallacia and Kemps Creek-Badgerys Creek-Luddenham-Mount Vernon also had a notable share of its population in the 'empty-nester' and retiree age groups (50-69), whose children would have already left the family home.

Income:

An analysis of the household income levels in 2001 for Regentville-Mulgoa-Wallacia and Orchard Hills relative to Penrith City showed a greater proportion of high income households and a lesser share at the low income end. Kemps Creek-Badgerys Creek-Luddenham-Mount Vernon when compared to Penrith City in 2001 indicated similar income levels.

Car Ownership:

There was a greater percentage of households in Regentville-Mulgoa-Wallacia that owned 2 or more motor vehicles compared to Penrith City in 2001. This may suggest that there is an absence of public transport or families with an adult and children at home. The most prominent categories in this area were households with 2 vehicles (36.5%) and 3 vehicles or more (26.2%).

Orchard Hills had a substantially higher share of households owning motor vehicles compared to Penrith City in 2001. This is indicative of a preference (or need) to use private mobility options over public transport options. The most prominent categories in this area were households with 2 vehicles (44.9%) and 3 vehicles or more (34.7%).

There was a greater percentage of households in Kemps Creek-Badgerys Creek-Luddenham-Mount Vernon that owned 2 or more motor vehicles compared to Penrith City in 2001. This hints at a preference for private transport over public transport, the relative isolation of rural-residential development and larger dwellings with vehicle accommodation. The more limited public transport options would also be a contributing factor. The most prominent categories in this area were households with 3 vehicles or more (36.8%) and 2 vehicles (32.3%).

Households:

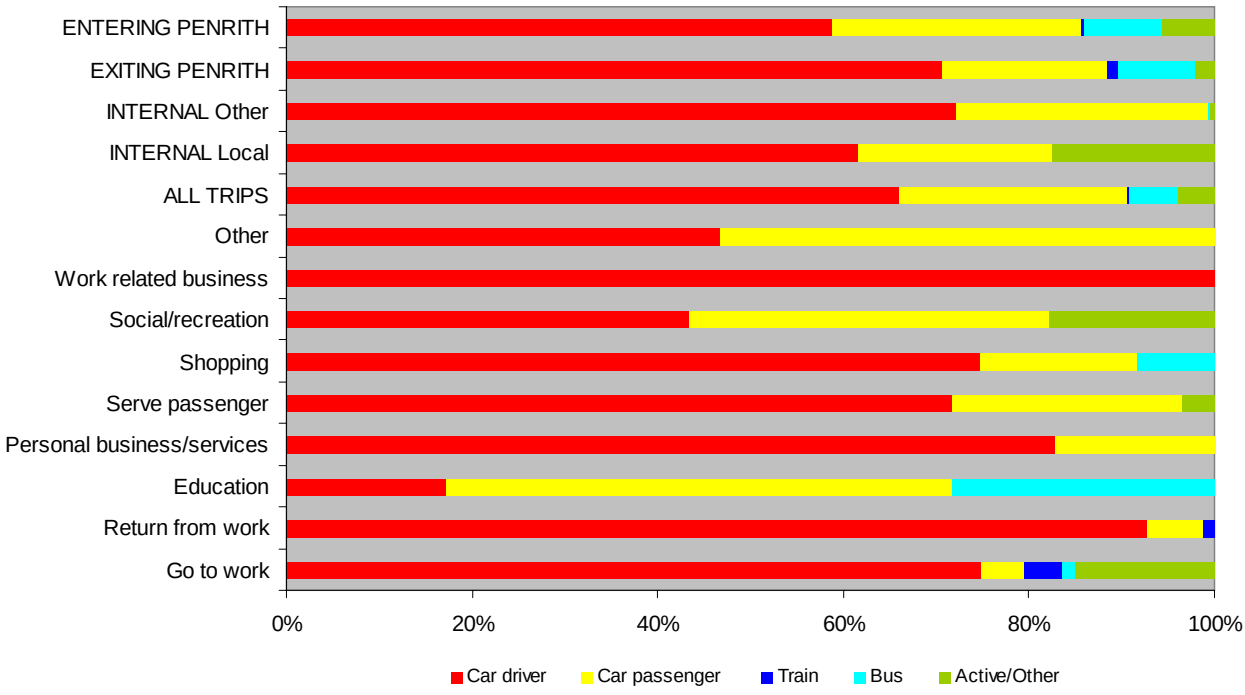
The combination of traditional and non-traditional household types in Regentville-Mulgoa-Wallacia is indicative of the diverse household structure of the area in 2001. The basis for the mix of household types relates to the broad spread of the population in a number of age groups. There was a significant share of family households in Orchard Hills and Kemps Creek-Badgerys Creek-Luddenham-Mount Vernon, which is illustrative of the role that the area plays in the regional housing market.

Dwellings:

There is a significant concentration of detached dwellings in all areas, which is consistent with a greater degree of similarity in residential land uses. The greater share of detached dwellings means that this area is more likely to appeal to families. In 2001, the percentage of detached dwellings (85.3%) in all areas when compared to Penrith City was a significantly greater while the proportion of flats and apartments was smaller.

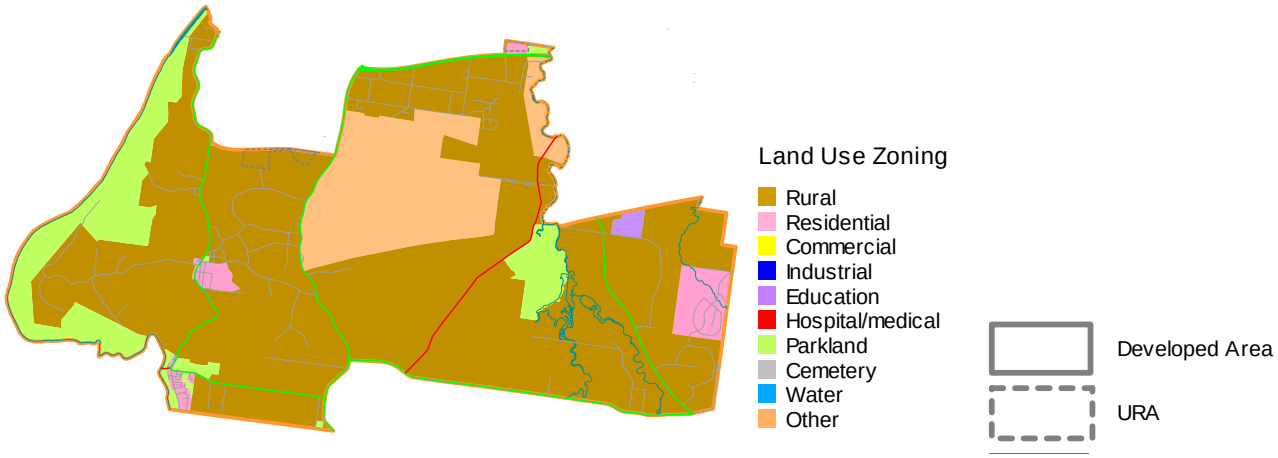
Mode of Travel:

The mode of travel for the Southern Rural SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the Southern Rural SLA. We can see the predominance of rural lands (72%), only 3% of land is zoned for residential uses around the villages. There is a sizable portion of land zoned for parkland (11%) within the SLA.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	158.5	-
Residential	0.0	3%
Employment	0.0	0%
Developed Area	0.0	0%
URA	0.8	1%
Future Developed Area	0.8	1%

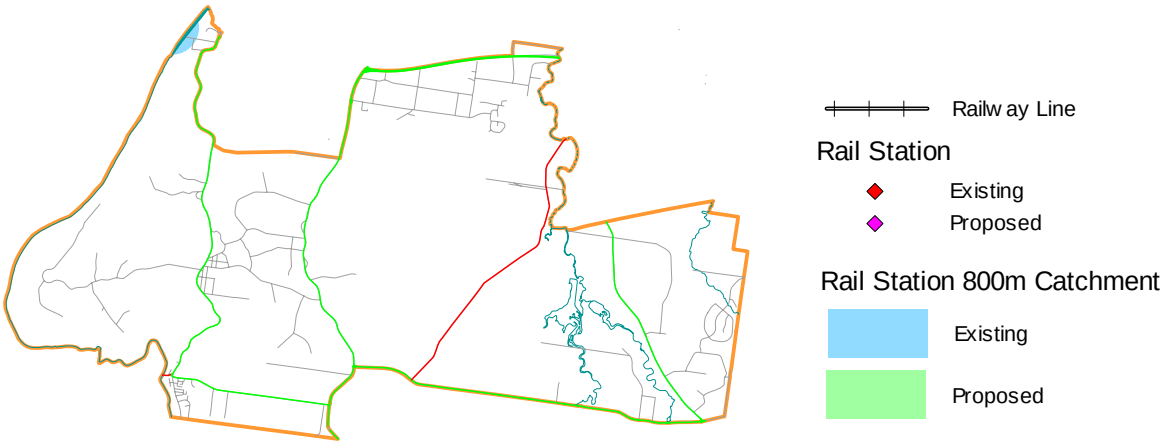
Population, Employment & Workforce:

The population is expected to increase with no increase in employment in the area.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	5,944	38	9,922	63
Resident Workforce	2,922	18	4,722	30
Employment	1,514	10	1,514	10
Workforce Ratio	0.5		0.3	

Rail Catchment Areas:

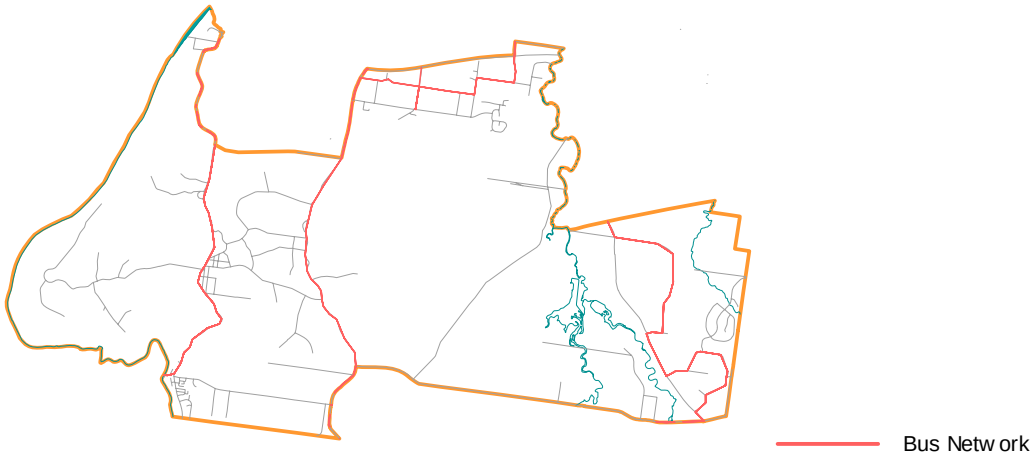
Due to the distance of the Southern Rural SLA from the Main Western Railway Line, no part of the SLA is located within the pedestrian catchment of a railway station. Hence it is critical that other forms of pubic transport including regular and demand responsive bus opportunities are provided.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	0.3	0%
Developed Areas	0.0	-

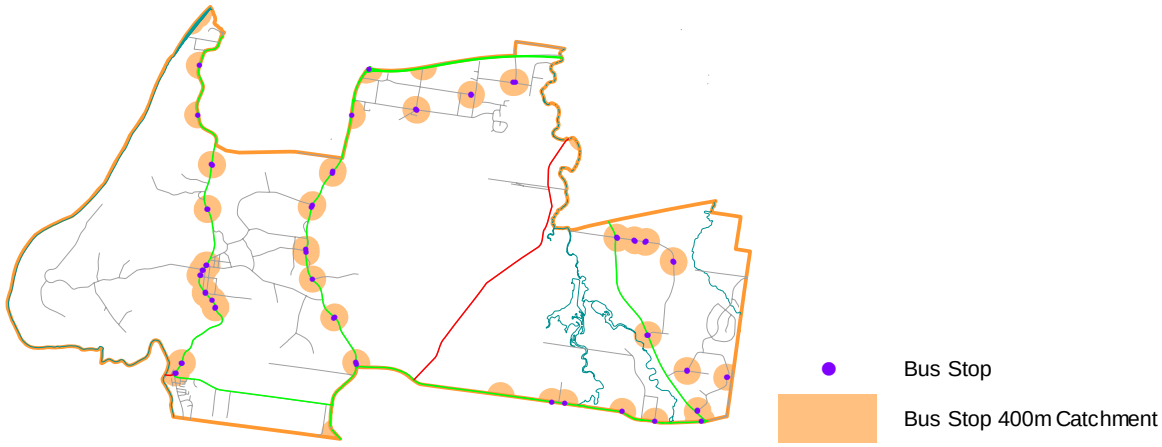
Bus Network:

The figure below shows the layout of bus services in Southern Rural SLA.



Bus Catchment Areas:

The figure below shows the areas of Southern Rural SLA which are within the walking catchment of a bus stop, this represents only 9% of the SLA. The low population densities in these rural areas make it difficult to provide good coverage to all residents. Other forms of public transport such as demand responsive personal public transport is required to fill the gaps in the network,



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	14.7	9%
Developed Areas	0.0	-

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for Southern Rural SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

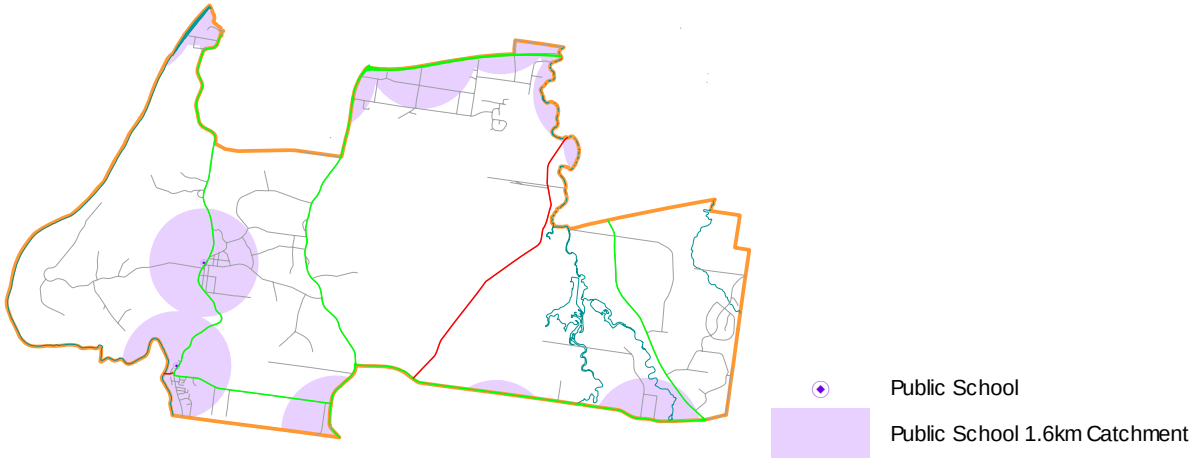
Buses and/or trains serve 22.8% of the Southern Rural SLA while the remaining 77.2% of the area does not have services. Bus services are not available for the majority of the area (77.2%). Buses are running at a frequency of >60 minutes for 16.8% of the SLA while buses with 30-60 minutes frequencies serve 6.0% of Southern Rural SLA.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. Southern Rural SLA has 6 different bus routes serving the SLA:

- 2 bus routes serve the SLA during day time periods and on weekends:
- 1 bus route meets the standard for route directness by having a factor of 1.00;
- the remainder of the bus routes recorded factors ranging from 1.03 – 1.24.

Public School Catchment Area:

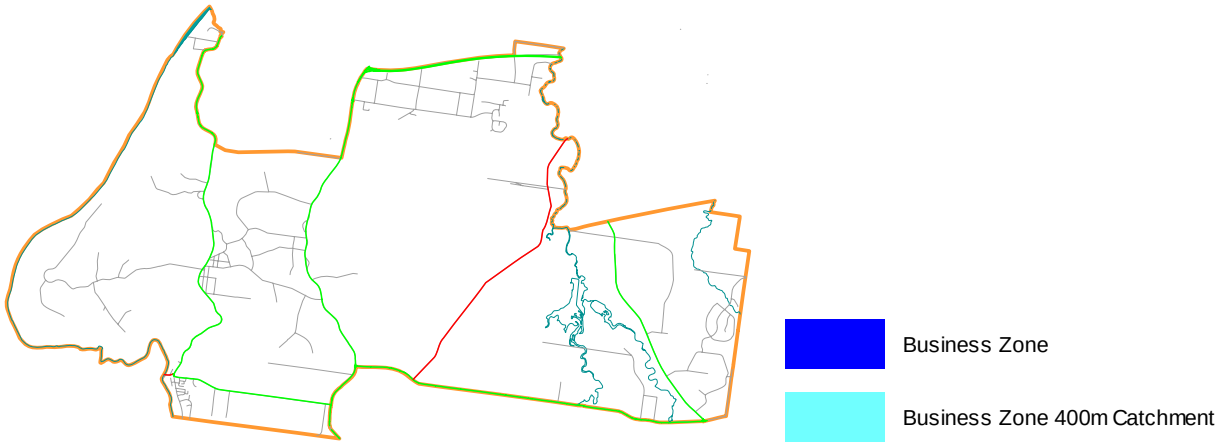
The figure below shows the areas of the Southern Rural SLA that are within the 1.6km public school catchment, this represents only 17% of the SLA.. The majority of school children in the rural SLA will be eligible for free bus travel.



Catchment within 1.6km of Public School in:	Area in km²	Coverage (%)
SLA	26.4	17%
Developed Areas	0.0	-

Local Shopping Centre Catchment Area:

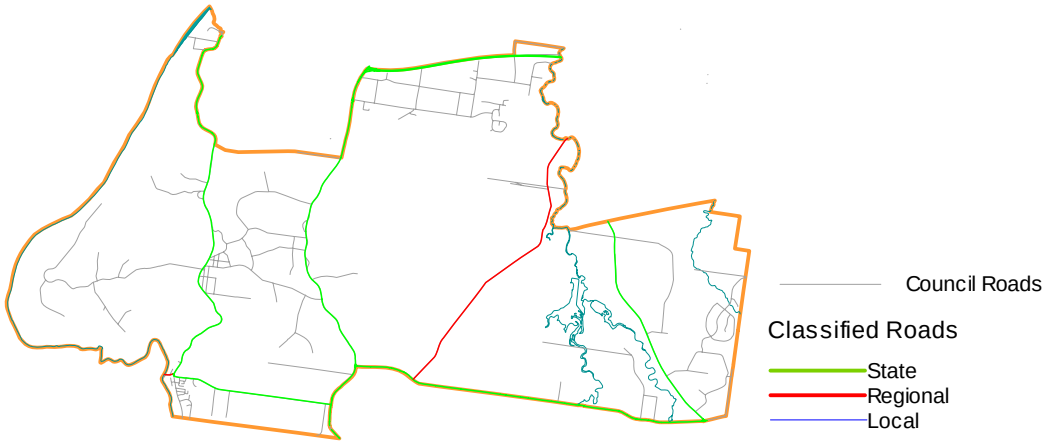
No information on the location of business zones in Southern Rural SLA was available to the study.



Catchment within 400m of shopping centre in:	Area in km²	Coverage (%)
SLA	0.0	0%
Developed Areas	0.0	-

Road Infrastructure:

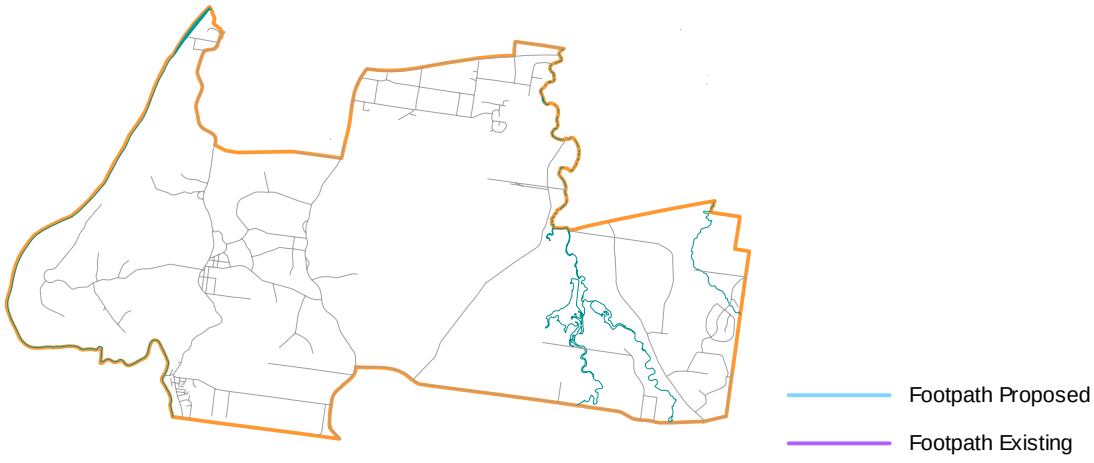
The figure below shows the location of State and Regional Roads in Southern Rural SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	61.8	0.4
Local Roads	110.4	0.7
All Roads	172.2	1.1

Footpath Networks

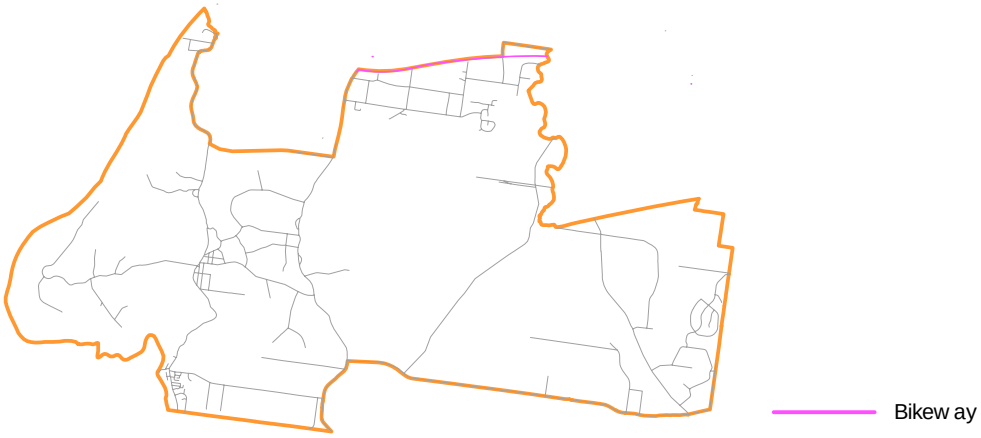
There is no reliable data available for footpaths in the southern rural areas. This highlights the inequity of rural versus urban areas of Penrith. Footpaths around the local village areas should be provided.



Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	0.0	0%	0.0	0.0	0%	0.0
Local Roads	0.0	0%	0.0	0.0	0%	0.0
All Roads	0.0	0%	0.0	0.0	0%	0.0

Bikeways

There is no reliable data available for bikeways in the southern rural areas. This again highlights the inequity of rural versus urban areas of Penrith. Bikeways leading to villages and schools should be provided.

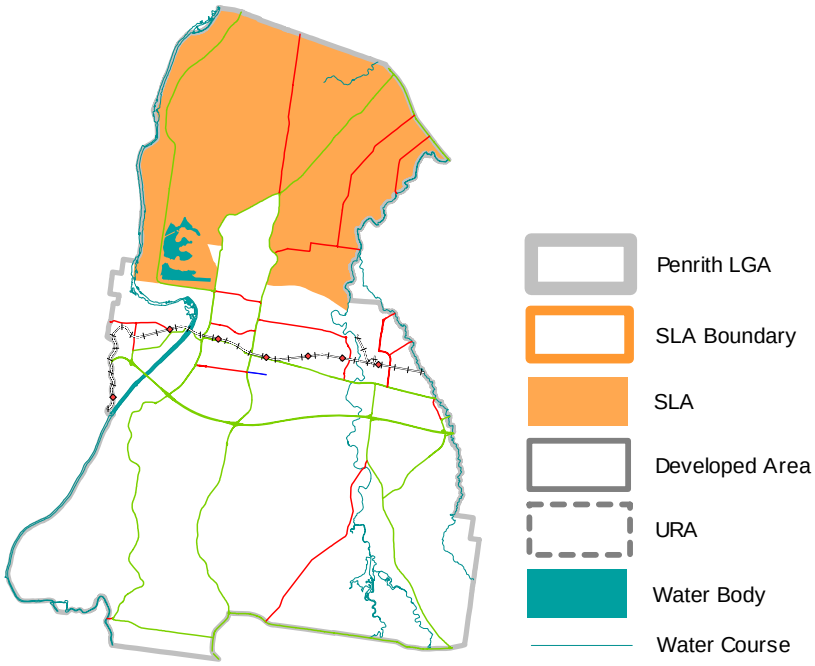


Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	5.4	9%	0.0
Local Roads	0.0	0%	0.0
All Roads	5.4	3%	0.0

6.2.2 NORTHERN RURAL

The Northern Rural SLA incorporates the suburbs of Castlereagh, Agnes Banks, Londonderry, Berkshire Park, Llandilo and northern parts of Cranebrook. This SLA is a rural in nature with extensive quarrying in the southern section fronting the Penrith Lakes. Londonderry is a mainly rural area with a small village in the centre and some defence force land use. Llandilo-Berkshire Park is a rural and rural-residential area. The northern rural SLA is all the remaining land to the north of the previous urban SLAs.

Castlereagh-Agnes Banks experienced a relatively stable population between 1996 and 2001. Londonderry and Llandilo-Berkshire Park experienced an increase in population, a result of a limited number of new dwellings being added to the area.



Features:

Major features of the area include:

- Public schools: Kindalin Christian School, Xavier Catholic College and St Paul's Grammar;
- Penrith Lakes Environmental Education Centre;
- Foundation for the Disabled;
- Castlereagh Cemetery;
- Former ADI Site;
- Castlereagh Waste Depot;
- Muru Mittigar Aboriginal Culture Centre, Londonderry and Castlreagh Halls
- RAAF Transmitting Station, John Morony Correctional Centre, South Creek Pet Cemetery & Crematorium and Berkshire Park Bird Farm;
- Llandilo Golf Driving Range, Nepean Raceway, Sydney International Regatta Centre, Penrith Whitewater Stadium and Richmond Race Track;
- Penrith Lakes Scheme;
- Penrith Lakes Regional Park, Agnes Banks Nature Reserve, the Nepean River, Castlereagh Bicentennial Demonstration Forest (Castlereagh Nature Reserve) and Wilson Park.

Age:

The age structure of Castlereagh-Agnes Banks represented a concentration of older families (emerging 'empty nesters') in 2001, with children in their late teens and twenties, many of whom would have already left home, as well as those expected to leave home in coming years, as well as their parents in their late forties and fifties.

The age structure of Londonderry in 2001 was represented by large numbers of persons in both young and more mature family age groups, with 76.5% of the population aged 0-49, which is indicative of continued new residential development in the area over a number of decades.

The age structure of Llandilo-Berkshire Park was diverse with significant numbers of persons in most young adult and mature adult age groups (18-49). There were comparatively fewer children compared to adults, showing that the birth rates of the area are relatively low and that many of the households are non-family.

Income:

An analysis of the household income levels in 2001 for Castlereagh-Agnes Banks relative to Penrith City showed a greater proportion of high income households and a lesser share at the low income end. Household income levels in 2001 for Londonderry relative to Penrith City revealed a lower share of high income households and a greater concentration of households at the low income end. A comparison of household income between Llandilo-Berkshire Park and Penrith City in 2001 indicated similar income levels.

Car Ownership:

All areas had a substantially higher share of households owning motor vehicles compared to Penrith City in 2001. The most prominent categories in these areas were households with 2 vehicles (37.2%/35.2%/37.9%) and 3 vehicles or more (34.8%/29.2%/35.7%) for the precincts of Castlereagh-Agnes Banks, Londonderry and Llandilo-Berkshire Park respectively.

Households:

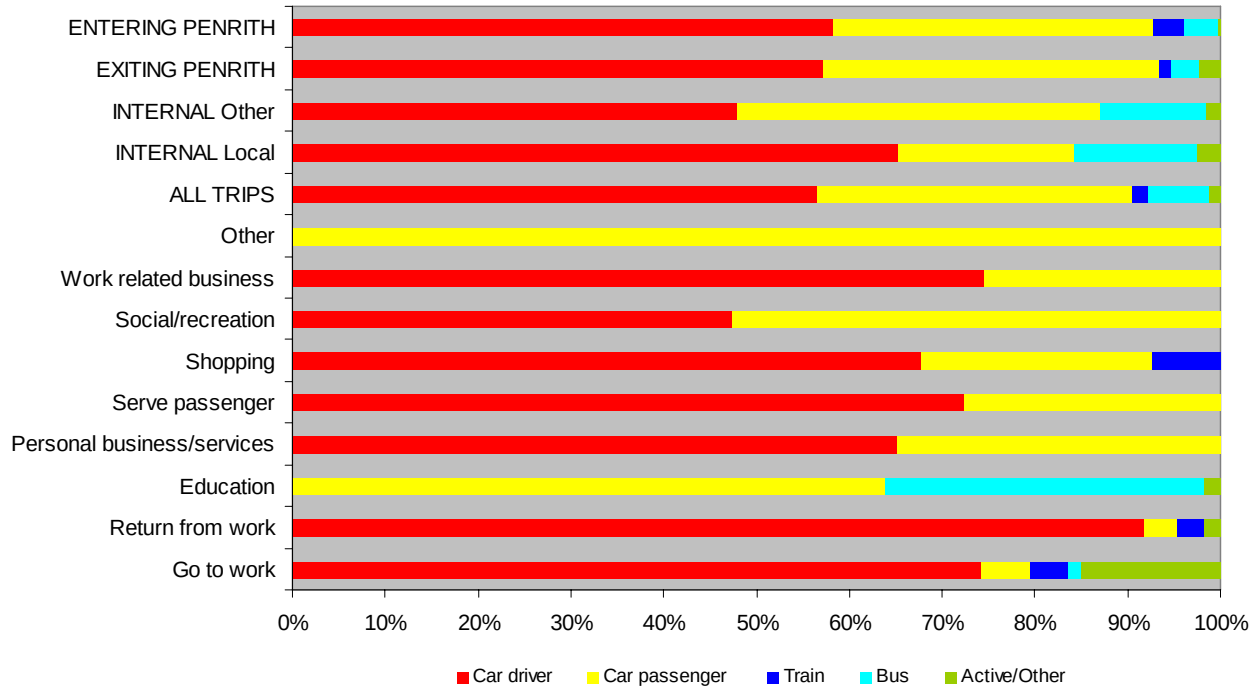
There was a significant share of family households in all areas, which is illustrative of the role that the area plays in the regional housing market.

Dwellings:

There is a significant concentration of detached dwellings in all areas, which is consistent with a greater degree of similarity in residential land uses. In 2001, the percentage of detached dwellings in Castlereagh-Agnes Banks (97.3%), Londonderry (90.7%) and Llandilo-Berkshire Park (95.8%) was higher than Penrith City (85.3%). The share of semi-detached etc. dwellings was smaller in the area.

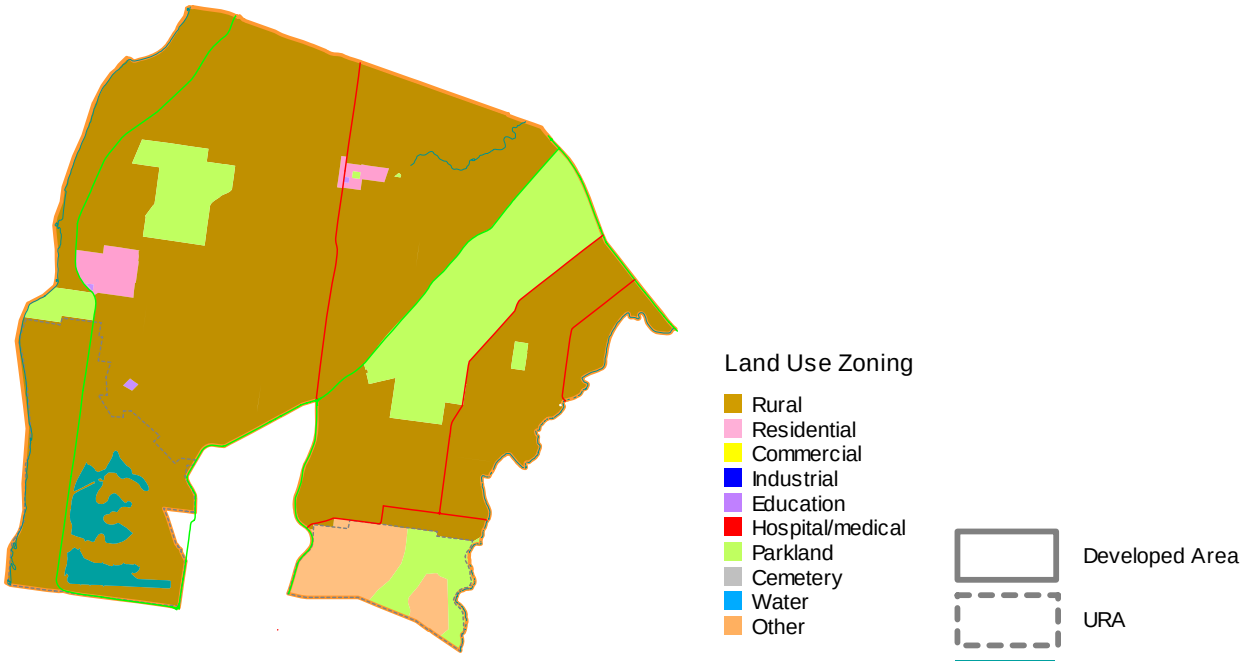
Mode of Travel:

The mode of travel for the Northern Rural SLA for the different types of trips is demonstrated in the graph below.



Land Use:

The figure below shows the different land use zones in the Northern Rural SLA. We can see the predominance of rural lands (78%), only 1% of land is zoned for residential uses around the villages. There is a sizable portion of land zoned for parkland (15%) within the SLA.



Land Use	Area in km^2	SLA Coverage (%)
Total SLA Area	121.9	-
Residential	0.0	1%
Employment	0.0	0%
Developed Area	0.0	0%
URA	23.3	19%
Future Developed Area	23.3	19%

Urban Release Areas:

The northern rural SLA will yield two of the most significant Urban Release Areas:

- Penrith Lakes – will be home to approximately 14,000 people in around 4,900 dwellings and will provide around 5260 jobs(including off-site jobs); and
- St Marys Release Area (formerly ADI site) – the Penrith component will provide over 3000 dwellings for more than 7800 people, with a further 3460 jobs.

The URAs will mean that around 19% of the Northern Rural SLA will be developed land.

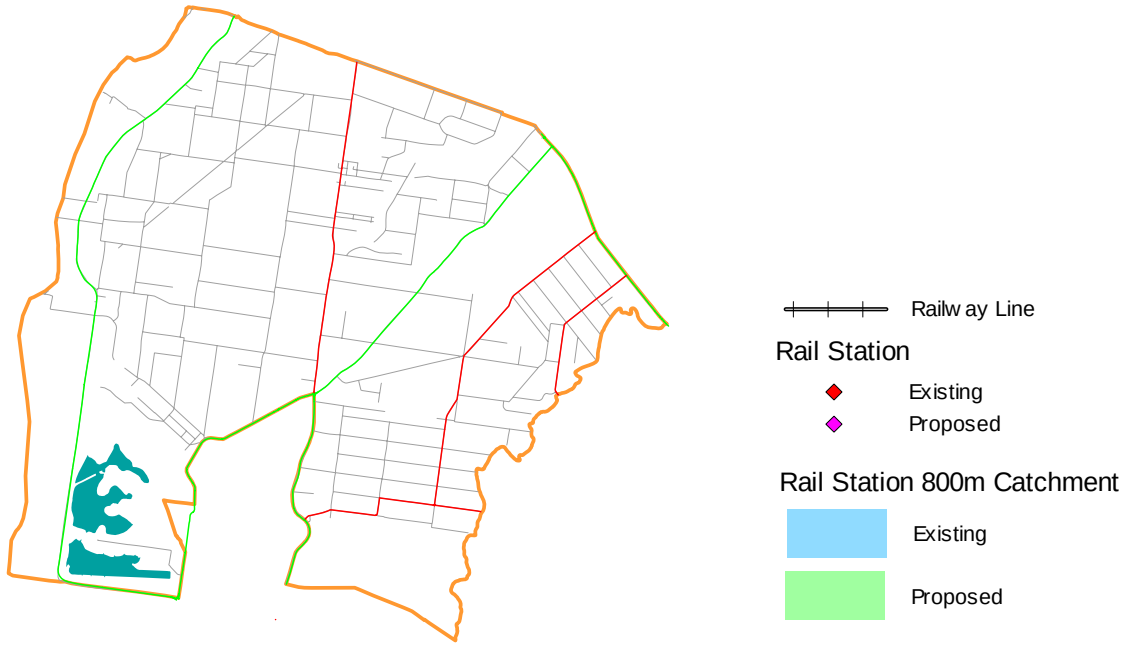
Population, Employment & Workforce:

The population and employment are both expected to increase significantly in the southern parts of the SLA.

Population	2001		2016	
	People	Population Density (Per sqkm)	People	Population Density (per sqkm
Population	8,309	68	31,461	258
Resident Workforce	3,750	31	14,236	117
Employment	2,119	17	8,603	71
Workforce Ratio	0.6		0.6	

Rail Catchment Areas:

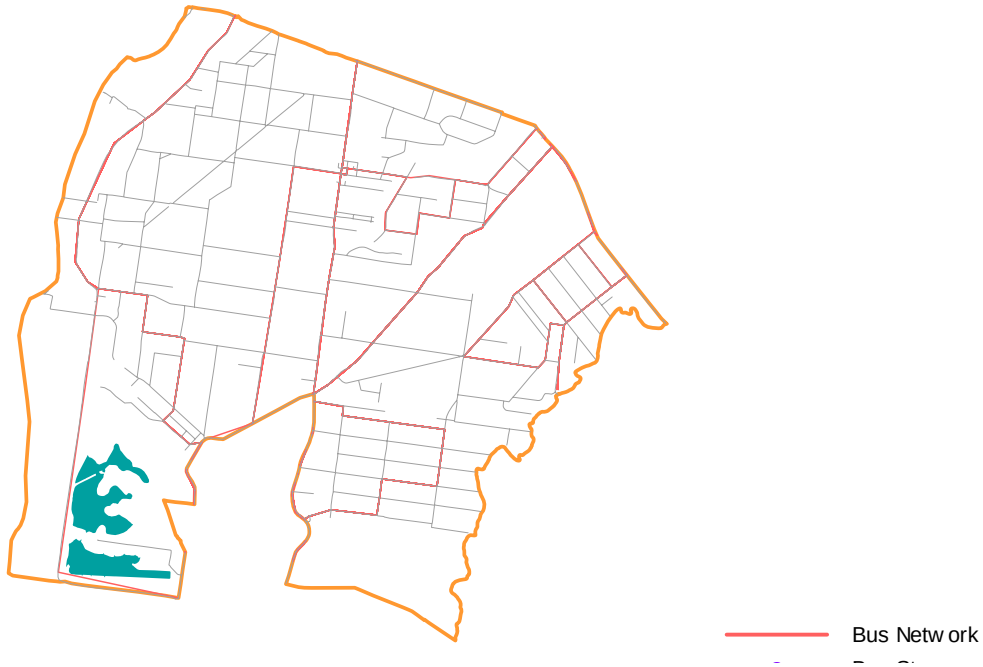
Due to the distance of the Northern Rural SLA from the Main Western Railway Line, no part of the SLA is located within the pedestrian catchment of a railway station. Hence it is critical that other forms of pubic transport including regular and demand responsive bus opportunities are provided.



Catchment within 800m of Train Station in:	Area in km^2	Coverage (%)
SLA	0.0	0%
Developed Areas	0.0	-

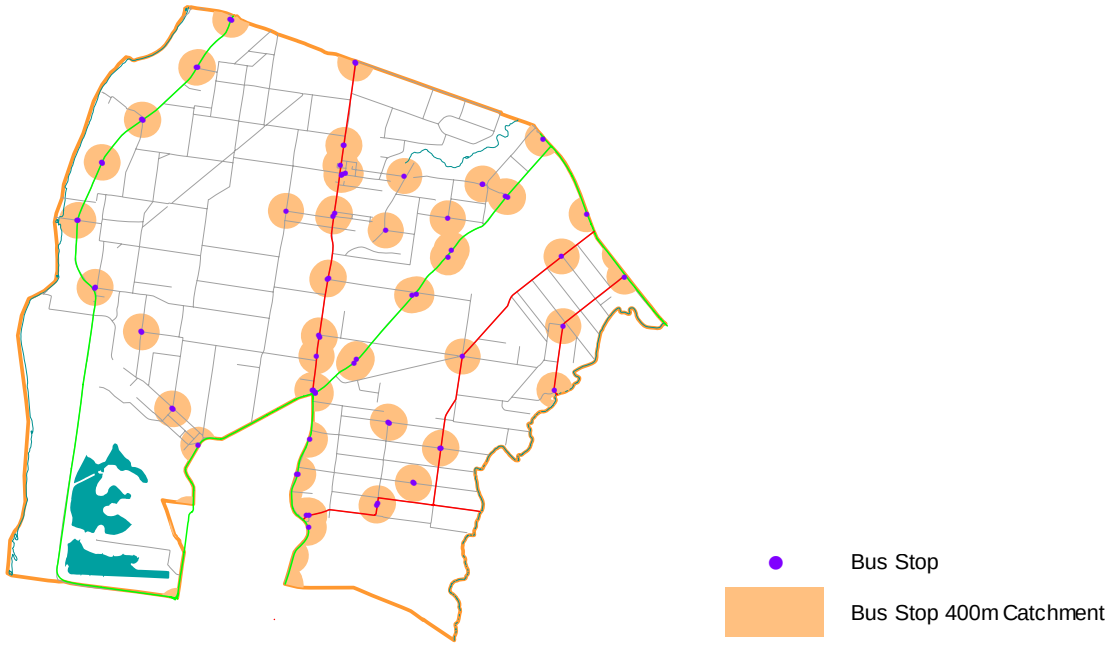
Bus Network:

The figure below shows the layout of bus services in Northern Rural SLA.



Bus Catchment Areas:

The figure below shows the areas of Northern Rural SLA that are within the walking catchment of a bus stop, this represents only 16% of the SLA, which is greater than the Southern Rural SLA.. The low population densities in these rural areas make it difficult to provide good coverage to all residents. Other forms of public transport such as demand responsive personal public transport is required to fill the gaps in the network. Bus routes to the new release areas should be provided at early stages of development.



Catchment within 400m of Bus Stop in:	Area in km^2	Coverage (%)
SLA	19.3	16%
Developed Areas	0.0	-

Public Transport Availability Indicators:

The following describes the public transport availability indicator results for the northern rural SLA as per the Bus Service Analysis Study Stage 2 report (2Plan, May 2005). It should be noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route as opposed to bus stops considered in the previous assessment. Areas defined as being served by train are within 800 metres of a train station.

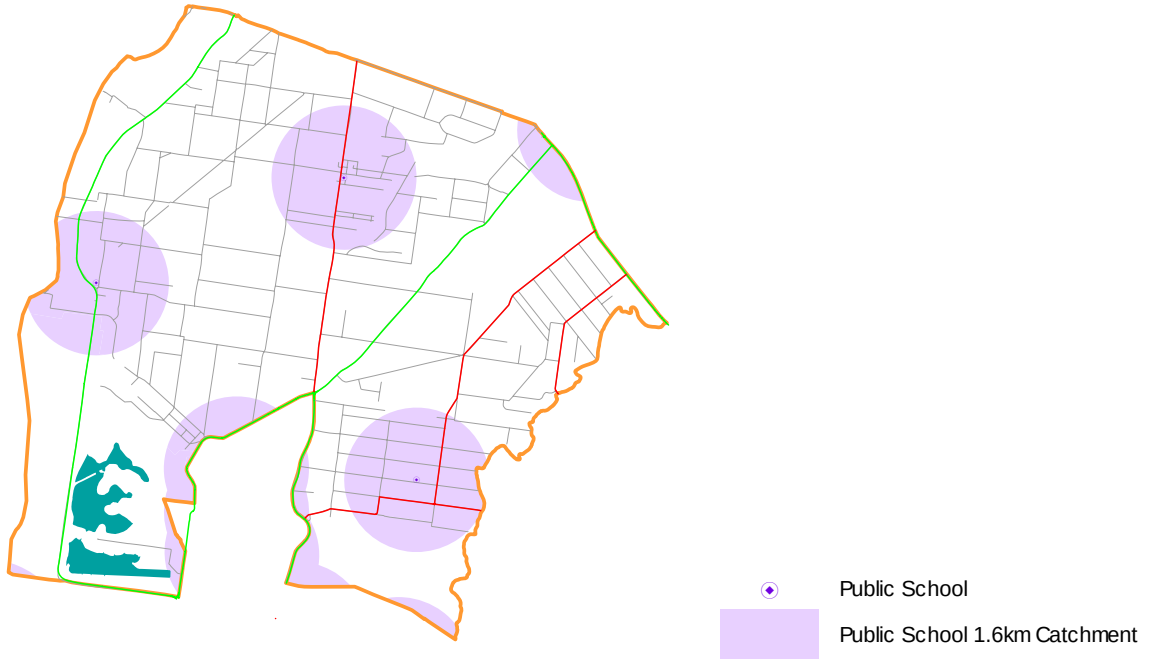
Buses and/or trains serve 35.0% of the Northern Rural SLA while the remaining 65.0% of the area does not have services. Bus services are not available for the majority of the area (65.0%). Buses are running at a frequency of >60 minutes for 16.6% of the total study area while buses with 30-60 minutes frequencies serve 9.4% of the northern rural SLA.

The bus routes and their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route have been assessed. It is noted that direct routes have a factor of 1.00 and less direct routes have increasingly greater values. The northern rural SLA has 3 different bus routes serving the SLA:

- All routes serve the SLA during commuter peaks and day time periods only;
- 2 bus routes meet the standard for route directness by having a factor of 1.00 while the remainder bus route recorded a factor of 1.23.

Public School Catchment Area:

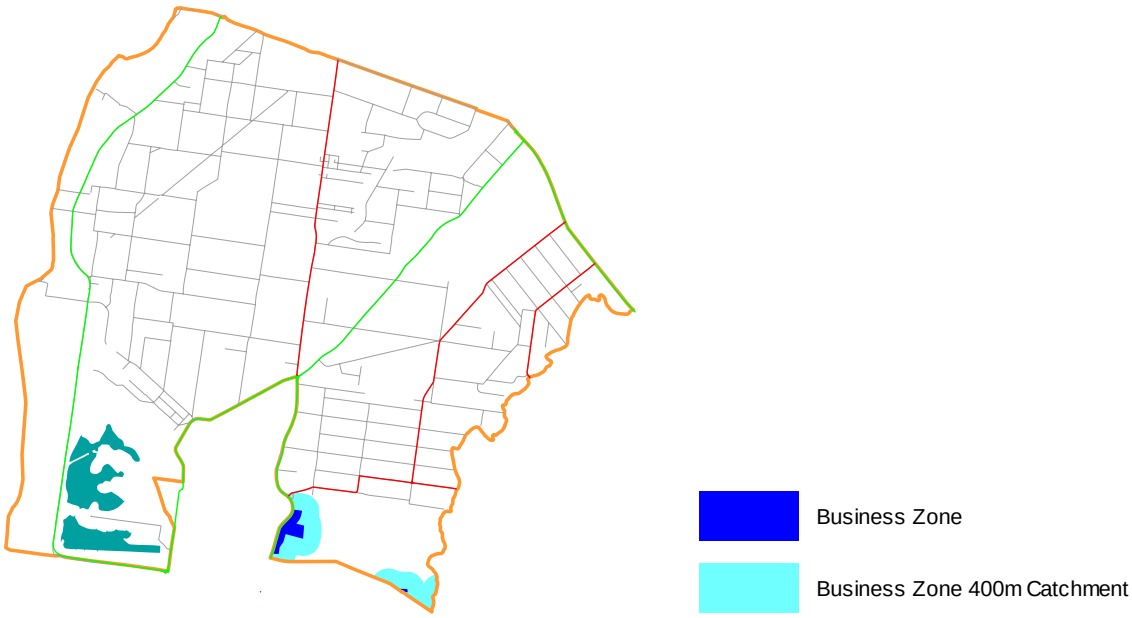
The figure below shows the areas of the Northern Rural SLA that are within the 1.6km public school catchment. The majority of school children in the rural SLA will be eligible for free bus travel.



Catchment within 1.6km of Public School in:	Area in km^2	Coverage (%)
SLA	28.7	24%
Developed Areas	0.0	-

Local Shopping Centre Catchment Area:

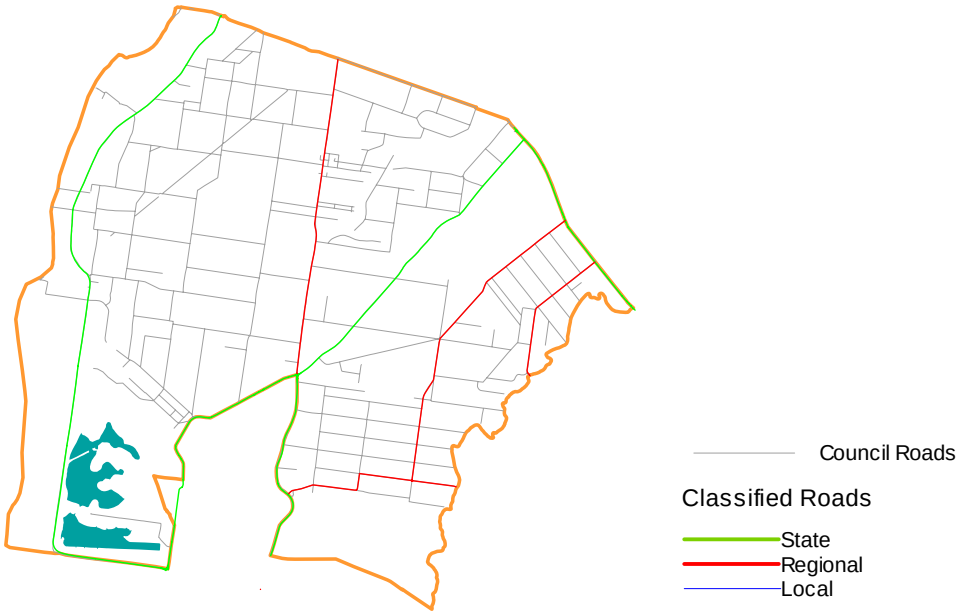
Little information on the location of business zones in Northern Rural SLA was available to the study, small areas of business zones were identified in the develop areas to the south of the SLA..



Catchment within 400m of shopping centre in:	Area in km^2	Coverage (%)
SLA	1.9	2%
Developed Areas	0.0	-

Road Infrastructure:

The figure below shows the location of State and Regional Roads in Northern Rural SLA.



Existing Roads	Length (km)	Density (km/sqkm)
State & Regional Roads	64.7	0.5
Local Roads	187.5	1.5
All Roads	252.2	2.1

Footpath Networks

There is no reliable data available for footpaths in the southern rural areas. This highlights the inequity of rural versus urban areas of Penrith. Footpaths around the local village areas should be provided.

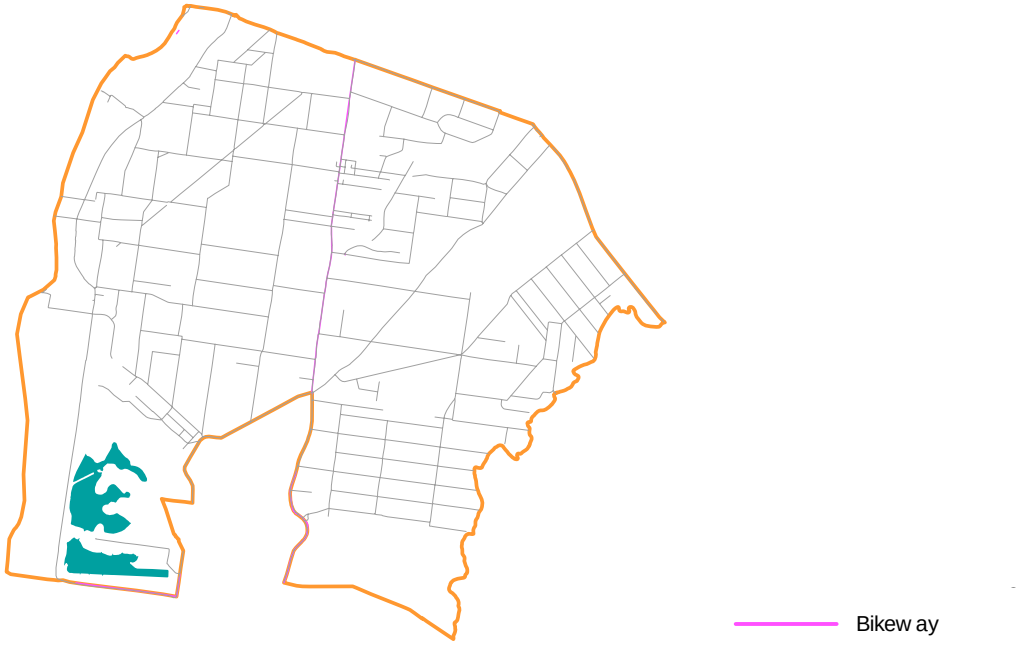
Footpath Proposed

Footpath Existing

Footpaths on:	Existing Footpaths			Existing & Proposed Footpaths		
	Length (km)	%age / Road length	Density (Km / Sqkm)	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	0.4	0%	0.0	1.0	1%	0.0
Local Roads	0.0	0%	0.0	0.0	0%	0.0
All Roads	0.4	0%	0.0	1.0	0%	0.0

Bikeways

There is no reliable data available for bikeways in the southern rural areas. This again highlights the inequity of rural versus urban areas of Penrith. Bikeways leading to villages and schools should be provided.



Existing Bikeways on	Length (km)	%age / Road length	Density (Km / Sqkm)
State & Regional Roads	13.0	20%	0.1
Local Roads	0.0	0%	0.0
All Roads	13.0	5%	0.1

Key Rural SLA Issues:

R1) Bus services do not serve the community sufficiently
R2) Cycle and walking links need to be improved
R3) Alternative transport options need to be considered for remote areas
R4) Restrict major trip generators from locating in rural areas (eg schools, employment providers)
R5) Limit rural residential development unless complimented by new neighbourhood centres and employment facilities
R6) Lack of information on facilities in rural areas for planning purposes

6.3 COMMERCIAL CENTRES

6.3.1 PENRITH CITY CENTRE

Access & Transport

The Great Western Highway (Henry Street) and Belmore Street/Jane Street are the main east-west vehicular routes servicing Penrith City Centre. Mulgoa/Castlereagh Roads and Parker Street are the primary north-south routes of. Other major access routes include High Street, Woodriff Street and Station Street.

Many of the City Centre roads carry significant volumes of traffic during peak hours. With vehicles in the city centre currently experiencing significant delays in Mulgoa Road, westbound in High Street and westbound in the Great Western Highway approaching Parker Street during the afternoon peak.

The majority of intersections operate with good or satisfactory levels of service. However, the intersections of Mulgoa Road/Great Western Highway and Jane Street/Castlereagh Road operate at a poor level of service with vehicles and buses experiencing significant delays during the morning and evening peak. These intersections are currently being considered for upgrading.

A key element of access to the City Centre is the main Western Rail line, which provides relatively high frequency services during peak periods, as well as a good spread of services. The rail provides eastern connection to Sydney city via Parramatta and western connection to the Blue Mountains and Central Western NSW.

Private bus operators provide for local trips to serve the city centre. They also provide feeder services for rail travel. Bus service frequency and connectivity with rail services is an issue.

The Penrith City Centre generally has a well-defined pedestrian network, with footpaths mostly adequate and made of high quality materials. Pedestrian and vehicular conflicts occur in Belmore Street at the bus rail interchange, and jaywalking is common in Station, High, Henry and Riley Streets. There are a number of existing bikeways on the periphery of the City Centre, however there is no specific provision for cyclists within the City Centre.

The Penrith City Centre Access Map was developed to be an easy-to-use guide to identify an accessible path of travel throughout the City Centre. It includes information about facilities such as public telephones, kerb ramps, public transport and audible traffic signals.

Parking

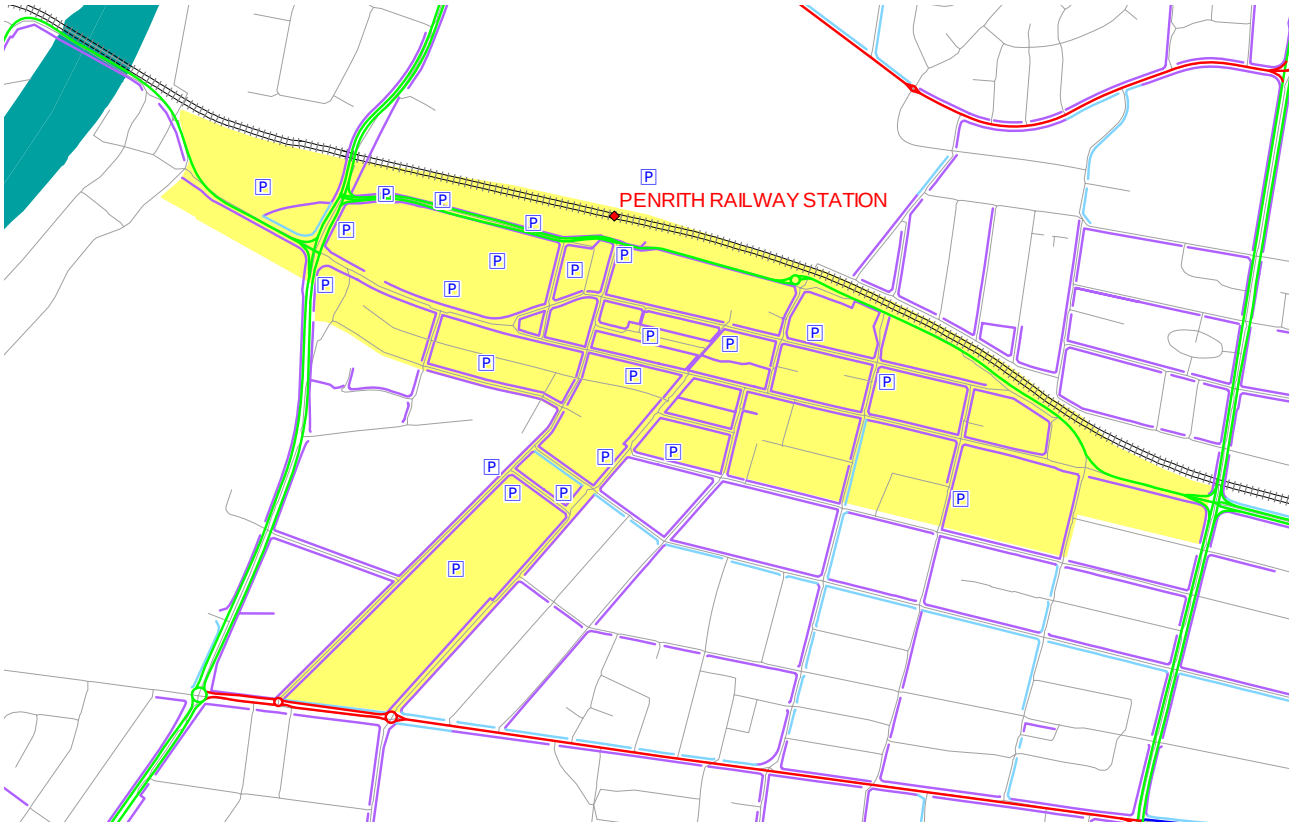
The Parking Strategy identified a total 10,021 off street car parking spaces in the City Centre, including 3,594 in Penrith Plaza. Excluding the parking in Penrith Plaza, 4,629 spaces are long term (unrestricted) and the remainder (1,395) have some time restriction. There are also approximately 845 on street parking spaces. Table 6.1Table 6.1 identifies the parking spaces by management and prime purpose. Parking utilisation was not available.

Table 6.1: Estimate of Current Total Parking Supply in Penrith City Centre (Nov 2005 after Penrith Plaza Expansion)

Management	Prime Purpose	Current Spaces	%
Commuter Rail	Railcorp	1220	11%
Council (off-street)	Multipurpose	1964	18%
Penrith Plaza	Retail	3594	33%
Other Private	Reserved	3243	30%
Council (On-Street)	Multipurpose	845	8%
Total		**10866**	**100%**

Figure 6.1 highlights the footpath network and location of key parking areas in the Penrith City Centre.

Figure 6.1 Penrith City Centre Access



P Parking
Existing Rail Station
Railway
Commercial Centre
Existing Footpath
Proposed Footpath
Council Roads

Cassified Roads
State
Regional
Local

Key Centre Issues:

C1) Wayfinding and signage around the centre is poor
C2) Insufficient taxi rank provision
C3) Parking supply is inadequate for some users
C4) Gaps in the cycle network
C5) Pedestrian facilities and infrastructure improvements are needed
C6) Infrastructure improvements identified in the PAMP require to be implemented
C7) Speed in town centres is a key problem
C8) Transport to key attractors such as the Penrith Panthers and Nepean River could be improved

6.3.2 ST MARYS TOWN CENTRE

Access & Transport

The Great Western Highway and the Western Motorway (M4) are the main east-west vehicular routes servicing the St Marys Town City Centre. From the south, Mamre Road is the main vehicular access, however traffic must travel via Glossop Street from North St Marys due to the location of the railway line blocking access from Queen Street.

The majority of intersections within the Town Centre operate at a good level of service, however the intersection of Great Western Highway and Mamre Road is currently over capacity and is being considered for upgrading.

A key element of access to the Town Centre is the main Western Rail line, which provides relatively high frequency services during peak periods, as well as a good spread of services. The rail provides eastern connection to Sydney city via Parramatta and western connection to the Blue Mountains and Central Western NSW.

Private bus operators provide for local trips to serve the town centre. They also provide feeder services for rail travel. Bus service frequency and connectivity with rail services is an issue. Safety at the rail station is also a major concern.

Pedestrian facilities in St Marys Town Centre are generally considered to be good and well defined along the major streets. Although the connectivity between the two major shopping centres and Queen Street is poor. There are a lack of footpaths in both East and West Lanes, constraining pedestrian movement through these lanes. Access for people with disabilities between the carparks and Queen Street is also limited.

There are a number of existing bikeways in the vicinity of St Marys Town Centre at:

- Charles Hackett Drive, from Gabriels Street to Kalang Avenue
- Swanston Street, and
- Monfarville Street.

No priority exists for cyclists on the road networks. Council plans to install bikeways along the following streets in the future:

- Queen Street, from Great Western Highway to Station Street
- Mamre Road
- Great Western Highway, westwards from Glossop Street to Kalang Avenue

The St Marys Town Centre Access Map was developed to be an easy-to-use guide to identify an accessible path of travel throughout the City Centre. It includes information about facilities such as public telephones, kerb ramps, public transport and audible traffic signals.

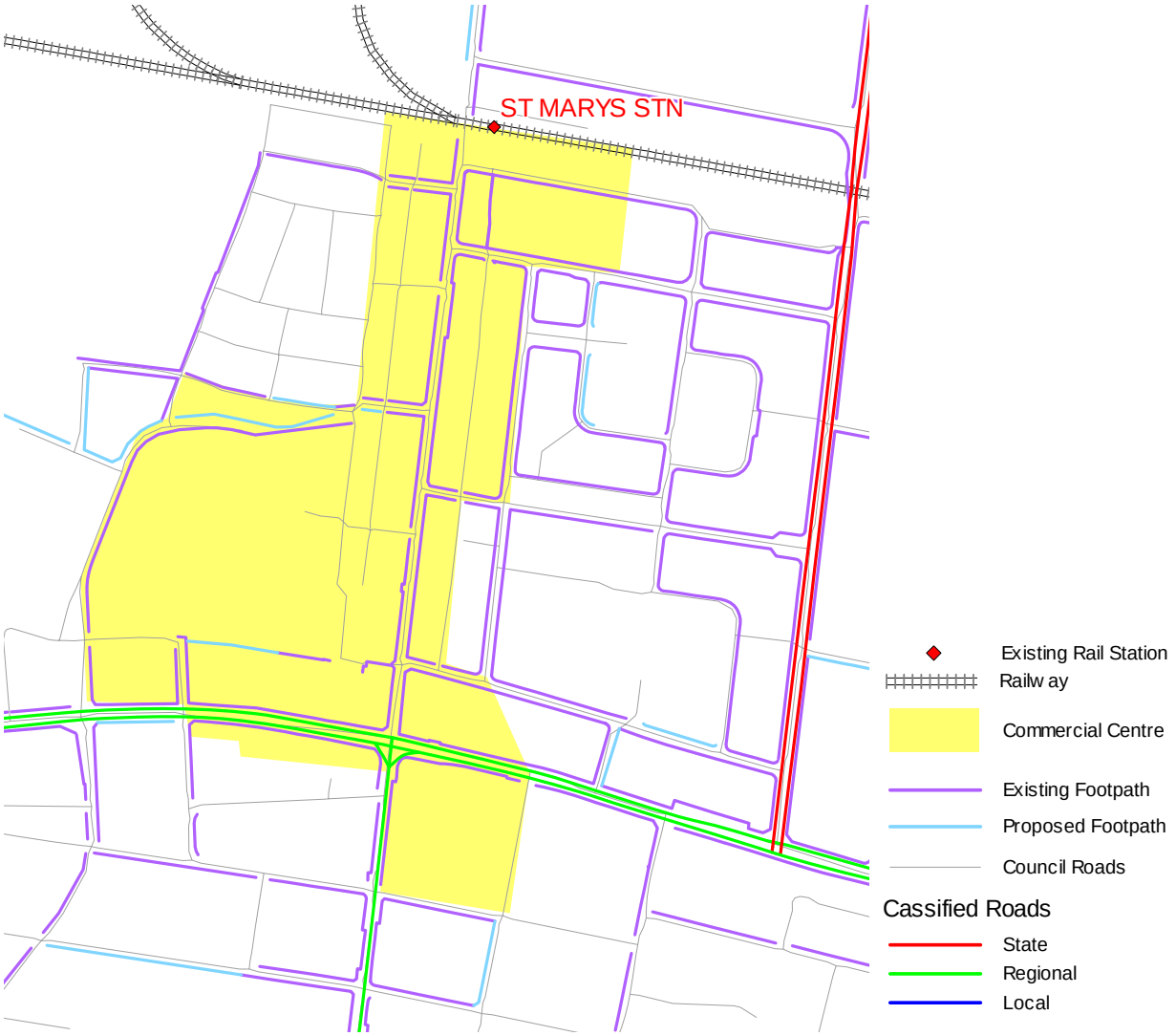
Parking

There were a total of 2,754 parking spaces in the off-street car parks at St Marys Town Centre. This included 2,076 long-term parking spaces and 678 short-term parking. There are also 242 short-term kerbside parking spaces.

It was estimated by SKM, that based on Council's parking code and provision of retail and commercial floor space, St Marys Town Centre should have 1,725 spaces. Hence there is a significant surplus of some 742 spaces. A parking survey undertaken by SKM concluded that there were 309 vacant car parking spaces scattered in the various off-street carparks within the Town Centre during the weekday mid-day period.

Figure 6.1 highlights the footpath network in the St Marys Town Centre.

Figure 6.2 St Marys Town Centre Access



Key Centre Issues:

C9) Lack of wayfinding and signage in the centre
C10) Accessibility for pedestrians and cyclists needs to be improved
C11) Gaps in cycle infrastructure and facilities
C12) Taxi rank provision is insufficient
C13) A need for additional commuter parking at the railway station

chapter 7
penrith integrated transport and land use strategy action plans

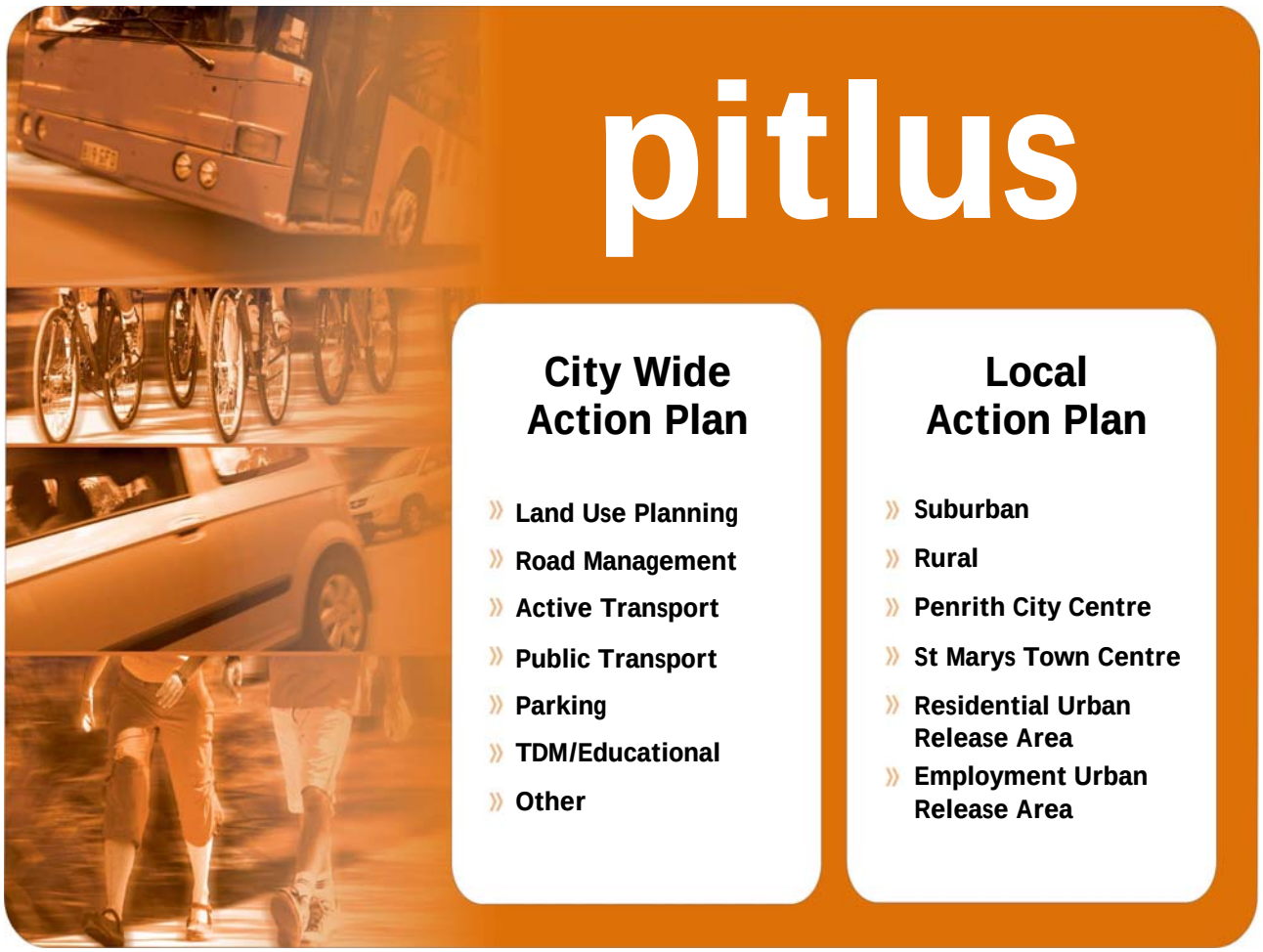
7 PENRITH INTEGRATED TRANSPORT & LAND USE STRATEGY ACTION PLANS

The Penrith Integrated Transport and Land Use Strategy (PITLUS) Action Plan consists of a series of short, medium and long term measures to be implemented by Council - often in partnership with government agencies, transport operators and other partnerships - to achieve the established goals.

The action plan defines the tasks that need to be undertaken and then the responsibility for undertaking the tasks is further defined in the implementation plan. The actions encompass a variety of capital projects, revenue spending and initiatives, Council therefore need to be clear who is responsible for delivering each element of the strategy and identify sources of funding, delivery partners and any other work that requires to be commissioned.

It should be noted, that all development and infrastructure improvements resulting from the actions should give full consideration to mobility and accessibility to ensure that the optimum level of access is provided to all users.

These actions have been divided up into two action plans as shown below:



7.1 CITY WIDE ACTION PLAN

Given the critical nature of the challenges associated with transport and accessibility to the Penrith LGA and the agreed residential and employment projections set in Sydney's Metropolitan Strategy there is clearly a need to take appropriate interventions to produce more suitable and sustainable transport outcomes. The actions contained in this strategy will feed into the development of the City's new Local Environmental Plan and inform state infrastructure provision plans and to recognise the regional City status of Penrith.

The City Wide Action Plan (CWAP) addresses the existing urban areas as well as the future urban release areas with the principle objective of constraining single person vehicle trips. In order to achieve this, the acceptability of automatically using the car for all trip purposes & lengths needs to be overcome. While the cost of petrol is impacting on this decision making at an individual level, Council's social and infrastructure planning and release area masterplanning should ensure that viable alternatives are accelerated at a much higher rate in the existing areas and are available from day one in the urban release areas.

This strategy must address the psyche of residents and visitors that only private vehicles provide them with the opportunity to live the lifestyle they desire.

Increasing the mode share for travel using active and public transport modes will help offset the growth in congestion and lead to a more sustainable system in the long term, maintaining the city's amenity and attractiveness. Council will lead by example as a major property owner and employer within the LGA therefore, a series of actions which address investigation and pilot of forward thinking programs is recommended.

The City Wide Action Plan has been developed to address all modes of transport, steer land use and development strategies and provides suggestions for innovations and travel behaviour modifications plans. It focuses on those actions that can be implemented across the whole LGA or are recommendations that have implications for the whole LGA and has been broken down into individual action groupings for ease of reference:

- Land Use Planning (LUP);
- Road Management (RM);
- Active Transport (AT);
- Public Transport (PT);
- Parking (PK);
- Travel Demand Management/Educational (TDM); and
- Other (OTH).

Each individual action is numbered according to its action grouping eg the first public transport action is referred to as action PT1. A list of explanations of the terms used in the actions is provided in this section with a brief discussion on each action is provided in Appendix 7-A.

7.1.1 LAND USE PLANNING

Transport is a derived demand. Without land use there would be no demand for transport. Similarly, without transport there would be no means to access land use. The two are inextricably linked, relying on each other to produce a successful and sustainable urban form.

Integrating land use and transport planning aims to ensure that transport and land use are complementary to each other and do not detrimentally affect the ability of land uses and transport networks to function effectively. Integration of transport and land use planning helps to shape the scale, density and mix of land uses, therefore reducing the need to travel, the length of journeys and the costs of providing an efficient transport system. Land use planning practice should result in urban development and change that moderate private vehicle reliance. Planning and development must consider all relevant transport modes and in particular, improving access by walking, cycling and public transport.

In Penrith's case, the built form is substantially in existence already. For this reason, transport infrastructure takes precedence when planning sustainable urban form. However, the opportunity exists to enhance the effectiveness of the transport network when redevelopment of the existing built form occurs. Concepts such as increased density of development at nodes that are well served by public transport (e.g. railway stations and suburban town centres) and the co-location of employment, residences, services and transport, are imperative to the continued efficient operation of the transport network.

To successfully integrate land use and transport it is necessary to ensure that urban form achieves the following planning objectives:

- improving access to housing, jobs and services by walking, cycling and public transport;
- increasing the choice of available transport and reducing dependence on cars;
- reducing travel demand including the number of trips generated by development and the distances travelled, especially by car;
- supporting the efficient and viable operation of public transport services;
- providing for the efficient movement of freight;
- locating trip-generating activities near one another; and
- supporting a network of mixed use centres to accommodate these activities.

Businesses and services which generate transport demand should be located to maximise a choice of transport and increase opportunities for multi-purpose trips. Vibrant, accessible, mixed use centres closely aligned with the public transport system should be encouraged.

To ensure use of public transport is maximised, building forms and subdivision designs and layouts must encourage walking, cycling and the use of public transport.

Locating activities closer together supports a shift from car use to walking, cycling and public transport use. The provision of locally accessible facilities is a high priority for people moving into a new area, with the lack of them a common cause of dissatisfaction.

The clustering of facilities provides an opportunity for multi-purpose trips, and close association between uses reinforces their viability. Clustering increases the proportion of people using public transport rather than private car by reducing the need for 'trip-chaining'.

The land use planning issues identified in Chapter 4 have been addressed through the following actions.

LUP1 **Council should adopt the following principle to avoid poorly integrated developments:**

Development outside the existing urban area should be generally avoided, except where new urban development areas meet the NSW government principles for integrating land use and transport including:

- **that the location, density, design and development (including staging) of new residential areas maximise access to public transport to promote more viable public transport and reduce car dependence;**
- **target minimum density of 15 dwellings per hectare for new residential release areas. This will slow the consumption of land and ensure there are enough people to support viable and effective public transport services;**
- **every household should be within 800 m total walking distance of an existing or programmed metropolitan rail station (or equivalent mass transit node) served at least every 15 minutes, or within 400 m walking distance of a bus route (accessing such a node) served at least every 30 minutes; and**
- **new residential development should accommodate the highest feasible density, in terms of land capability and market, and either form on its own, or as part of larger area, a public transport catchment with the potential to serve 6000 residents.**

Future increases in population and employment should be facilitated by increasing the density of the existing urban area. This will, in turn, ensure a more efficient and accessible transport system.

LUP2 **Prepare a detailed Public Transport Accessibility Levels Analysis (PTAL) and mapping to provide a basis for future land use planning and parking policy.**

LUP3 **Plan for increased residential densities throughout the existing urban area where compatible within the urban fabric and amenity.**

LUP4 **Inclusion of policies in the DCP/LEP to deliver the integration of appropriate land uses and transportation and to reduce the need to travel by car, including:**

- **Encouraging mixed use developments where appropriate;**
- **Facilitating walking/cycling in all developments;**
- **Utilising Mixed Use zones where suitable;**
- **Encouraging higher density development (including residential development where appropriate) around key public transport & activity nodes;**
- **Establishing transit oriented developments (TODs) around high frequency transit services (these areas should be higher in density and mixed use);**
- **Develop policies to deliver the improved housing choice and integration of land uses with transport**

LUP5	Carry out research into the appropriate standards and levels of provision of cycle facilities at different land uses, then adopt standards for the provision of cycle parking and end of trip facilities at for all new developments within the LGA.
LUP6	Provide increased public transport and active transport links to existing neighbourhood shopping facilities within residential areas. Identify locations for the addition of neighbourhood shopping facilities.
LUP7	Require new developments over a specified threshold to be accompanied by a transport assessment
LUP8	Require developers to make appropriate provision for access by a range of transport modes and where appropriate by way of planning conditions, make infrastructure contributions to a more sustainable transport system
LUP9	Set a planning policy context to ensure accessibility to the built environment for people with disabilities

Council can integrate land use and transport by identifying land located next to public transport routes in its land use policy. The following Actions should be incorporated into the policy.

LUP10	Undertake a detailed analysis of land within the 800m rail catchment of Penrith station to determine the under-utilised development potential and where appropriate consider zoning land within the catchment to a zone that permits high density and mixed uses.
LUP11	Council's Residential Strategy Review should incorporate a detailed analysis of land within the 800m rail catchment of all other rail stations within the LGA to determine the under-utilised development potential and where appropriate consider zoning land within the catchment to catchment to a zone that permits high density and mixed uses
LUP12	Council's Residential Strategy Review should incorporate a detailed analysis of land adjoining Strategic Bus corridors for the potential to develop higher density development and in particular the suitability of areas for a zone that permits mixed uses or medium and high density residential development.

7.1.2 ROAD MANAGEMENT

Roads provide an important transport function in the Penrith LGA, not only for private vehicle use but for freight movement and public transport services. However, there is a need to limit the impact that vehicular traffic has on the environment and the community.

Objectives for the management of roads in Penrith LGA include:

- To reduce the impact of arterial roads on activity centres and on residential areas;
- To reduce the barrier effect of arterial routes;
- To reduce the severity and number of accidents occurring in Penrith LGA and improve overall safety for all road users;
- Increase bus priority on main roads with a positive result on bus travel times and reliability; and
- Reduce vehicle speeds in residential areas.

Council's road network should be designed to operate to equally benefit public transport services as well as private vehicles. This includes the allocation of road space for public transport services and the provision of priority measures where congestion exists.

RM1	**Determine a functional road hierarchy and corresponding priorities and performance standards for all modes on all roads within the LGA taking on board their traffic and public transport function, adjacent land uses safety risk and people moving ability.**
RM2	**Review the status of all major roads in the Penrith LGA for classification as State or Regional roads under the care and control of the Roads and Traffic Authority, including any new road links to growth areas particularly major employment centres such as the Erskine Park Employment Area and other WSEH areas.**
RM3	**Road Authorities (RTA and Council) need to work in partnership to develop a priority of works on classified roads**

The Penrith Arterial Road Study listed a number of improvements, in order to manage traffic more efficiently, it is imperative to progress with this work for state, regional and non-classified arterial routes.

RM4	**Progress road improvements on State and Regional roads as proposed in the PARS study to include:** a) **Werrington Arterial** b) **Erskine Park Arterial – Erskine Park Employment area/M7 Link Road** c) **Jane Street Extension** d) **Bus lane underpass under the Penrith to Kingswood railway line from Belmore St to Penrith North Army land** **(full list provided in Appendix 7-B)**
RM5	**Progress the road improvements proposed in the PARS study for non-classified arterial roads.**
RM6	**Establish road network performance standards.**
RM7	**Conduct a program of road space reallocation on arterial roads to give priority to the non-car modes and to support other actions in this strategy.**

By introducing a road hierarchy and network performance standards, Council will be able to better manage and prioritise planning.

RM8	**Conduct a program of road space reallocation on Council roads where road space should be reallocated to pedestrians, cyclists, and public transport.**

To reduce the severity and number of accidents occurring in Penrith LGA and improve overall safety for all road users, it is recommended that Council implement its Road Safety Plan. The improvement and upgrading of roads generally in the area will also lead to enhanced safety for all road users.

RM9	**Carry out a regular audit and update of Councils Road Safety Strategy every 5 years.**
RM10	**Identify LATM study locations for crash analysis and speed and volumes surveys.**
RM11	**In the locations determined by RM9 & RM10, implement treatments to improve local amenity and cycle and pedestrian provisions.**

Freight movement is likely to be restricted to arterial and sub-arterial roads controlled by the RTA, however adequate access for heavy vehicles to employment lands and for deliveries to neighbourhood/town centres should be provided.

RM12	**Carry out research to establish the needs of freight transportation in Penrith**
RM13	**Maintain adequate access for heavy vehicles to employment lands and for deliveries to neighbourhood/town centres.**

7.1.3 ACTIVE TRANSPORT

Active transport modes, that is, where people are active when travelling, are the most sustainable form of transport available and these generally refer to walking and cycling.

Due to an increase in weight and obesity problems in Australia, much emphasis has been placed on walking and cycling as alternatives to private vehicle use for short distance trips.

Walking is a sustainable transport mode that can be enjoyed by people of almost all physical conditions and ages and does not require skill or specialist equipment. Given the growing health issues and costs associated with lack of exercise, the more that walking can be incorporated into the transport system the greater the benefits for the community and environmental sustainability.

Walking and cycling are generally viable alternatives for travel over short distances. As such, short trips can be targeted for change to walking and cycling. This can be achieved by providing high quality walking and cycling networks throughout all areas, particularly with 5-10km of key activity areas.

Walking and cycling is also important outside of key centres and should be provided for recreational and long distance commuters. Examples of initiatives that could be pursued in the area include rail trails, and grade separation at major barriers (e.g. rail line, major road).

Walking and cycling are also important as start and end modes in a multi-modal public transport trip – e.g. walk to bus stop, catch bus to City Centre, then walk to destination. It is important the connections between bus stops, railway stations and surrounding land uses are adequate and attractive for potential public transport patrons.

CYCLING

To encourage cycling, Council will embark upon a series of infrastructure and policy improvements with the underlying principle of AT1.

AT1 **Establish a hierarchy of bicycle friendly provisions to guide planning for new roads and for retro-fitting existing roads. On State & Regional roads and within subject sub-divisions, appropriate contributions or facilities are provided by developers where major new land releases are planned.**

The network of cycle routes and facilities in the LGA require to be audited to determine the existing condition prior to the commencement of the review of the bike plan. A number of local authorities , including Penrith City Council, have embarked upon GIS systems to allow accurate mapping and referencing of facilities. It is highly recommended that Council utilise this system better. The Bike Plan then requires updating following the audit of existing facilities and infrastructure. The Plan needs to include more than just cycle routes and should include an implementation and funding strategy.

The funding of cycle network could be provided jointly between the RTA and Council with additional funding to be obtained for projects of regional significance such as end trip facilities at the University of Western Sydney and proposed new railway station between Werrington and Kingswood.

AT2 **Conduct an audit of existing mapped bike routes and facilities to determine condition and extent of infrastructure provision. Update the current GIS system to accurately map facilities and routes.**

AT3 **Following the audit of facilities, review the Bike Plan for the LGA which complies with State best practice in bicycle facility planning and facilitate with a prioritised engineering works and behavioral program. Cycle facilities should be provided on all major residential collector roads in accordance with current standards and guidelines established in AT1. In addition, cycle facilities should provide access to key bicycle trip attractors (e.g. schools, shops, recreational facilities).**

AT4 **Priority for works should consider connections to key cycle trip attractors such as residential areas, employment centres, commercial, hospitals and educational facilities as well as key recreational destinations.**

AT5 **Prioritise roads requiring treatments to become bicycle friendly within the Bike Plan. For State and Regional roads establish a priority work plan for the provision on segregated cycle facilities.**

Cycle lockers are provided at some railway stations in the LGA, to increase opportunity for interchange between modes, secure lockers and racks should be installed at all stations.

AT6 **Provide a variety of secure bike parking at all railway stations, with priority at Penrith Station and the proposed UWS Station.**

Include standards within development policy for the inclusion of trip end facilities as part of all new developments to encourage active transport.

AT7	**To ensure adequate parking, showers, lockers and other facilities are provided in new developments, adopt cycle standards contained in current guidance (NSW Planning Guidelines foe Cycling & Walking) for all new development within the LGA in planning policy.**

In Canberra, ACTION (the public transport service provider) provides some services with buses that have bicycle racks on the front of them. This enables cyclists to utilise bus services as part of a multi-modal trip, increasing the trip options available to them. A report by ACTION regarding the effectiveness and utilisation of this service will soon be presented to the ACT government. This is an interesting initiative that should be investigated by Penrith City Council in conjunction with the MoT and bus operators. See Action PT18.

WALKING

To identify specific mobility issues, it is recommended that a series of Pedestrian and Mobility Programs are undertaken. Council then needs to prepare a priority program for this work to be carried out. The first step in undertaking this work is to understand the existing infrastructure that is available and make this information easily accessible by all concerned.

AT8	**Conduct an audit of existing footpaths and other pedestrian facilities (such as crossings, pram ramps etc) to determine condition and extent of infrastructure provision. Update the current GIS system to accurately map facilities and infrastructure.**
AT9	**Review the Pedestrian Access and Mobility Plan (PAMP), previously undertaken for the whole of the Urban LGA to expand and improve pedestrian facilities taking on board road safety, personal safety and pedestrian amenity.**
AT10	**Priority for works should redress the imbalance of footpath provisions in differing areas and consider connections in residential areas especially within walking catchments of local attractors such as railway stations, school and shops.**

Chapter 5 highlighted that often cycling and walking routes to railway stations need improving to allow easier access and to follow desire lines to encourage people within the 800m catchment to use active transport modes to get to stations.

AT11	**Evaluate and implement pedestrian accessibility within 800m of each railway station. These audits can be used to develop pedestrian facilities that comply with Australian Standards for the mobility impaired.**

Similarly, walking and cycling routes to schools are often perceived to be dangerous and may account for the high level of car travel to drop children of at schools. To combat this, it is recommended that 'Safer Routes to Schools' projects are rolled out.

Pedestrian safety was raised as an issue; Council can actively work towards improving pedestrian safety through the Road Safety Plan and by providing new and improved infrastructure at key locations where safety issues have been identified.

AT12	**Undertake 'Safer Routes to Schools' projects at all primary schools with a view to develop appropriate behaviour programs (eg walking, buses) and an engineering program of works for implementation as required.**
AT13	**Undertake pedestrian crash analysis on a bi-annual basis to identify pedestrian black spots throughout the LGA.**
AT14	**Improve safety at pedestrian crossings by providing more appropriate phasing at signalised intersections and installing cautionary devices at school crossings, such as flashing lights and high friction surfaces.**

There are already a series of access maps available on Council's website. These should be updated regularly to include new infrastructure and facilities. These should be made available on Council's website and at key council locations such as libraries and offices.

AT15	**Audit and update the access maps for Penrith and St Marys centres as required**

7.1.4 PUBLIC TRANSPORT

Public transport refers to all traditional modes such as bus and rail, as well as taxi services and community transport.

In order for public transport to provide an equivalent level of services to the community that the private vehicle currently does, major changes need to be made. A fully integrated network of public transport modes and services, providing comparable cost and travel time benefits and also a wide range of trip options, is a necessity.

A comprehensive overhaul of the public transport system is largely beyond the scope, jurisdiction and resources of Penrith City Council. However, Council is an a position to take a proactive role in lobbying the State Government for early action, as well as identifying service and infrastructure improvements that are needed and/or desirable within the LGA. Council can also assist the provision of sustainable public transport by ensuring development of the Penrith urban area is conducive to the use of public transport as the primary transport mode.

RAIL

Along the railway line there are opportunities to take advantage of the high level accessibility that is currently offered around existing railway stations and also to investigate the provision of additional stations in the long term. These can be treated as Transit Oriented Development (TOD) sites as well as providing opportunities for existing land users to switch from private vehicle use for their trips. See LUP 4.

PT1	**Work in partnership with authorities to deliver the proposed UWS railway station in Werrington between the existing Werrington Station and Kingswood Station.**
PT2	**Ensure that associated transport infrastructure, such as a bus interchange, cycling facilities and commuter parking is provided at the proposed UWS station. Accessible walking routes to/from the station within an 800m catchment should be incorporated into the design.**
PT3	**In conjunction with MoT, RailCorp and DoP investigate the provision of a new railway station in Oxley Park between St Marys and Mt Druitt Stations (opposite the intersection of Sydney Street & Hobart Street) to achieve TOD and value capture.**
PT4	**Seek advancement of the upgrade of the Western line corridor from St Marys to Westmead from Railcorp.**
PT5	**Seek advancement of the upgrade and duplication of the Western line corridor from St Marys to Penrith from Railcorp.**
PT6	**Railcorp to upgrade Penrith Rail Station, to include an additional platform and a yard upgrade with additional stabling.**
PT7	**Prepare a planned program to replace existing stock with trains designed for access for people with disabilities**

Accessibility to railway stations should be improved within an 800m radius of each station. Non-private vehicular modes should be given priority within this radius so that as many people as possible can switch from car to walking, cycling or bus use as possible.

PT8	**Complete an accessibility audit then design and implement a rolling program of physical improvements to walking and cycling routes between railway stations and key residential areas within an 800m catchment of stations. As a priority:** a) **Penrith & St Marys stations** b) **Emu Plains, Kingswood & Werrington stations** c) **Other stations**
PT9	**In association with rail authorities, identify easy access infrastructure improvements to stations to remove barriers and allow equitable access to facilities. Non-infrastructure improvements must also be included.** ▪ **Werrington, Emu Plains and Kingswood stations**
PT10	**Design and implement a rolling programme of physical improvement to the principal walking routes between the railway stations and town centres / residential areas within ten minutes walk**
PT11	**Implement the adopted Cycling Strategy proposals by identifying and implementing a rolling Program of designated principal routes between railway stations and residential areas served by these stations which are within 15 minutes cycle ride (as part of AT3)**

As the LGA expands, there will be a need to identify if additional capacity on trains or increased frequency of service is required. This is however an extremely complex task involving the wider rail network.

PT12	**Identify the need for additional frequency of service or additional capacity on trains to meet the projected growth of the LGA**
PT13	**Continue lobbying of State and Federal Government by Council in support of a fast rail link to Sydney CBD**

BUS

Current bus services focus more on service coverage, e.g. providing bus stops/routes within 400m of 90% of the population, resulting in circuitous routes and longer travel times. This then results in low levels of patronage, as the services are largely inconvenient and too slow for most potential passengers. Route planning standards need to consider the directness of the route and the trip time relative to similar trips by private vehicle. Frequent connecting services, combined with integrated ticketing, can and will increase trip options for public transport users.

Upgrading the urban environment to improve the accessibility, safety and attractiveness of public transport is also essential. Infrastructure is the responsibility of Council, and includes bus shelters, footpaths, and lighting.

PT14	**Upon completion of the Ministry of Transport's bus reforms in the Penrith area, a review of Councils bus strategy actions contained within this document should be carried out to ensure consistency and relevance.**
PT15	**Seek advancement of the implementation of strategic bus corridors for the area by the Ministry of Transport and review strategic corridor routes and destinations.**
PT16	**Implement the express bus service and bus priority measures from St Marys URA to Penrith and St Marys rail stations in accordance with the St Marys Development Agreement**
PT17	**In partnership with the MoT investigate the feasibility and demand for providing an Express Bus service and bus priority on Mamre Rd from the proposed Erskine Park Employment Area to St Marys Rail Station.**
PT18	**Work in partnership with the RTA to provide Bus Priority measures on key road links (as described in the Bus Service Analysis Study) including:** ▪ **Mulgoa Road;** ▪ **The Northern Road;** ▪ **Mamre Road.** *A full list of locations provided in Appendix 7-C*
PT19	**Commission an area review to identify local activity nodes within suburban areas that are not served by bus routes and highlight these as part of the Ministry of Transports bus reform process. This should include transport to recreational facilities.**
PT20	**Conduct an audit of all bus stops and shelters.** **Establish a hierarchy of bus stop facilities for implementation that comply with State best practice in bus infrastructure provision including shelter, signage, access etc.** **Investigate advertising revenue to fund bus stop infrastructure improvements and a bus shelter maintenance program.**

PT21	**Investigate the feasibility of introducing a 'Bikes on Buses' program in Penrith LGA.**
PT22	**Work in partnership to encourage the development of a comprehensive timetable which combines all bus services including private, subsidised and voluntary services**
PT23	**Promote with partners measures to ensure adequate timetable information is displayed at all bus stops**
PT24	**Encourage operators to prepare a planned program to replace existing stock with buses designed for access for people with disabilities**

BUS-RAIL INTEGRATION

The legibility, directness and reliable travel time of fixed transport systems, such as rail, can be built into flexible systems like buses, through the use of dedicated busways, bus lanes, bus priority measures, branding of routes and better travel information, such as detailed route maps and timetables at bus stops. It is important that the reassurance provided by a railway line to travellers who are unfamiliar to an area – i.e. the perception that there is a railway line and therefore there must be a service – needs to be built into the more flexible modes. This can be achieved through better signage and information provision at bus stops. Bus route pointers can also provide some certainty to a perceptive but unfamiliar public transport user.

Improvements to interchanges to address the issues identified in earlier chapters are:

PT25	**Undertake planning for a new or expanded Bus-Rail Interchange at Penrith Station & St Marys that considers:** ▪ Forward planning of bus network by MoT and RTA ▪ Possible relocation/expansion of the Penrith interchange to the northern side of the station ▪ Bus and railway connections over the railway line ▪ Rail duplication and additional platforms ▪ implementation of TOD principles ▪ Development of adjacent undeveloped sites ▪ Funding opportunities and value capture
PT26	**Conduct audits of all bus-rail interchanges for compliance with minimum best practice standards provided in the Ministry of Transport's Draft Interchange Design Guidelines.**
PT27	**Create better co-ordination of bus and rail services to maximize interchange and integration for passengers.**
PT28	**In conjunction with authorities and bus operators, support the development and implement an integrated ticketing system.**
PT29	**Support the implementation of an integrated fares system**
PT30	**Work in partnership with public transport providers to better co-ordinate publication of timetables for bus and rail interchange at rail stations and improve publicity and signing for interchange possibilities at all rail stations and adjacent bus stops in Penrith**

PERSONAL PUBLIC TRANSPORT

The Ministry of Transport's Bus Reform programme will allow a good opportunity to highlight new routes and infrastructure for the LGA. The timescales for this process are unclear at present; therefore the recommendations made in this strategy will require to be reviewed upon completion of the Ministry's reforms. Where there are gaps identified in the network that cannot be filled by service buses, demand responsive transport can be introduced.

PT31	**Investigate a fixed route mini-cab or mini-bus to operate a route between locations within the LGA where distance and timing or mobility issues may be an issue for public transport users, such as evening events at Penrith Panthers, mobility impaired access for patrons from Nepean Hospital to Kingswood Station, UWS campus to UWS Station.**
PT32	**Develop and implement a demand responsive PPT service incorporating a wheelchair accessible bus for use by all members of the community to access amenities and facilities where the existing public transport system does not currently meet their needs.**
PT33	**Investigate the gaps in access provision for people with disabilities and assess the potential for a minibus service**

TAXIS

Taxis are essential in a sustainable public transport scheme. Their use, combined with buses, can provide levels of convenience that avoid the need to own a private vehicle or, at least, a second family vehicle. Currently their role in meeting community transport needs is restricted, due to the restrictive regulatory regime for taxis and relatively high costs.

PT34	**Review adequacy of designated legal taxi pick up and set down areas in Penrith. The areas do not have to be exclusive taxi ranks but a system that allows taxis to stop for 1 minute in a no stopping zone for pick up/set down (similar to that in Sydney CBD) should be investigated.**
PT35	**In conjunction with the taxi council and taxi operators, prepare an action plan to implement the key recommendations determined in the Sydney Metropolitan Strategy (e.g. shared use of taxis, alternative fare structures, increased numbers of taxi vehicles).**
PT36	**Investigate the gaps in access provision for people with disabilities and assess the potential to provide subsidised taxi or a minibus service for people with disabilities where access to public transport is not feasible to a range of destinations including hospitals.**
PT37	**Work with the Taxi Council to provide a greater number of taxi vehicles servicing the LGA**
PT38	**Work with the Taxi Council & Operators to encourage greater provision of accessible taxi vehicles**

7.1.5 PARKING

Car parking is an important component of travel, limiting or increasing the accessibility and attractiveness of centres for travel by private vehicle. Parking also has land use implications – it is very land-intensive, particularly noticeable in town centres, because of road space needed to serve large areas of car parking.

The Metropolitan Parking Policy (MPS) is currently being prepared by the Ministry of Transport and the RTA to steer parking policy in the region. It is likely that this will have implications for the city of Penrith.

PK1 **Review all of the following actions after the Metropolitan Parking Strategy has been finalised to ensure consistency with the Strategy.**

Development within Penrith LGA should not be designed so as to prohibit the ownership of a private vehicle. There are many trips that public transport cannot serve adequately, including trips to rural areas, holidays, and the carriage of bulky items. Rather, the aim should be to limit available parking at destinations where adequate public transport services can be provided, for example town centres. This way, public/active transport can be used for trips which it serves well and private vehicles used for trips which public/active transport cannot serve.

Parking rates should be reviewed to reflect the guidance provided in the MPS and include comprehensive guidance on cycle, mobility and motorcycle parking as well as car parking. Current practice is to base rates on the proximity to and availability of public transport. For example, in highly accessible areas such as city centres or development located near an interchange, parking rates should be minimal, whereas in areas with poor public transport, it could be expected that parking rates could be more lenient.

Parking should be tailored to suit the needs of those who should be driving and parking. For example, disabled parking spaces should be provided in town centres to allow people with mobility impairments – who cannot, or find it very difficult to, use public transport – are able to drive/be driven and park within the town centre. Similarly, drop off and pick up zones should also be provided to allow for mode changes, taxi services, community transport and 'mum's taxi'.

PK2 **Upon publication of the Metropolitan Parking Strategy, Council should carry out a complete review of parking rates and develop new standards for all land uses in the LGA for inclusion in Council planning policy. Cognisance should be given to:**

- **Proximity to public transport accessibility and provision**
- **Specific land uses**
- **Maximum standards and guidance provided in the Metropolitan Parking Strategy**
- **Area specific rates**
- **Rates for motorcycle, bicycle and disabled parking**

PK3 **Investigate parking provision linked to Public Transport Accessible Locations (PTAL) outcomes for major transport nodes**

A successful example of parking limitations resulting in a high modal split to public transport is the City of Sydney. However, this would not have been possible if the high quality public transport services which currently exist were not provided. This example shows that, if the services are provided, they will be used. The provision of TOD's and location of development around existing rail and bus networks may be a similar way to pursue this.

Commuter parking at railway stations needs to be promoted, expanded and introduced wherever possible at strategic locations stations in the LGA. This type of facility can discourage long distance commuting by cars and therefore reduce the number of vehicles on roads. A full feasibility study would be required to be carried out on land surrounding the stations to enable the optimum design and amount of parking which should include mobility, motorcycle and cycle parking, ticketing options and drop of areas.

PK4	**In conjunction with CityRail, Railcorp and the MoT examine needs and opportunities for commuter parking at all rail stations. Taking into consideration:** ▪ **Land use planning;** ▪ **forward planning for bus services;** ▪ **potential for Park & Ride balanced against potential under-mining of bus investment;** ▪ **limiting access to rail ticket holders.** **This should be implemented in conjunction with local area parking management schemes in Penrith City Centre to limit long term parking in the city centre (refer to PK8).**
PK5	**Examine options for implementation to ensure commuter parking is available for commuters**
PK6	**Investigate & implement Park & Ride Satellite Parking Stations along the strategic bus corridors**

Ultimately, the aim of parking policy is to balance the supply of and demand for parking spaces with the objective of minimising additional traffic generation through restraining car use, while ensuring the economic viability of each centre / development is maintained. If a centre is to be attractive, it must be accessible, and for that reason parking restrictions must go hand-in-hand with public transport improvements.

PK7	**Undertake a detailed parking survey of all parking spaces within Penrith City Centre and St Marys town centre. Parking surveys should include supply, occupancy, turnover, length of stay and management.**
PK8	**Develop a parking policy which ensures a gradual shift away from the provision of private parking towards access by non private vehicle modes. This policy should have a target for ultimate mode split of travel to the centres for all purposes including rail commuter.**
PK9	**Undertake a review of the parking rates for new developments in commercial centres including:** ▪ **Recommendations for maximum and minimum rates;** ▪ **Recommendations for proportion of short term and long term parking;** ▪ **Maximum amount of on-site parking to be provided including restriction on number of basement levels;** ▪ **Contributions for parking in lieu of on-site of provision;** ▪ **Opportunities for shared parking (mixed use and temporal);** ▪ **Bicycle parking, Motorcycle parking;** ▪ **Disabled Parking;** ▪ **Lower minimum rates for developers providing travel plans.**
PK10	**Investigate the opportunities and costs of providing multi-deck satellite car parking on the fringe of the city, linked by shuttle buses.**

Residential parking supply is extremely important in managing car use and road space. The following actions have been recommended to better manage the issues surrounding residential parking supply.

PK11	**Investigate introducing un-bundled parking schemes for higher density residential developments whereby parking spaces are excluded from a lease/purchase requiring the person to pay an additional cost to park on site.**
PK12	**Investigate introducing residential parking schemes around transit nodes, whereby residents are required to purchase a parking permit to park on-street to discourage car ownership in areas well served by public transport.**

Parking for all users of facilities needs to be provided for when considering parking at developments. It has been identified that there is a need for more disabled parking spaces in the LGA. Actions have been recommended to provide parking for all users.

PK13	**Investigate introducing additional disabled parking spaces at public buildings within the LGA in accordance with any changes in standards outlined in PK2.**

7.1.6 TDM/EDUCATIONAL

Travel Demand Management (TDM) initiatives are increasingly being employed within Australia to encourage the use of more sustainable alternatives to the private car or more sustainable car use. The success of TDM initiatives require the implementation of a package of varied measures and the provision of quality alternatives to the car. For example, in the absence of a safe walking network people will be unlikely to consider walking to their destination, even if it is within an easy walk distance. Similarly, if public transport services are slow, infrequent and have short operating hours, people will not be enticed to use them.

The particular actions set out in this section are should be carried out as a package of measures, trialled or as part of a pilot programme.

TDM1	**Prepare access maps for active transport modes (walking and cycling). Provide maps via the internet to minimise costs and save paper, seek constant feedback from the community, and be aware of access issues and changes in the area.**
TDM2	**Update accessibility maps for Penrith and St Marys and prepare accessibility maps for selected areas within LGA. Provide maps via the internet to for the reasons listed under TDM1.**
TDM3	**Develop Transport Access Guides (TAGs) to identify low energy forms of transport (such as walking, cycling, or public transport) for people traveling to and from key sites or venues. TAGs should be prepared for all:** ▪ **Council facilities such as civic centre, libraries, leisure centres;** ▪ **Major tourist attractions such the Sydney International Regatta Centre;** ▪ **Penrith City Centre;** ▪ **St Marys Town Centre.**
TDM4	**Encourage existing major trip attractors such as Nepean Hospital, UWS, TAFE and Penrith Panthers to produce TAGs and voluntary Travel Plans.**
TDM5	**Require the submission of Travel Plans as part of the Development Application process for all new commercial, industrial and residential developments. Thresholds for the requirement of Travel Plans must be set by Council. Council should establish guidelines for when this is required and whose responsibility it is.**
TDM6	**Require new major trip attractors to produce TAGs as part of Travel Plans secured in the development application process. Council should establish guidelines for when this is required and whose responsibility it is.**
TDM7	**Host an internet based car pooling (ride sharing) site, allowing people living and/or working in the LGA to find a car pooling partner for regular or occasional trips. Following the development of the site, publicise the service through a variety of media and via other community services. Members of the community without access to the internet should be able to access the service at Council's offices and at facilities such as libraries.**

TDM8	Investigate the demand for a car sharing service for Penrith LGA with Car Sharing Operators. The service would operate on a membership basis and provides residents and visitors with alternative travel choices. There are a number of successful car share schemes already in operation in the Sydney Metropolitan region.
TDM9	Support Bicycle User Groups (BUGs) to encourage more people to cycle in their local area and to work. Investigate providing support to the groups' activities.
TDM10	Actively promote the health and financial benefits of walking and cycling

Council is in a position to implement TravelSmart initiatives throughout its workforce, as well as measures such as community brochures with sustainable transport information and including TravelSmart programs as part of the Development Application process.

TDM11	Establish TravelSmart program pilots in targeted workplaces, schools, destinations, and communities. In addition, TravelSmart programs can be undertaken for individual households as part of residential travel plans.

Examples of TDM initiatives include TravelSmart programs in schools, workplaces and communities, such as the Walking School Bus. Travel behaviour change programs are being used increasingly throughout Australia, implemented under the TravelSmart branding in all states.

TDM12	Work in partnership with local schools to reduce the proportion of students traveling to and from school by car, and increase the proportion traveling by active transport (walking and cycling) using School Travel Plans and TravelSmart Programs and introducing 'Safer Routes to Schools' schemes.

7.1.7 OTHER

Other actions for sustainable transport and land use revolve around Council's role and position of representing the Penrith community.

Council is ideally placed to set an example to the community through implementation of travel behavior change programs in its workforce. Council is also ideally placed to promote information about sustainable transport options to the community.

OTH1 **Develop and implement a Travel Plan for Council. Components of the Travel Plan are suggested as actions below:**

- **Prepare Transport Access Guides for all Council public buildings**
- **Provide cycle parking & end of trip facilities at all Council Buildings integrated with cycle routes**
- **Review on-site car parking to ensure high priority for disabled and High Occupancy Vehicle (HOV) parking**
- **Further promote and encourage staff to tele-commute/work from home.**
- **Develop and implement a pilot program for staff to ride share.**
- **Review council car policy, this can include a review of the quantity and type of vehicles. Recommendations should suggest opportunities for environmentally efficient vehicles (such as hybrid cars) or for shared/pool cars instead of individual vehicles.**
- **Provide alternatives to council cars (eg Public Transport tickets or cycles).**
- **Provide driver training for fuel efficiency and safety.**
- **Annually collect staff travel behaviour data and translate into impacts. These benefits can be used to publicise in council and community annual reports.**

Public transport information should be provided to new home buyers, other incoming residents and businesses, as these community groups are unlikely to have yet established travel patterns. The opportunity exists to dispel perceptions of inadequate accessibility by public transport and thus obviate the need for unnecessary vehicle ownership and a corresponding decrease in public transport patronage.

OTH2 **Provide 'resident' transport and travel information packs containing information and incentives for sustainable travel. This should be available from Council to all residents, but supplied in particular in new development areas. This target population may not yet have established travel patterns and habits. It may include the following:**

- **orientation of available public transport services**
- **information of existing and proposed (including timing for delivery) pedestrian and cycle networks**
- **material on cost savings associated with reduced use of a car, including the elimination of a second household car.**

As part of Travel Plans required to be provided by developers through the development assessment process, this pack could be further enhanced by providing:

- **a one or two year public transport pass**
- **subsidised public transport passes for residents after the first one or two years; and**
- **a free bike with each home purchase.**

Special community events can be organised by Council to promote the use of sustainable transport modes. These events should encourage the use of walking and cycling and a sense of community, counteracting perceptions of an unsafe community.

OTH3 **Investigate opportunities to implement 'cyclovia.' This is an innovative concept utilised in many international locations where a street, or section of street, is temporarily closed to motorised vehicles on a regular basis (eg every Sunday) and is open to alternative forms of transportation, eg pedestrians and cyclists.**

Transportation Management Associations are a mechanism that has arisen in the US in response to major transport issues in suburban employment nodes. These groups, generally made up of volunteers from various employers, seek to promote change and improvement in transport systems in their area as well as provide services to address transport issues specific to their area. Typically, these groups are non-profit organisations self funded through levies. Examples of programs and initiatives that can be implemented by TMAs include:

- rideshare or car pooling;
- guaranteed ride home;
- walking and cycling network improvements;
- financial incentives for 'sustainable' commuters;
- shuttle services;
- transport access guides.

OTH4 **Promote the development of transportation management associations. Groups can comprise volunteers from the local community or various employers, these associations advocate the change and advancement of local transport systems, as well as provide services to address transport issues specific to their area.**

To effectively steer, monitor, update and report to Council on PITLUS, it would be advisable to form a steering committee. This Committee would consist of Council officers, Councilors and members of the public.

OTH5 **Form a PITLUS Steering Committee for the on-going, monitoring and review of the Strategy, its implementation and effectiveness.**

As mentioned earlier in this chapter, a number of the actions are labour and funding intensive. Other local authorities have sought state funding of additional staff to implement the Actions and seek funding from various bodies.

OTH6 **Employ a person or group to implement and manage travel behaviour programs and mechanisms. This person or group would fulfil the role of a travel coordinator and encourage alternative forms of transportation.**

7.2 LOCAL ACTION PLAN

The Local Action Plan has been developed to address specific issues in local suburban, rural, employment and commercial centres. It focuses on those actions that should specifically be implemented within an area and has been broken down into individual action groupings for ease of reference:

- SUBURBAN (SUB)– specific actions for each of the 9 suburban SLA's:
  - St Clair;
  - St Marys;
  - North St Marys;
  - North Werrington;
  - South Werrington;
  - Cranebrook;
  - Emu Plains
  - Penrith; and
  - Glenmore Park;
- RURAL (RUR) - actions specific to the rural areas of the LGA;
- PENRITH CITY CENTRE (PCC) – actions that relate to the Penrith City Centre;
- ST MARYS CENTRE (SMTC) - actions that relate to the ST Marys Town Centre;
- RESIDENTIAL URBAN RELEASE AREAS (URA)- actions that relate to the development of residential urban release areas; and
- EMPLOYMENT URBAN RELEASE AREAS (EMP)- actions that relate to the development of new employment areas.

Each individual action is numbered according to its action grouping eg the first suburban action is referred to as action SUB1.

7.2.1 SUBURBAN

ST CLAIR SLA

Chapter 6 identified issues occurring in the St Clair SLA. The following specific Actions have been identified to be implemented to improve transport and land use integration.

SUB1	The planning for the HUB lands should consider the inclusion of a local neighbourhood centre to serve employees in the HUB areas of the St Clair community. Consider opportunities to provide higher density dwellings surrounding the HUB lands.

This will decrease long distance trips for shopping and local services. Council should ensure that the commercial centre does not detract from the viability of the existing commercial retail centres within the hierarchy such as St Marys CBD yet provide business opportunities which can assist in the provision of local employment opportunities.

Other actions include:

SUB2	Ensure the LGA bike plan (AT3) addresses the missing links in the St Clair bike network (eg Erskine Park Rd), and due consideration is given to the connection of new residential and employment areas to the network.
SUB3	Provide an Express Bus lane/service on Mamre Rd from the proposed Erskine Business Park to St Marys Station (refer PT14) & connecting to all WSEH lands; through Mount Druitt and Blacktown.
SUB4	Improve accessibility to local facilities by active and public transport by implementing the proposed PAMP (AT9), new cycle routes and facilities and reviewing bus routes.
SUB5	Develop a rolling programme of Safer Routes to School projects and encourage the provision of secure cycle parking at all schools where a need is identified through the programme (AT12).

ST MARYS SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the St Marys SLA.

SUB6	**In conjunction with MoT, RailCorp and DoP investigate the provision of a new railway station in Oxley Park between St Marys and Mt Druitt Stations (opposite the intersection of Sydney Street & Hobart Street) (refer PT3).**
SUB7	**In conjunction with above review the development densities in Oxley Park within 800m walking distance from the above proposed new railway station in order to introduce higher density housing opportunities with links over the railway line to the major employment area in North St Marys. The City wide draft LEP should utilise a zone that permits high density residential development in such areas adjoining key activity nodes and identified as transport accessible.**
SUB8	**Prioritise Colyton and Oxley Park LATM studies, to establish residential amenity on the long straight de-facto collector road system.**
SUB9	**Implement proposed footpaths and increase the coverage as established under relevant PAMP (refer AT9) and Safer Routes to School programs (AT12).**
SUB10	**Address the following in the LGA bike plan (AT3):** ▪ **Lack of bike facilities in Oxley Park** ▪ **Links to St Marys Town Centre from the existing bikeways**
SUB11	**Identify and implement new active transport links to the CBD**
SUB12	**Improve accessibility to local facilities by active and public transport by implementing the proposed PAMP, new cycle routes and facilities and reviewing bus routes.**
SUB13	**Develop a rolling programme of Safer Routes to School projects and encourage the provision of secure cycle parking at all schools where a need is identified through the programme.**

EMU PLAINS SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the Emu Plains SLA.

SUB14	**Implement commuter parking at Emu Plains Railway Station (refer PK7) in the short term to utilise the existing undeveloped land adjoining and within close proximity of the station. Future development should ensure the long term provision of commuter parking.**
SUB15	**Increase land use densities surrounding the railway station.**
SUB16	**Implement proposed footpaths and increase the coverage and connectivity as established under relevant PAMP (refer AT9) with particular emphasis on:** ▪ **The 800m walking catchments to existing stations; and** ▪ **Connections to the shopping facilities.**
SUB17	**Ensure the LGA bike plan (AT3) affords a high priority in Emu Plains due to the existing lack of facilities with particular emphasis on the flatter areas around the river, with links to the shops and railway station.**

NORTH WERRINGTON SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the North Werrington SLA.

SUB18	**Prioritise implementation of the proposed new railway station in Werrington (UWS) (refer PT1).**
SUB19	**Extend the bus network to provide direct north-south links to existing railway stations during peak periods.**
SUB20	**Implement proposed footpaths and increase the coverage as established under relevant PAMP (AT9). With emphasis placed on:** ▪ **The 800m walking catchments to existing stations;** ▪ **Dunheved Road; and** ▪ **Connections to the shopping facilities.**
SUB21	**Address the following in the LGA bike plan (AT3):** ▪ **Continuous bike route along Dunheved Road onto which existing local routes converge; and** ▪ **Continue existing routes to Werrington Station;**
SUB22	**Undertake LATM studies in Cambridge Park as a priority in order to create residential amenity on the long straight de-facto collector road system (refer RM10 & RM11).**

SOUTH WERRINGTON SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the South Werrington SLA.

SUB23	**Prioritise implementation of the new railway station in Werrington (UWS) (refer PT1).**
SUB24	**Provide a PPT (fixed route) link serving the new UWS rail station and internal road systems and stops of the TAFE and UWS campuses (refer PT22). TAFE and UWS will be required to provide associated safe facilities within the ground at stops and linkages to these stops.**
SUB25	**Establish a well-defined bike network in the URA on the de-facto collector road network which should link up to Werrington, Kingswood, St Marys Urban Release Area and the proposed UWS Stations.**

PENRITH SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the Penrith SLA.

SUB26	**Extend bus network coverage into the residential area west of Mulgoa Road through Willoring Crescent.**
SUB27	**Address the following in the LGA bike plan (AT3):** ▪ **Existing on-road gaps;** ▪ **An off-road shared path system for bikes/pedestrian is investigated in the extensive & continuous reserves (in the South Penrith & Jamisontown area) with a link across Mulgoa Road to the Nepean River; and** ▪ **Connections between future residential and employment release areas and major activity generators.**
SUB28	**Implement proposed footpaths and increase the coverage as established under the relevant PAMP (AT9) with particular emphasis around the schools in South Penrith (AT12).**
SUB29	**Investigate the provision of a bus link between the Panthers Stadium, Panthers club and Penrith town centre, especially on special events day.**

GLENMORE PARK SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the Glenmore Park SLA.

SUB30	**Provide an Express Bus lane/service on Mulgoa Rd from the residential area to Penrith Station.**
SUB31	**Ensure the LGA bike plan (AT3) affords a high priority in the Glenmore Park area due to the existence of minimal facilities at present.**
SUB32	**Provide pedestrian crossing facilities as required after undertaking the relevant PAMP (refer AT9) with particular emphasis on accessing the open spaces and shopping facilities.**
SUB33	**Establish traffic calming methods and pedestrian crossing facilities along the long continuous de-facto residential collector roads (refer RM10 & RM11).**
SUB34	**Identify new active and public transport links to the southern expansion area**
SUB35	**Improve access to Penrith by bus and install bus stops on the M4 required**

CRANEBROOK SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the Cranebrook SLA.

SUB36	**Implement proposed footpaths and increase the coverage as required after undertaking the relevant PAMP (refer AT9) with particular emphasis on:** ▪ **The residential area between Andrews Road and Coreen Avenue;** ▪ **The residential area between Boundary Road and Laycock St; and** ▪ **Connections to the shopping facilities and Penrith Station.**
SUB37	**Extend bus network coverage into the industrial areas around Mullins Road, Coombes Drive, and Borec Rd-Leland St to connect with Penrith railway station during peak periods.**
SUB38	**Address the following in the LGA bike plan (AT3):** ▪ **The residential area between Andrews Road and Coreen Avenue;** ▪ **The residential area between Boundary Road and Laycock St; and** ▪ **Has continuous connections throughout the de-facto collector road network.**
SUB39	**Establish traffic calming methods along the long continuous de-facto residential collector roads (refer RM10 & RM11).**

NORTH ST MARYS SLA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the North St Marys SLA.

SUB40	**Provide high quality pedestrian and cycle links in the industrial and residential areas within 800m of this study's proposed railway station in Oxley Park, in conjunction with provision of the station.**
SUB41	**Provide a major commuter car park in the North St Marys industrial areas adjoining the proposed new railway station in Oxley Park, in conjunction with provision of the station. Appropriate developments within close proximity to and adjoining a proposed commuter car park should be carefully considered to maximise the car park benefits and to improve user safety.**
SUB42	**Subject to analysis by the MoT, extend bus network coverage into the industrial estates of Dunheved and St Marys (Lee Holm Drive) to connect with St Marys and ultimately Oxley Park railway station. Further connections to the St Marys Urban Release Area should be provided.**
SUB43	**Implement proposed footpaths and increase the coverage as established under relevant PAMP (refer AT9). Emphasis should be placed on the industrial estates of Dunheved and St Marys (Lee Holm Drive) and connections to the proposed bus network extensions.**
SUB44	**Ensure the LGA bike plan (AT3) addresses the following:** ▪ **Lack of bike facilities in the industrial estates of Dunheved and St Marys (Lee Holm Drive);** ▪ **Links to St Marys Town Centre and Railway Station (future Oxley Park Station) and St Marys Urban Release Area; and** ▪ **Lack of coverage in the residential area and connections to the industrial employment areas.**
SUB45	**Link public transport and active transport infrastructure in new release area (St Marys Release Area) and industrial area**

7.2.2 RURAL

The following specific Actions have been identified to be implemented to improve transport and land use integration in the Rural Penrith area.

RUR1	**Perform a 'transport needs analysis' for public transport in rural areas.**
RUR2	**Plan and consult to determine the most appropriate form and methodology for implementation of a demand responsive service. The study should develop an action/business plan defining the fundamentals for implementation of the preferred option.**
RUR3	**Identify improvements to the rural village walking network and cycling network**
RUR4	**Provide information on transport facilities in rural areas for planning purposes**
RUR5	**Gather information on facilities in rural areas for planning purposes**
RUR6	**Prepare a maintenance program and ensure an adequate level of upgrading and maintenance on rural roads to improve safety for those travelling by car, cycle and bus**
RUR7	**Inclusion of policies in the DCP/LEP to:** ▪ **Investigating restricting major trip generators from locating in rural areas (eg schools, employment providers)** ▪ **Limit rural residential development unless complimented by new neighbourhood centres and employment facilities**

7.2.3 PENRITH CITY CENTRE

The following specific Actions have been identified to be implemented to improve transport and land use integration in the Penrith City Centre.

PCC1	**Develop a hierarchy of movement strategy and corresponding program of works. Hierarchical movement corridors should identify:** ▪ **Pedestrian and cycle only links (these may be off road through public opens spaces as well as within/through building and can include on road sections);** ▪ **Public Transport (PT) priority streets with signalisation priority at congested intersections for bus and other PT such as taxis;** ▪ **Pedestrian & cycle priority streets with vehicle speeds slowed;** ▪ **Goods delivery routes & management; and** ▪ **Private vehicle access routes to parking.**
PCC2	**Provide way finding signage to include popular destinations, walking and cycling routes, public transport information, walking distances, and key points of interest, etc. Signage should include two types of signs, map-based signs for orientation (eg 'you are here'), and route signs to help people along the route (pointer/directional signs).**
PCC3	**Reduce speed limit within the city centre to maximum of 40kph, with lower speeds on shared routes.**
PCC4	**Audit accessibility within the city centre to ensure all facilities meet standards and guidelines for mobility impaired pedestrians.**
PCC5	**Perform pedestrian accessibility audits to assess & recommend options to include:** ▪ **Weather protection** ▪ **Seating** ▪ **Lighting** ▪ **Crime prevention**
PCC6	**Infrastructure improvements identified in the PAMP to be implemented**
PCC7	**Perform audits and gap analysis of cycle facilities to identify locations for new or improved facilities such as bike parking facilities.**
PCC8	**Upgrade public domain space to provide improved amenities for pedestrians and cyclists.**
PCC9	**Provide a free shuttle bus service that loops through the city centre and connects local destinations such as Penrith Panthers, the Penrith Football Stadium, Mulgoa Road Bulky Goods precinct, and Nepean River. The service could operate as a public private partnership.**
PCC10	**Review taxi ranks within the centre to ensure adequate provisions and appropriateness of locations.**

PCC11	**In accordance with current standards, provide an adequate number of spaces in town centre car parks for drivers with disabilities**
PCC12	**Additional actions relating to parking within the city centre are included in the Parking Actions within the citywide strategy.**

7.2.4 ST MARYS TOWN CENTRE

The following specific Actions have been identified to be implemented to improve transport and land use integration in St Mary's Town Centre.

SMTC1	**Provide way finding signage to include popular destinations, walking and cycling routes, public transport information, walking distances, and key points of interest, etc. Signage should include two types of signs, map-based signs for orientation (eg 'you are here'), and route signs to help people along the route (pointer/directional signs).**
SMTC2	**Reduce speed limit within the town centre to maximum of 40kph, with lower speeds on shared routes.**
SMTC3	**Audit accessibility within the town centre to ensure all facilities meet standards and guidelines for mobility impaired pedestrians.**
SMTC4	**Perform pedestrian accessibility audits to assess & recommend options to include:** ▪ **Weather protection** ▪ **Seating** ▪ **Lighting** ▪ **Crime prevention**
SMTC5	**Perform audits and gap analysis of cycle facilities to identify locations for new or improved facilities such as bike parking facilities.**
SMTC6	**Upgrade public domain space to provide improved amenities for pedestrians and cyclists.**
SMTC7	**Establish guidelines and enforcement measures for the private use of public footpaths eg cafes, display areas. This will ensure that public footpaths retain sufficient space for good pedestrian circulation.**
SMTC8	**Review taxi ranks within the centre to ensure adequate provisions and appropriateness of locations.**
PCC13	**Provide an adequate number of spaces in town centre car parks for drivers with disabilities**
SMTC9	**Convert part of current off-street long stay parking spaces to commuter parking; limit access to valid rail ticket holders.**

7.2.5 RESIDENTIAL URBAN RELEASE AREA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the residential urban release areas.

RURA1	**Continue to regularly update knowledge base to include best practice in residential design incorporating land use/transport integration and the provision of active transport and public transport infrastructure.**
RURA2	**Continue to encourage self sufficient URAs by integrating and providing diverse land uses, such as local shopping and community facilities. This will obviate the need for unnecessary travel outside the local area.**
RURA3	**Provide bus infrastructure in residential areas to key destinations (eg closest City Centre, rail line, or high school) on the first day of residents' occupation of dwellings.**
RURA4	**Prepare and distribute 'Welcome Packs' to new residents which include TAGs of the Penrith Town Centre, local bus route and services (obtained from the bus operator) and Nepean Hospital TAG (prepared by the Department of Health / Nepean Hospital).**

Residential street networks and block sizes are important in encouraging access and movement. A 'grid network' of streets that are aligned with major routes and land-marks assist in way-finding and in creating a legible urban space. A 'grid network' of street and small block sizes create an accessible urban framework. 'Grid network' of streets can be straight as in the past or slightly curved to discourage excessive speeding within precinct without overly impeding straight line distance travel. Curvilinear street networks are difficult to follow and frequently inefficient in terms of travel distance versus actual 'as the crow flies' distance.

RURA5	**Provide a legible and permeable street network that enables good access for pedestrians, cyclists and buses in new residential areas.**

7.2.6 EMPLOYMENT URBAN RELEASE AREA

The following specific Actions have been identified to be implemented to improve transport and land use integration in the employment urban release areas.

EMP1	**Within each employment URA, encourage land uses that obviate the need for unnecessary travel outside the employment area, such as Day Care centres, and/or Pre Schools by private operators or employers and local shopping facilities.**
EMP2	**Provide bus services during AM/PM peaks from the first day of occupation of employment premises to the closest rail line.**
EMP3	**Prepare and distribute 'Welcome Packs' to employers which include the local bus route and services (obtained from the bus operator) to the closest rail station and other key locations on bus routes such as shopping centres and schools.**

The location of intermodal terminals in western Sydney will support growth at Port Botany and help achieve the target of increasing rail's share of Port Botany container movements to 40 per cent by 2011. Consistent with the Government's vision to build on strong economic growth and employment in western Sydney, there is a need to ensure sufficient land remains available to support a network of intermodal terminals in western Sydney.

EMP4	**Investigate suitable locations for the provision of an intermodal terminal within the LGA, located on the main road and rail network.**

chapter 8
key performance indicators

8 KEY PERFORMANCE INDICATORS

This section explores the need for adopting a set of performance indicators and targets which can be used to assess whether the strategy is delivering the stated objectives and how the key performance indicators (KPIs) were set.

8.1 ASSESSING THE STRATEGY

It is important that the outcomes of the strategy and the actions implemented are monitored to ensure that the objectives are being fulfilled. Council required that the study:

"*recommend realistic performance measures to be used as indicators of improvements (or otherwise) to the transport environment over time.*"

The performance measures will record the status quo of the city's transport infrastructure and services and identify future targets for change and be documented as Key Performance Indicators.

8.1.1 DEVELOPING KEY INDICATORS

A series of KPIs were developed through a consultative process to align with the strategy goals and vision. Preliminary KPIs were developed at a steering committee workshop with aim of being realistic.

Consideration of the ease of measuring the KPI was given a priority. A broad range of data is already collected by Council and others and this can largely be used as the basis of the monitoring program, ensuring that monitoring does not become onerous or take resources that should be utilised in the implementation of the strategy.

The preliminary KPIs were then presented to Councillors for comment and refinement. Further adjustments were made to the KPIs by individual Council Officers. A summary of the resulting KPIs are highlighted overleaf.

8.1.2 REPORTING

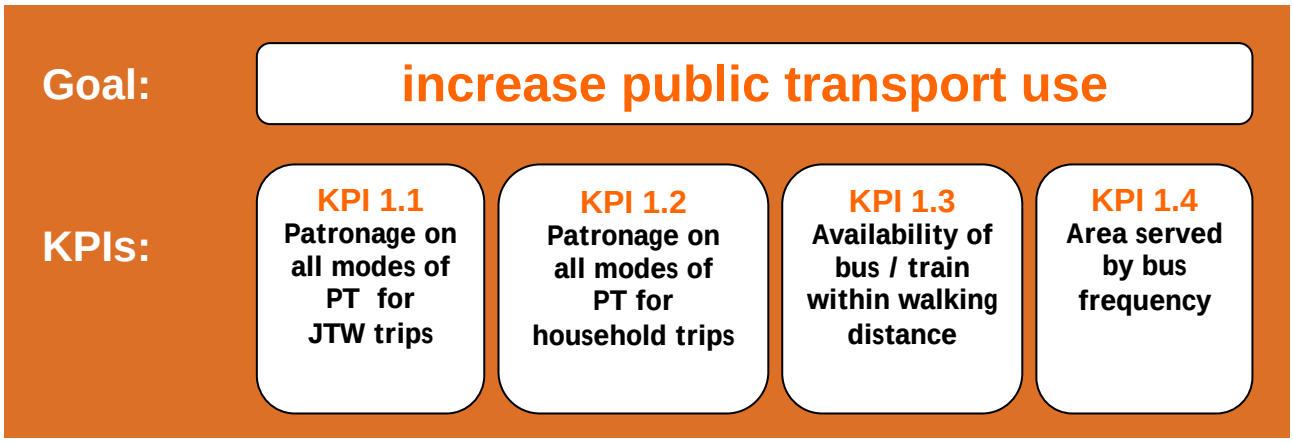
Council will need to establish internal arrangements for monitoring the performance indicators. It would be advisable to report back to Council on an annual basis to ensure that sufficient resources and funding are made available to implement the Actions that will achieve the outcomes of the targets.

8.2 PERFORMANCE INDICATORS

The following tables below show the agreed indicators to monitor Councils progress with the implementation of the Strategy.

Appendix 8-A details how the baseline figures have been calculated. For consistency, when Council review the baseline figures for comparison in future years, the same method of calculation should be used.

8.2.1 GOAL 1



AIMS AND ASPIRATIONS	i) **Increase public transport use** ii) **Decrease motorised private vehicle use** iii) **Improve access to all activities**

PERFORMANCE INDICATOR	KPI 1.1 Patronage levels on all modes of Public Transport (PT) for Journey To Work (JTW) trips per capita
METHODOLOGY	Calculation by Council from data provided by Australian Bureau of Statistics (ABS) Journey To Work (JTW) data
BASE DATA SOURCE	2001 ABS JTW Census data (to be updated to 2006 upon release)
BASELINE	PT (Bus and train) JTW Trips: – 5.9 trips within LGA per 1000 people (PCC LGA population) – 6.9 trips entering LGA per 1000 people (PCC LGA population) – 50 trips exiting LGA per 1000 people (PCC LGA population) – 62.8 trips for all LGA per 1000 people (PCC LGA population)
YEAR 2011 TARGET	10% increase by 2011 from 2001 base level

PERFORMANCE INDICATOR	KPI 1.2 Patronage levels on all modes of Public Transport for household trips per capita
METHODOLOGY	Calculation by Council from data provided by Transport Data Centre (TDC) Household Travel Survey (HTS) data
BASE DATA SOURCE	2001 TDC HTS data (to be updated to 2006 upon release)
BASELINE	PT (Bus and train) Household Trips (adjusted to reflect all HTS trips excluding to/from work and work related business trips): – 87.7 trips within LGA per 1000 people (PCC LGA population) – 45.3 trips entering LGA per 1000 people (PCC LGA population) – 46.3 trips exiting LGA per 1000 people (PCC LGA population) – 179.3 trips for all LGA per 1000 people (PCC LGA population)
YEAR 2011 TARGET	10% increase by 2011 from 2001 base level

PERFORMANCE INDICATOR	KPI 1.3 Availability of bus / train within walking distance*
METHODOLOGY	Calculation by Council from data provided by Ministry of Transport (MoT)
BASE DATA SOURCE	Penrith Bus Analysis Study (2Plan, 2005)
BASELINE	42.6% of Penrith LGA served by bus / train
YEAR 2011 TARGET	10% increase in LGA area served by bus/train by 2011

***** It is noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route. Areas defined as being served by train are within 800 metres of a train station.

PERFORMANCE INDICATOR	KPI 1.4 Areas served by bus frequency
METHODOLOGY	Calculation by Council from data provided by Ministry of Transport (MoT)
BASE DATA SOURCE	Penrith Bus Analysis Study (2Plan, 2005)
BASELINE	Proportion of LGA in area served by bus frequency: – <15 minutes – 4.5% – 15-30 minutes - 13.6% – 30-60 minutes - 10.7% – <60 minutes - 13.1% – No service - 58.2%
YEAR 2011 TARGET	Target proportion of LGA in area served by bus frequency: – <15 minutes – 10% – 15-30 minutes - 30% – 30-60 minutes - 10% – <60 minutes - 10% – No service - 40%

8.2.2 GOAL 2

Goal: Decrease motorised private vehicles use

KPIs:

- **KPI 2.1** PMV mode share for JTW trips
- **KPI 2.2** PMV mode share for household trips
- **KPI 2.3** PT & AT mode share doe JTW trips
- **KPI 2.4** PT & AT mode share for household trips

AIMS AND ASPIRATIONS	i) **Increase public transport use &** ii) **Decrease motorised private vehicle use** iii) **Improve access to all activities** iv) **Improve access to jobs and economic activity** v) **To increase the proportion of travel by sustainable modes** vi) **To maximise use of an effective transport system**

PERFORMANCE INDICATOR	KPI 2.1 Private Motor Vehicle mode share for journey to work trips
METHODOLOGY	Calculation by Council from data provided by Australian Bureau of Statistics (ABS) Journey To Work (JTW) data
BASE DATA SOURCE	2001 ABS JTW Census data (to be updated to 2006 upon release)
BASELINE	Mode share for journey to work trips: – 72.2% by private motor vehicle (car driver) within LGA – 82.2% by private motor vehicle (car driver) entering LGA – 68.2% by private motor vehicle (car driver) exiting LGA – 72.1% by private motor vehicle (car driver) all LGA
YEAR 2011 TARGET	Minimum 10% reduction by 2011 from 2001 base level

PERFORMANCE INDICATOR	KPI 2.2 Private Motor Vehicle mode share for household trips
METHODOLOGY	Calculation by Council from data provided by Transport Data Centre (TDC) Household Travel Survey (HTS) data
BASE DATA SOURCE	2001 TDC HTS data (to be updated to 2006 upon release)
BASELINE	Mode share for household trips (adjusted to reflect all HTS trips excluding to/from work and work related business trips): – 39.2% by private motor vehicle (car driver) within LGA – 55.3% by private motor vehicle (car driver) entering LGA – 55.7% by private motor vehicle (car driver) exiting LGA – 44.6% by private motor vehicle (car driver) all LGA
YEAR 2011 TARGET	Minimum 10% reduction by 2011 from 2001 base level

PERFORMANCE INDICATOR	KPI 2.3 Public Transport / Active Travel mode share for journey to work trips
METHODOLOGY	Calculation by Council from data provided by Australian Bureau of Statistics (ABS) Journey To Work (JTW) data
BASE DATA SOURCE	2001 ABS JTW Census data (to be updated to 2006 upon release)
BASELINE	Mode share for journey to work trips: – 12.4% by active transport / 4.3% by public transport (bus and train) within LGA – 4.5% by active transport / 6.9% by public transport (bus and train) entering LGA – 7.3% by active transport / 18.6% by public transport (bus and train) exiting LGA – 4.5% by active transport / 12.4% by public transport (bus and train) all LGA
YEAR 2011 TARGET	Minimum 10% increase in PT and AT by 2011 from 2001 base level

PERFORMANCE INDICATOR	KPI 2.4 Public Transport / Active Travel mode share for household trips
METHODOLOGY	Calculation by Council from data provided by Transport Data Centre (TDC) Household Travel Survey (HTS) data
BASE DATA SOURCE	2001 TDC HTS data (to be updated to 2006 upon release)
BASELINE	Mode share for household trips (adjusted to reflect all HTS trips excluding to/from work and work related business trips): – 22.5% by active transport / 4.0% by public transport (bus and train) within LGA – 0.7% by active transport / 8.3% by public transport (bus and train) entering LGA – 0.9% by active transport / 8.6% by public transport (bus and train) exiting LGA – 15.3% by active transport / 5.5% by public transport (bus and train) all LGA
YEAR 2011 TARGET	Minimum 10% increase in PT and AT by 2011 from 2001 base level

8.2.3 GOAL 3

Goal: Decrease the number and length of trips per capita including those on PT

KPIs:

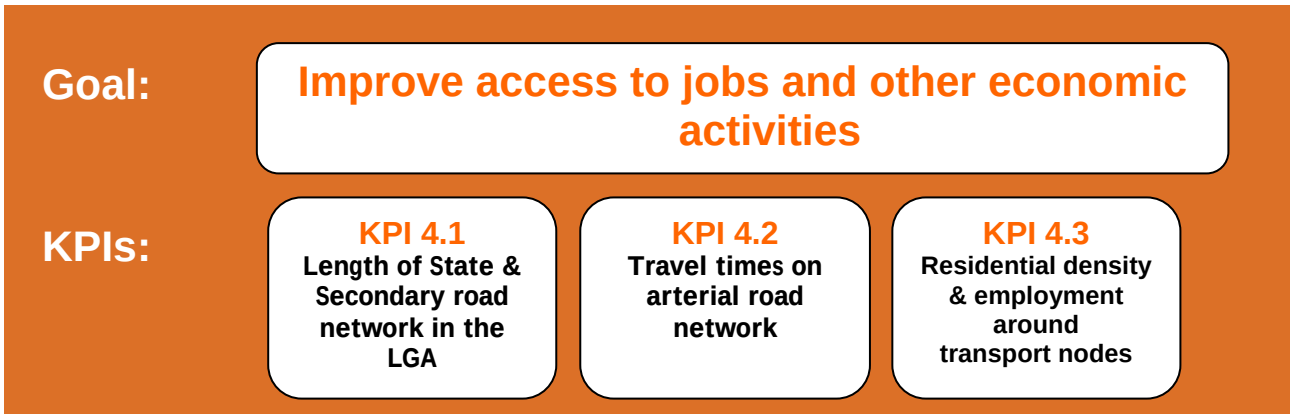
- **KPI 3.1** — No. of PMV/PT JTW trips per capita
- **KPI 3.2** — No. of PMV/PT household trips per capita

AIMS AND ASPIRATIONS	i) **Increase active transport use** ii) **Decrease motorised private vehicle use** iii) **Improve access to jobs and economic activity**

PERFORMANCE INDICATOR	KPI 3.1 Number of Private Motor Vehicle / Public Transport (Non-Active) Journey To Work trips per capita
METHODOLOGY	Calculation by Council from data provided by Australian Bureau of Statistics (ABS) Journey To Work (JTW) data
BASE DATA SOURCE	2001 ABS JTW Census data (to be updated to 2006 upon release)
BASELINE	Non-Active (car driver, car passenger, bus and train) JTW Trips: – 119.3 trips within LGA per 1000 people (PCC LGA population) – 96.1 trips entering LGA per 1000 people (PCC LGA population) – 249.1 trips exiting LGA per 1000 people (PCC LGA population) – 464.6 trips for all LGA per 1000 people (PCC LGA population)
YEAR 2011 TARGET	Minimum 5% decrease in non-active JTW transport trips by 2011 from 2001 base level

PERFORMANCE INDICATOR	KPI 3.2 Number of Private Motor Vehicle / Public Transport household trips per capita
METHODOLOGY	Calculation by Council from data provided by Transport Data Centre (TDC) Household Travel Survey (HTS) data
BASE DATA SOURCE	2001 TDC HTS data (to be updated to 2006 upon release)
BASELINE	Non-Active (car driver, car passenger, bus and train) household trips (adjusted to reflect all HTS trips excluding to/from work and work related business trips): – 1710.9 trips within LGA per 1000 people (PCC LGA population) – 539.6 trips entering LGA per 1000 people (PCC LGA population) – 533.7 trips exiting LGA per 1000 people (PCC LGA population) – 274.2 trips for all LGA per 1000 people (PCC LGA population)
YEAR 2011 TARGET	Minimum 5% decrease in non-active household travel trips by 2011 from 2001 base level

8.2.4 GOAL 4



AIMS AND ASPIRATIONS	i) **Increase public transport use** ii) **Decrease motorised private vehicle use** iii) **Improve access to jobs and economic activity**

PERFORMANCE INDICATOR	KPI 4.1 Length of State & Secondary road network in the LGA
METHODOLOGY	Calculation by Council using Council and RTA GIS databases
BASE DATA SOURCE	2006 GIS Data sets
BASELINE	203.4 km
YEAR 2011 TARGET	10% increase

PERFORMANCE INDICATOR	KPI 4.2 Travel times on arterial road network
METHODOLOGY	Calculation by Council using RTA vehicle travel times survey data
BASE DATA SOURCE	RTA and Council
BASELINE	Penrith Council to purchase
YEAR 2011 TARGET	No change

PERFORMANCE INDICATOR	KPI 4.3 Residential density & employment around transport nodes
METHODOLOGY	Calculation by Council using Zoning contained in DCP/LEP and Australian Bureau of Statistics (ABS) census population data
BASE DATA SOURCE	To be agreed by Council
BASELINE	To be agreed by Council
YEAR 2011 TARGET	To be agreed by Council

8.3 OTHER PERFORMANCE MEASURES

The Key Performance Indicators listed above provide a quantitative way of measuring the level of success of the Strategy. There are however, a number of ways to measure the success of the Strategy including qualitative, for example, whereby users are asked about there perceptions to accessibility following the introduction of a new service or facility. Often measuring does not present a true reflection of the success of a project, Council could install a number of cycle racks and easily meet a target, however if the racks are not being used or located inconveniently then the project has not been successful.

Council should therefore consider other ways of reviewing the implementation and achievement of the Strategy. Some examples of additional measures are provided below:

- Number of disability access taxis that service the LGA;
- Number of accessible public buses operating within the LGA;
- Number of educational initiatives undertaken e.g. Walking to School Program; Kids riding bikes to school etc;
- Survey of target resident groups to ascertain information on transport such as:
  - Rationales for travel mode choices of residents, (including decisions they make about their children's travel behaviour) could be collected using council surveys;
  - Perceived walk-ability within the LGA (eg between railway stations and significant destinations/ places/ landuses such as Panthers/ Penrith Stadium or between the station and UWS)
  - Identifiy key places/land uses which have potential to be within walkable and cycling distances (eg 400m for walkers) of likely users (eg a park to residents or food shop/ café/ takeaway to lunchtime office workers), this information could also be used to inform the development of a schedule of key places that will generate possible pedestrian and bicycle traffic and map the pathways available.
- Dwelling density for new release areas within 400m of neighbourhood centres (sufficient to support a range of related land uses such as retailing, recreation, education, community facilities)
- Dwelling densities in established areas (sufficient to support a range of related land uses such as retailing, recreation, education, community facilities)
- Economic viability of neighbourhood and local shopping centres (as an indicator of the attractiveness of the centres to residents by being able to offer sufficient range of essential daily facilities).

- Level of Co-location of land uses (ie located in such close and convenient proximity to each other that a trip to one land use enables accessing the other without making an additional journey).
- "VAMPIRE" index for spatial vulnerability of households to the combined impact of increasing mortgage and petrol costs
- Walking and cycling distance between critical destinations and surrounding residential development, such as:
  - Shops (providing for daily consumer needs)
  - Schools (primary and secondary)
  - Local scale park (passive and playing field)
  - Community facilities
  - Child care
  - Bus stop/train station
- The number of travel plans received as part of DA's
- The number of new bus routes and add on's to existing routes over time
- The number of people in rural areas using DRT or experiencing a change in accessibility
- The number of cycle racks provided by Council, no. of racks being used (annual bike survey)

8.4 IMPLICATIONS OF THE ACTION PLANS

Having analysed the current and future situation, Council has determined what it wants the Strategy to achieve through its Goals. In order to achieve the Goals set out in Chapter 1 of the Strategy, Council need to implement the Actions prescribed in the Action Plan.

To understand which actions are likely to have the most impact on the strategy goals, a matrix will be developed to indicate the relevance of each action to the goals. A sample of the matrix format is provided in Table 8.1Table 8.1.

Some of these actions will be able to be carried out within a short term period, whereas other actions are focused on the longer term or because of limitations on available information, staff resources and the resources or programmes of partners, can only be tackled over the longer term. At the centre of a Strategy should be a costed, realistic and balanced programme of measures. No one measure on its own is likely to provide a solution to the challenges within the area and an effective strategy will consist of a balanced package of measures. This will require Council to work in partnership with key stakeholders to be able to implement the actions. Therefore, Council will be required to carry out an outline plan of how to implement the Action Plan each financial year of what needs to be done, by whom, when and indicative costs.

Table 8.1: Sample Goal vs Action Matrix

Action	Increase public transport use	Decrease motorised private vehicles use	Decrease the number and length of trips	Improve access to jobs and other economic activities
LUPx				
RMx				
PTx				
ATx				
PKx				
TDMx				
OTHx				
SUBx				
RURx				
PCCx				
SMTCx				
RURAx				
EMPx				

Low Impact
Medium Impact
High Impact

The above matrix will be completed to include all strategy actions once the final strategy actions have been agreed.

chapter 9
implementation plan

9 IMPLEMENTATION PLAN

The implementation plan is a working document that Council can use to ensure that the recommendations of the strategy are carried out. For each action a set of information will be provided to assist Council in determining the type of action, the priority, responsibility etc. The information to e provided for each action is detailed in the following sections.

9.1 WHAT DOES THE PLAN INCLUDE

The action plan will document the following elements in a live spreadsheet for Council's continued updating and use.

9.1.1 ACTION NUMBER

The action number correlates to the number allocated in Section 7.

9.1.2 ACTION DECSRIPTION

The description may be an abbreviation of the action described in detail in Section 7.

9.1.3 TYPE OF ACTION

Actions are identified by the type:

- **Infrastructure** (Inf)- referring to built form or part of the built environment, such as roads, footpaths, traffic signals and bus stops. Infrastructure actions may also have an element of policy, planning & study. However the end result is defined as an infrastructure action.
- **Behavioural** (Beh) -actions relating to behavioural change such as marketing, educational programs, participation in national awareness programs and community consultation to change travel behaviour and patterns.
- **Planning Policy** (PP) - these actions require planning studies to identify actions or to investigate/gain further information regarding specific matters or involve a policy to be adopted by Council l.
- **Lobbying** (Lob) - Liaising with authorities and government departments for the implementation of actions outside of Councils responsibility.
- **Innovations** (Inn) - Piloting programs or initiatives that are not yet tested in this State or LGA or initiatives Council can implement as a major employer to demonstrate leadership to the community.
- **Service Improvements** (SI) - Improvements made to public transport or Council services

9.1.4 RESPONSIBILITY & STAKEHOLDERS

Each action identifies the responsibilities and stakeholders. The following groups have been identified for these:

- Penrith City Council (PCC);
- Department of Planning, NSW (DOP);
- Roads and Traffic Authority, NSW (RTA);
- Rail Corp (RC);
  - CityRail (CR);
  - Transport Infrastructure Development Corporation (TIDC);
- Ministry of Transport, NSW (MOT);
- Bus Operators (Bus);
- Community Transport Operators (CT);
- Taxi Operators or NSW Taxi Council (Tax);
- Developers (Dev);
- Community (Com).

Responsibility is divided into:

- The primary responsibility – the authority, agency or group whose is responsible for driving the action; and
- The funding responsibility – the authority, agency or group responsible for funding the cost of the action implementation.

Stakeholders are defined as:

- Primary stakeholders (Pr); or
- Secondary stakeholders (Sec).

9.1.5 COST IMPLICATION TO PCC

The cost implication to Penrith City Council for each action has been estimated using the following classifications.

- None (Nil) i.e. cost to developer or other authority;
- Staff Costs (SC) only;
- Low (Low): up to $50,000;
- Medium (Med): $50,000 - $500,000; and
- High (Hi): greater than $500,000.

9.1.6 PRIORITY

The recommended priority for each action is categorised into:

- Low (Low)
- Medium (Med)
- High (Hi)

9.1.7 TIMING

The recommended timing for each action is categorised into the following groups:

- Short Term (0 - 5 years);
- Medium Term (5 - 10 years);
- Long Term (10 - 20 years);
- Ongoing;
- Ongoing development application.

9.1.8 REFERENCE

References to other Council strategies and planning documents will be provided where similar actions are recommended

9.1.9 STATUS

The status of the action item will be noted by Council as the implementation progresses and may include the following:

- Not started;
- Partially complete;
- On-going;
- Complete.

9.2 IMPLEMENTATION PLAN

The implementation plan is shown in **Appendix 9-A**.

APPENDICES

APPENDIX 4-A

ZONED LAND USE AREA (sqm)

SLA	Commercial	Industrial	Hospital	Education	Residential	Other	Cemetery	Rural	Parkland	Water	TOTAL
St Clair	5.2	0.0	0.0	0.3	7.8	2.5	0.0	2.1	1.7	0.0	19.7
St Marys	0.2	0.0	0.0	0.4	6.7	0.8	0.0	0.0	1.7	0.0	9.9
Emu Plains	0.1	1.5	0.0	0.4	4.9	0.0	0.0	1.7	4.5	0.5	13.5
North Werrington	0.0	0.0	0.0	0.2	6.1	1.4	0.0	0.0	4.3	0.0	12.0
South Werrington	0.0	0.0	0.0	2.7	1.9	0.5	0.0	3.8	2.1	0.0	11.0
Penrith	0.7	1.1	0.2	0.5	8.6	0.0	0.0	1.9	2.6	0.3	15.9
Glenmore Park	0.0	0.0	0.0	0.2	7.3	0.0	0.0	4.2	3.6	0.0	15.3
Cranebrook	0.0	3.3	0.0	0.3	8.9	0.0	0.1	2.8	3.9	0.1	19.5
North St Marys	0.0	3.1	0.0	0.1	1.2	0.4	0.0	0.0	2.6	0.0	7.5
Sub-Total Urban	6.2	9.0	0.2	5.1	53.4	5.6	0.1	16.6	26.9	0.9	124.1
South Rural	0.0	0.0	0.0	0.7	5.0	21.6	0.0	113.6	16.8	0.1	158.5
South Rural	0.0	0.0	0.0	0.1	1.7	4.2	0.0	95.2	18.0	2.5	121.9
Sub-Total Rural	0.0	0.0	0.0	0.7	6.7	25.8	0.0	208.8	34.8	2.6	280.4
TOTAL LGA	**6.2**	**9.0**	**0.2**	**5.9**	**60.1**	**31.4**	**0.1**	**225.3**	**61.7**	**3.5**	404.5

ZONED LAND USE PROPORTION

SLA	Commercial	Industrial	Hospital	Education	Residential	Other	Cemetery	Rural	Parkland	Water	TOTAL
St Clair	26%	0%	0%	2%	40%	13%	0%	11%	9%	0%	100%
St Marys	2%	0%	0%	4%	68%	9%	0%	0%	17%	0%	100%
Emu Plains	1%	11%	0%	3%	36%	0%	0%	13%	33%	4%	100%
North Werrington	0%	0%	0%	2%	51%	11%	0%	0%	36%	0%	100%
South Werrington	0%	0%	0%	25%	18%	4%	0%	35%	19%	0%	100%
Penrith	4%	7%	1%	3%	55%	0%	0%	12%	17%	2%	100%
Glenmore Park	0%	0%	0%	2%	48%	0%	0%	27%	23%	0%	100%
Cranebrook	0%	17%	0%	2%	46%	0%	0%	14%	20%	1%	100%
North St Marys	0%	42%	0%	2%	16%	5%	0%	0%	35%	0%	100%
Sub-Total Urban	**5%**	**7%**	**0%**	**4%**	**43%**	**4%**	**0%**	**13%**	**22%**	**1%**	**100%**
South Rural	0%	0%	0%	0%	3%	14%	0%	72%	11%	0%	100%
South Rural	0%	0%	0%	0%	1%	3%	0%	78%	15%	2%	100%
Sub-Total Rural	**0%**	**0%**	**0%**	**0%**	**2%**	**9%**	**0%**	**75%**	**12%**	**1%**	**100%**
TOTAL LGA	**2%**	**2%**	**0%**	**1%**	**15%**	**8%**	**0%**	**56%**	**15%**	**1%**	**100%**

APPENDIX 4-B

DEVELOPED AREAS (sqm)

SLA	SLA Area	Existing Developed Area*		Urban Release Area**		Future Developed Area**	
	km²	km²	% SLA	km²	% SLA	km²	%SLA
St Clair	19.7	9.6	49%	5.0	26%	14.6	74%
St Marys	9.9	8.0	82%	0.0	0%	8.0	82%
Emu Plains	13.5	7.7	56%	0.0	0%	7.7	56%
North Werrington	12.0	7.0	58%	3.3	28%	10.3	86%
South Werrington	11.0	4.0	37%	2.4	22%	6.4	58%
Penrith	15.9	13.3	84%	0.0	0%	13.3	84%
Glenmore Park	15.3	8.3	55%	1.7	11%	10.0	65%
Cranebrook	19.5	12.2	63%	3.9	20%	16.1	83%
North St Marys	7.5	4.6	62%	0.1	1%	4.7	63%
Sub-Total Urban	**124.1**	**74.9**	**60%**	**16.3**	**13%**	**91.2**	**74%**
South Rural	158.5	0.0	0%	0.8	1%	0.8	1%
South Rural	121.9	0.0	0%	23.3	19%	23.3	19%
Sub-Total Rural	**280.4**	**0.0**	**0%**	**24.2**	**9%**	**24.2**	**9%**
TOTAL LGA	**404.5**	**74.9**	**19%**	**40.5**	**10%**	**115.4**	**29%**

* Developed Areas are those areas developed for more intensive uses, such as urban residential areas, employment centres etc.

** Urban Release Areas are those designated areas proposed for future intensive uses

APPENDIX 4-C

PUBLIC SCHOOL 1.6KM CATCHMENT AREA

SLA	Within SLA		Within SLA Existing Developed Areas		Within SLA Urban Release Areas		Within SLA Future Developed Areas	
	km²	% *	km²	% **	km²	% #	km²	% ##
St Clair	16.6	84%	9.4	98%	4.0	80%	13.4	92%
St Marys	9.8	100%	8.0	100%	0.0	-	8.0	100%
Emu Plains	13.0	96%	7.7	100%	0.0	-	7.7	100%
North Werrington	11.9	99%	7.0	100%	3.2	96%	10.2	99%
South Werrington	11.0	100%	4.0	100%	2.3	98%	6.4	99%
Penrith	15.9	100%	13.2	99%	0.0	-	13.2	99%
Glenmore Park	12.7	83%	8.1	97%	0.8	49%	8.9	89%
Cranebrook	16.0	82%	11.1	91%	2.2	56%	13.3	82%
North St Marys	6.7	89%	4.2	92%	0.0	63%	4.3	91%
Sub-Total Urban	**113.5**	**91%**	**72.8**	**97%**	**12.6**	**77%**	**85.4**	**94%**
South Rural	26.4	17%	0.0	-	0.2	21%	0.2	21%
South Rural	28.7	24%	0.0	-	4.8	20%	4.8	20%
Sub-Total Rural	**55.1**	**20%**	**0.0**	**-**	**4.9**	**20%**	**4.9**	**20%**
TOTAL LGA	**168.6**	**42%**	**72.8**	**97%**	**17.5**	**43%**	**90.3**	**78%**

* % is the proportion of the SLA covered by the school 1.6km catchment

** % is the proportion of the existing developed areas covered by the school 1.6km catchment

% is the proportion of the URA covered by the school 1.6km catchment

% is the proportion of the future developed areas covered by the school 1.6km catchment

APPENDIX 4-D

BUSINESS ZONE 400m CATCHMENT AREA

SLA	Within SLA		Within SLA Existing Developed Areas		Within SLA Urban Release Areas		Within SLA Future Developed Areas	
	km^2	% *	km^2	% **	km^2	% #	km^2	% ##
St Clair	3.0	15%	2.6	28%	0.0	0%	2.6	18%
St Marys	4.6	47%	4.2	52%	0.0	-	4.2	52%
Emu Plains	3.0	22%	2.7	36%	0.0	-	2.7	36%
North Werrington	3.8	31%	2.9	42%	0.7	21%	3.6	35%
South Werrington	2.4	22%	1.5	38%	0.3	14%	1.9	29%
Penrith	8.4	53%	8.1	61%	0.0	-	8.1	61%
Glenmore Park	0.8	5%	0.8	9%	0.0	0%	0.8	8%
Cranebrook	3.6	19%	2.8	23%	0.4	11%	3.2	20%
North St Marys	2.3	31%	1.7	37%	0.1	96%	1.8	38%
Sub-Total Urban	**31.8**	**26%**	**27.5**	**37%**	**1.5**	**9%**	**29.0**	**32%**
South Rural	0.0	0%	0.0	-	0.0	0%	0.0	0%
South Rural	1.9	2%	0.0	-	1.9	8%	1.9	8%
Sub-Total Rural	**1.9**	**1%**	**0.0**	**-**	**1.9**	**8%**	**1.9**	**8%**
TOTAL LGA	**33.7**	**8%**	**27.5**	**37%**	**3.4**	**8%**	**30.9**	**27%**

* % is the proportion of the SLA covered by the business zone 400m walking catchment
** % is the proportion of the existing developed areas covered by the business zone 400m walking catchment
# % is the proportion of the URA covered by the business zone 400m walking catchment
% is the proportion of the future developed areas covered by the business zone 400m walking catchment

APPENDIX 4-E

2001 POPULATION, EMPLOYMENT & WORKFORCE

SLA	Population		Workforce		Employment		Employment v Workforce	
	People	% LGA	Workers	%LGA	Jobs	%LGA	Difference	Ratio
St Clair	28,551	17%	13,910	17%	2,270	5%	-11,640	0.2
St Marys	19,598	11%	8,034	10%	4,073	8%	-3,961	0.5
Emu Plains	13,982	8%	7,129	9%	3,217	6%	-3,912	0.5
North Werrington	20,327	12%	9,991	12%	1,270	3%	-8,721	0.1
South Werrington	5,405	3%	2,558	3%	1,913	4%	-645	0.7
Penrith	27,154	16%	12,528	15%	20,869	42%	8,341	1.7
Glenmore Park	19,545	11%	10,136	13%	1,914	4%	-8,222	0.2
Cranebrook	19,611	11%	8,627	11%	5,388	11%	-3,239	0.6
North St Marys	3,972	2%	1,407	2%	5,262	11%	3,855	3.7
Sub-Total Urban	**158,145**	**92%**	**74,320**	**92%**	**46,176**	**93%**	**-28,144**	**0.6**
South Rural	5,944	3%	2,922	4%	1,514	3%	-1,408	0.5
South Rural	8,309	5%	3,750	5%	2,119	4%	-1,631	0.6
Sub-Total Rural	**14,253**	**8%**	**6,672**	**8%**	**3,633**	**7%**	**-3,039**	**0.5**
TOTAL LGA	**172,398**	**100%**	**80,992**	**100%**	**49,809**	**100%**	**-31,183**	**0.6**

APPENDIX 4-F

2016 POPULATION, EMPLOYMENT & WORKFORCE

SLA	Population		Workforce		Employment		Employment v Workforce	
	People	% LGA	Workers	%LGA	Jobs	%LGA	Difference	Ratio
St Clair	29,957	13%	14,547	14%	10,026	10%	-4,521	0.7
St Marys	21,704	9%	8,988	8%	4,073	4%	-4,915	0.5
Emu Plains	15,333	7%	7,741	7%	3,217	3%	-4,524	0.4
North Werrington	25,220	11%	12,208	11%	3,270	3%	-8,938	0.3
South Werrington	11,320	5%	5,237	5%	31,913	33%	26,676	6.1
Penrith	32,814	14%	15,093	14%	20,869	22%	5,776	1.4
Glenmore Park	20,824	9%	10,715	10%	1,914	2%	-8,801	0.2
Cranebrook	26,186	11%	11,606	11%	6,060	6%	-5,546	0.5
North St Marys	4,469	2%	1,632	2%	5,262	5%	3,630	3.2
Sub-Total Urban	**187,827**	**82%**	**87,767**	**82%**	**86,604**	**90%**	**-1,163**	**1.0**
South Rural	9,922	4%	4,722	4%	1,514	2%	-3,208	0.3
South Rural	31,461	14%	14,236	13%	8,603	9%	-5,633	0.6
Sub-Total Rural	**41,384**	**18%**	**18,958**	**18%**	**10,117**	**10%**	**-8,841**	**0.5**
TOTAL LGA	**229,211**	**100%**	**106,725**	**100%**	**96,721**	**100%**	**-10,004**	**0.9**

APPENDIX 4-G

2001 & 2016 DENSITY

SLA	Population Density (people / SLA sqkm)		Workforce Density (workers / SLA sqkm)		Employment Density (jobs / SLA sqkm)	
	2001	2016	2001	2016	2001	2016
St Clair	1,451	1,523	707	740	115	510
St Marys	1,988	2,201	815	912	413	413
Emu Plains	1,034	1,134	527	573	238	238
North Werrington	1,688	2,095	830	1,014	105	272
South Werrington	494	1,034	234	478	175	2,914
Penrith	1,713	2,070	790	952	1,317	1,317
Glenmore Park	1,277	1,361	662	700	125	125
Cranebrook	1,008	1,346	443	596	277	311
North St Marys	532	598	188	219	705	705
Sub-Total Urban	**1,274**	**1,513**	**599**	**707**	**372**	**698**
South Rural	38	63	18	30	10	10
South Rural	68	258	31	117	17	71
Sub-Total Rural	**51**	**148**	**24**	**68**	**13**	**36**
TOTAL LGA	**426**	**567**	**200**	**264**	**123**	**239**

APPENDIX 5-A

EXISTING ROADS

SLA		State & Regional Roads#			Council Roads##			All Roads		
		km	km/km^2	people/km	km	km/km^2	people/km	km	km/km^2	people/km
St Clair		14.5	0.7	1,976	125.0	6.4	228	139.4	7.1	205
St Marys		12.0	1.2	1,628	91.2	9.2	215	103.2	10.5	190
Emu Plains		9.9	0.7	1,417	72.8	5.4	192	82.7	6.1	169
North Werrington		7.6	0.6	2,675	89.0	7.4	229	96.6	8.0	211
South Werrington		9.3	0.9	580	42.1	3.8	128	51.5	4.7	105
Penrith		18.4	1.2	1,473	138.2	8.7	197	156.6	9.9	173
Glenmore Park		10.9	0.7	1,801	105.0	6.9	186	115.8	7.6	169
Cranebrook		27.0	1.4	727	103.7	5.3	189	130.7	6.7	150
North St Marys		4.3	0.6	915	33.2	4.4	120	37.6	5.0	106
Sub-Total Urban	**Sum***	**113.9**	**0.9**	**1,389**	**800.0**	**6.4**	**198**	**913.9**	**7.4**	**173**
	Actual**	**101.7**	**0.8**	**1,555**	**799.8**	**6.4**	**198**	**901.5**	**7.3**	**175**
South Rural		61.8	0.4	96	110.4	0.7	54	172.2	1.1	35
North Rural		64.7	0.5	128	187.5	1.5	44	252.2	2.1	33
Sub-Total Rural	**Sum***	**126.5**	**0.5**	**113**	**298.0**	**1.1**	**48**	**424.4**	**1.5**	**34**
	Actual**	**126.5**	**0.5**	**113**	**297.9**	**1.1**	**48**	**424.4**	**1.5**	**34**
TOTAL LGA	**Sum***	**240.3**	**0.6**	**717**	**1,098.0**	**2.7**	**157**	**1,338.3**	**3.3**	**129**
	Actual**	**203.4**	**0.5**	**848**	**1,094.6**	**2.7**	**157**	**1,298**	**3.2**	**133**

* Sum of individual SLA values may exceed the actual total as some roads form SLA boundaries and hence are considered in more than one SLA

** Actual total with no duplication of roads

\# Source: RTA GIS data – dual carriageways were represented by duplicate links, where possible duplicate links have been accounted for, but some overlapping may still remain

Source: Council GIS road centreline data

APPENDIX 5-B

EXISTING BIKEWAYS#

SLA		On State & Regional Roads				On Council Roads				On All Roads			
		km	%##	km/ 1000 People	km/km^2	km	%##	km/ 1000 People	km/km^2	km	%##	km/ 1000 People	km/km^2
St Clair		8.4	58%	0.3	0.4	20.2	16%	0.7	1.0	28.6	21%	1.0	1.5
St Marys		4.4	36%	0.2	0.4	15.1	17%	0.8	1.5	19.5	19%	1.0	2.0
Emu Plains		3.2	32%	0.2	0.2	0.9	1%	0.1	0.1	4.1	5%	0.3	0.3
North Werrington		4.7	62%	0.2	0.4	16.7	19%	0.8	1.4	21.4	22%	1.1	1.8
South Werrington		5.7	61%	1.1	0.5	3.4	8%	0.6	0.3	9.1	18%	1.7	0.8
Penrith		6.5	35%	0.2	0.4	31.3	23%	1.2	2.0	37.9	24%	1.4	2.4
Glenmore Park		4.1	38%	0.2	0.3	5.8	6%	0.3	0.4	9.9	9%	0.5	0.6
Cranebrook		12.4	46%	0.6	0.6	10.3	10%	0.5	0.5	22.6	17%	1.2	1.2
North St Marys		1.8	41%	0.5	0.2	3.2	10%	0.8	0.4	5.0	13%	1.3	0.7
Sub-Total Urban	**Sum***	**51.1**	**45%**	**0.3**	**0.4**	**107.0**	**13%**	**0.7**	**0.9**	**158.1**	**17%**	**1.0**	**1.3**
	Actual**	**43.5**	**43%**	**0.3**	**0.4**	**102.6**	**13%**	**0.6**	**0.8**	**146.1**	**16%**	**0.9**	**1.2**
South Rural		5.4	9%	0.9	0.0	0.0	0%	0.0	0.0	5.4	3%	0.9	0.0
North Rural		13.0	20%	1.6	0.1	0.0	0%	0.0	0.0	13.0	5%	1.6	0.1
Sub-Total Rural	**Sum***	**18.4**	**15%**	**1.3**	**0.1**	**0.0**	**0%**	**0.0**	**0.0**	**18.4**	**4%**	**1.3**	**0.1**
	Actual**	**18.4**	**15%**	**1.3**	**0.1**	**0.0**	**0%**	**0.0**	**0.0**	**18.4**	**4%**	**1.3**	**0.1**
TOTAL LGA	**Sum***	**69.6**	**29%**	**0.4**	**0.2**	**107.0**	**10%**	**0.6**	**0.3**	**176.6**	**13%**	**1.0**	**0.4**
	Actual**	**50.9**	**25%**	**0.3**	**0.1**	**102.8**	**9%**	**0.6**	**0.3**	**153.7**	**12%**	**0.9**	**0.4**

* Sum of individual SLA values may exceed the actual total as bikeways area on roads that form SLA boundaries and hence are considered in more than one SLA

** Actual total with no duplication of bikeways

\# Source: Council GIS existing bikeway data set

Proportion of road that is covered by bikeways

APPENDIX 5-C

Listing of Path Paving in Penrith City Council as at 30/06/2007:

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.0001	1	ACACIA AVENUE	FLORABUNDA	BLUEBELL	77	CO	R	0	77	77	1.2	92
20.0001	2	ACACIA AVENUE	BLUEBELL	DAFFODIL	105	CO	R	77	182	105	1.2	126
20.0001	3	ACACIA AVENUE	DAFFODIL	AZALEA CT	84	CO	R	182	266	84	1.2	101
20.0001	4	ACACIA AVENUE	AZALEA CT	RAINBOW CL	78	CO	R	266	344	78	1.2	94
20.0001	5	ACACIA AVENUE	RAINBOW CL	BURSARIA	74	CO	R	344	418	74	1.2	89
11.1001	1	ADELAIDE STREET	MELBOURNE	WOODLAND A	597	CO	L	0	587	587	1.2	704
11.1001	2	ADELAIDE STREET	WOODLAND A	PERTH ST	92	CO	L	597	689	92	1.2	110
11.1001	3	ADELAIDE STREET	PERTH ST	SYDNEY ST	473	CO	L	689	1155	466	1.2	559
11.1001	4	ADELAIDE STREET	SYDNEY ST	AUSTRALIA	582	CO	L	1162	1736	574	1.2	689
11.1001	5	ADELAIDE STREET	AUSTRALIA	GLOSSOP	139	CO	L	1744	1879	135	1.2	162
30.1011	2	ALDAN PLACE	HAY CL	DEAD END	190	CO	C	254	288	34	1.2	41
11.2065	1	ALDEBARAN STREET	END OF RD	HERCULES	134	CO	R	0	134	134	1.2	161
11.2065	2	ALDEBARAN STREET	HERCULES	KANA CL	88	CO	R	134	222	88	1.2	106
11.2065	3	ALDEBARAN STREET	KANA CL	ARCTURUS	37	CO	R	222	259	37	1.2	44
11.2065	4	ALDEBARAN STREET	ARCTURUS	CARINA PL	279	CO	R	259		259	1.2	311
11.2065	5	ALDEBARAN STREET	CARINA PLACE	ANDROMEDA DRIVE	68	CO	R	538	606	68	1.2	82
10.107	1	ALLEN PLACE	WOODRIFF LANE	STATION ST (STH)	273	CO	L	0	273	273	1.5	410
10.107	2	ALLEN PLACE	STATION ST (NTH)	GAYMARK LANE	125	CO	L	0	125	125	1.5	188
10.107	3	ALLEN PLACE	GAYMARK LANE	WOODRIFF LANE	185	CO	L	125	310	185	1.5	278
20.0002	2	ALLISON DRIVE	LANGLEY AV	ERNSTINE	144	CO	L	91	235	144	1.2	173
20.0002	3	ALLISON DRIVE	ERNSTINE	GILES CL	32	CO	L	235	267	32	1.2	38
20.0002	4	ALLISON DRIVE	GILES CL	LUTTRELL	116	CO	L	267	383	116	1.2	139
2524	1	ALSTON LANE	ALSTON STREET	GARSWOOD ROAD	633	CO		0	633	633	2	1266
20.0167	1	ALSTON STREET	THE LAKES DR	BARDO STREET	241	CO	R	0	241	241	2	482
20.0167	2	ALSTON STREET	BARDO STREET	KUKUNDI DRIVE	135	CO	R	241	376	135	1.2	162
10.0104	1	ANDREWS ROAD	NORTHERN RD	GREYGUMS RD	514	CO	L	0	514	514	2	1028
11.2003	1	ANDROMEDA DRIVE	THE NORTHERN RD	GOLDMARK CR	136	CO	R	0	136	136	1.2	163
11.2003	2	ANDROMEDA DRIVE	GOLDMARK CR	GOLDMARK CR	233	CO	R	136	369	233	1.2	280
11.2003	3	ANDROMEDA DRIVE	GOLDMARK CR	BORODIN CL	140	CO	R	369	509	140	1.2	168
11.2003	4	ANDROMEDA DRIVE	BORODIN	BARRETT PL	165	CO	R	509	674	165	1.2	198
11.2003	5	ANDROMEDA DRIVE	BARRETT PL	CASSA CR	372	CO	L	674	797	123	1.2	148
11.2003	5	ANDROMEDA DRIVE	BARRETT PL	CASSA CR	372	CO	R	674	800	126	1.2	151
11.2003	6	ANDROMEDA DRIVE	CASSA CR	CASSAR CR	113	CO	L	1046	1159	113	1.2	136
11.2003	7	ANDROMEDA DRIVE	CASSAR CR	RABAT CL	70	CO	L	1159	1229	70	1.2	84
11.2003	8	ANDROMEDA DRIVE	RABAT CL	PROCYON PL	133	CO	L	1229	1362	133	1.2	160
11.2003	9	ANDROMEDA DRIVE	PROCYON PL	GENEVA RD	121	CO	L	1362	1483	121	1.2	145
11.2003	10	ANDROMEDA DRIVE	GENEVA RD	BELLATRIX ST	223	CO	R	1483	1533	50	1.2	60
11.2003	10	ANDROMEDA DRIVE	GENEVA RD	BELLATRIX ST	223	CO	R	1533	1706	173	1.2	208
11.2003	11	ANDROMEDA DRIVE	BELLATRIX ST	VINCENT RD	155	CO	R	1706	1861	155	1.2	186
10.6002	1	ANGEL STREET	MADIGAN DR	JOHN BAT A	102	CO	L	0	102	102	1.2	122
20.1004	2	ANNIE SPENCE CLOSE	END OF AC	END OF ROAD WEST	90	GR	R	237	327	90	3	270
30.7004	1	ANTHONY CRESCENT	MORPHETT	PEARSON ST	350	CO	L	0	350	350	1.2	420
2544	1	ANTHONY LANE	ANTHONY CRESCENT	GREAT WESTERN HWY	538	CO		0	538	538	1.9	1022
10.3001	1	ANZAC STREET	CATALINA	WATTLE ST	163	CO	L	0	163	163	1.2	196
30.1296	1	APOLLO PLACE	OLYMPUS DRIVE	END OF ROAD	42	CO	R	0	42	42	1.2	50
30.4003	3	AQUARIUS CRESCENT	KRUGER PL	HOCKING PL	187	CO	R	340	464	124	1.2	149
30.4003	4	AQUARIUS CRESCENT	HOCKING PL	SWALLOW DR	75	CO	R	464	539	75	1.2	90
10.2002	1	ARAKOON AVENUE	COREEN AVE	WILLAWA RD	95	CO	L	0	95	95	1.2	114
10.2002	2	ARAKOON AVENUE	WILLAWA RD	HILLTOP RD	264	CO	L	95	359	264	1.2	317
10.2002	3	ARAKOON AVENUE	HILLTOP RD	CALOOLA	114	CO	L	359	473	114	1.2	137
10.8003	1	ARMSTEIN CRESCENT	BURTON ST	REINDEER	84	CO	L	0	84	84	1.2	101
10.8003	2	ARMSTEIN CRESCENT	REINDEER	INNES PL	241	CO	L	84	325	241	1.2	289
11.1002	1	AUSTRALIA STREET	HOBART ST	KENNY AVE	144	CO	R	0	144	144	1.2	173
11.1002	2	AUSTRALIA STREET	KENNY AVE	BRISBANE ST	145	CO	L	144	289	145	1.2	174
11.1002	3	AUSTRALIA STREET	BRISBANE ST	CANBERRA ST	158	CO	R	300	447	147	1.2	176

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
11.1002	4	AUSTRALIA STREET	CANBERRA ST	ADELAIDE ST	156	CO	R	458	603	145	1.2	174
11.1002	5	AUSTRALIA STREET	ADELAIDE ST	EDMONDSON ST	132	CO	R	623	735	112	1.2	134
11.1002	6	AUSTRALIA STREET	EDMONDSON ST	GREAT WESTERN HWY	147	CO	R	754	882	128	1.2	154
20.0288	2	AVALON CRESCENT	END OF ROAD	END OF ROAD	47	CO	R	122	169	47	1.5	71
20.1006	1	BALACLAVA ROAD	TRAFALGAR	WEDMORE RD	237	CO	R	0	237	237	1.2	284
20.0006	1	BANJO PATERSON CLOSE	FITZGERALD	MILES FRAN	76	CO	R	0	76	76	1.2	91
30.1018	1	BANKS DRIVE	BENNETT RD	NIGHTMIST	105	CO	L	0	105	105	1.2	126
30.1018	2	BANKS DRIVE	NIGHTMIST	SHAKESPEAR	41	CO	L	105	146	41	1.2	49
30.1018	3	BANKS DRIVE	SHAKESPEAR	TIMESWEEP	100	CO	L	146	246	100	1.2	120
30.1018	4	BANKS DRIVE	TIMESWEEP	HERON CRES	231	CO	L	246	477	231	1.2	277
30.1018	5	BANKS DRIVE	HERON CRES	RAINBOW PL	44	CO	L	477	521	44	1.2	53
30.1018	6	BANKS DRIVE	RAINBOW PL	DOBELL CCT	85	CO	L	521	606	85	1.2	102
30.1018	7	BANKS DRIVE	DOBELL CCT	HERON CRES	85	CO	L	606	691	85	1.2	102
30.1018	8	BANKS DRIVE	HERON CRES	PLOVER CL	78	CO	L	691	769	78	1.2	94
30.1018	9	BANKS DRIVE	PLOVER CL	BLACKWELL	81	CO	L	769	850	81	1.2	97
30.1018	10	BANKS DRIVE	BLACKWELL	HARVEY CCT	80	CO	L	850	930	80	1.2	96
30.1018	12	BANKS DRIVE	ENDEAVOR	COOK PDE	293	CO	L	1170	1463	293	1.2	352
30.1018	13	BANKS DRIVE	COOK PDE	MELVILLE	291	CO	L	1469	1754	285	1.2	342
30.1018	14	BANKS DRIVE	MELVILLE	OLYMPUS DR	378	CO	L	1754	2129	375	1.2	450
30.1018	14	BANKS DRIVE	MELVILLE	OLYMPUS DR	378	CO	R	1754	2132	378	1.2	454
30.1018	15	BANKS DRIVE	OLYMPUS DR	SHADLOW CR	150	CO	R	2132	2162	30	1.2	36
30.1018	15	BANKS DRIVE	OLYMPUS DR	SHADLOW CR	150	CO	R	2132	2282	150	1.2	180
30.1018	16	BANKS DRIVE	SHADLOW CR	TEAK ST	74	CO	R	2286	2356	70	1.2	84
30.1018	16	BANKS DRIVE	SHADLOW CR	TEAK ST	74	CO	L	2282	2356	74	1.2	89
30.1018	17	BANKS DRIVE	TEAK ST	ST CLAIR	105	CO	R	2356	2455	99	1.2	119
30.1018	17	BANKS DRIVE	TEAK ST	ST CLAIR	105	CO	L	2356	2461	105	1.2	126
30.1018	18	BANKS DRIVE	ST CLAIR	MAMRE RD	309	CO	R	2461	2491	30	1.2	36
30.1018	18	BANKS DRIVE	ST CLAIR	MAMRE RD	309	CO	L	2461	2770	309	1.2	371
10.3005	1	BANKSIA STREET	WATTLE ST	WILOW RD	263	CO	L	0	263	263	1.2	316
30.7006	1	BARBER AVENUE	PARKER ST	END OF RD	176	CO	L	0	176	176	1.2	211
2570	1	BARD LANE	BARD CIRCUIT	ILLAWARRA AVE	127	AC		0	127	127	2.1	267
10.5004	1	BARLOW STREET	COLLEGE ST	HOLLIER ST	519	CO	R	0	519	519	1.2	623
10.5004	2	BARLOW STREET	HOLLIER ST	WRENCH ST	257	CO	R	519	776	257	1.2	308
10.5005	3	BARRY STREET	CAMBRIDGE	OXFORD LN	313	CO	R	268	581	313	1.2	376
30.3013	1	BEGA STREET	MARANIE AV	DESBOROUGH	114	CO	L	0	114	114	1.2	137
2525	1	BEGONIA LANE	BEGONIA CIRCUIT	GLENMORE PARKWAY	57	CO		0	57	57	1.9	108
10.4006	1	BELAR STREET	QUEEN ST	WEST LANE	60	CO	L	0	57	57	1.2	68
10.4006	1	BELAR STREET	QUEEN ST	WEST LANE	60	CO	R	0	57	57	4.4	251
2552	1	BELLEREVE LANE	BELLEREVE PLACE	DELORAINE DRIVE	22	CO		0	22	22	1.2	26
30.1027	1	BENNETT ROAD	END OF SEAL	ST CLAIR AVE	151	CO	L	0	151	151	1.2	181
30.1027	1	BENNETT ROAD	END OF SEAL	ST CLAIR AVE	151	CO	R	0	151	151	1.2	181
30.1027	2	BENNETT ROAD	ST CLAIR AVE	EXPLORERS WAY	313	CO	L	151	458	307	1.2	368
30.1027	2	BENNETT ROAD	ST CLAIR AVE	EXPLORERS WAY	313	CO	R	151	464	313	1.2	376
30.1027	3	BENNETT ROAD	EXPLORERS WAY	ENDEAVOUR AVE	106	CO	L	469	570	101	1.2	121
30.1027	3	BENNETT ROAD	EXPLORERS WAY	ENDEAVOUR AVE	106	CO	R	464	570	106	1.2	127
30.1027	4	BENNETT ROAD	ENDEAVOUR AVE	AUTUMNLEAF	166	CO	R	576	732	156	1.2	187
30.1027	4	BENNETT ROAD	ENDEAVOUR AVE	AUTUMNLEAF	166	CO	L	570	736	166	1.2	199
30.1027	5	BENNETT ROAD	AUTUMNLEAF	GLENROWAN	48	CO	R	739	784	45	1.2	54
30.1027	6	BENNETT ROAD	GLENROWAN	SNOWDRIFT	224	CO	R	784	1005	221	1.2	265
30.1027	7	BENNETT ROAD	SNOWDRIFT	MCLAREN GR	65	CO	R	1011	1073	62	1.2	74
30.1027	7	BENNETT ROAD	SNOWDRIFT	MCLAREN GR	65	CO	L	1008	1073	65	1.2	78
30.1027	8	BENNETT ROAD	MCLAREN GR	COONAWARRA	77	CO	R	1073	1150	77	1.2	92
30.1027	8	BENNETT ROAD	MCLAREN GR	COONAWARRA	77	CO	L	1073	1150	77	1.2	92
30.1027	9	BENNETT ROAD	COONAWARRA	MUDGEE PLC	145	CO	R	1150	1295	145	1.2	174
30.1027	9	BENNETT ROAD	COONAWARRA	MUDGEE PLC	145	CO	L	1150	1295	145	1.2	174
30.1027	10	BENNETT ROAD	MUDGEE PLC	LOCKHEED	174	CO	R	1295	1469	174	1.2	209
30.1027	10	BENNETT ROAD	MUDGEE PLC	LOCKHEED	174	CO	L	1295	1469	174	1.2	209
30.1027	11	BENNETT ROAD	LOCKHEED	BANKS DRVE	144	CO	L	1469	1613	144	1.2	173
30.3014	1	BENNETT ROAD	GT WESTERN	SHANE ST	157	CO	L	0	157	157	1.2	188
30.3014	1	BENNETT ROAD	GT WESTERN	SHANE ST	157	CO	R	0	157	157	1.2	188
30.3014	2	BENNETT ROAD	SHANE ST	BROOKER ST	31	CO	L	0	31	31	1.2	37
30.3014	2	BENNETT ROAD	SHANE ST	BROOKER ST	31	CO	R	157	188	31	1.2	37
30.3014	3	BENNETT ROAD	BROOKER ST	MUSCIO ST	106	CO	L	0	106	106	1.2	127

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30.3014	3	BENNETT ROAD	BROOKER ST	MUSCIO ST	106	CO	R	188	294	106	1.2	127
30.3014	4	BENNETT ROAD	MUSCIO ST	CARPENTER	112	CO	L	0	112	112	1.3	146
30.3014	4	BENNETT ROAD	MUSCIO ST	CARPENTER	112	CO	R	294	406	112	1.2	134
30.3014	5	BENNETT ROAD	CARPENTER	LUTON PL	100	CO	L	0	100	100	1.3	130
30.3014	5	BENNETT ROAD	CARPENTER	LUTON PL	100	CO	R	406	506	100	1.2	120
30.3014	6	BENNETT ROAD	LUTON PL	CROKER CRS	22	CO	L	0	22	22	1.3	29
30.3014	6	BENNETT ROAD	LUTON PL	CROKER CRS	22	CO	R	506	528	22	1.2	26
30.3014	7	BENNETT ROAD	CROKER CRS	SUFFOLK PL	53	CO	L	0	53	53	1.3	69
30.3014	7	BENNETT ROAD	CROKER CRS	SUFFOLK PL	53	CO	R	528	581	53	1.2	64
30.3014	8	BENNETT ROAD	SUFFOLK PL	BENTLEY RD	86	CO	L	0	86	86	1.3	112
30.3014	8	BENNETT ROAD	SUFFOLK PL	BENTLEY RD	86	CO	R	581	667	86	1.2	103
30.3014	9	BENNETT ROAD	BENTLEY RD	CHELSEA PL	81	CO	L	0	81	81	1.3	105
30.3014	9	BENNETT ROAD	BENTLEY RD	CHELSEA PL	81	CO	R	667	748	81	1.2	97
30.3014	10	BENNETT ROAD	CHELSEA PL	DESBOROUGH	94	CO	L	0	94	94	1.3	122
30.3014	10	BENNETT ROAD	CHELSEA PL	DESBOROUGH	94	CO	R	748	842	94	1.2	113
30.3014	11	BENNETT ROAD	DESBOROUGH	REBBECA	335	CO	L	0	335	335	1.2	402
30.3014	11	BENNETT ROAD	DESBOROUGH	REBBECA	335	CO	R	950	1177	227	1.2	272
30.3014	12	BENNETT ROAD	REBECCA	SHEPHERD	87	CO	L	0	87	87	1.2	104
30.3014	12	BENNETT ROAD	REBECCA	SHEPHERD	87	CO	R	1177	1264	87	1.2	104
30.3014	13	BENNETT ROAD	SHEPHERD	END OF SEAL	411	CO	L	0	411	411	1.2	493
2526	1	BERRIL LANE	BERRIL PLACE	BUYU ROAD	124	CO		0	124	124	2.1	260
10.5007	4	BESLEY STREET	HAINING ST	OXFORD ST	273	CO	R	251	524	273	1.2	328
20.0109	1	BIJA DRIVE	MURU DR	TUGRA CL	82	CO	R	0	82	82	1.2	98
20.0109	2	BIJA DRIVE	TUGRA CL	KARABI PL	63	CO	R	82	145	63	1.2	76
20.0109	3	BIJA DRIVE	KARABI PL	BURRA CL	312	CO	R	145	457	312	1.2	374
20.0109	4	BIJA DRIVE	BURRA CL	GARSWOOD	82	CO	R	457	539	82	1.2	98
10.3006	1	BIRCH STREET	KURRAJONG	WILGA ST	234	CO	L	0	234	234	1.2	281
10.3006	2	BIRCH STREET	WILGA ST	DEBRINCAT	232	CO	L	234	466	232	1.2	278
31.1017	4	BIRMINGHAM ROAD	YORK ROAD	BLACKFORD CR	138	CO	L	325	463	138	1.2	166
31.1017	5	BIRMINGHAM ROAD	BLACKFORD CR	STOKE CRS	83	CO	L	463	546	83	1.2	100
31.1017	6	BIRMINGHAM ROAD	STOKE CRS	MOSLEY AVE	53	CO	L	546	599	53	1.2	64
31.1017	7	BIRMINGHAM ROAD	MOSLEY AVE	PRICE ST	47	CO	L			0	1.2	0
31.1017	8	BIRMINGHAM ROAD	PRICE ST	CHIPPING PL	76	CO	L	646	722	76	1.2	91
31.1017	9	BIRMINGHAM ROAD	CHIPPING PL	CLAREMONT PL	96	CO	L	722	818	96	1.2	115
31.1017	10	BIRMINGHAM ROAD	CLAREMONT PL	MALDON ST	88	CO	L	818	906	88	1.2	106
31.1017	11	BIRMINGHAM ROAD	MALDON ST	YORK ROAD	80	CO	L	906	986	80	1.2	96
30.1031	3	BLACKWELL AVENUE	CORIO DR	JODY PL	81	CO	L	68	149	81	1.2	97
30.1031	4	BLACKWELL AVENUE	JODY PL	STRAUSS RD	65	CO	L	149	214	65	1.2	78
30.1031	5	BLACKWELL AVENUE	STRAUSS RD	COOK PDE	228	CO	L	214	442	228	1.2	274
30.1031	6	BLACKWELL AVENUE	COOK PDE	THE GRANDSTAND	70	CO	L	454	520	66	1.2	79
30.1031	6	BLACKWELL AVENUE	COOK PDE	THE GRANDSTAND	70	CO	R	454	524	70	1.2	84
30.1031	7	BLACKWELL AVENUE	THE GRANDSTAND	MCCARTNEY CR	68	CO	L	528	588	60	1.2	72
30.1031	7	BLACKWELL AVENUE	THE GRANDSTAND	MCCARTNEY CR	68	CO	R	524	592	68	1.2	82
30.1031	8	BLACKWELL AVENUE	MCCARTNEY CR	COOWARRA DR	79	CO	R	592	667	75	1.2	90
30.1031	8	BLACKWELL AVENUE	MCCARTNEY CR	COOWARRA DR	79	CO	L	592	671	79	1.2	95
30.1031	9	BLACKWELL AVENUE	COOWARRA DR	NAPUNYAH WAY	134	CO	R	674	801	127	1.2	152
30.1031	9	BLACKWELL AVENUE	COOWARRA DR	NAPUNYAH WAY	134	CO	L	671	805	134	1.2	161
30.1031	10	BLACKWELL AVENUE	NAPUNYAH WAY	MCCARTNEY CR	119	CO	L	805	924	119	1.2	143
30.1031	10	BLACKWELL AVENUE	NAPUNYAH WAY	MCCARTNEY CR	119	CO	R	805	924	119	1.2	143
30.1031	11	BLACKWELL AVENUE	MCCARTNEY CR	THE GRANDSTAND	87	CO	R	924	1011	87	1.2	104
30.1031	12	BLACKWELL AVENUE	THE GRANDSTAND	EURABBIE GLEN	86	CO	R	1011	1097	86	1.2	103
30.1031	13	BLACKWELL AVENUE	EURABBIE GLEN	BRADMAN AVE	89	CO	R	1097	1186	89	1.2	107
30.1031	14	BLACKWELL AVENUE	BRADMAN AVE	BANKS DR	198	CO	R	1186	1384	198	1.2	238
10.4008	1	BLAIR AVENUE	LETHBRIDGE	ROSS PL	238	CO	L	0	236	236	1.2	283
10.4008	3	BLAIR AVENUE	ROSS PL	PHILLIP ST	82	CO	L	268	350	82	1.2	98
31.2001	1	BLAXLAND STREET	THE CRESCE	THURSTON	326	CO	L	0	326	326	1.2	391
20.0262	2	BLUE HILLS DRIVE	BRIGADOON AVENUE	MONTERAY TERRACE	353	CO	L	177	299	122	1.5	183
10.001	1	BLUEBIRD ROAD	LAYCOCK RD	ARAFURA AV	70	CO	L	0	70	70	1.2	84
10.001	2	BLUEBIRD ROAD	ARAFURA AV	FIREBALL	182	CO	L	70	252	182	1.2	218
10.001	3	BLUEBIRD ROAD	FIREBALL	RAVINE CLS	46	CO	L	252	298	46	1.2	55
10.001	4	BLUEBIRD ROAD	RAVINE CLS	TORNADO CR	61	CO	L	298	359	61	1.2	73
10.001	5	BLUEBIRD ROAD	TORNADO CR	CLIFF PL	35	CO	L	359	394	35	1.2	42
10.001	6	BLUEBIRD ROAD	CLIFF PL	SOLING CRS	48	CO	L	394	442	48	1.2	58

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.0305	1	BLUESTONE DRIVE	CHN 9	CHN 98	89	CO	L	9	98	89	1.5	134
11.1028	1	BOND PLACE	GREAT WESTERN HIGHWA	END OF ROAD	125	CO	L	0	125	125	1.2	150
10.3007	1	BORONIA ROAD	KURRAJONG AVE	ATHEL ST	125	CO	L	0	125	125	1.2	150
10.3007	2	BORONIA ROAD	ATHEL ST	CYPRESS RD	121	CO	L	125	246	121	1.2	145
10.3007	3	BORONIA ROAD	CYPRESS RD	MULGA ST	323	CO	L	246	569	323	1.2	388
10.3007	4	BORONIA ROAD	MULGA ST	DEBRINCAT AVE	327	CO	L	569	896	327	1.2	392
10.0012	1	BORROWDALE WAY	THE NORTHERN RD	SEATON CRS	73	CO	R	0	73	73	1.2	88
10.0012	1	BORROWDALE WAY	THE NORTHERN RD	SEATON CRS	73	CO	L	0	73	73	1.2	88
10.0012	2	BORROWDALE WAY	SEATON CRS	HOLMEGATE	31	CO	R	73	104	31	1.2	37
10.0012	2	BORROWDALE WAY	SEATON CRS	HOLMEGATE	31	CO	L	73	104	31	1.2	37
10.0012	3	BORROWDALE WAY	HOLMGATE	BOOTLE PLC	109	CO	R	104	213	109	1.2	131
10.0012	3	BORROWDALE WAY	HOLMGATE	BOOTLE PLC	109	CO	L	104	213	109	1.2	131
10.0012	4	BORROWDALE WAY	BOOTLE PLC	DODD PLACE	58	CO	R	213	271	58	1.2	70
10.0012	4	BORROWDALE WAY	BOOTLE PLC	DODD PLACE	58	CO	L	213	271	58	1.2	70
10.0012	5	BORROWDALE WAY	DODD PLACE	PENDOCK RD	42	CO	R	271	313	42	1.2	50
10.0012	5	BORROWDALE WAY	DODD PLACE	PENDOCK RD	42	CO	L	271	313	42	1.2	50
10.0012	6	BORROWDALE WAY	PENDOCK RD	HOLMEGATE	77	CO	R	313	390	77	1.2	92
10.0012	6	BORROWDALE WAY	PENDOCK RD	HOLMEGATE	77	CO	L	313	390	77	1.2	92
10.0012	7	BORROWDALE WAY	HOLMEGATE	RAVENGLASS	54	CO	R	390	444	54	1.2	65
10.0012	7	BORROWDALE WAY	HOLMEGATE	RAVENGLASS	54	CO	L	390	444	54	1.2	65
10.0012	8	BORROWDALE WAY	RAVENGLASS	MUNCASTER	80	CO	R	444	524	80	1.2	96
10.0012	8	BORROWDALE WAY	RAVENGLASS	MUNCASTER	80	CO	L	444	524	80	1.2	96
10.0012	9	BORROWDALE WAY	MUNCASTER	THORNFLAT	69	CO	R	524	593	69	1.2	83
10.0012	9	BORROWDALE WAY	MUNCASTER	THORNFLAT	69	CO	L	524	593	69	1.2	83
10.0012	10	BORROWDALE WAY	THORNFLAT	WOODGATE	82	CO	R	593	675	82	1.2	98
10.0012	10	BORROWDALE WAY	THORNFLAT	WOODGATE	82	CO	L	593	675	82	1.2	98
10.0012	11	BORROWDALE WAY	WOODGATE	SHERRINGHAM RD	137	CO	R	675	812	137	1.2	164
10.0012	12	BORROWDALE WAY	SHERRINGHAM RD	HOSKINS ST	149	CO	L	812	961	149	1.2	179
10.0012	12	BORROWDALE WAY	SHERRINGHAM RD	HOSKINS ST	149	CO	R	812	961	149	1.2	179
10.0012	13	BORROWDALE WAY	HOSKINS ST	CALLISTO	44	CO	L	966	1005	39	1.2	47
10.0012	13	BORROWDALE WAY	HOSKINS ST	CALLISTO	44	CO	R	961	1005	44	1.2	53
10.0012	14	BORROWDALE WAY	CALLISTO	WHITCOM ST	250	CO	L	1005	1255	250	1.2	300
10.0012	14	BORROWDALE WAY	CALLISTO	WHITCOM ST	250	CO	R	1005	1255	250	1.2	300
10.0012	15	BORROWDALE WAY	WHITCOM ST	LAYCOCK ST	79	CO	L	1255	1333	78	1.2	94
10.0012	15	BORROWDALE WAY	WHITCOM ST	LAYCOCK ST	79	CO	R	1255	1334	79	1.2	95
20.0212	4	BRIGADOON AVENUE	BRONTE WAY	GLENGARRY DRIVE	78	CO	L	270	348	78	1.2	94
30.7103	1	BRINGELLY BUSBAY	BRINGELLY RD AT KHS	BRINGELLY RD AT KHS	90	CO	L	0	90	90	1.9	171
30.7102	1	BRINGELLY LANE	BRINGELLY RD	END OF ROAD	108	CO	R	0	45	45	1.2	54
30.7009	1	BRINGELLY ROAD	PARKER ST	OAG CRS	202	CO	L	0	202	202	1.2	242
30.7009	1	BRINGELLY ROAD	PARKER ST	OAG CRS	202	CO	R	0	202	202	1.2	242
30.7009	2	BRINGELLY ROAD	OAG CRS	CADDENS RD	127	CO	L	202	329	127	1.2	152
30.7009	2	BRINGELLY ROAD	OAG CRS	CADDENS RD	127	CO	R	202	329	127	1.2	152
30.7009	3	BRINGELLY ROAD	CADDENS RD	WALSH PLACE	474	CO	L	329	803	474	1.2	569
30.7009	5	BRINGELLY ROAD	PEPPERMINT CR	SMITH ST	87	CO	L	842	924	82	1.2	98
30.7009	6	BRINGELLY ROAD	SMITH ST	PEPPERMINT CR	201	CO	L	929	1130	201	1.2	241
30.7009	6	BRINGELLY ROAD	SMITH ST	PEPPERMINT CR	201	CO	R	929	1130	201	1.2	241
30.7009	7	BRINGELLY ROAD	PEPPERMINT CR	ELIZABETH CR	68	CO	L	1130	1198	68	1.2	82
30.7009	7	BRINGELLY ROAD	PEPPERMINT CR	ELIZABETH CR	68	CO	R	1130	1198	68	1.2	82
30.7009	8	BRINGELLY ROAD	ELIZABETH CR	WEST ST	18	CO	L	1198	1216	18	1.2	22
30.7009	8	BRINGELLY ROAD	ELIZABETH CR	WEST ST	18	CO	R	1198	1216	18	1.2	22
30.7009	9	BRINGELLY ROAD	WEST ST	JAMISON RD	153	CO	L	1216	1369	153	1.2	184
30.7009	9	BRINGELLY ROAD	WEST ST	JAMISON RD	153	CO	R	1216	1369	153	1.2	184
30.7009	10	BRINGELLY ROAD	JAMISON RD	BADEN POWELL AVE	68	CO	L	1369	1437	68	1.2	82
30.7009	10	BRINGELLY ROAD	JAMISON RD	BADEN POWELL AVE	68	CO	R	1369	1437	68	1.2	82
30.7009	11	BRINGELLY ROAD	BADEN POWELL AVE	STAFFORD ST	79	CO	L	1437	1516	79	1.2	95
30.7009	12	BRINGELLY ROAD	STAFFORD ST	DERBY ST	132	CO	L	1516	1648	132	1.2	158
30.7009	13	BRINGELLY ROAD	DERBY ST	ORTH ST	216	CO	L	1648	1864	216	1.2	259
30.7009	13	BRINGELLY ROAD	DERBY ST	ORTH ST	216	CO	R	1648	1864	216	1.2	259
30.7009	14	BRINGELLY ROAD	ORTH ST	RODGERS ST	118	CO	L	1874	1982	108	1.2	130
30.7009	14	BRINGELLY ROAD	ORTH ST	RODGERS ST	118	CO	R	1864	1982	118	1.2	142
30.7009	15	BRINGELLY ROAD	RODGER ST	WAINWRIGHT LANE	67	CO	L	1991	2049	58	1.2	70
30.7009	15	BRINGELLY ROAD	RODGER ST	WAINWRIGHT LANE	67	CO	R	1982	2049	67	1.2	80
30.7009	16	BRINGELLY ROAD	WAINWRIGHT LANE	GREAT WESTERN HWY	39	CO	L	2049	2088	39	1.2	47

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
30.7009	16	BRINGELLY ROAD	WAINWRIGHT LANE	GREAT WESTERN HWY	39	CO	R	2049	2088	39	1.2	47
11.1009	1	BRISBANE STREET	GLOSSOP ST	AUSTRALIA	129	CO	L	0	126	126	1.2	151
11.1009	1	BRISBANE STREET	GLOSSOP ST	AUSTRALIA	129	CO	R	0	129	129	1.2	155
11.1009	2	BRISBANE STREET	AUSTRALIA	SYDNEY ST	627	CO	R	134	753	619	1.2	743
11.1009	3	BRISBANE STREET	SYDNEY ST	PERTH ST	473	CO	R	756	1229	473	1.2	568
11.1009	4	BRISBANE STREET	PERTH ST	BRADDON ST	132	CO	R	1229	1361	132	1.2	158
11.1009	5	BRISBANE STREET	BRADDON ST	MELBOURNE	267	CO	R	1361	1628	267	1.2	320
20.0284	1	BRONTE WAY	COOLABAH CRESCENT	BRIGADOON AVE	100	CO	L	0	100	100	1.2	120
20.0074	1	BULU DRIVE	WOMRA CRES	WARGON CRT	139	CO	R	0	139	139	1.2	167
20.0074	2	BULU DRIVE	WOMRA CR	GUNARA TERRACE	71	CO	R	139	210	71	1.2	85
20.0074	3	BULU DRIVE	GUNNARA TERRACE	GUNNARA TERRACE	205	CO	R	210	415	205	1.2	246
20.0074	4	BULU DRIVE	GUNNARA TERRACE	MORRISON STREET	169	CO	R	415	584	169	1.2	203
20.0074	4	BULU DRIVE	GUNNARA TERRACE	MORRISON STREET	169	CO	R	415	584	169	3.3	558
20.4007	1	BURING AVENUE	LEONAY PDE	LINKSVIEW	270	CO	R	0	270	270	1.2	324
20.4007	1	BURING AVENUE	LEONAY PDE	LINKSVIEW	270	CO	L	0	270	270	1.2	324
30.6072	1	BURLINGTON STREET	SILVERWOOD WAY	SPRINGDALE STREET	114	CO	R	0	114	114	1.2	137
30.6072	1	BURLINGTON STREET	SILVERWOOD WAY	SPRINGDALE STREET	114	CO	L	0	114	114	1.2	137
20.0075	1	BURRA CLOSE	BIJA DRIVE	JIMBI PL	96	CO	L	0	96	96	1.2	115
20.0075	2	BURRA CLOSE	JIMBI PL	WOODI CL	76	CO	L	96	172	76	1.2	91
20.0012	1	BURSARIA CRESCENT	CAMELLIA	HONEYSUCK	59	CO	L	0	59	59	1.2	71
20.0012	2	BURSARIA CRESCENT	HONEYSUCK	LILY COURT	65	CO	L	59	124	65	1.2	78
20.0012	3	BURSARIA CRESCENT	LILY COURT	ACACIA AVE	177	CO	L	124	301	177	1.2	212
20.0012	4	BURSARIA CRESCENT	ACACIA AVE	HONEYSUCK	79	CO	R	301	380	79	1.2	95
20.0012	5	BURSARIA CRESCENT	HONEYSUCK	LADY JAMI	217	CO	R	380	597	217	1.2	260
20.0012	6	BURSARIA CRESCENT	LADY JAMI	ASTER CL	91	CO	R	597	688	91	1.2	109
20.0012	7	BURSARIA CRESCENT	ASTER CL	YELLOWGUM	111	CO	R	688	799	111	1.2	133
10.8008	1	BURTON STREET	VICTORIA	IMPALA AVE	75	CO	R	0	75	75	1.2	90
10.8008	2	BURTON STREET	IMPALA AVE	ROEBUCK RD	106	CO	R	75	181	106	1.2	127
10.8008	3	BURTON STREET	ROEBUCK RD	ARMSTEIN	33	CO	R	181	214	33	1.2	40
10.8008	4	BURTON STREET	ARMSTEIN	LACK PLACE	98	CO	R	214	312	98	1.2	118
10.8008	5	BURTON STREET	LACK PLACE	HEAVY ST	102	CO	R	312	414	102	1.2	122
20.0161	1	BUYU ROAD	MURU DR	MARI CL	63	CO	R	0	63	63	1.2	76
20.0161	2	BUYU ROAD	MARI CL	BUYU LANE	119	CO	R	63	182	119	1.2	143
20.0161	3	BUYU ROAD	BUYU LANE	WARI AVE	185	CO	R	182	367	185	1.2	222
30.6062	1	CADDENS GROVE	CADDENS ROAD	CHN 73	73	CO	L	0	73	73	1.2	88
30.6062	2	CADDENS GROVE	CHN 73	CHN 262	189	CO	L	73	262	189	1.2	227
10.0015	1	CALLISTO DRIVE	BOUNDARY RD	MELLFELL RD	86	CO	L	0	86	86	1.2	103
10.0015	2	CALLISTO DRIVE	MELLFELL RD	GAMA ST	76	CO	L	86	162	76	1.2	91
10.0015	3	CALLISTO DRIVE	GAMA ST	MOXHAM ST	116	CO	L	162	278	116	1.2	139
10.0015	4	CALLISTO DRIVE	MOXHAM ST	NEREID RD	63	CO	L	278	341	63	1.2	76
10.0015	5	CALLISTO DRIVE	NEREID RD	BORROWDALE WAY	245	CO	L	341	586	245	1.2	294
10.2005	1	CALOOLA AVENUE	THE NORTHERN RD	KAREELA AVE	119	CO	R	0	116	116	1.2	139
10.2005	2	CALOOLA AVENUE	KAREELA AV	ORANA AVE	109	CO	R	123	228	105	1.2	126
10.2005	2	CALOOLA AVENUE	KAREELA AV	ORANA AVE	109	CO	L	119	228	109	1.2	131
10.2005	3	CALOOLA AVENUE	ORANA AVE	ARAKOON AVE	50	CO	R	228	278	50	1.2	60
10.2005	4	CALOOLA AVENUE	ARAKOON AVE	ILLAWONG AVE	96	CO	R	278	375	97	1.2	116
10.2005	5	CALOOLA AVENUE	ILLAWONG AVE	ILLAWONG AVE	514	CO	L	382	888	506	1.2	607
2548	1	CALOOLA LANE	CALOOLA LANE	ILLAWONG AVE	132	CO		0	132	132	1.2	158
10.5009	2	CAM STREET	CAMBRIDGE	OXFORD ST	347	CO	R	148	495	347	1.2	416
10.5009	3	CAM STREET	OXFORD ST	ETON ROAD	346	CO	R	495	841	346	1.2	415
10.501	1	CAMBRIDGE STREET	WRENCH ST	STERLING	229	CO	L	0	229	229	1.2	275
10.501	2	CAMBRIDGE STREET	STERLING	BALMORAL	58	CO	L	229	284	55	1.2	66
10.501	3	CAMBRIDGE STREET	BALMORAL	SANDRINGHAM AVE	232	CO	L	290	516	226	1.2	271
10.501	4	CAMBRIDGE STREET	SANDRINGHAM AVE	BREYLEY RD	54	CO	L	522	573	51	1.2	61
10.501	5	CAMBRIDGE STREET	BREYLEY RD	MELITA RD	97	CO	L	573	670	97	1.2	116
10.501	6	CAMBRIDGE STREET	MELITA RD	COLLEGE ST	91	CO	L	670	756	86	1.2	103
10.501	7	CAMBRIDGE STREET	COLLEGE ST	RULE ST	70	CO	L	768	828	60	1.2	72
10.501	8	CAMBRIDGE STREET	RULE ST	BARRY ST	70	CO	L	836	898	62	1.2	74
10.501	9	CAMBRIDGE STREET	BARRY ST	CAM STREET	138	CO	L	908	1035	127	1.2	152
10.501	10	CAMBRIDGE STREET	CAM STREET	PEMBROKE ST	135	CO	L	1047	1171	124	1.2	149
20.0014	1	CAMELLIA AVENUE	BURSARIA	PRUNUS CL	300	CO	R	0	111	111	2	222
20.0014	1	CAMELLIA AVENUE	BURSARIA	PRUNUS CL	300	CO	L	0	180	180	2	360
20.0014	1	CAMELLIA AVENUE	BURSARIA	PRUNUS CL	300	CO	L	90	300	210	2	420

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20.0014	2	CAMELLIA AVENUE	PRUNUS CL	GLENMORE PARKWAY	256	CO	R	303	368	65	2	130
11.1005	1	CANBERRA STREET	AUSTRALIA	SYDNEY ST	602	CO	L	0	598	598	1.2	718
11.1005	2	CANBERRA STREET	SYDNEY ST	PERTH ST	468	CO	R	602	1070	468	1.2	562
11.1005	3	CANBERRA STREET	PERTH ST	MELBOURNE	573	CO	R	1070	1643	573	1.2	688
10.4011	1	CARINYA AVENUE	CAMIRA AVE	NARIEL ST	80	CO	R	0	80	80	1.2	96
10.4011	2	CARINYA AVENUE	NARIEL ST	MERINDA ST	54	CO	R	80	134	54	1.2	65
10.4011	3	CARINYA AVENUE	MERINDA ST	BELAR ST	91	CO	R	134	225	91	1.2	109
10.4011	4	CARINYA AVENUE	BELAR ST	WARATAH ST	59	CO	R	225	284	59	1.2	71
10.4011	5	CARINYA AVENUE	WARATAH ST	BENALONG	67	CO	R	284	351	67	1.2	80
10.4011	6	CARINYA AVENUE	BENALONG A	CHARLES HA	53	CO	R	351	404	53	1.2	64
10.4011	8	CARINYA AVENUE	CRANA ST	CAR-PARK	88	CO	L	585	655	70	3.6	252
30.3022	1	CARPENTER STREET	MONFARVILLE ST	KNOX ST	260	CO	R	0	260	260	1.2	312
30.3022	2	CARPENTER STREET	KNOX ST	ADAMS CRS	92	CO	R	260	352	92	1.2	110
30.3022	3	CARPENTER STREET	ADAMS CRS	ADAMS CRS	92	CO	R	352	444	92	1.2	110
30.3022	4	CARPENTER STREET	ADAMS CRS	SHULTZ ST	7	CO	R	444	451	7	1.2	8
30.3022	5	CARPENTER STREET	SHULTZ ST	TIDSWELL ST	107	CO	R	0	107	107	1.2	128
30.3022	6	CARPENTER STREET	TIDSWELL ST	WHITE PDE	90	CO	R	0	90	90	1.2	108
30.3022	7	CARPENTER STREET	WHITE PDE	MARK ST	67	CO	R	0	67	67	1.2	80
30.3022	8	CARPENTER STREET	MARK ST	MARSDEN RD	93	CO	L	0	99	99	1.2	119
30.3022	9	CARPENTER STREET	MARSDEN RD	DAN CRS	253	CO	L	0	255	255	1.2	306
30.3022	10	CARPENTER STREET	DAN CRS	DAY ST	69	CO	L	0	69	69	1.2	83
30.3022	11	CARPENTER STREET	DAY ST	PARKIN RD	30	CO	L	0	31	31	1.2	37
30.3022	12	CARPENTER STREET	PARKIN RD	FREEMAN ST	106	CO	L	0	107	107	1.2	128
30.3022	13	CARPENTER STREET	FREEMAN ST	LEONARD ST	100	CO	L	0	100	100	1.2	120
30.3022	14	CARPENTER STREET	LEONARD ST	BENNETT RD	158	CO	L	0	158	158	1.2	190
30.3022	15	CARPENTER STREET	BENNETT RD	KENT PL	98	CO	L	0	98	98	1.2	118
30.3022	16	CARPENTER STREET	KENT PL	DOROTHY CR	65	CO	L	0	66	66	1.2	79
30.3022	17	CARPENTER STREET	DOROTHY CR	DOROTHY CR	93	CO	L	0	93	93	1.2	112
30.3022	18	CARPENTER STREET	DOROTHY CR	DALTON ST	322	CO	L	0	312	312	1.2	374
30.3022	19	CARPENTER STREET	DALTON ST	COOINDA ST	92	CO	L	0	93	93	1.2	112
30.3022	20	CARPENTER STREET	COOINDA ST	HEWITT ST	159	CO	L	0	154	154	1.2	185
11.6005	1	CARRINGTON STREET	LONDONDERR	MUSCHARRY	120	CO	R	0	120	120	1.2	144
11.6005	2	CARRINGTON STREET	MUSCHARRY	FARLEY PL	132	CO	R	120	252	132	1.2	158
11.6005	3	CARRINGTON STREET	FARLEY PL	O'BRIEN RD	90	CO	R	252	342	90	1.2	108
30.3023	1	CARRINGTON STREET	MONFARVILLE ST	THOMAS ST	231	CO	L	0	231	231	1.2	277
30.3023	2	CARRINGTON STREET	THOMAS ST	OXFORD ST	102	CO	L	231	333	102	1.2	122
30.3023	3	CARRINGTON STREET	OXFORD ST	MURRAY ST	96	CO	L	333	429	96	1.2	115
10.4012	1	CARSON LANE	QUEEN ST	CAR PARK E	82	CO	L	0	82	82	1.4	115
20.2008	1	CARY STREET	NEPEAN ST	STANSBURY ST	205	CO	L	0	200	200	1.2	240
20.2008	2	CARY STREET	STANSBURY ST	GREAT WESTERN HWY	203	CO	L	208	407	199	1.2	239
30.3146	1	CASSANDRA PLACE	ASTWOOD STREET	END OF ROAD	111	CO	R	0	111	111	1.2	133
30.3146	1	CASSANDRA PLACE	ASTWOOD STREET	END OF ROAD	111	CO	L	0	111	111	1.2	133
90.0001	17	CASTLEREAGH ROAD	COREEN AVE	PEACHTREE ROAD	276	CO	L	17245	17521	276	1.2	331
90.0001	18	CASTLEREAGH ROAD	PEACHTREE ROAD	JANE STREET	500	CO	L	17521	18021	500	1.2	600
90.0001	19	CASTLEREAGH ROAD	JANE STREET	HIGH STREET	154	CO	L	18021	18175	154	1.2	185
10.1007	1	CASTLEREAGH STREET	JAMISON RD	STAFFORD S	346	CO	R	0	341	341	1.2	409
10.1007	2	CASTLEREAGH STREET	STAFFORD S	DERBY ST	289	CO	R	353	632	279	1.2	335
10.1007	3	CASTLEREAGH STREET	DERBY ST	LETHBRIDGE	205	CO	R	638	835	197	1.2	236
10.1007	3	CASTLEREAGH STREET	DERBY ST	LETHBRIDGE	205	CO	L	638	835	197	1.2	236
10.1007	4	CASTLEREAGH STREET	LETHBRIDGE	TINDALE ST	117	CO	L	847	951	104	1.2	125
10.1007	4	CASTLEREAGH STREET	LETHBRIDGE	TINDALE ST	117	CO	R	847	957	110	1.2	132
10.1007	5	CASTLEREAGH STREET	TINDALE ST	MASTERS PL	51	BP	R	957	1008	51	3.4	173
10.1007	5	CASTLEREAGH STREET	TINDALE ST	MASTERS PL	51	CO	L	963	1006	43	3.6	155
10.1007	6	CASTLEREAGH STREET	MASTERS PL	JOHN CRAM	15	CO	R	1008	1023	15	3.4	51
10.1007	6	CASTLEREAGH STREET	MASTERS PL	JOHN CRAM	15	CO	L	1008	1023	15	3.6	54
10.1007	7	CASTLEREAGH STREET	JOHNCRAM P	HIGH ST	47	BP	R	1023	1070	47	3.4	160
10.1007	7	CASTLEREAGH STREET	JOHNCRAM P	HIGH ST	47	CO	L	1023	1070	47	3.6	169
10.3009	4	CATALINA STREET	WARREGO ST	GRIFFITH S	155	CO	R	447	602	155	1.2	186
10.301	1	CEDAR CRESCENT	DEBRINCAT	END OF RD	302	CO	R	0	302	302	1.2	362
2527	1	CENTRAL LANE	WOODI CLOSE	CENTRAL TREE RESERVE	82	CO		0	82	82	2	164
30.6067	1	CENTRAL PARK DRIVE	DONCASTER AVENUE	ILUKA ROAD	88	CO	R	0	88	88	1.2	106
30.6067	1	CENTRAL PARK DRIVE	DONCASTER AVENUE	ILUKA ROAD	88	CO	L	0	88	88	1.2	106
30.6067	2	CENTRAL PARK DRIVE	ILUKA DRIVE	COACHWOOD DRIVE	84	CO	R	88	172	84	1.2	101

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30.6067	2	CENTRAL PARK DRIVE	ILUKA DRIVE	COACHWOOD DRIVE	84	CO	L	88	172	84	1.2	101
30.6067	3	CENTRAL PARK DRIVE	COACHWOOD DRIVE	MEADOW PLACE	32	CO	R	172	204	32	1.2	38
30.6067	4	CENTRAL PARK DRIVE	MEADOW PLACE	SPRINGFIELD STREET	130	CO	R	204	334	130	1.2	156
30.6067	4	CENTRAL PARK DRIVE	MEADOW PLACE	SPRINGFIELD STREET	130	CO	L	204	334	130	1.2	156
30.6067	5	CENTRAL PARK DRIVE	SPRINGFIELD STREET	END OF ROAD	44	CO	R	334	378	44	1.2	53
30.6067	5	CENTRAL PARK DRIVE	SPRINGFIELD STREET	END OF ROAD	44	CO	L	334	378	44	1.2	53
10.4013	1	CHAMPNESS CRESCENT	LETHBRIDGE	LETHBRIDGE	341	CO	L	0	341	341	1.2	409
10.4014	1	CHAPEL STREET	QUEEN ST	EAST LANE	46	CO	R	0	41	41	3.6	148
10.4014	1	CHAPEL STREET	QUEEN ST	EAST LANE	46	CO	L	0	41	41	3.6	148
10.4014	2	CHAPEL STREET	EAST LANE	GIDLEY ST	66	CO	R	48	104	56	3.6	202
10.4014	2	CHAPEL STREET	EAST LANE	GIDLEY ST	66	CO	L	48	104	56	3.6	202
10.4014	3	CHAPEL STREET	GIDLEY ST	LETHBRIDGE	223	CO	R	116	330	214	1.2	257
10.4014	4	CHAPEL STREET	LETHBRIDGE	GLOSSOP ST	215	CO	R	337	548	211	1.2	253
10.4014	4	CHAPEL STREET	LETHBRIDGE	GLOSSOP ST	215	CO	L	335	550	215	1.2	258
10.4015	1	CHARLES HACKETT DRIVE	GREAT WESTERN HWY	GABRIELS LANE	95	CO	R	0	95	95	1.2	114
10.4015	2	CHARLES HACKETT DRIVE	GABRIELS LANE	THE KINGSWAY	255	BP	R	99	350	251	1.8	452
10.4015	3	CHARLES HACKETT DRIVE	THE KINGSWAY	KALANG AVE	115	BP	R	350	465	115	1.8	207
10.4015	3	CHARLES HACKETT DRIVE	THE KINGSWAY	KALANG AVE	115	CO	L	350	465	115	1.2	138
10.4015	4	CHARLES HACKETT DRIVE	KALANG AVE	KUNGALA ST	223	BP	R	465	688	223	1.8	401
10.4015	4	CHARLES HACKETT DRIVE	KALANG AVE	KUNGALA ST	223	CO	L	465	688	223	1.2	268
10.4015	5	CHARLES HACKETT DRIVE	KUNGALA ST	CARINYA AVE	52	BP	R	688	737	49	1.8	88
10.4015	5	CHARLES HACKETT DRIVE	KUNGALA ST	CARINYA AVE	52	CO	L	692	714	22	1.2	26
10.4015	6	CHARLES HACKETT DRIVE	CARINYA AVE	WEST LANE	39	CO	R	740	779	39	1.2	47
10.4015	7	CHARLES HACKETT DRIVE	WEST LANE	QUEEN ST	62	CO	R	782	841	59	1.2	71
10.4015	7	CHARLES HACKETT DRIVE	WEST LANE	QUEEN ST	62	CO	L	782	841	59	1.9	112
10.8013	1	CHARLES TODD CRESCENT	RUGBY ST	DALY COURT	91	CO	L	0	91	91	1.2	109
10.8013	2	CHARLES TODD CRESCENT	DALY COURT	RUGBY ST	364	CO	L	91	455	364	1.2	437
30.1049	1	CHARLTON PLACE	DEAD END	OLIVER	27	CO	R	0	23	23	1.2	28
10.4016	1	CHESHAM STREET	LETHBRIDGE	END OF RD	185	CO	R	0	185	185	1.2	222
2563	1	CHIPPING LANE	CHIPPING PLACE	MOSELEY AVE	119	CO		0	119	119	1.8	214
11.0005	1	CHRISTIE STREET	END OF BRIDGE	LEE HOLM RD	345	CO	R	0	345	345	1.2	414
11.0005	2	CHRISTIE STREET	LEE HOLM RD	TRESCO ST	391	CO	R	345	736	391	1.2	469
11.0005	3	CHRISTIE STREET	TRESCO ST	POWER ST	382	CO	R	736	1118	382	1.2	458
11.0005	4	CHRISTIE STREET	POWER ST	FORRESTER RD	138	CO	R	1118	1256	138	1.2	166
20.4008	1	CLIFFBROOK CRESCENT	LEONAY PDE	NOOK PLC	69	CO	R	0	69	69	1.2	83
20.4008	2	CLIFFBROOK CRESCENT	NOOK PLC	BLACKBUTT	78	CO	R	69	147	78	1.2	94
20.4008	3	CLIFFBROOK CRESCENT	BLACKBUTT	DELORAINE	99	CO	R	147	246	99	1.2	119
20.4008	4	CLIFFBROOK CRESCENT	DELORAINE	SANCTUARY	269	CO	L	246	515	269	1.2	323
30.6068	1	COACHWOOD DRIVE	DONCASTER AVENUE	CENTRAL PARK DRIVE	148	CO	L	0	148	148	1.2	178
10.5015	1	COLLEGE STREET	RICHMOND	CONWAY AVE	131	CO	R	0	128	128	1.2	154
10.5015	2	COLLEGE STREET	CONWAY AVE	RASCHKE ST	100	CO	R	131	231	100	1.2	120
10.5015	4	COLLEGE STREET	NORFOLK RD	DUNDEE ST	104	CO	R	240	338	98	1.2	118
10.5015	5	COLLEGE STREET	DUNDEE ST	CAMBRIDGE	108	CO	R	344	444	100	1.2	120
10.5015	6	COLLEGE STREET	CAMBRIDGE	OXFORD LN	311	CO	R	449	760	311	1.2	373
10.5015	7	COLLEGE STREET	OXFORD LN	OXFORD ST	32	CO	R	765	792	27	1.2	32
10.5015	8	COLLEGE STREET	OXFORD ST	MICHELLE	87	CO	R	792	879	87	1.2	104
10.5015	9	COLLEGE STREET	MICHELLE	BARLOW ST	200	CO	R	879	1079	200	1.2	240
10.1009	1	COLLESS STREET	END OF RD	BARBER AVE	113	CO	R	0	113	113	1.2	136
10.1009	2	COLLESS STREET	BARBER AVE	LETHBRIDGE	118	CO	R	113	225	112	1.2	134
30.3026	7	COLLINS STREET	SADDINGTON ST	SWANSTON ST	139	CO	L	0	139	139	1.2	167
30.1068	1	COLORADO DRIVE	COONAWARRA	BOSTON PLC	180	CO	L	0	180	180	1.2	216
30.1068	1	COLORADO DRIVE	COONAWARRA	BOSTON PLC	180	CO	R	0	180	180	1.2	216
30.1068	2	COLORADO DRIVE	BOSTON PLC	LEXINGTON	256	CO	L	184	436	252	1.2	302
30.1068	2	COLORADO DRIVE	BOSTON PLC	LEXINGTON	256	CO	R	180	436	256	1.2	307
30.1068	3	COLORADO DRIVE	LEXINGTON	LAURA PLCE	46	CO	L	436	472	36	1.2	43
30.1068	3	COLORADO DRIVE	LEXINGTON	LAURA PLCE	46	CO	R	436	482	46	1.2	55
30.1068	4	COLORADO DRIVE	LAURA PLCE	ANCHORAGE PL	242	CO	R	482	724	242	1.2	290
30.1068	5	COLORADO DRIVE	ANCHORAGE	CHATSWORTH	95	CO	R	724	819	95	1.2	114
2571	1	COMMUNITY LANE	PATH A	CARPARK COMM CENTRE	52	CO		0	52	52	1.2	62
30.1061	1	COOK PARADE	BANKS DR	SOLANDER	177	CO	R	0	177	177	1.2	212
30.1061	8	COOK PARADE	MCINTYRE	PINECREEK	93	CO	R	941	1034	93	1.2	112
30.1061	9	COOK PARADE	PINECREEK	CORIO DR	409	CO	R	1039	1439	400	1.2	480
30.1061	10	COOK PARADE	CORIO DR	BLACKWELL	150	CO	R	1446	1593	147	1.2	176

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
30.1061	10	COOK PARADE	CORIO DR	BLACKWELL	150	CO	L	1443	1593	150	1.2	180
20.0209	4	COOLABAH CRESCENT	BRONTE WAY	GLENGARRY DRIVE	28	CO	R	353	381	28	1.2	34
30.1069	3	COONAWARRA DRIVE	LIECESTER WAY	ARUNDEL PARK DR	148	CO	L	272	420	148	1.2	178
30.1069	4	COONAWARRA DRIVE	ARUNDEL PARK DR	LORIKEET PL	84	CO	L	420	504	84	1.2	101
30.1069	5	COONAWARRA DRIVE	LORIKEET PL	ARUNDEL PARK DR	51	CO	L	504	555	51	1.2	61
30.1069	6	COONAWARRA DRIVE	ARUNDEL PARK DR	COLORADO DR	112	CO	L	555	667	112	1.2	134
30.1063	1	COOWARRA AVENUE	BLACKWELL	BERRIGAN	132	CO	R	0	132	132	1.2	158
30.1063	2	COOWARRA AVENUE	BERRIGAN	TONGA CLSE	183	CO	R	132	315	183	1.2	220
30.1063	3	COOWARRA AVENUE	TONGA CLSE	CLARENCE	124	CO	R	315	439	124	1.2	149
30.1063	4	COOWARRA AVENUE	CLARENCE	WALKERS LN	90	CO	R	439	529	90	1.2	108
30.1063	5	COOWARRA AVENUE	WALKERS LN	FONTANA CL	38	CO	R	529	567	38	1.2	46
30.7015	2	COPELAND STREET	PHILLIP ST	PARKER ST	362	CO	L	387	749	362	1.2	434
30.7015	2	COPELAND STREET	PHILLIP ST	PARKER ST	362	CO	R	387	749	362	1.2	434
30.7015	3	COPELAND STREET	PARKER ST	MARKHAM AVE	83	CO	R	749	832	83	1.2	100
30.7015	4	COPELAND STREET	MARKHAM AVE	SHERWOOD CT	34	CO	R	832	866	34	1.2	41
30.7015	5	COPELAND STREET	SHERWOOD CT	JENKINS AVE	53	CO	R	866	919	53	1.2	64
30.7015	6	COPELAND STREET	JENKINS AVE	KING ST	265	CO	R	919	1184	265	1.2	318
10.2009	1	COREEN AVENUE	THE NRN RD	KAREELA AV	92	CO	R	0	92	92	1.2	110
10.2009	1	COREEN AVENUE	THE NRN RD	KAREELA AV	92	CO	L	0	92	92	1.2	110
10.2009	2	COREEN AVENUE	KAREELA AV	ARAKOON AV	203	CO	R	92	295	203	1.2	244
10.2009	2	COREEN AVENUE	KAREELA AV	ARAKOON AV	203	CO	L	92	295	203	1.2	244
10.2009	3	COREEN AVENUE	ARAKOON AV	KING ST	128	CO	L	295	418	123	1.2	148
10.2009	4	COREEN AVENUE	KING ST	HUGHES ST	261	CO	L	428	684	256	1.2	307
10.2009	5	COREEN AVENUE	HUGHES ST	LEMONGROVE	175	CO	R	684	859	175	1.2	210
10.2009	6	COREEN AVENUE	LEMONGROVE	BELAIR RD	138	CO	R	859	997	138	1.2	166
20.0308	1	CORONET TERRACE	CHN 0	CHN 70	70	CO	R	0	70	70	1.5	105
30.7016	1	COSGROVE CRESCENT	MORPHETT	KENARF CL	139	CO	L	0	136	136	1.2	163
30.7016	2	COSGROVE CRESCENT	KENARF CL	DAPHNE CL	106	CO	L	142	242	100	1.2	120
30.7016	3	COSGROVE CRESCENT	DAPHNE CL	PEARSON ST	84	CO	L	248	326	78	1.2	94
30.7017	1	COX AVENUE	RICHMOND	PHILLIP ST	445	CO	L	0	445	445	1.2	534
30.7017	2	COX AVENUE	PHILLIP ST	PARKER ST	364	CO	R	445	809	364	1.2	437
30.7017	3	COX AVENUE	PARKER ST	MARKHAM	87	CO	R	821	908	87	1.2	104
30.7017	4	COX AVENUE	MARKHAM	JENKINS	86	CO	R	908	994	86	1.2	103
30.7017	5	COX AVENUE	JENKINS	KING ST	291	CO	R	994	1285	291	1.2	349
10.4018	1	CRANA STREET	CARINYA AV	WEST LANE	35	BP	R	0	35	35	1.8	63
10.4018	1	CRANA STREET	CARINYA AV	WEST LANE	35	CO	L	0	32	32	5	160
10.4018	2	CRANA STREET	WEST LANE	QUEEN ST	60	CO	L	39	93	54	5	270
10.4018	2	CRANA STREET	WEST LANE	QUEEN ST	60	CO	R	35	93	58	5	290
90.0002	8	CRANEBROOK ROAD	FARRELLS LANE	AINSLEE COURT	160	CO	L	4291	4451	160	1.2	192
90.0002	11	CRANEBROOK ROAD	NEPEAN STREET	ANDREWS ROAD 1	0	CO	L	5488	6129	641	1.5	962
2528	1	CREEK LANE	SURVEYORS CREEK RD	GARSWOOD ROAD	65	CO		0	65	65	1.2	78
10.4059	1	CREEK ROAD	THE KINGSWAY	KUNGALA STREET	117	CO	L	0	117	117	2.1	246
2509	1	DAHLIA LANE	DAHLIA CRESCENT	SUNFLOWER DRIVE	63	CO		0	63	63	2	126
30.3033	1	DAY STREET	CARPENTER	MUSICO ST	102	CO	R	0	102	102	1.2	122
30.3033	4	DAY STREET	BALL ST	GT WESTERN	83	CO	L	315	398	83	1.2	100
10.1012	1	DE VILNITS PARADE	VISTA ST	END OF RD	57	CO	R	0	57	57	1.2	68
10.3014	1	DEBRINCAT AVENUE	GLOSSOP ST	OLEANDER	102	CO	L	0	100	100	1.2	120
10.3014	1	DEBRINCAT AVENUE	GLOSSOP ST	OLEANDER	102	CO	R	0	100	100	1.2	120
10.3014	2	DEBRINCAT AVENUE	OLEANDER	DEBRINCAT	83	CO	R	107	185	78	1.2	94
10.3014	3	DEBRINCAT AVENUE	DEBRINCAT	CEDAR CRES	31	CO	L	192	216	24	1.2	29
10.3014	3	DEBRINCAT AVENUE	DEBRINCAT	CEDAR CRES	31	CO	R	185	216	31	1.2	37
10.3014	4	DEBRINCAT AVENUE	CEDAR CRES	BIRCH ST	108	CO	R	223	324	101	1.2	121
10.3014	4	DEBRINCAT AVENUE	CEDAR CRES	BIRCH ST	108	CO	L	216	324	108	1.2	130
10.3014	5	DEBRINCAT AVENUE	BIRCH ST	POPLAR ST	111	CO	R	332	435	103	1.2	124
10.3014	5	DEBRINCAT AVENUE	BIRCH ST	POPLAR ST	111	CO	L	324	435	111	1.2	133
10.3014	6	DEBRINCAT AVENUE	POPLAR ST	JACKARANDA	109	CO	R	442	544	102	1.2	122
10.3014	6	DEBRINCAT AVENUE	POPLAR ST	JACKARANDA	109	CO	L	435	544	109	1.2	131
10.3014	7	DEBRINCAT AVENUE	JACKARANDA	MAPLE RD	107	CO	R	551	651	100	1.2	120
10.3014	7	DEBRINCAT AVENUE	JACKARANDA	MAPLE RD	107	CO	L	551	651	100	1.2	120
10.3014	8	DEBRINCAT AVENUE	MAPLE RD	MAGNOLIA S	107	CO	R	659	758	99	1.2	119
10.3014	8	DEBRINCAT AVENUE	MAPLE RD	MAGNOLIA S	107	CO	L	659	758	99	1.2	119
10.3014	9	DEBRINCAT AVENUE	MAGNOLIA	BORONIA RD	106	CO	R	765	862	97	1.2	116
10.3014	9	DEBRINCAT AVENUE	MAGNOLIA	BORONIA RD	106	CO	L	765	862	97	1.2	116

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
2572	1	DENVER LANE	DENVER STREET	UNKNOWN	649	CO		0	649	649	2	1298
30.1077	1	DENVER ROAD	EXPLORERS WAY	CHARDONNAY	98	CO	R	0	98	98	1.2	118
30.1077	2	DENVER ROAD	CHARDONNAY RD	KALINDI PL	201	CO	R	98	299	201	1.2	241
30.1077	3	DENVER ROAD	KALINDI PL	COLUMBUS AVE	84	CO	R	299	383	84	1.2	101
30.1077	4	DENVER ROAD	COLUMBUS AVE	LAURA PL	82	CO	R	383	465	82	1.2	98
30.1077	5	DENVER ROAD	LAURA PL	COLORADO DR	83	CO	R	465	548	83	1.2	100
10.1013	1	DERBY STREET	STATION ST	WOODRIFF S	176	CO	R	0	176	176	1.2	211
10.1013	2	DERBY STREET	WOODRIFF	BROWN ST	105	CO	L	188	293	105	1.2	126
10.1013	3	DERBY STREET	BROWN ST	CASTLEREAGH ST	104	CO	L	293	379	86	1.2	103
10.1013	4	DERBY STREET	CASTLEREAGH ST	WARWICK ST	155	CO	L	409	564	155	1.2	186
10.1013	5	DERBY STREET	WARWICK ST	HAND AVE	146	CO	L	564	710	146	1.2	175
10.1013	6	DERBY STREET	HAND AVE	EVAN ST	95	CO	L	710	805	95	1.2	114
10.1013	8	DERBY STREET	DOONMORE	COLLESS ST	323	CO	L	1064	1387	323	1.2	388
10.1013	9	DERBY STREET	COLLESS ST	PARKER ST	327	CO	L	1387	1714	327	1.2	392
30.7019	1	DERBY STREET	PARKER ST	SOMERSET ST	410	CO	L	0	410	410	1.2	492
30.7019	1	DERBY STREET	PARKER ST	SOMERSET ST	410	CO	R	0	410	410	1.2	492
30.7019	2	DERBY STREET	SOMERSET ST	HARGRAVE ST	274	CO	L	410	684	274	1.2	329
30.7019	3	DERBY STREET	HARGRAVE ST	BRINGELLY RD	167	CO	L	684	851	167	1.2	200
30.3035	1	DESBOROUGH ROAD	MONFARVILE	MACLEAY CR	243	CO	L	0	243	243	1.2	292
30.3035	2	DESBOROUGH ROAD	MACLEAY CR	MACLEAY CR	104	CO	R	243	347	104	1.2	125
30.3035	3	DESBOROUGH ROAD	MACLEAY CR	BEGA ST	64	CO	R	0	64	64	1.2	77
30.3035	4	DESBOROUGH ROAD	BEGA ST	MURRAY ST	26	CO	R	0	26	26	1.2	31
30.3035	5	DESBOROUGH ROAD	MURRAY ST	HERSHON ST	110	CO	R	0	110	110	1.2	132
30.3035	6	DESBOROUGH ROAD	HERSHON ST	BERESFORD	95	CO	L	0	95	95	1.2	114
30.3035	7	DESBOROUGH ROAD	BERESFORD	MARSDEN RD	160	CO	R	0	160	160	1.2	192
30.3035	8	DESBOROUGH ROAD	MARSDEN RD	DARAYA ST	98	CO	L	0	98	98	1.2	118
30.3035	9	DESBOROUGH ROAD	DARAYA ST	BLAMEY ST	57	CO	L	0	57	57	1.2	68
30.3035	10	DESBOROUGH ROAD	BLAMEY ST	PARKIN RD	199	CO	L	0	199	199	1.2	239
30.3035	11	DESBOROUGH ROAD	PARKIN RD	HOLMES ST	270	CO	L	0	270	270	1.2	324
30.3035	12	DESBOROUGH ROAD	HOLMES ST	BENNETT RD	97	CO	L	0	97	97	1.2	116
30.3035	13	DESBOROUGH ROAD	BENNETT RD	BENTLEY RD	255	CO	R	0	255	255	1.5	383
30.3035	13	DESBOROUGH ROAD	BENNETT RD	BENTLEY RD	255	CO	L	1523	1778	255	1.2	306
30.3035	14	DESBOROUGH ROAD	BENTLEY RD	REBECCA ST	5	CO	L	1778	1783	5	1.2	6
30.3035	15	DESBOROUGH ROAD	REBECCA ST	BASS ST	101	CO	R	0	105	105	1.5	158
30.3035	15	DESBOROUGH ROAD	REBECCA ST	BASS ST	101	CO	L	1783	1884	101	1.2	121
30.3035	16	DESBOROUGH ROAD	BASS ST	BURFORD ST	4	CO	L	1884	1888	4	1.2	5
30.3035	16	DESBOROUGH ROAD	BASS ST	BURFORD ST	4	CO	R	0	94	94	1.5	141
30.3035	17	DESBOROUGH ROAD	BURFORD ST	BARR ST	94	CO	R	0	89	89	1.5	134
30.3035	18	DESBOROUGH ROAD	BARR ST	KENNELLY ST	89	CO	R	0	91	91	1.5	137
30.3035	19	DESBOROUGH ROAD	KENNELLY ST	THORPE ST	91	CO	R	0	177	177	1.5	266
30.3035	20	DESBOROUGH ROAD	THORPE ST	HEWITT ST	177	CO	R	2162	2339	177	1.2	212
20.0131	3	DEVANEY AVENUE	MARCUS CLARKE CR	CHN 99 (DEVANEY)	99	CO	R	0	99	99	1.2	119
20.0131	4	DEVANEY AVENUE	CHN 99 (DEVANEY)	END OF ROAD	12	CO	R	99	111	12	1.2	14
2553	1	DEWDENY LANE	DEWDENY ROAD	YODALLA AVE	28	CO		0	28	28	1.2	34
30.6064	1	DONCASTER AVENUE	CENTRAL PARK DRIVE	ILUKA ROAD	203	CO	R	0	203	203	1.2	244
30.6064	1	DONCASTER AVENUE	CENTRAL PARK DRIVE	ILUKA ROAD	203	CO	L	0	203	203	1.2	244
30.6064	2	DONCASTER AVENUE	ILUKA ROAD	COACHWOOD DRIVE	86	CO	R	203	289	86	1.2	103
30.6064	2	DONCASTER AVENUE	ILUKA ROAD	COACHWOOD DRIVE	86	CO	L	203	289	86	1.2	103
30.6064	3	DONCASTER AVENUE	COACHWOOD DRIVE	SILVERWOOD WAY	35	CO	R	289	324	35	1.2	42
30.6064	3	DONCASTER AVENUE	COACHWOOD DRIVE	SILVERWOOD WAY	35	CO	L	289	324	35	1.2	42
30.6064	4	DONCASTER AVENUE	SILVERWOOD WAY	SPRINGDALE ROAD	105	CO	R	324	429	105		0
30.6064	4	DONCASTER AVENUE	SILVERWOOD WAY	SPRINGDALE ROAD	105	CO	L	324	429	105	1.2	126
30.6064	5	DONCASTER AVENUE	SPRINGDALE STREET	END OF ROAD	37	CO	R	429	466	37	1.2	44
30.6064	5	DONCASTER AVENUE	SPRINGDALE STREET	END OF ROAD	37	CO	L	429	466	37	1.2	44
10.1014	1	DOONMORE STREET	JAMISON RD	DARLING ST	86	CO	R	0	86	86	1.2	103
10.1014	2	DOONMORE STREET	DARLING ST	CRONIN ST	35	CO	R	86	118	32	1.2	38
10.1014	3	DOONMORE STREET	CRONIN ST	JIPP ST	42	CO	R	124	163	39	1.2	47
10.1014	4	DOONMORE STREET	JIPP ST	STAFFORD S	86	CO	R	163	243	80	1.2	96
10.1014	5	DOONMORE STREET	STAFFORD	TORNAROS	105	CO	R	255	354	99	1.2	119
10.1014	6	DOONMORE STREET	TORNAROS	DERBY ST	115	CO	R	354	466	112	1.2	134
10.1014	7	DOONMORE STREET	DERBY ST	LETHBRIDGE	193	CO	R	469	662	193	1.2	232
10.1014	8	DOONMORE STREET	LETHBRIDGE	FULTON ST	113	CO	R	668	775	107	1.2	128
10.1014	9	DOONMORE STREET	FULTON ST	HIGH ST	127	CO	L	778	896	118	1.2	142

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.1014	9	DOONMORE STREET	FULTON ST	HIGH ST	127	CO	R	775	896	121	1.2	145
10.1014	10	DOONMORE STREET	HIGH ST	ANDERSON	42	CO	R	908	944	36	1.2	43
10.1014	11	DOONMORE STREET	ANDERSON	HENRY ST	96	CO	L	947	1040	93	1.2	112
10.1014	11	DOONMORE STREET	ANDERSON	HENRY ST	96	CO	R	944	1040	96	1.2	115
10.601	1	DUNHEVED ROAD	LAVIN CRES	HENRY LAWSON AVE	168	CO	R	0	168	168	1.2	202
10.601	1	DUNHEVED ROAD	LAVIN CRES	HENRY LAWSON AVE	168	CO	L	0	168	168	1.2	202
10.601	2	DUNHEVED ROAD	HENRY LAWSON AVE	END OF AC	179	CO	R	168	347	179	1.2	215
10.601	7	DUNHEVED ROAD	START OF 1ST BRIDGE	END OF 1ST BRIDGE	162	CO	R	2003	2165	162	1.9	308
10.7016	3	DUNHEVED ROAD	GREENBANK	FRANCIS ST	79	CO	L	1401	1480	79	1.2	95
10.7016	4	DUNHEVED ROAD	FRANCIS ST	LAVIN CRES	114	CO	L	1480	1594	114	1.2	137
11.0007	1	DUNHEVED ROAD	START OF 2ND BRIDGE	END OF 2ND BRIDGE	72	CO	R	0	72	72	1.9	137
20.0107	1	DUTBA PLACE	KARABI PL	END OF ROAD	104	CO	R	0	104	104	1.2	125
10.402	1	EDGAR STREET	WARICK ST	MAMRE RD	211	CO	R	111	211	100	1.2	120
10.1069	1	EDWARD PLACE	LAWSON ST	WOODRIFF LANE	173	CO	R	0	173	173	1	173
20.0155	1	ELIZA PLACE	LADY JAMISON DR	DUNCAN CL	59	CO	L	0	59	59	1.2	71
20.0155	2	ELIZA PLACE	DUNCAN CL	GLASSCOCK CL	36	CO	L	59	95	36	1.2	43
20.0155	3	ELIZA PLACE	GLASSCOCK CL	END OF ROAD	87	CO	R	95	182	87	1.2	104
2510	1	ELOUERA LANE	PRIMROSE CIRCUIT	SUNFLOWER DRIVE	141	CO		0	141	141	1.7	240
20.2014	5	EMERALD STREET	FORBES ST	GWANDALAN	112	CO	L	367	383	16	1.2	19
20.2014	5	EMERALD STREET	FORBES ST	GWANDALAN	112	BP	L	383	479	96	3.4	326
20.2014	6	EMERALD STREET	GWANDALAN	STANSBURY	83	CO	L	479	562	83	1.2	100
20.2014	7	EMERALD STREET	STANSBURY	GT WST HWY	141	CO	L	562	691	129	1.2	155
20.2014	7	EMERALD STREET	STANSBURY	GT WST HWY	141	CO	L	562	703	141	1.2	169
30.1087	1	ENDEAVOUR ROAD	BENNETT RD	MOORE ST	605	CO	R	0	599	599	1.2	719
30.1087	1	ENDEAVOUR ROAD	BENNETT RD	MOORE ST	605	CO	L	0	605	605	2	1210
30.1087	2	ENDEAVOUR ROAD	MOORE ST	CHANNON GL	274	CO	L	605	879	274	1.2	329
30.1087	2	ENDEAVOUR ROAD	MOORE ST	CHANNON GL	274	CO	R	605	879	274	1.2	329
30.1087	3	ENDEAVOUR ROAD	SHANNON GL	BANKS DRVE	212	CO	L	879	1091	212	1.2	254
30.1087	3	ENDEAVOUR ROAD	SHANNON GL	BANKS DRVE	212	CO	R	879	1091	212	1.2	254
2573	1	ERSKINE LANE	ERSKINE PARK RD	BENNETT ROAD 1	257	AC		0	1257	1257	2.1	2640
10.1015	1	EVAN STREET	THE CRESCENT	HENRY ST	171	CO	R	0	165	165	1.2	198
10.1015	1	EVAN STREET	THE CRESCENT	HENRY ST	171	CO	L	0	165	165	1.2	198
10.1015	2	EVAN STREET	HENRY ST	HIGH ST	138	CO	R	177	304	127	1.2	152
10.1015	2	EVAN STREET	HENRY ST	HIGH ST	138	CO	L	177	304	127	1.2	152
10.1015	3	EVAN STREET	HIGH ST	HIGGINS ST	118	CO	R	316	421	105	1.2	126
10.1015	4	EVAN STREET	HIGGINS ST	LETHBRIDGE ST	116	CO	R	433	537	104	1.2	125
10.1015	5	EVAN STREET	LETHBRIDGE ST	DERBY ST	192	CO	R	549	732	183	1.2	220
10.1015	6	EVAN STREET	DERBY ST	TORNAROS AVE	121	CO	R	738	856	118	1.2	142
10.1015	7	EVAN STREET	TORNAROS AVE	STAFFORD ST	111	CO	R	856	961	105	1.2	126
10.1015	8	EVAN STREET	STAFFORD ST	JIPP ST	87	CO	R	973	1054	81	1.2	97
10.1015	10	EVAN STREET	HORNSEYWOOD AVE	DARLING ST	76	CO	R	1068	1139	71	1.2	85
10.1015	11	EVAN STREET	DARLING ST	JAMISON RD	92	CO	R	1139	1230	91	1.2	109
31.1048	1	EVAN STREET	JAMISON RD	PERRITT	79	CO	L	0	79	79	1.2	95
31.1048	1	EVAN STREET	JAMISON RD	PERRITT	79	CO	R	0	79	79	1.2	95
31.1048	2	EVAN STREET	PERRITT	BAXTER	158	CO	L	79	234	155	1.2	186
31.1048	2	EVAN STREET	PERRITT	BAXTER	158	CO	R	79	237	158	1.2	190
31.1048	3	EVAN STREET	BAXTER	UPTON ST	83	CO	L	241	317	76	1.2	91
31.1048	3	EVAN STREET	BAXTER	UPTON ST	83	CO	R	237	320	83	1.2	100
31.1048	4	EVAN STREET	UPTON ST	SMITH ST	85	CO	L	323	400	77	1.2	92
31.1048	4	EVAN STREET	UPTON ST	SMITH ST	85	CO	R	320	405	85	1.2	102
31.1048	5	EVAN STREET	SMITH ST	DWYER	96	CO	R	412	497	85	1.2	102
31.1048	5	EVAN STREET	SMITH ST	DWYER	96	CO	L	405	501	96	1.2	115
31.1048	6	EVAN STREET	DWYER	PARKVIEW AVE	13	CO	L	501	514	13	1.2	16
31.1048	7	EVAN STREET	PARKVIEW AVE	GREENHILLS	80	CO	R	514	594	80	1.2	96
31.1048	7	EVAN STREET	PARKVIEW AVE	GREENHILLS	80	CO	L	514	594	80	1.2	96
31.1048	8	EVAN STREET	GREENHILLS	STEVENSON	70	CO	R	600	664	64	1.2	77
31.1048	8	EVAN STREET	GREENHILLS	STEVENSON	70	CO	L	594	664	70	1.2	84
31.1048	9	EVAN STREET	STEVENSON	KEITH ST	221	CO	R	664	882	218	1.2	262
31.1048	9	EVAN STREET	STEVENSON	KEITH ST	221	CO	L	664	885	221	1.2	265
31.1048	10	EVAN STREET	KEITH ST	CHESTERFIELD AVE	221	CO	R	890	1106	216	1.2	259
31.1048	10	EVAN STREET	KEITH ST	CHESTERFIELD AVE	221	CO	L	885	1106	221	1.2	265
31.1048	11	EVAN STREET	CHESTERFIELD AVE	MAXWELL ST	90	CO	R	1106	1190	84	1.2	101
31.1048	11	EVAN STREET	CHESTERFIELD AVE	MAXWELL ST	90	CO	L	1106	1196	90	1.2	108

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
31.1048	12	EVAN STREET	MAXWELL ST	TRENT ST	233	CO	L	1202	1429	227	1.2	272
31.1048	12	EVAN STREET	MAXWELL ST	TRENT ST	233	AC		1429	1707	278	2	556
31.1048	12	EVAN STREET	MAXWELL ST	TRENT ST	233	CO	R	1429	1774	345	1.2	414
10.0036	1	FIREBALL AVENUE	LAYCOCK ST	ARAFURA AV	92	CO	L	0	92	92	1.2	110
10.0036	2	FIREBALL AVENUE	ARAFURA AV	STINGRAY	293	CO	L	92	385	293	1.2	352
10.0036	3	FIREBALL AVENUE	STINGRAY	BLUEBIRD	185	CO	L	385	570	185	1.2	222
20.0185	3	FIRESTONE CRESCENT	MAIDSTONE PLACE	TROON COURT	78	CO	L	260	338	78	2.25	176
20.0185	4	FIRESTONE CRESCENT	TROON COURT	LAGUNA DRIVE	82	CO	L	338	420	82	2	164
2529	1	FIRESTONE LANE	FIRESTONE CR	SURVEYORS CREEK RD	86	CO		0	86	86	1.2	103
20.002	1	FITZGERALD PLACE	KENNETH	BANJO PAT	78	CO	R	0	78	78	1.2	94
30.3121	2	FLEMING STREET	MORRIS ST	GORDON ST	79	CO	R	69		69		0
30.3121	3	FLEMING STREET	GORDON ST	GT WESTERN	40	CO	R	148	188	40		0
20.0022	1	FLORIBUNDA AVENUE	SIR JOHN JMISON CCT	LADY JAMISON DRIVE	177	CO	R	0	177	177	1.2	212
20.0022	2	FLORIBUNDA AVENUE	LADY JAMISON DRIVE	FREESIA PL	235	CO	R	110	345	235	1.2	282
20.0022	3	FLORIBUNDA AVENUE	FREESIA PL	ACACIA AVE	88	CO	R	345	433	88	1.2	106
20.0022	4	FLORIBUNDA AVENUE	ACACIA AVE	BEGONIA COURT	74	CO	R	433	507	74	1.2	89
20.0022	5	FLORIBUNDA AVENUE	BEGONIA COURT	VIOLA PL	85	CO	R	507	592	85	1.2	102
20.0022	6	FLORIBUNDA AVENUE	VIOLA PL	END OF ROAD	128	CO	R	592	720	128	1.2	154
2530	1	FLORIBUNDA LANE	GLENMORE PARKWAY	FLORIBUNDA AVE	889	CO		0	889	889	2	1778
20.2082	1	FORBES STREET	RUSSELL ST	TROY ST	284	CO	L	0	280	280	1.2	336
20.2082	2	FORBES STREET	TROY ST	EMERALD ST	222	CO	L	284	506	222	1.2	266
10.3045	1	FORRESTER ROAD	END OF RD	HARRIS ST	68	CO	R	0	62	62	1.2	74
10.3045	2	FORRESTER ROAD	HARRIS ST	GLOSSOP ST	514	CO	R	74	576	502	1.2	602
10.3045	2	FORRESTER ROAD	HARRIS ST	GLOSSOP ST	514	CO	L	68	582	514	1.2	617
10.3045	3	FORRESTER ROAD	GLOSSOP ST	CATALINA	248	CO	L	582	830	248		0
10.3045	3	FORRESTER ROAD	GLOSSOP ST	CATALINA	248	CO	R	590	826	236	1.2	283
10.3045	4	FORRESTER ROAD	CATALINA	WORDOO ST	133	CO	R	833	963	130	1.2	156
10.3045	4	FORRESTER ROAD	CATALINA	WORDOO ST	133	CO	L	830	963	133	1.2	160
10.3045	5	FORRESTER ROAD	WORDOO ST	GRIFFITHS	168	CO	R	963	1128	165	1.2	198
10.3045	6	FORRESTER ROAD	GRIFFITHS	COMMON-WTH	31	CO	R	1131	1162	31	1.2	37
10.3045	7	FORRESTER ROAD	COMMON-WTH	COMMON-WTH	117	CO	R	1162	1279	117	1.2	140
10.3045	8	FORRESTER ROAD	COMMON-WTH	MAPLE ROAD	34	CO	R	1279	1313	34	1.2	41
10.3045	9	FORRESTER ROAD	MAPLE ROAD	CHRISTIE	281	CO	R	1313	1594	281	1.2	337
2549	1	FOX LANE	FOX PLACE	ILLAWONG AVE	94	CO		0	94	94	1.2	113
31.1055	1	FRAGAR ROAD	JAMISON RD	BUTLER CRE	92	CO	L	0	92	92	1.2	110
31.1055	2	FRAGAR ROAD	BUTLER CRE	FISHER ST	70	CO	L	92	162	70	1.2	84
31.1055	3	FRAGAR ROAD	FISHER ST	PAYNE ST	78	CO	L	162	232	70	1.2	84
31.1055	4	FRAGAR ROAD	PAYNE ST	UREN ST	81	CO	L	240	316	76	1.2	91
31.1055	5	FRAGAR ROAD	UREN ST	SMITH ST	82	CO	L	324	397	73	1.2	88
31.1055	6	FRAGAR ROAD	SMITH ST	TREETOPS AVE	91	CO	L	409	494	85	1.2	102
31.1055	7	FRAGAR ROAD	TREETOPS	BURGESS RD	275	CO	L	494	766	272	1.2	326
31.1055	8	FRAGAR ROAD	BURGESS RD	BLUEGUM AVE	106	CO	L	774	875	101	1.2	121
31.1055	9	FRAGAR ROAD	BLUEGUM AVE	FLETCHER ST	118	CO	L	875	993	118	1.2	142
31.1055	10	FRAGAR ROAD	FLETCHER ST	TANIA AVE	123	CO	L	993	1111	118	1.2	142
31.1055	11	FRAGAR ROAD	TANIA AVE	MAXWELL ST	80	CO	L	1119	1196	77	1.2	92
31.1055	12	FRAGAR ROAD	MAXWELL ST	WARDELL DR	84	CO	L	1208	1292	84	1.2	101
31.1055	13	FRAGAR ROAD	WARDELL DR	GLORIA PL	214	CO	L	1292	1506	214	1.2	257
31.1055	14	FRAGAR ROAD	GLORIA PL	SAMUEL FOS	32	CO	L	1506	1538	32	1.2	38
31.1055	15	FRAGAR ROAD	SAMUEL FOS	WARDELL DR	257	CO	L	1538	1795	257	1.2	308
31.1055	16	FRAGAR ROAD	WARDELL DR	TUKARA RD	123	CO	L	1795	1918	123	1.2	148
2574	1	FRAMPTON LANE	FRAMPTON AVE	LOCKHEED CIRCUIT	44	CO		0	44	44	8.2	361
10.5025	1	FRANCIS STREET	CHN 150	RUGBY ST	138	CO	R	112	250	138	1.2	166
10.5025	1	FRANCIS STREET	CHN 150	RUGBY ST	138	CO	L	112	250	138	1.2	166
10.5025	2	FRANCIS STREET	RUGBY ST	TUMBRIDGE	287	CO	R	250	537	287	1.2	344
10.5025	3	FRANCIS STREET	TUMBRIDGE	LAKE ACCES	98	CO	R	537	635	98	1.2	118
10.5025	4	FRANCIS STREET	LAKE ACCES	WILLIAM ST	59	CO	R	635	694	59	1.2	71
10.5025	5	FRANCIS STREET	DUNHEVED ROAD	CHN 150	150	CO	L	0	150	150	1.2	180
2531	1	FREESIA LANE	SHOPPING CENTRE	PATH 2	180	CO		0	180	180	1.2	216
10.014	1	FULMAR WAY	LAKESVIEW DRIVE	END OF AC	49	CO	R	0	49	49	1.2	59
10.4022	1	GABRIELS LANE	CHARLES HA	PRINCESS M	129	CO	L	0	129	129	1.2	155
30.6066	1	GALEA STREET	CADDENS ROAD	DONCASTER AVENUE	79	CO	R	0	79	79	1.2	95
10.0142	1	GANNETT DRIVE	WATERSIDE BOULEVARDE	GUILLEMONT STREET	61	CO	L	0	61	61	1.2	73
10.0142	2	GANNETT DRIVE	GULLEMONT STREET	KNOT STREET	84	CO	L	61	145	84	1.2	101

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.2018	1	GARDENIA AVENUE	SHORT ST	THORSBY PL	77	CO	R	0	77	77	1.2	92
20.2018	2	GARDENIA AVENUE	THORSBY PL	HARTIGAN A	84	CO	R	77	161	84	1.2	101
20.2018	3	GARDENIA AVENUE	HARTIGAN A	MCAULEY CR	22	CO	R	161	183	22	1.2	26
20.2018	4	GARDENIA AVENUE	MCAULEY CR	HERMES PL	155	CO	R	183	338	155	1.2	186
20.2018	5	GARDENIA AVENUE	HERMES PL	MORTIMER S	67	CO	R	338	405	67	1.2	80
20.2018	6	GARDENIA AVENUE	MORTIMER S	MCAULEY CR	56	CO	R	405	461	56	1.2	67
20.2018	7	GARDENIA AVENUE	MCAULEY CR	BELLBROOK	199	CO	R	461	660	199	1.2	239
20.2018	8	GARDENIA AVENUE	BELLBROOK	WATSONIA	84	CO	R	660	744	84	1.2	101
20.2018	9	GARDENIA AVENUE	WATSONIA	ROSEMONT	256	CO	R	744	1000	256	1.2	307
20.2018	10	GARDENIA AVENUE	ROSEMONT	GT WST HWY	69	CO	R	1000	1069	69	1.2	83
2532	1	GARSWOOD LANE	GLENMORE PARKWAY	GARSWOOD ROAD	424	CO		0	424	424	2	848
20.0164	1	GARSWOOD ROAD	WILLIAM HOWELL DRIVE	JIRANG PL	48	CO	R	0	48	48	1.2	58
20.0164	2	GARSWOOD ROAD	JIRANG PL	BIJA DR	531	CO	L	48	579	531	1.2	637
20.0164	3	GARSWOOD ROAD	BIJA DR	KUTMUT ST	271	CO	L	579	661	82	3	246
20.0164	4	GARSWOOD ROAD	KUTMUT ST	SURVEYORS CREEK RD	248	CO	L	850	1098	248	1.2	298
20.0164	9	GARSWOOD ROAD	SUNNINGDALE DRIVE	BALLYBUNNION TERRACE	59	CO	L	0	59	59	1.2	71
20.0164	10	GARSWOOD ROAD	BALLYBUNNION TERRACE	PANTON CLOSE	88	CO	L	59	147	88	1.2	106
20.0164	11	GARSWOOD ROAD	PANTON CL	BALLYBUNNION TERRACE	165	CO	L	147	312	165	1.2	198
20.0164	12	GARSWOOD ROAD	BALLYBUNNION TERRACE	ST ANDREWS DRIVE	70	CO	L	312	382	70	1.2	84
20.0164	13	GARSWOOD ROAD	ST ANDREWS DRIVE	ABERDEEN CIRCUIT	235	CO	R	382	617	235	2	470
20.0164	14	GARSWOOD ROAD	ABERDEEN CIRCUIT	SOUTH STREET	217	CO	R	617	834	217	2	434
20.0164	15	GARSWOOD ROAD	SOUTH STREET	NORTHERN ROAD	550	CO	L	834	1384	550	1.2	660
30.7031	8	GASCOIGNE STREET	VILLAGE PL	KING ST	238	CO	L	789	1027	238	1.2	286
10.4025	1	GIDLEY STREET	KING ST	CHAPEL ST	253	CO	L	0	250	250	1.2	300
10.4025	1	GIDLEY STREET	KING ST	CHAPEL ST	253	CO	R	0	250	250	1.2	300
10.4025	2	GIDLEY STREET	CHAPEL ST	LITTLE CHP	36	CO	L	258	289	31	1.2	37
10.4025	3	GIDLEY STREET	LITTLE CHA	ROSS PL	192	CO	R	297	481	184	1.2	221
10.4025	3	GIDLEY STREET	LITTLE CHA	ROSS PL	192	CO	L	294	481	187	1.2	224
10.4025	4	GIDLEY STREET	ROSS PL	ROSS PL	30	CO	L	486	511	25	1.2	30
10.4025	5	GIDLEY STREET	ROSS PL	PHILLIP ST	81	CO	R	518	592	74	1.2	89
10.4025	5	GIDLEY STREET	ROSS PL	PHILLIP ST	81	CO	L	516	592	76	1.2	91
30.6027	3	GIPPS STREET	OLD GIPPS RD	SUNFLOWER DR	53	CO	L	926	979	53	1.2	64
30.6027	4	GIPPS STREET	SUNFLOWER DR	GREAT WESTERN HWY	343	CO	L	979	1322	343	1.2	412
20.0165	1	GLASSCOCK CLOSE	ELIZA PL	END OF ROAD	63	CO	R	0	63	63	1.2	76
30.7035	3	GLEBE PLACE	PARKER ST	SPRINGFIE	174	CO	L	459	621	162	1.2	194
30.7035	4	GLEBE PLACE	SPRINGFIE	KING ST	265	CO	L	636	886	250	1.2	300
20.0268	5	GLENGARRY DRIVE	WESTERLY WAY	WINDORRA AVE	136	CO	L	632	768	136	1.5	204
20.0268	6	GLENGARRY DRIVE	WINDORRA AVE	BRIGADOON AVE	92	CO	L	768	860	92	2	184
20.0268	7	GLENGARRY DRIVE	BRIGADOON AVE	COOLABAH CR	118	CO	L	860	978	118	2	236
20.0268	8	GLENGARRY DRIVE	COOLABAH CR	GLENMORE PARKWAY	90	CO	L	978	1068	90	2	180
20.0203	1	GLENMORE PARKWAY	GLENMORE PARKWAY	GLENMORE PARKWAY	126	CO	L	0	126	126	3.5	441
20.0204	1	GLENMORE PARKWAY	WOODLANDS AVE	SCHOOL ROUNDABOUT	165	CO	R	0	165	165	2	330
20.0204	2	GLENMORE PARKWAY	SCHOOL ROUNDABOUT	BUS BAY ROUNDABOUT	144	CO	R	165	309	144	2	288
20.0204	3	GLENMORE PARKWAY	BUS BAY ROUNDABOUT	SCHOOL ROUNDABOUT	184	CO	R	309	374	65	2	130
20.0204	4	GLENMORE PARKWAY	SCHOOL ROUNDABOUT	MURU DRIVE	341	CO	L	493	834	341	2	682
20.0024	1	GLENMORE PARK WAY	MULGOA RD	SIR JOHN JAMISON CCT	398	CO	L	0	398	398	1.2	478
20.0024	2	GLENMORE PARK WAY	SIR JOHN JAMISON CCT	KENNETH SLESSOR DR	365	CO	R	398	763	365	1.2	438
20.0024	5	GLENMORE PARK WAY	MORRISON ST	CHN 78	78	CO	L	1620	1698	78	2	156
20.0024	6	GLENMORE PARK WAY	CHN 78	CAMELIA AVE	270	CO	R	1698	1968	270	1.2	324
20.0024	7	GLENMORE PARK WAY	CAMELIA AVE	CANDLEBARK CT	114	CO	L	1968	2082	114	1.2	137
20.0024	8	GLENMORE PARK WAY	CANDLEBARK CT	WOODLAND S DRIVE	227	CO	L	2082	2309	227	1.2	272
20.0127	3	GLENMORE PARKWAY ROAD	SURVEYORS CREEK ROAD	ST ANDREWS DRIVE	376	CO	L	865	1241	376	2	752
20.0127	4	GLENMORE PARKWAY ROAD	ST ANDREWS DRIVE	GLENGARRY ROAD	180	CO	L	1241	1421	180	2	360
20.0127	5	GLENMORE PARKWAY ROAD	GLENGARRY ROAD	WINDORRA AVE	173	CO	L	1421	1594	173	2	346
20.0127	6	GLENMORE PARKWAY ROAD	WINDORRA AVE	NORTHERN RD	692	CO	L	2100	2286	186	2	372
20.0127	6	GLENMORE PARKWAY ROAD	WINDORRA AVE	NORTHERN RD	692	CO	R	1594	2100	506	2	1012
10.3044	1	GLOSSOP STREET	HOBART ST	HARRIS ST	121	CO	L	0	111	111	1.2	133
10.3044	1	GLOSSOP STREET	HOBART ST	HARRIS ST	121	CO	R	0	116	116	1.2	139
10.3044	2	GLOSSOP STREET	HARRIS ST	FORTHORN	195	CO	R	122	305	183	1.2	220
10.3044	3	GLOSSOP STREET	FORTHORN	DEBRINCAT AVE	240	CO	R	317	546	229	1.2	275
10.3044	3	GLOSSOP STREET	FORTHORN	DEBRINCAT AVE	240	CO	L	317	551	234	1.2	281
10.3044	4	GLOSSOP STREET	DEBRINCAT AVE	TELFORD PL	133	CO	L	556	679	123	1.2	148
10.3044	4	GLOSSOP STREET	DEBRINCAT AVE	TELFORD PL	133	CO	R	556	684	128	1.2	154

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.3044	5	GLOSSOP STREET	TELFORD PL	WATTLE AVE	14	CO	R	689	703	14	1.2	17
10.3044	6	GLOSSOP STREET	WATTLE AVE	ELM ST	259	CO	R	703	954	251	1.2	301
10.3044	7	GLOSSOP STREET	ELM ST	FORRESTER RD	113	CO	R	962	1064	102	1.2	122
10.3044	7	GLOSSOP STREET	ELM ST	FORRESTER RD	113	CO	L	1030	1075	45	1.2	54
10.4058	1	GLOSSOP STREET	GREAT WESTERN HWY	KING ST	80	CO	R	0	80	80	1.2	96
10.4058	2	GLOSSOP STREET	KING ST	ADELAIDE	177	CO	L	84	257	173	1.2	208
10.4058	2	GLOSSOP STREET	KING ST	ADELAIDE	177	CO	R	80	253	173	1.2	208
10.4058	3	GLOSSOP STREET	ADELAIDE	CHAPEL ST	146	CO	L	257	399	142	1.2	170
10.4058	3	GLOSSOP STREET	ADELAIDE	CHAPEL ST	146	CO	R	261	403	142	1.2	170
10.4058	4	GLOSSOP STREET	CHAPEL ST	BRISBANE ST	183	CO	L	407	586	179	1.2	215
10.4058	4	GLOSSOP STREET	CHAPEL ST	BRISBANE ST	183	CO	R	403	582	179	1.2	215
10.4058	5	GLOSSOP STREET	BRISBANE	PHILLIP ST	256	CO	L	586	836	250	1.2	300
10.4058	5	GLOSSOP STREET	BRISBANE	PHILLIP ST	256	CO	R	590	842	252	1.2	302
10.4058	6	GLOSSOP STREET	PHILLIP ST	HOBART ST	145	CO	R	842	983	141	1.2	169
11.2022	1	GRAYS LANE	VINCENT RD	KOMIRRA RD	222	CO	R	0	222	222	1.2	266
11.2022	2	GRAYS LANE	KOMIRRA RD	KENILWORTH	312	CO	R	222	534	312	1.2	374
11.2022	5	GRAYS LANE	K&F PAVING	HINDMARSH ST	221	CO	R	916	1131	215	1.2	258
11.2022	5	GRAYS LANE	K&F PAVING	HINDMARSH ST	221	CO	L	916	1131	215	1.2	258
90.0004	1	GREAT WESTERN HIGHWAY	COUNCIL BOUNDARY	ROPER ROAD	40	CO	R	0	40	40	1.2	48
90.0004	1	GREAT WESTERN HIGHWAY	COUNCIL BOUNDARY	ROPER ROAD	40	CO	L	0	40	40	1.2	48
90.0004	2	GREAT WESTERN HIGHWAY	ROPER ROAD	MELBOURNE STREET	160	CO	R	40	200	160	1.2	192
90.0004	2	GREAT WESTERN HIGHWAY	ROPER ROAD	MELBOURNE STREET	160	CO	L	40	200	160	1.2	192
90.0004	3	GREAT WESTERN HIGHWAY	MELBOURNE STREET	CRAIG AVE	200	CO	R	200	400	200	1.2	240
90.0004	3	GREAT WESTERN HIGHWAY	MELBOURNE STREET	CRAIG AVE	200	CO	L	200	400	200	1.2	240
90.0004	4	GREAT WESTERN HIGHWAY	CRAIG AVE	BENNETT ROAD	440	CO	R	400	840	440	1.2	528
90.0004	4	GREAT WESTERN HIGHWAY	CRAIG AVE	BENNETT ROAD	440	CO	L	400	840	440	1.2	528
90.0004	5	GREAT WESTERN HIGHWAY	BENNETT ROAD	WOODLAND AVE	100	CO	R	840	940	100	1.2	120
90.0004	5	GREAT WESTERN HIGHWAY	BENNETT ROAD	WOODLAND AVE	100	CO	L	840	940	100	1.2	120
90.0004	6	GREAT WESTERN HIGHWAY	WOODLAND AVE	WHITCROFT PL	150	CO	R	940	1090	150	1.2	180
90.0004	6	GREAT WESTERN HIGHWAY	WOODLAND AVE	WHITCROFT PL	150	CO	L	940	1090	150	1.2	180
90.0004	7	GREAT WESTERN HIGHWAY	WHITCROFT PL	DAY STREET	100	CO	R	1090	1190	100	1.2	120
90.0004	7	GREAT WESTERN HIGHWAY	WHITCROFT PL	DAY STREET	100	CO	L	1090	1190	100	1.2	120
90.0004	8	GREAT WESTERN HIGHWAY	DAY STREET	NOELA PL	50	CO	R	1190	1240	50	1.2	60
90.0004	8	GREAT WESTERN HIGHWAY	DAY STREET	NOELA PL	50	CO	L	1190	1240	50	1.2	60
90.0004	9	GREAT WESTERN HIGHWAY	NOELA PL	SYDNEY ROAD	260	CO	R	1240	1500	260	1.2	312
90.0004	9	GREAT WESTERN HIGHWAY	NOELA PL	SYDNEY ROAD	260	CO	L	1240	1500	260	1.2	312
90.0004	10	GREAT WESTERN HIGHWAY	SYDNEY ROAD	FLEMMING STREET	410	CO	R	1500	1910	410	1.2	492
90.0004	10	GREAT WESTERN HIGHWAY	SYDNEY ROAD	FLEMMING STREET	410	CO	L	1500	1910	410	1.2	492
90.0004	11	GREAT WESTERN HIGHWAY	FLEMMING STREET	AUSTRALIA STREET	260	CO	R	1910	2170	260	1.2	312
90.0004	11	GREAT WESTERN HIGHWAY	FLEMMING STREET	AUSTRALIA STREET	260	CO	L	1910	2170	260	1.2	312
90.0004	12	GREAT WESTERN HIGHWAY	AUSTRALIA STREET	GLOSSOP STREET	150	CO	R	2170	2320	150	1.2	180
90.0004	12	GREAT WESTERN HIGHWAY	AUSTRALIA STREET	GLOSSOP STREET	150	CO	L	2170	2320	150	1.2	180
90.0004	13	GREAT WESTERN HIGHWAY	GLOSSOP STREET	MONFARVILLE STREET	110	CO	R	2320	2430	110	1.2	132
90.0004	13	GREAT WESTERN HIGHWAY	GLOSSOP STREET	MONFARVILLE STREET	110	CO	L	2320	2430	110	1.2	132
90.0004	14	GREAT WESTERN HIGHWAY	MONFARVILLE STREET	MAGDALENE STREET	120	CO	R	2430	2550	120	1.2	144
90.0004	14	GREAT WESTERN HIGHWAY	MONFARVILLE STREET	MAGDALENE STREET	120	CO	L	2430	2550	120	1.2	144
90.0004	15	GREAT WESTERN HIGHWAY	MAGDALENE STREET	COLLINS STREET	85	CO	R	2550	2635	85	1.2	102
90.0004	15	GREAT WESTERN HIGHWAY	MAGDALENE STREET	COLLINS STREET	85	CO	L	2550	2635	85	1.2	102
90.0004	16	GREAT WESTERN HIGHWAY	COLLINS STREET	MAMRE ROAD	200	CO	R	2635	2835	200	1.2	240
90.0004	16	GREAT WESTERN HIGHWAY	COLLINS STREET	MAMRE ROAD	200	CO	L	2635	2835	200	1.2	240
90.0004	17	GREAT WESTERN HIGHWAY	MAMRE ROAD	PRINCESS MARY STREET	280	CO	L	2835	3115	280	1.2	336
90.0004	17	GREAT WESTERN HIGHWAY	MAMRE ROAD	PRINCESS MARY STREET	280	CO	R	2835	3115	280	5.6	1568
90.0004	18	GREAT WESTERN HIGHWAY	PRINCESS MARY STREET	PAGES ROAD	120	CO	R	3115	3235	120	5.6	672
90.0004	19	GREAT WESTERN HIGHWAY	PAGES ROAD	NEALE STREET	110	CO	L	3235	3345	110	1.2	132
90.0004	19	GREAT WESTERN HIGHWAY	PAGES ROAD	NEALE STREET	110	CO	R	3235	3345	110	1.2	132
90.0004	20	GREAT WESTERN HIGHWAY	NEALE STREET	BRIDGE STREET	510	CO	R	3345	3855	510	1.2	612
90.0004	21	GREAT WESTERN HIGHWAY	BRIDGE STREET	TENNANT ROAD	165	CO	R	3855	4020	165	1.2	198
90.0004	21	GREAT WESTERN HIGHWAY	BRIDGE STREET	TENNANT ROAD	165	CO	L	3855	4020	165	1.2	198
90.0004	22	GREAT WESTERN HIGHWAY	TENNANT ROAD	WERRINGTON ROAD	200	CO	R	4020	4220	200	1.2	240
90.0004	22	GREAT WESTERN HIGHWAY	TENNANT ROAD	WERRINGTON ROAD	200	CO	L	4020	4220	200	1.2	240
90.0004	23	GREAT WESTERN HIGHWAY	WERRINGTON ROAD	OLD GIPPS ROAD	200	CO	L	4220	4420	200	1.2	240
90.0004	24	GREAT WESTERN HIGHWAY	OLD GIPPS ROAD	NEW GIPPS ROAD	110	CO	L	4420	4530	110	1.2	132
90.0004	25	GREAT WESTERN HIGHWAY	NEW GIPPS ROAD	WATER STREET	140	CO	L	4530	4670	140	1.2	168

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
90.0004	27	GREAT WESTERN HIGHWAY	OCONNELL STREET	MILLEN STREET	400	CO	L	6370	6770	400	1.2	480
90.0004	27	GREAT WESTERN HIGHWAY	OCONNELL STREET	MILLEN STREET	400	CO	R	6370	6770	400	1.2	480
90.0004	28	GREAT WESTERN HIGHWAY	MILLEN STREET	COSGROVE CRESCENT	200	CO	R	6770	6970	200	1.2	240
90.0004	29	GREAT WESTERN HIGHWAY	COSGROVE CRESCENT	MORLEY AVE	200	AC	R	6970	7170	200	3.5	700
90.0004	30	GREAT WESTERN HIGHWAY	MORLEY AVE	SANTLEY CRESCENT	110	CO	R	7170	7280	110	1.2	132
90.0004	31	GREAT WESTERN HIGHWAY	SANTLEY CRES	BRINGELLY ROAD	350	CO	L	7280	7630	350	1.2	420
90.0004	31	GREAT WESTERN HIGHWAY	SANTLEY CRES	BRINGELLY ROAD	350	CO	R	7280	7630	350	1.2	420
90.0004	32	GREAT WESTERN HIGHWAY	BRINGELLY ROAD	SOMERSET STREET	410	CO	L	7630	8040	410	3.4	1394
90.0004	33	GREAT WESTERN HIGHWAY	SOMERSET STREET	PARKER STREET	400	CO	L	8040	8440	400	1.2	480
90.0004	34	GREAT WESTERN HIGHWAY	PARKER STREET	KENDALL STREET	460	CO	L	8440	8900	460	1.2	552
90.0004	34	GREAT WESTERN HIGHWAY	PARKER STREET	KENDALL STREET	460	CO	R	8440	8900	460	1.2	552
90.0004	36	GREAT WESTERN HIGHWAY	HENRY STREET	LAWSON STREET	600	CO	L	9000	9600	600	1.2	720
90.0004	37	GREAT WESTERN HIGHWAY	LAWSON STREET	RAILWAY STREET	390	CO	R	9600	9990	390	1.4	546
90.0004	37	GREAT WESTERN HIGHWAY	LAWSON STREET	RAILWAY STREET	390	CO	L	9600	9990	390	3	1170
90.0004	38	GREAT WESTERN HIGHWAY	RAILWAY STREET	STATION STREET	80	CO	R	9990	10070	80	3	240
90.0004	38	GREAT WESTERN HIGHWAY	RAILWAY STREET	STATION STREET	80	CO	L	9990	10070	80	3	240
90.0004	39	GREAT WESTERN HIGHWAY	STATION STREET	RILEY STREET	180	BP	L	10070	10250	180	5.3	954
90.0004	39	GREAT WESTERN HIGHWAY	STATION STREET	RILEY STREET	180	BP	R	10070	10250	180	10.2	1836
90.0004	40	GREAT WESTERN HIGHWAY	RILEY STREET	CASTLEREAGH ROAD	550	CO	R	10250	10800	550	1.2	660
90.0004	40	GREAT WESTERN HIGHWAY	RILEY STREET	CASTLEREAGH ROAD	550	CO	L	10250	10800	550	1.2	660
90.0004	41	GREAT WESTERN HIGHWAY	CASTLEREAGH ROAD	HIGH STREET	120	CO	L	10800	10920	120	1.2	144
90.0004	42	GREAT WESTERN HIGHWAY	HIGH STREET	LADBURY AVE	330	CO	L	10920	11250	330	1.2	396
90.0004	42	GREAT WESTERN HIGHWAY	HIGH STREET	LADBURY AVE	330	CO	R	10920	11250	330	1.2	396
90.0004	43	GREAT WESTERN HIGHWAY	LADBURY AVE	BRUCE NEALE DRIVE	160	CO	L	11250	11410	160	1.2	192
90.0004	43	GREAT WESTERN HIGHWAY	LADBURY AVE	BRUCE NEALE DRIVE	160	CO	R	11250	11410	160	1.2	192
90.0004	44	GREAT WESTERN HIGHWAY	BRUCE NEALE DRIVE	STANTON PLACE	500	CO	L	11410	11910	500	1.2	600
90.0004	45	GREAT WESTERN HIGHWAY	STANTON PL	PUNT ROAD	120	CO	L	11910	12030	120	1.2	144
90.0004	46	GREAT WESTERN HIGHWAY	PUNT ROAD	RIVER ROAD	30	AC	L	12030	12060	30	2	60
90.0004	48	GREAT WESTERN HIGHWAY	LAMROCK STREET	YORK STREET	50	CO	R	12170	12220	50	1.2	60
90.0004	49	GREAT WESTERN HIGHWAY	YORK STREET	BILLINGTON PL	120	CO	R	12220	12340	120	1.2	144
90.0004	50	GREAT WESTERN HIGHWAY	BILLINGTON PL	STANTON PL	160	CO	R	12340	12500	160	3.5	560
90.0004	51	GREAT WESTERN HIGHWAY	STANTON PL	OLD BATHURST ROAD	50	CO	R	12500	12550	50	1.2	60
90.0004	52	GREAT WESTERN HIGHWAY	OLD BATHURST ROAD	NAPIER AVE	200	CO	R	12550	12750	200	1.2	240
90.0004	53	GREAT WESTERN HIGHWAY	NAPIER AVE	GARDENIA AVE	245	CO	R	12750	12995	245	1.2	294
90.0004	54	GREAT WESTERN HIGHWAY	GARDENIA AVE	WARRING AVE	250	CO	R	12995	13245	250	1.2	300
90.0004	55	GREAT WESTERN HIGHWAY	WARRING AVE	PARK ROAD	120	CO	R	13245	13365	120	1.2	144
90.0004	56	GREAT WESTERN HIGHWAY	PARK ROAD	PYRAMID STREET	580	CO	R	13365	13945	580	1.2	696
90.0004	57	GREAT WESTERN HIGHWAY	PYRAMID STREET	EMERALD STREET	90	CO	L	13945	14035	90	1.2	108
90.0004	58	GREAT WESTERN HIGHWAY	EMERALD STREET	TROY STREET	220	CO	L	14035	14255	220	1.2	264
90.0004	59	GREAT WESTERN HIGHWAY	TROY STREET	RUSSELL STREET	296	CO	R	14265	14561	296	1.2	355
90.0004	59	GREAT WESTERN HIGHWAY	TROY STREET	RUSSELL STREET	296	CO	L	14265	14561	296	1.2	355
10.7023	12	GREENBANK DRIVE	OAKLAND PD	WINTERCORN	57	CO	L	1316	1373	57	1.2	68
10.7023	13	GREENBANK DRIVE	WINTERCORN	PASTUREGAT	240	CO	L	1373	1613	240	1.2	288
2555	1	GREENHALG LANE	GREENHALG RD	MILLIGAN RD	102	CO		0	102	102	2.1	214
10.0042	1	GREENHALG ROAD	MCHENRY RD	DEAD END	170	CO	R	0	170	170	1.2	204
2556	1	GREYGUMS LANE	GREYGUMS RD	ANDREWS RD	290	CO		0	290	290	2	580
10.3046	1	GRIFFITH STREET	FORRESTER	SHORT ST	63	CO	R	0	53	53	1.2	64
10.3046	2	GRIFFITH STREET	SHORT ST	WORBOYS PL	35	CO	R	63	89	26	1.2	31
10.3046	3	GRIFFITH STREET	WORBOYS PL	VINEY ST	145	CO	R	98	237	139	1.2	167
10.3046	4	GRIFFITH STREET	VINEY ST	YARRA ST	43	CO	R	243	277	34	1.2	41
10.3046	5	GRIFFITH STREET	YARRA ST	CATALINA	95	CO	R	286	372	86	1.2	103
10.3046	6	GRIFFITH STREET	CATALINA	WATTLE ST	101	CO	R	381	470	89	1.2	107
10.0144	1	GUILLEMONT STREET	SHOVELER WAY	JABIRU WAY	100	CO	L	0	100	100	1.2	120
10.0144	2	GUILLEMONT STREET	JABIRU WAY	GANNET DRIVE	123	CO	L	100	223	123	1.2	148
10.4026	1	HALL STREET	MAMRE RD	GALLIPOLI ST	153	CO	L	0	65	65	1.2	78
30.7039	1	HARGRAVE STREET	SOMERSET	DERBY ST	356	CO	R	0	356	356	1.2	427
10.3018	1	HARRIS STREET	GLOSSOP ST	FORRESTER	543	CO	L	0	543	543	1.2	652
10.5028	1	HARROW ROAD	HERBERT ST	WRENCH ST	569	CO	L	0	569	569	1.2	683
30.1115	1	HARVEY COURT	BANKS DRVE	JERSEY GLEN	175	CO	R	0	175	175	1.2	210
30.1115	2	HARVEY COURT	JERSEY GLEN	DOBELL CRT	160	CO	R	175	335	160	1.2	192
30.1115	3	HARVEY COURT	DOBELL CRT	TIMESWEEP	78	CO	R	335	413	78	1.2	94
31.2003	1	HAYNES STREET	THURSTON	CRESCENT	368	CO	R	0	368	368	1.2	442
31.2003	1	HAYNES STREET	THURSTON	CRESCENT	368	CO	L	0	368	368	1.2	442

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.803	1	HEAVEY STREET	LETHBRIDGE ST	DANNY ST	91	CO	L	0	84	84	1.2	101
10.803	2	HEAVEY STREET	DANNY ST	ISABELLA S	101	CO	L	92	192	100	1.2	120
10.803	3	HEAVEY STREET	ISABELLA S	ANDRO PL	328	CO	L	192	515	323	1.2	388
10.803	3	HEAVEY STREET	ISABELLA S	ANDRO PL	328	CO	R	192	520	328	1.2	394
10.803	4	HEAVEY STREET	ANDRO PL	BURTON ST	197	CO	L	520	717	197	1.2	236
10.803	4	HEAVEY STREET	ANDRO PL	BURTON ST	197	CO	R	520	717	197	1.2	236
10.0047	1	HEFFERMAN ROAD	SHERRINGHM	ROSANNAH	121	CO	L	0	118	118	1.2	142
10.0047	1	HEFFERMAN ROAD	SHERRINGHM	ROSANNAH	121	CO	R	0	121	121	1.2	145
10.0047	2	HEFFERMAN ROAD	ROSANNAH	JOSHUA WAY	64	CO	L	124	185	61	1.2	73
10.0047	2	HEFFERMAN ROAD	ROSANNAH	JOSHUA WAY	64	CO	R	121	185	64	1.2	77
10.1064	2	HENRY STREET	DOONMORE	EVAN ST	248	CO	L	141	383	242	2	484
10.1064	2	HENRY STREET	DOONMORE	EVAN ST	248	CO	R	135	383	248	1.2	298
10.1064	3	HENRY STREET	EVAN ST	LAWSON ST	261	CO	R	395	640	245	3.3	809
10.1064	3	HENRY STREET	EVAN ST	LAWSON ST	261	CO	L	395	640	245	3.5	858
10.1064	4	HENRY STREET	LAWSON ST	WOODRIFF	146	CO	L	650	785	135	1.2	162
10.1064	4	HENRY STREET	LAWSON ST	WOODRIFF	146	CO	R	650	785	135	3.6	486
10.1064	5	HENRY STREET	WOODRIFF	GAYMARK	208	CO	L	797	996	199	3.4	677
10.1064	5	HENRY STREET	WOODRIFF	GAYMARK	208	CO	R	797	998	201	3.5	704
10.1064	6	HENRY STREET	GAYMARK	STATION ST	114	CO	L	1002	1108	106	3.7	392
10.1064	6	HENRY STREET	GAYMARK	STATION ST	114	CO	R	999	1108	109	3.7	403
10.1064	7	HENRY STREET	STATION ST	LITTLEJANE	50	CO	L	1120	1163	43	3.4	146
10.1064	7	HENRY STREET	STATION ST	LITTLEJANE	50	CO	R	1120	1161	41	4.5	185
10.1064	8	HENRY STREET	LITTLEJANE	RILEY ST	95	CO	R	1165	1253	88	3.6	317
10.1064	8	HENRY STREET	LITTLEJANE	RILEY ST	95	CO	L	1163	1253	90	3.7	333
10.1064	9	HENRY STREET	RILEY ST	HIGH ST	101	CO	L	1264	1358	94	1.2	113
10.6019	1	HENRY LAWSON AVENUE	LOCKYER AV	POOLE ST	88	CO	L	0	88	88	1.2	106
10.6019	2	HENRY LAWSON AVENUE	POOLE ST	ANGAS ST	37	CO	L	88	125	37	1.2	44
10.6019	3	HENRY LAWSON AVENUE	ANGAS ST	OVENS DR	116	CO	L	125	241	116	1.2	139
10.6019	15	HENRY LAWSON AVENUE	MADIGAN DR	LOCKYER AV	183	CO	L	1441	1624	183	1.2	220
10.6019	16	HENRY LAWSON AVENUE	LOCKYER AV	DUNHEVED RD	21	CO	L	1624	1645	21	1.2	25
2511	1	HENZE LANE	HENZE CR	SUNFLOWER DRIVE	93	CO		0	93	93	2	186
10.5029	1	HERBERT STREET	WILLIAM ST	HARROW RD	94	CO	R	0	94	94	1.2	113
30.3052	2	HEWITT STREET	SHEPHERD	YARRABEE	85	CO	L	141	226	85	1.2	102
30.3052	2	HEWITT STREET	SHEPHERD	YARRABEE	85	CO	R	141	226	85	1.2	102
30.3052	3	HEWITT STREET	YARRABEE	NEVADA AVE	83	CO	L	226	309	83	1.2	100
30.3052	3	HEWITT STREET	YARRABEE	NEVADA AVE	83	CO	R	226	309	83	1.2	100
30.3052	4	HEWITT STREET	NEVADA AVE	ALBANY LNE	26	CO	L	309	335	26	1.2	31
30.3052	4	HEWITT STREET	NEVADA AVE	ALBANY LNE	26	CO	R	309	335	26	1.2	31
30.3052	5	HEWITT STREET	ALBANY LNE	HUDDLESTON	56	CO	L	335	391	56	1.2	67
30.3052	6	HEWITT STREET	HUDDLESTON	JENSEN ST	31	CO	L	391	422	31	1.2	37
30.3052	7	HEWITT STREET	JENSEN ST	FRANKLIN PL	55	CO	L	422	477	55	1.2	66
30.3052	8	HEWITT STREET	FRANKLIN PL	DESBOROUGH RD	86	CO	L	477	563	86	1.2	103
30.3052	9	HEWITT STREET	DESBOROUGH RD	TANDERRA ST	87	CO	L	0	87	87	1.2	104
30.3052	10	HEWITT STREET	TANDERRA ST	ALLAMBI ST	81	CO	L	650	731	81	1.2	97
30.3052	11	HEWITT STREET	ALLAMBI ST	HENDREN PL	126	CO	L	731	857	126	1.2	151
30.3052	12	HEWITT STREET	HENDREN PL	CARPENTER ST	126	CO	L	857	983	126	1.2	151
30.3052	13	HEWITT STREET	CARPENTER ST	ROPER RD	207	CO	L	0	207	207	1.2	248
10.1021	1	HIGGINS LANE	HIGH ST	HIGGINS ST	107	CO	L	0	107	107	1.2	128
10.1022	1	HIGGINS STREET	EVAN ST	HIGGINS LN	182	CO	L	0	182	182	1.2	218
10.1061	1	HIGH STREET	HENRY ST	KENDALL ST	113	CO	L	0	113	113	1.2	136
10.1061	2	HIGH STREET	KENDALL ST	DOONMORE ST	228	CO	L	113	335	222	1.1	244
10.1061	2	HIGH STREET	KENDALL ST	DOONMORE ST	228	CO	R	118	335	217	2.7	586
10.1061	3	HIGH STREET	DOONMORE ST	EVAN ST	253	CO	L	347	588	241	3.1	747
10.1061	3	HIGH STREET	DOONMORE ST	EVAN ST	253	CO	R	347	588	241	3.2	771
10.1061	4	HIGH STREET	EVAN ST	HIGGINS LN	184	CO	L	600	775	175	3.1	543
10.1061	4	HIGH STREET	EVAN ST	HIGGINS LN	184	CO	R	600	777	177	3.2	566
10.1061	5	HIGH STREET	HIGGINS LN	LAWSON ST	68	CO	R	778	840	62	3.2	198
10.1061	5	HIGH STREET	HIGGINS LN	LAWSON ST	68	CO	L	779	845	66	3.6	238
10.1061	6	HIGH STREET	LAWSON ST	CASTLEREAGH ST	62	CO	L	846	901	55	3.1	171
10.1061	6	HIGH STREET	LAWSON ST	CASTLEREAGH ST	62	CO	R	850	908	58	3.2	186
10.1061	7	HIGH STREET	CASTLEREAGH ST	WOODRIFF ST	136	CO	L	913	1042	129	3.1	400
10.1061	7	HIGH STREET	CASTLEREAGH ST	WOODRIFF ST	136	CO	R	908	1042	134	3.2	429
10.1061	8	HIGH STREET	STATION ST	RILEY ST	131	CO	L	1048	1169	121	3.35	405

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.1061	8	HIGH STREET	STATION ST	RILEY ST	131	CO	R	1048	1163	115	3.55	408
10.1061	9	HIGH STREET	RILEY ST	HENRY ST	103	CO	R	1175	1272	97	3	291
10.1061	9	HIGH STREET	RILEY ST	HENRY ST	103	CO	L	1177	1272	95	3.5	333
10.1061	10	HIGH STREET	WOODRIFF STREET	STATION STREET	277	BP	L	1278	1555	277	3.85	1066
10.1061	10	HIGH STREET	WOODRIFF STREET	STATION STREET	277	BP	R	1278	1555	277	3.85	1066
10.1061	11	HIGH STREET	HENRY ST	WORTH ST	184	BP	L	0	184	184	3.6	662
11.2038	1	HINDMARSH STREET	BOUNDARY RD	GRAYS LANE	64	CO	L	0	64	64	1.2	77
11.2038	2	HINDMARSH STREET	GRAYS LANE	ELLIM PL	189	CO	L	64	253	189	1.2	227
11.2038	3	HINDMARSH STREET	ELLIM PL	MIDDLETON AVE	345	CO	L	253	598	345	1.2	414
11.2038	4	HINDMARSH STREET	MIDDLETON AVE	YILKI PLACE	77	CO	L	598	675	77	1.2	92
11.2038	5	HINDMARSH STREET	YILKI PLACE	GOOLWA CR	12	CO	L	674	686	12	1.2	14
11.2038	6	HINDMARSH STREET	GOOLWA CR	ANDROMEDA DRIVE	206	CO	L	686	892	206	1.2	247
11.1017	1	HOBART STREET	MELBOURNE	CONSTANCE	187	CO	L	0	187	187	1.2	224
11.1017	2	HOBART STREET	CONSTANCE	SYDNEY ST	353	CO	L	187	540	353	1.2	424
11.1017	3	HOBART STREET	SYDNEY ST	AUSTRALIA	672	CO	L	540	1212	672	1.2	806
11.1017	4	HOBART STREET	AUSTRALIA	GLOSSOP ST	145	CO	L	1221	1357	136	1.2	163
11.1017	4	HOBART STREET	AUSTRALIA	GLOSSOP ST	145	CO	L	1212	1357	145	1.2	174
2564	1	HOBBY LANE	HOBBY CLOSE	STOKE AVE	61	CO		0	61	61	2	122
2533	1	HONEYSUCKLE LANE	FLORIBUNDA AVE	BURSARIA CR	560	CO		0	560	560	1.9	1064
10.005	1	HOSKING STREET	BORROWDALE	LAYCOCK RD	455	CO	L	0	455	455	1.2	546
10.005	1	HOSKING STREET	BORROWDALE	LAYCOCK RD	455	CO	R	0	455	455	1.2	546
20.2025	1	HUNTER STREET	NEPEAN ST	ANNETT ST	86	CO	L	0	86	86	1.2	103
20.2025	2	HUNTER STREET	ANNETT ST	BEACH ST	91	CO	L	86	177	91	1.2	109
20.2025	3	HUNTER STREET	BEACH ST	RIVER RD	121	CO	L	177	298	121	1.2	145
20.3033	1	IKIN STREET	GLENBROOK	ENFIELD ST	130	CO	L	0	130	130	1.2	156
20.3033	2	IKIN STREET	ENFIELD ST	KURMOND ST	91	CO	L	130	221	91	1.2	109
20.3033	3	IKIN STREET	KURMOND ST	THURWOOD A	192	CO	L	221	413	192	1.2	230
20.3033	4	IKIN STREET	THURWOOD	DRAKE ST	40	CO	L	413	453	40	1.2	48
20.3033	5	IKIN STREET	DRAKE ST	YORK RD	98	CO	L	453	551	98	1.2	118
10.2023	1	ILLAWONG AVENUE	KAREELA AV	ILLAWONG A	103	CO	R	0	96	96	1.2	115
10.2023	2	ILLAWONG AVENUE	ILLAWONG A	CALOOLA AV	94	CO	R	103	190	87	1.2	104
10.2023	3	ILLAWONG AVENUE	CALOOLA AV	CALOOLA AV	123	CO	R	199	313	114	1.2	137
10.2023	4	ILLAWONG AVENUE	CALOOLA AV	KARUAH RD	173	CO	R	322	487	165	1.2	198
10.2023	5	ILLAWONG AVENUE	KARUAH AV	HILLEREST	78	CO	R	493	571	78	1.2	94
2550	1	ILLAWONG LANE	CALOOLA AVE	ILLAWONG AVE	132	CO		0	132	132	1.2	158
30.6071	1	ILUKA ROAD	CENTRAL PARK DRIVE	DONCASTER AVENUE	131	CO	R	0	131	131	1.2	157
30.6071	1	ILUKA ROAD	CENTRAL PARK DRIVE	DONCASTER AVENUE	131	CO	L	0	131	131	1.2	157
20.2026	2	IMPERIAL AVENUE	WILLOWTREE	NAPIER AVE	104	CO	L	44	148	104	1.2	125
20.2026	3	IMPERIAL AVENUE	NAPIER AVE	WARRING AV	526	CO	L	148	674	526	1.2	631
20.2026	4	IMPERIAL AVENUE	WARRING AV	NEPEAN ST	118	CO	L	686	792	106	1.2	127
10.0143	1	JABIRU WAY	WATERSIDE BOULEVARDE	GUILLEMONT STREET	69	CO	R	0	69	69	1.2	83
10.0143	2	JABIRU WAY	GUILLEMONT STREET	KNOT STREET	80	CO	L	69	149	80	1.2	96
11.4031	1	JACK WILLIAMS DRIVE	CASTLEREAGH RD	BOREC ROAD	227	CO	R	0	60	60	1.2	72
10.302	1	JACKARANDA STREET	WATTLE AVE	WILLOW	360	CO	R	0	357	357	1.2	428
10.302	2	JACKARANDA STREET	WILLOW RD	OAK ST	106	CO	R	363	464	101	1.2	121
10.302	3	JACKARANDA STREET	OAK ST	DEBRINCAT	107	CO	R	470	569	99	1.2	119
10.302	4	JACKARANDA STREET	DEBRINCAT	MALLEE ST	391	CO	R	573	964	391	1.2	469
2534	1	JAMISON LANE	BURSARIA CR	LADY JAMISON DRIVE	186	CO		0	186	186	2	372
20.3035	3	JAMISON ROAD	STATION ST	MULGOA RD	172	CO	R	298	470	172	1.2	206
20.3035	4	JAMISON ROAD	MULGOA RD	MC NAUGHTON ST	82	CO	L	470	552	82	1.2	98
20.3035	5	JAMISON ROAD	MCNAUGHTON	HARRIS ST	173	CO	L	552	725	173	1.2	208
30.7042	1	JAMISON ROAD	BRINGELLY	MILNE AVE	156	CO	L	0	153	153	1.2	184
30.7042	2	JAMISON ROAD	MILNE AVE	TRINDER	102	CO	L	159	254	95	1.2	114
30.7042	3	JAMISON ROAD	TRINDER	CLEMSON ST	92	CO	L	260	345	85	1.2	102
30.7042	4	JAMISON ROAD	CLEMSON ST	STAPLEY ST	123	CO	L	351	466	115	1.2	138
30.7042	5	JAMISON ROAD	STAPLEY ST	ELLIOTT ST	78	CO	L	475	546	71	1.2	85
30.7042	6	JAMISON ROAD	ELLIOTT ST	GLADYS ST	106	CO	L	554	653	99	1.2	119
30.7042	7	JAMISON ROAD	GLADYS ST	JEAN ST	100	CO	L	659	757	98	1.2	118
30.7042	8	JAMISON ROAD	JEAN ST	PARKER ST	111	CO	L	757	868	111	1.2	133
31.1077	1	JAMISON ROAD	PARKER ST	FRAGAR RD	115	CO	L	0	109	109	1.2	131
31.1077	1	JAMISON ROAD	PARKER ST	FRAGAR RD	115	CO	R	0	115	115	1.2	138
31.1077	2	JAMISON ROAD	FRAGAR RD	COLLESS ST	220	CO	L	121	335	214	1.2	257
31.1077	2	JAMISON ROAD	FRAGAR RD	COLLESS ST	220	CO	R	115	335	220	1.2	264

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
31.1077	3	JAMISON ROAD	COLLESS ST	PENROSE CR	195	CO	L	335	526	191	1.2	229
31.1077	3	JAMISON ROAD	COLLESS ST	PENROSE CR	195	CO	R	335	530	195	1.2	234
31.1077	4	JAMISON ROAD	PENROSE CR	DOONMORE ST	138	CO	L	533	668	135	1.2	162
31.1077	4	JAMISON ROAD	PENROSE CR	DOONMORE ST	138	CO	R	530	668	138	1.2	166
31.1077	5	JAMISON ROAD	DOONMORE ST	TALOMA ST	15	CO	L	668	677	9	1.2	11
31.1077	6	JAMISON ROAD	TALOMA ST	EVAN ST	237	CO	R	683	914	231	1.2	277
31.1077	6	JAMISON ROAD	TALOMA ST	EVAN ST	237	CO	L	689	920	231	1.2	277
31.1077	7	JAMISON ROAD	EVAN ST	EVAN ST	23	CO	L	920	937	17	1.2	20
31.1077	7	JAMISON ROAD	EVAN ST	EVAN ST	23	CO	R	926	943	17	1.2	20
31.1077	8	JAMISON ROAD	EVANS ST	HORNSEYWOOD AVE	127	CO	L	949	1070	121	1.2	145
31.1077	8	JAMISON ROAD	EVANS ST	HORNSEYWOOD AVE	127	CO	R	943	1070	127	1.2	152
31.1077	9	JAMISON ROAD	HORNSEYWOOD AVE	VICTORY ST	29	CO	L	1070	1094	24	1.2	29
31.1077	9	JAMISON ROAD	HORNSEYWOOD AVE	VICTORY ST	29	CO	R	1070	1099	29	1.2	35
31.1077	10	JAMISON ROAD	VICTORY ST	WARWICK ST	75	CO	L	1104	1174	70	1.2	84
31.1077	10	JAMISON ROAD	VICTORY ST	WARWICK ST	75	CO	R	1099	1174	75	1.2	90
31.1077	11	JAMISON ROAD	WARWICK ST	CHAPMAN AVE	111	CO	L	1174	1285	111	1.2	133
31.1077	11	JAMISON ROAD	WARWICK ST	CHAPMAN AVE	111	CO	R	1174	1285	111	1.2	133
31.1077	12	JAMISON ROAD	CHAPMAN AVE	RAWSON AVE	165	CO	L	1285	1450	165	1.2	198
31.1077	13	JAMISON ROAD	RAWSON AVE	RACECOURSE RD	39	CO	L	1450	1489	39	1.2	47
31.1077	14	JAMISON ROAD	RACECOURSE RD	CASTLEREAGH RD	151	CO	L	1489	1640	151	1.2	181
31.1077	15	JAMISON ROAD	CASTLEREAGH RD	BROWN ST	127	CO	R	1640	1767	127	1.2	152
31.1077	16	JAMISON ROAD	BROWN ST	YORK RD	144	CO	R	1767	1911	144	1.2	173
10.1025	1	JANE STREET	STATION ST	RILEY ST	127	CO	R	0	127	127	3.2	406
10.1025	1	JANE STREET	STATION ST	RILEY ST	127	BP	L	0	127	127	8.1	1029
10.1025	2	JANE STREET	RILEY ST	CASTLEREAG	564	CO	L	127	691	564	1.2	677
10.1025	2	JANE STREET	RILEY ST	CASTLEREAG	564	CO	R	127	691	564	1.5	846
2535	1	JARRA LANE	JARRA CL	WARGON CR	201	CO		0	201	201	2	402
31.1078	1	JASON AVENUE	TUKARA RD	HINGERTY	93	CO	L	0	93	93	1.2	112
31.1078	2	JASON AVENUE	HINGERTY	EASTERBROO	89	CO	L	93	182	89	1.2	107
31.1078	3	JASON AVENUE	EASTERBROO	JOANNA ST	241	CO	L	182	423	241	1.2	289
30.7044	1	JENKINS AVENUE	COPELAND	COX AVENUE	143	CO	L	0	143	143	1.2	172
30.3058	1	JENSEN STREET	HEWITT ST	MILTON ST	83	CO	R	0	83	83	1.2	100
20.0033	1	JESSUP PLACE	CARRIAGE	SIR JOHN	120	CO	R	0	120	120	1.2	144
10.1026	1	JIPP STREET	DOONMORE	EVANS ST	243	CO	L	0	243	243	1.2	292
2536	1	JOHN LANE	REGENTVILLE ROAD	SIR JOHN JAMSION CT	501	AC		0	501	501	2.1	1052
2583	1	JOHN LANE	JOHN ST	RESERVE	121	CO		0	121	121	1.2	145
10.6021	1	JOHN BATMAN AVENUE	HNY LWS AV	MADIGAN DR	115	CO	L	0	115	115	1.2	138
10.6021	2	JOHN BATMAN AVENUE	MADIGAN DR	ANGEL ST	256	CO	R	119	367	248	1.2	298
10.6021	2	JOHN BATMAN AVENUE	MADIGAN DR	ANGEL ST	256	CO	L	115	371	256	1.2	307
10.6021	3	JOHN BATMAN AVENUE	ANGEL ST	OVENS DR	131	CO	L	371	497	126	1.2	151
10.6021	3	JOHN BATMAN AVENUE	ANGEL ST	OVENS DR	131	CO	R	375	502	127	1.2	152
10.1068	1	JOHN CRAM PLACE	CASTLEREAGH ST	JOHN CRAM PL CARPARK	42	AC	R	0	42	42	1.5	63
10.1068	1	JOHN CRAM PLACE	CASTLEREAGH ST	JOHN CRAM PL CARPARK	42	AC	L	0	42	42	1	42
30.411	1	JOHN MORPHETT DRIVE	LENORE DRIVE	END OF ROAD	176	CO	R	0	176	176	1.2	211
30.411	1	JOHN MORPHETT DRIVE	LENORE DRIVE	END OF ROAD	176	CO	L	0	176	176	1.2	211
2545	1	JOSEPH LANE	JOSEPH STREET	VICTORIA STREET	86	CO		0	86	86	1.2	103
30.7046	2	JOSEPH STREET	WALTER ST	RICHMOND	490	CO	L	444	925	481	1.2	577
30.7046	2	JOSEPH STREET	WALTER ST	RICHMOND	490	CO	R	725	925	200	1.2	240
10.4028	2	KALANG AVENUE	NARIEL ST	MERINDA ST	61	CO	R	65	126	61	1.2	73
10.4028	3	KALANG AVENUE	MERINDA ST	WARATAH AVE	148	CO	R	126	274	148	1.2	178
10.4028	4	KALANG AVENUE	WARATAH AVE	BENALONG ST	68	CO	R	274	342	68	1.4	95
10.4028	5	KALANG AVENUE	BENALONG ST	KUNGALA AVE	67	CO	R	342	409	67	1.4	94
20.0108	1	KARABI PLACE	BIJA DR	DUTBA PL	83	CO	R	0	83	83	1.2	100
10.2024	3	KAREELA AVENUE	BREWONGLE	ILLAWONG	304	CO	R	470	774	304	1.2	365
10.2024	4	KAREELA AVENUE	ILLAWONG	CALOOLA	160	CO	L	781	941	160	1.2	192
10.2024	4	KAREELA AVENUE	ILLAWONG	CALOOLA	160	CO	R	781	941	160	1.2	192
10.2024	5	KAREELA AVENUE	CALOOLA	WILLAWA RD	232	CO	L	950	1182	232	1.2	278
10.2024	6	KAREELA AVENUE	WILLAWA	COREEN AVE	99	CO	L	1182	1281	99	1.2	119
20.0116	1	KARUK STREET	SURVEYORS CREEK RD	KIBER DR	80	CO	L	0	80	80	1.2	96
10.804	2	KAZANIS CIRCUIT	VICTORIA L	DEAD END	39	CO	R	60	97	37	1.2	44
10.804	2	KAZANIS CIRCUIT	VICTORIA L	DEAD END	39	CO	L	59	97	38	3.6	137
10.1028	1	KENDALL STREET	HIGH ST	HENRY ST	109	CO	R	0	109	109	1.1	120
10.1028	1	KENDALL STREET	HIGH ST	HENRY ST	109	CO	L	0	109	109	3.4	371

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.0035	1	KENNETH SLESSOR DRIVE	GLENMORE PARKWAY	RICHARDSON PL	98	CO	L	0	98	98	1.2	118
20.0035	2	KENNETH SLESSOR DRIVE	RICHARDSON PL	BARRON FIELD DR	33	CO	L	98	131	33	1.2	40
20.0035	2	KENNETH SLESSOR DRIVE	RICHARDSON PL	BARRON FIELD DR	33	CO	R	98	131	33	1.2	40
20.0035	3	KENNETH SLESSOR DRIVE	BARRON FIELD DR	HARWOOD CCT	180	CO	R	131	260	129	1.2	155
20.0035	3	KENNETH SLESSOR DRIVE	BARRON FIELD DR	HARWOOD CCT	180	CO	L	131	311	180	1.2	216
20.0035	4	KENNETH SLESSOR DRIVE	HARWOOD CCT	HARWOOD CCT	245	CO	L	311	556	245	1.2	294
20.0035	5	KENNETH SLESSOR DRIVE	HARWOOD CCT	FITZGERALD PL	65	CO	L	556	621	65	1.2	78
20.0035	6	KENNETH SLESSOR DRIVE	FITZGERALD PL	SORENSON	84	CO	L	621	705	84	1.2	101
30.6065	1	KINDLEBARK CLOSE	CADDENS ROAD	END OF ROAD	229	CO	R	0	229	229	1.2	275
10.4029	1	KING STREET	QUEEN ST	EAST LANE	50	CO	R	0	50	50	1.2	60
10.4029	1	KING STREET	QUEEN ST	EAST LANE	50	CO	L	0	50	50	1.2	60
10.4029	2	KING STREET	EAST LANE	GIDLEY ST	69	CO	R	50	119	69	1.2	83
10.4029	2	KING STREET	EAST LANE	GIDLEY ST	69	CO	L	50	119	69	1.2	83
10.4029	3	KING STREET	GIDLEY ST	MAGDALENE	197	CO	R	119	312	193	1.2	232
10.4029	4	KING STREET	MAGDALENE	WARRAMUNGA	27	CO	R	320	343	23	1.2	28
10.4029	5	KING STREET	WARRAMUNGA	STAPLETON	129	CO	R	343	472	129	1.2	155
10.4029	6	KING STREET	STAPLETON	GLOSSOP ST	94	CO	R	472	566	94	1.2	113
31.2011	2	KING STREET	ACCESS	ACCESS END	56	CO	L	42	90	48	1.2	58
31.2011	2	KING STREET	ACCESS	ACCESS END	56	CO	R	42	98	56	1.2	67
31.2011	3	KING STREET	ACCESS END	COPELAND ST	82	CO	L	98	180	82	1.2	98
31.2011	4	KING STREET	COPELAND ST	VILLAGE CR	88	CO	L	180	266	86	1.2	103
31.2011	5	KING STREET	VILLAGE CR	GASCOIGNES	66	CO	R	270	327	57	1.2	68
31.2011	5	KING STREET	VILLAGE CR	GASCOIGNES	66	CO	L	268	334	66	1.2	79
31.2011	6	KING STREET	GASCOIGNE	GLEBE PL	166	CO	L	334	493	159	1.2	191
10.0145	1	KNOT STREET	LAKESVIEW DRIVE	SHOVELER WAY	71	CO	R	0	71	71	1.2	85
10.0145	2	KNOT STREET	SHOVELER WAY	JABIRU WAY	99	CO	R			0	1.2	0
10.0145	3	KNOT STREET	JABIRU WAY	GANNET DRIVE	174	CO	R	170	344	174	1.2	209
20.0246	1	KUKUNDI DRIVE	ALSTON STREET	TERRA COURT	69	CO	L	0	69	69	1.2	83
20.0246	2	KUKUNDI DRIVE	TERRA COURT	PUNKA PLACE	66	CO	L	69	135	66	1.2	79
20.0246	3	KUKUNDI DRIVE	PUNKA PLACE	CHN 34	34	CO	L	135	169	34	1.2	41
20.0246	4	KUKUNDI DRIVE	CHN 34	YUROKA STREET	35	CO	L	169	204	35	1.2	42
20.0246	5	KUKUNDI DRIVE	YUROKA STREET	NINDI CRESCENT	40	CO	L	204	244	40	1.2	48
20.0246	6	KUKUNDI DRIVE	NINDI CRESCENT	WOLARA AVENUE	31	CO	L	244	275	31	1.2	37
20.0246	7	KUKUNDI DRIVE	WOLARA AVENUE	WITTAMA DRIVE	216	CO	L	275	491	216	1.2	259
20.0246	8	KUKUNDI DRIVE	WITTAMA DRIVE	NINDI CRESCENT	147	CO	L	491	638	147	1.2	176
20.0246	9	KUKUNDI DRIVE	NINDI CRESCENT	TARRABUNDI DRIVE	81	CO	L	638	719	81	1.2	97
10.403	2	KUNGALA AVENUE	CREEK RD	KALANG AVE	140	CO	R	130	267	137	1.8	247
10.403	2	KUNGALA AVENUE	CREEK RD	KALANG AVE	140	CO	L	130	267	137	2.6	356
10.3021	1	KURRAJONG AVENUE	GLOSSOP ST	PLASSER CR	163	CO	L	0	163	163	1.2	196
10.3021	2	KURRAJONG AVENUE	PLASSER CR	BIRCH ST	152	CO	L	163	313	150	1.2	180
10.3021	3	KURRAJONG AVENUE	BIRCH ST	POPLAR ST	105	CO	L	319	418	99	1.2	119
10.3021	4	KURRAJONG AVENUE	POPLAR ST	PLASSER CR	99	CO	L	424	519	95	1.2	114
10.3021	5	KURRAJONG AVENUE	PLASSER CR	MAPLE RD	111	CO	L	520	627	107	1.2	128
10.3021	6	KURRAJONG AVENUE	MAPLE RD	BORONIA RD	389	CO	L	630	1019	389	1.2	467
20.0138	1	KUTMUT STREET	GARSWOOD RD	YUNGA RD	67	CO	R	0	67	67	1.2	80
20.0138	2	KUTMUT STREET	YUNGA RD	MURU DR	52	CO	R	67	119	52	1.2	62
2537	1	LADY LANE	PATH 5	LADY JAMISON DRIVE	209	CO		0	209	209	2	418
20.0038	1	LADY JAMISON DRIVE	BURSARIA	CARRRIAGE	71	CO	R	0	71	71	1.2	85
20.0038	2	LADY JAMISON DRIVE	CARRIAGE	ELIZA PL	99	CO	R	71	170	99	1.2	119
20.0038	3	LADY JAMISON DRIVE	ELIZA PL	STEIN PL	268	CO	R	170	438	268	1.2	322
20.0188	1	LAGUNA DRIVE	ST ANDREWS DRIVE	TANGLEWOOD PL	82	CO	L	0	82	82	1.2	98
20.0188	2	LAGUNA DRIVE	TANGLEWOOD PL	FIRESTONE CRES	45	CO	L	82	127	45	1.2	54
20.0188	3	LAGUNA DRIVE	FIRESTONE CRES	FIRESTONE CRES	108	CO	L	127	235	108	1.2	130
20.0188	4	LAGUNA DRIVE	FIRESTONE CRES	WOBURN CL	77	CO	L	235	312	77	2	154
20.0188	5	LAGUNA DRIVE	WOBURN CR	MUSSELLBURGH CL	86	CO	L	312	398	86	2	172
20.0188	6	LAGUNA DRIVE	MUSSELLBURCH CL	SURVEYORS CREEK RD	96	CO	R	398	494	96	1.9	182
20.0188	6	LAGUNA DRIVE	MUSSELLBURCH CL	SURVEYORS CREEK RD	96	CO	L	398	494	96	2	192
10.0146	1	LAKESVIEW DRIVE	WATERSIDE BOULEVARDE	FULMAR WAY	73	CO	R	0	73	73	1.2	88
10.0146	1	LAKESVIEW DRIVE	WATERSIDE BOULEVARDE	FULMAR WAY	73	CO	L	0	73	73	1.2	88
10.0146	2	LAKESVIEW DRIVE	FULMAR WAY	KNOT STREET	53	CO	R	73	126	53	1.2	64
10.0146	2	LAKESVIEW DRIVE	FULMAR WAY	KNOT STREET	53	CO	L	73	126	53	1.2	64
2551	1	LANDY LANE	LANDY AVE	ILLAWONG AVE	185	CO		0	185	185	1.2	222
2584	1	LAVIN LANE	LAVIN CR	FRANCIS STREET	105	CO		0	105	105	1.2	126

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.103	1	LAWSON STREET	HIGH ST	EDWARD PL	59	CO	R	0	59	59	1.1	65
10.103	1	LAWSON STREET	HIGH ST	EDWARD PL	59	CO	L	0	56	56	2.8	157
10.103	2	LAWSON STREET	EDWARD PL	HENRY ST	65	BP	L	62	118	56	3.1	174
10.103	2	LAWSON STREET	EDWARD PL	HENRY ST	65	BP	R	59	118	59	3.3	195
10.103	3	LAWSON STREET	HENRY ST	SOPER PL	62	BP	R	130	186	56	4.1	230
10.103	3	LAWSON STREET	HENRY ST	SOPER PL	62	CO	L	130	183	53	6	318
10.103	4	LAWSON STREET	SOPER PL	BELMORE ST	96	CO	R	186	281	95	3.6	342
10.103	4	LAWSON STREET	SOPER PL	BELMORE ST	96	CO	L	189	281	92	4	368
20.2031	1	LAWSON STREET	PYRAMID ST	SHORT ST	189	CO	L	0	189	189	1.2	227
10.0056	1	LAYCOCK STREET	BOUNDARY RD	TORNADO CR	14	CO	L	0	14	14	1.2	17
10.0056	2	LAYCOCK STREET	TORNADO CR	FIREBALL AVE	84	CO	L	14	98	84	1.2	101
10.0056	3	LAYCOCK STREET	FIREBALL AVE	ISLINGTON ST	135	CO	L	98	233	135	1.2	162
10.0056	3	LAYCOCK STREET	FIREBALL AVE	ISLINGTON ST	135	CO	R	98	233	135	1.2	162
10.0056	4	LAYCOCK STREET	ISLINGTON ST	HIGGS PL	86	CO	L	233	319	86	1.2	103
10.0056	4	LAYCOCK STREET	ISLINGTON ST	HIGGS PL	86	CO	R	233	319	86	1.2	103
10.0056	5	LAYCOCK STREET	HIGGS PL	BLUEBIRD RD	74	CO	L	319	393	74	1.2	89
10.0056	5	LAYCOCK STREET	HIGGS PL	BLUEBIRD RD	74	CO	R	319	393	74	1.2	89
10.0056	6	LAYCOCK STREET	BLUEBIRD RD	BORROWDALE WAY	110	CO	L	393	503	110	1.2	132
10.0056	6	LAYCOCK STREET	BLUEBIRD RD	BORROWDALE WAY	110	CO	R	393	503	110	1.2	132
10.0056	7	LAYCOCK STREET	BORROWDALE WAY	WATERFALL CRES	47	CO	L	508	550	42	1.2	50
10.0056	8	LAYCOCK STREET	WATERFALL CRES	HOSKING ST	82	CO	L	550	625	75	1.2	90
10.0056	9	LAYCOCK STREET	HOSKING ST	WATERFALL CRES	288	CO	L	637	920	283	1.2	340
10.0056	10	LAYCOCK STREET	WATERFALL CRES	GREYGUMS RD	54	CO	L	920	968	48	1.2	58
31.2005	1	LEMONGROVE ROAD	COREEN AVE	ROBERT ST	92	CO	L	0	92	92	1.2	110
31.2005	2	LEMONGROVE ROAD	ROBERT ST	THURSTON ST	136	CO	L	92	228	136	1.2	163
31.2005	3	LEMONGROVE ROAD	THURSTON ST	MACQUARIE AVE	100	CO	R	228	328	100	0.95	95
31.2005	3	LEMONGROVE ROAD	THURSTON ST	MACQUARIE AVE	100	CO	L	231	328	97	1.2	116
31.2005	5	LEMONGROVE ROAD	LEM-ACCESS	CRESCENT	196	CO	R	357	553	196	0.95	186
30.4048	1	LENORE DRIVE	ERSKINE PARK RD	CHN 778	778	CO	L	0	778	778	2	1556
30.4048	2	LENORE DRIVE	CHN 778	CHN 1075	297	CO	L	778	1075	297	2	594
30.4048	3	LENORE DRIVE	CHN 1075	CHN 1332	257	CO	L	1075	1332	257	2	514
20.4018	4	LEONAY PARADE	RIVERVIEW	CLIFFBROOK	139	CO	R	596	735	139	1.2	167
20.4018	5	LEONAY PARADE	CLIFFBROOK	BURING	134	CO	L	735	869	134	1.2	161
10.8046	2	LETHBRIDGE AVENUE	PRINCESS T	HEAVY ST	126	CO	R	163	289	126	1.2	151
10.8046	3	LETHBRIDGE AVENUE	HEAVY ST	ALBERT ST	43	CO	R	289	332	43	1.2	52
10.8046	4	LETHBRIDGE AVENUE	ALBERT ST	VICTORIA S	160	CO	R	332	492	160	1.2	192
10.1031	1	LETHBRIDGE STREET	PARKER ST	COLLESS ST	326	CO	R	0	323	323	1.2	388
10.1031	1	LETHBRIDGE STREET	PARKER ST	COLLESS ST	326	CO	L	0	323	323	1.2	388
10.1031	2	LETHBRIDGE STREET	COLLESS ST	DOONMORE ST	323	CO	R	329	643	314	1.2	377
10.1031	2	LETHBRIDGE STREET	COLLESS ST	DOONMORE ST	323	CO	L	329	643	314	1.2	377
10.1031	3	LETHBRIDGE STREET	DOONMORE ST	FULTON LN	168	CO	R	655	815	160	1.2	192
10.1031	3	LETHBRIDGE STREET	DOONMORE ST	FULTON LN	168	CO	L	655	817	162	1.2	194
10.1031	4	LETHBRIDGE STREET	FULTON LN	EVAN ST	80	CO	R	818	897	79	1.2	95
10.1031	4	LETHBRIDGE STREET	FULTON LN	EVAN ST	80	CO	L	817	897	80	1.2	96
10.1031	5	LETHBRIDGE STREET	EVAN ST	O'FARRELL	245	CO	R	909	1152	243	1.2	292
10.1031	5	LETHBRIDGE STREET	EVAN ST	O'FARRELL	245	CO	L	909	1154	245	1.2	294
10.1031	6	LETHBRIDGE STREET	O'FARRELL	CASTLEREAGH ST	60	CO	R	1156	1214	58	1.2	70
10.1031	6	LETHBRIDGE STREET	O'FARRELL	CASTLEREAGH ST	60	CO	L	1154	1214	60	1.2	72
10.1031	7	LETHBRIDGE STREET	CASTLEREAGH ST	WOODRIFF ST	234	CO	R	1226	1460	234	1.2	281
10.1031	7	LETHBRIDGE STREET	CASTLEREAGH ST	WOODRIFF ST	234	CO	L	1226	1460	234	1.2	281
10.4031	1	LETHBRIDGE STREET	STATION ST	CHESHAM ST	30	CO	R	0	30	30	1.2	36
10.4031	2	LETHBRIDGE STREET	CHESHAM	PHILLIP ST	96	CO	R	30	114	84	1.2	101
10.4031	2	LETHBRIDGE STREET	CHESHAM	PHILLIP ST	96	CO	L	33	120	87	1.2	104
10.4031	3	LETHBRIDGE STREET	PHILLIP ST	CHAMPNESS	89	CO	L	131	210	79	1.2	95
10.4031	3	LETHBRIDGE STREET	PHILLIP ST	CHAMPNESS	89	CO	R	126	215	89	1.2	107
10.4031	4	LETHBRIDGE STREET	CHAMPNESS	BLAIR AVE	128	CO	L	217	343	126	1.2	151
10.4031	4	LETHBRIDGE STREET	CHAMPNESS	BLAIR AVE	128	CO	R	215	343	128	1.2	154
10.4031	5	LETHBRIDGE STREET	BLAIR AVE	CHAMPNESS	34	CO	L	343	372	29	1.2	35
10.4031	6	LETHBRIDGE STREET	CHAMPNESS	LITTLE CHAPEL ST	50	CO	L	379	427	48	1.2	58
10.4031	7	LETHBRIDGE STREET	LITTLE CHAPEL ST	CHAPEL ST	43	CO	L	427	465	38	1.2	46
10.4031	8	LETHBRIDGE STREET	CHAPEL ST	BROCK AVE	96	CO	R	470	557	87	1.2	104
10.4031	8	LETHBRIDGE STREET	CHAPEL ST	BROCK AVE	96	CO	L	473	562	89	1.2	107
2554	1	LISA LANE	LISA PLACE	DELORAINE DRIVE	22	CO		0	22	22	1.2	26

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.4032	1	LITTLE CHAPEL STREET	GIDLEY ST	LETHBRIDGE	210	CO	R	0	210	210	1.2	252
11.6014	3	LONDONDERRY ROAD	WILTSHIRE	NAMATJIRA 1	335	CO	R	1700	2159	459	1.2	551
11.6014	5	LONDONDERRY ROAD	CARRINGTON	HUGHES ST	14	CO	L	2319	2333	14	1.2	17
11.6014	6	LONDONDERRY ROAD	HUGHES ST	TORKINGTON	103	CO	L	2333	2436	103	1.2	124
11.6014	8	LONDONDERRY ROAD	TRAHLEE RD	WARRINA PL	178	CO	L	2464	2639	175	1.2	210
30.3067	1	LONSDALE STREET	MAMRE RD	COLLINS ST	122	CO	R	0	122	122	1.2	146
30.3067	1	LONSDALE STREET	MAMRE RD	COLLINS ST	122	CO	L	0	122	122	1.2	146
30.3067	2	LONSDALE STREET	COLLINS ST	MONFARVILLE ST	200	CO	R	122	322	200	1.2	240
30.3067	2	LONSDALE STREET	COLLINS ST	MONFARVILLE ST	200	CO	L	122	322	200	1.2	240
20.0285	1	LUTTRELL STREET	GLENMORE PARKWAY	CHN 186 (SHOPS)	186	CO	L	0	186	186	1.9	353
20.2039	3	MACKELLAR STREET	END OF AC	START KG	330	CO	R	281	611	330	1.2	396
31.2006	1	MACQUARIE AVENUE	LEMONGROVE	CRESCENT	181	CO	R	0	169	169	1.2	203
31.2006	1	MACQUARIE AVENUE	LEMONGROVE	CRESCENT	181	CO	L	0	169	169	1.2	203
10.6025	1	MADIGAN DRIVE	HEN LWS AV	COFTON CT	81	CO	L	0	81	81	1.2	97
10.6025	2	MADIGAN DRIVE	COFTON CT	COLSON CR	26	CO	L	81	107	26	1.2	31
10.6025	3	MADIGAN DRIVE	COLSON CR	LESLIE CT	70	CO	L	107	177	70	1.2	84
10.6025	4	MADIGAN DRIVE	LESLIE CT	ANGEL ST	129	CO	L	177	306	129	1.2	155
10.6025	5	MADIGAN DRIVE	ANGEL ST	COLSON CR	115	CO	L	306	421	115	1.2	138
2575	1	MADISON LANE	MADISON CIRCUIT	BANKS PUBLIC SCHOOL	260	CO		0	260	260	2.1	546
10.406	1	MAGDALENE STREET	KING ST	GREAT WESTERN HWY	93	CO	L	0	93	93	1.2	112
10.3023	1	MAGNOLIA STREET	CYPRESS RD	MULGA ST	267	CO	R	0	267	267	1.2	320
10.3023	2	MAGNOLIA STREET	MULGA ST	DEBRINCAT	303	CO	R	267	570	303	1.2	364
10.3023	3	MAGNOLIA STREET	DEBRINCAT	SYCAMORE	349	CO	R	570	919	349	1.2	419
2538	1	MAIDSTONE LANE	MAIDSTONE CR	GLENMORE PARKWAY	67	CO		0	67	67	2	134
20.0184	1	MAIDSTONE PLACE	FIRESTONE CRESCENT	END OF ROAD	108	CO	R	0	108	108	2	216
90.0007	10	MAMRE ROAD	BANKS DRIVE	M4 FREEWAY	300	CO	L	11270	11570	300	1.2	360
90.0007	11	MAMRE ROAD	M4 FREEWAY	AINSBURY ROAD	180	CO	L	11570	11750	180	1.2	216
90.0007	12	MAMRE ROAD	AINSBURY ROAD	HALL STREET	100	CO	L	11750	11850	100	1.2	120
90.0007	12	MAMRE ROAD	AINSBURY ROAD	HALL STREET	100	CO	R	11750	11850	100	1.2	120
90.0007	12	MAMRE ROAD	AINSBURY ROAD	HALL STREET	100	CO	L	11750	11850	100	1.2	120
90.0007	13	MAMRE ROAD	HALL STREET	WILSON STREET	350	CO	L	11850	12200	350	1.2	420
90.0007	14	MAMRE ROAD	WILSON STREET	JOHN STREET	250	CO	L	12200	12450	250	1.2	300
90.0007	15	MAMRE ROAD	JOHN STREET	EDGAR STREET	140	CO	L	12450	12590	140	1.2	168
90.0007	15	MAMRE ROAD	JOHN STREET	EDGAR STREET	140	CO	R	12450	12590	140	1.2	168
90.0007	16	MAMRE ROAD	EDGAR STREET	SADDINGTON STREET	110	CO	L	12590	12700	110	1.2	132
90.0007	16	MAMRE ROAD	EDGAR STREET	SADDINGTON STREET	110	CO	R	12590	12700	110	1.2	132
90.0007	17	MAMRE ROAD	SADDINGTON STREET	PUTLAN STREET	120	CO	R	12700	12820	120	1.2	144
90.0007	17	MAMRE ROAD	SADDINGTON STREET	PUTLAN STREET	120	CO	L	12700	12820	120	1.2	144
90.0007	18	MAMRE ROAD	PUTLAND STREET	SAINSBURY STREET	100	CO	R	12820	12920	100	1.2	120
90.0007	18	MAMRE ROAD	PUTLAND STREET	SAINSBURY STREET	100	CO	L	12820	12920	100	1.2	120
90.0007	19	MAMRE ROAD	SAINSBURY STREET	GREAT WESTERN HWAY	110	BP	R	12920	13030	110	1.2	132
90.0007	19	MAMRE ROAD	SAINSBURY STREET	GREAT WESTERN HWAY	110	CO	L	12920	13030	110	1.2	132
10.3025	6	MAPLE ROAD	DEBRINCAT	SYCAMORE S	338	CO	L	719	1047	328	1.2	394
10.3025	7	MAPLE ROAD	SYCAMORE	WATTLE AVE	327	CO	L	1057	1374	317	1.2	380
10.3025	8	MAPLE ROAD	WATTLE AVE	LIDDLE ST	99	CO	R	1384	1473	89	1.2	107
10.3025	9	MAPLE ROAD	LIDDLE ST	VINEY ST	142	CO	R	1483	1615	132	1.2	158
10.3025	10	MAPLE ROAD	VINEY ST	AYLETT ST	72	CO	R	1626	1687	61	1.2	73
10.3025	11	MAPLE ROAD	AYLETT ST	SHORT ST	104	CO	R	1702	1791	89	1.2	107
10.3025	12	MAPLE ROAD	SHORT ST	FORRESTER	72	CO	R	1802	1863	61	1.2	73
20.0129	1	MARCUS CLARKE CRESCENT	LUTTRELL STREET	DEVANEY AVENUE	115	CO	R	0	115	115	1.2	138
20.0129	1	MARCUS CLARKE CRESCENT	LUTTRELL STREET	DEVANEY AVENUE	115	CO	L	0	115	115	1.2	138
20.0129	2	MARCUS CLARKE CRESCENT	DEVANEY AVENUE	RIDDELL CL	78	CO	L	115	193	78	1.2	94
20.0129	2	MARCUS CLARKE CRESCENT	DEVANEY AVENUE	RIDDELL CL	78	CO	R	115	193	78	1.2	94
20.0129	3	MARCUS CLARKE CRESCENT	RIDDELL CL	DYSON PL	121	CO	R	193	314	121	1.2	145
20.0129	3	MARCUS CLARKE CRESCENT	RIDDELL CL	DYSON PL	121	CO	L	193	314	121	1.2	145
20.0129	4	MARCUS CLARKE CRESCENT	DYSON PL	MARCUS CLARKE CR	81	CO	R	314	395	81	1.2	97
20.0129	4	MARCUS CLARKE CRESCENT	DYSON PL	MARCUS CLARKE CR	81	CO	R	314	395	81	1.2	97
20.0129	5	MARCUS CLARKE CRESCENT	MARCUS CLARKE CR	MARCUS CLARKE CR	39	CO	L	395	434	39	1.2	47
20.0129	5	MARCUS CLARKE CRESCENT	MARCUS CLARKE CR	MARCUS CLARKE CR	39	CO	R	395	434	39	1.2	47
20.0129	6	MARCUS CLARKE CRESCENT	MARCUS CLARKE CR	MARCUS CLARKE CR	69	CO	L	434	503	69	1.2	83
20.0129	6	MARCUS CLARKE CRESCENT	MARCUS CLARKE CR	MARCUS CLARKE CR	69	CO	R	434	503	69	1.2	83
20.0129	8	MARCUS CLARKE CRESCENT	MARCUS CLARKE (395)	MARCUS CLARKE (434)	64	CO	L	0	64	64	1.2	77
30.3072	1	MARSDEN ROAD	GREAT WESTERN HWY	MORRIS ST	127	CO	L	0	127	127	1.2	152

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
30.3072	2	MARSDEN ROAD	MORRIS ST	WHITE PDE	124	CO	L	127	251	124	1.2	149
30.3072	3	MARSDEN ROAD	WHITE PDE	CARPENTER ST	157	CO	L	251	408	157	1.2	188
30.3072	4	MARSDEN ROAD	CARPENTER ST	MALOUF ST	96	CO	L	408	504	96	1.2	115
30.3072	5	MARSDEN ROAD	MALOUF ST	DAN CRS	85	CO	L	504	589	85	1.2	102
30.3072	6	MARSDEN ROAD	DAN CRS	MARANIE AVE	149	CO	L	589	738	149	1.2	179
30.3072	7	MARSDEN ROAD	MARANIE AVE	DESBOROUGH RD	105	CO	L	738	843	105	1.2	126
2558	1	MARTHA LANE	MARTHA CR	CALLISTO DRIVE	70	CO		0	70	70	3.8	266
10.1032	1	MASTERS PLACE	CASTLEREAG	K/L MASTER	48	CO	R	0	48	48	0.95	46
31.1157	1	MAXWELL STREET	YORK RD	PARSONS AVE	86	CO	R	0	86	86	1.2	103
31.1157	2	MAXWELL STREET	PARSONS AVE	RACECOURSE RD	414	AC	R	86	500	414	2	828
31.1157	3	MAXWELL STREET	RACECOURSE RD	BIRMINGHAM RD	287	CO	R	500	787	287	1.2	344
31.1157	4	MAXWELL STREET	BIRMINGHAM RD	GRANDVIEW AVE	96	CO	R	787	883	96	1.2	115
31.1157	4	MAXWELL STREET	BIRMINGHAM RD	GRANDVIEW AVE	96	CO	L	787	883	96	1.2	115
31.1157	5	MAXWELL STREET	GRANDVIEW AVE	EVANS ST	87	CO	L			0	1.2	0
31.1157	5	MAXWELL STREET	GRANDVIEW AVE	EVANS ST	87	CO	R	883	970	87	1.2	104
31.1157	6	MAXWELL STREET	EVANS ST	SAMUEL FOSTER	356	CO	R	970	1326	356	1.2	427
2521	1	MCAULEY LANE	MCAULEY CRESCENT	HARTIGAN DRIVE	22	CO		0	22	22	1.2	26
2557	1	MCHENRY LANE	MCHENRY ROAD	BACK OF HOUSES	179	CO		0	179	179	2	358
10.0061	1	MCHENRY ROAD	GREYGUMS RD	FARMVIEW	81	CO	L	0	81	81	2	162
10.0061	2	MCHENRY ROAD	FARMVIEW	CALYPSO RD	127	CO	L	81	208	127	2	254
10.0061	5	MCHENRY ROAD	GREENHALG	BEECROFT	56	CO	L	422	471	49	2	98
10.0061	6	MCHENRY ROAD	BEECROFT	NEVILLE PL	69	CO	R	475	540	65	1.2	78
10.0061	6	MCHENRY ROAD	BEECROFT	NEVILLE PL	69	CO	L	477	544	67	2	134
10.0061	7	MCHENRY ROAD	NEVILLE PL	SHERRINGHAM RD	40	CO	R	546	583	37	1.2	44
10.0061	7	MCHENRY ROAD	NEVILLE PL	SHERRINGHAM RD	40	CO	L	544	583	39	2	78
30.607	1	MEADOW PLACE	CADDENS ROAD	CENTRAL PARK DRIVE	73	CO	R	0	73	73	1.2	88
30.607	1	MEADOW PLACE	CADDENS ROAD	CENTRAL PARK DRIVE	73	CO	L	0	73	73	1.2	88
11.1015	1	MELBOURNE STREET	GT WST HWY	ADELAIDE ST	409	CO	L	0	409	409	1.2	491
11.1015	2	MELBOURNE STREET	ADELAIDE ST	CANBERRA S	194	CO	L	418	603	185	1.2	222
11.1015	3	MELBOURNE STREET	CANBERRA ST	BRISBANE ST	254	CO	L	612	857	245	1.2	294
11.1015	4	MELBOURNE STREET	BRISBANE ST	DURHAM ST	109	CO	L	872	966	94	1.2	113
11.1015	5	MELBOURNE STREET	DURHAM ST	HOBART ST	335	CO	L	969	1301	332	1.2	398
30.1178	4	MELVILLE ROAD	ROCHFORD	MOORE ST	154	CO	L	422	570	148	1.2	178
30.1178	4	MELVILLE ROAD	ROCHFORD	MOORE ST	154	CO	R	422	576	154	1.2	185
30.1178	5	MELVILLE ROAD	MOORE ST	SAMUEL PLC	87	CO	R	576	663	87	1.2	104
30.1178	6	MELVILLE ROAD	SAMUEL PLC	BREN CLS	44	CO	R	663	707	44	1.2	53
30.1178	7	MELVILLE ROAD	BREN CLS	TODD ROW	221	CO	R	707	928	221	1.2	265
30.1178	8	MELVILLE ROAD	TODD ROW	BANKS DRVE	124	CO	R	928	1052	124	1.2	149
2559	1	MILLIGAN LANE	MILLIGAN ROAD	BACK OF HOUSES	90	CO		0	90	90	2.5	225
10.0064	3	MILLIGAN ROAD	PROVINS WY	PENELOPE	57	CO	R	77	134	57	1.2	68
10.0064	4	MILLIGAN ROAD	PENELOPE	KANINA PL	107	CO	R	134	241	107	1.2	128
2576	1	MIMOSA LANE	MIMOSA CIRCUIT	SHAKESPEARE AVE	181	CO		0	181	181	1.2	217
2512	1	MISTLETOE LANE	MISTLETOE AVE	PATH 1	123	CO		0	123	123	1.2	148
30.3077	1	MITCHELL STREET	MAMRE RD	COLLINS ST	145	CO	L	0	145	145	1.2	174
30.3077	2	MITCHELL STREET	COLLINS ST	INGLIS AVE	101	CO	L	145	246	101	1.2	121
30.3077	3	MITCHELL STREET	INGLIS ST	MONFARVILLE ST	95	CO	L	246	341	95	1.2	114
30.3079	3	MONFARVILLE STREET	CARRINGTON	MARGARET	62	CO	R	0	62	62	1.2	74
30.3079	4	MONFARVILLE STREET	MARGARET	STANLEY ST	178	CO	R	0	178	178	1.2	214
30.3079	4	MONFARVILLE STREET	MARGARET	STANLEY ST	178	CO	L	0	178	178	1.2	214
30.3079	5	MONFARVILLE STREET	STANLEY ST	DESBOROUGH	24	CO	L	0	24	24	3.6	86
30.3079	6	MONFARVILLE STREET	DESBOROUGH	LONSDALE	62	CO	L	0	62	62	3.6	223
30.3079	6	MONFARVILLE STREET	DESBOROUGH	LONSDALE	62	CO	R	362	424	62	1.2	74
30.3079	7	MONFARVILLE STREET	LONSDALE	MILHAM ST	40	CO	L	0	40	40	1.2	48
30.3079	7	MONFARVILLE STREET	LONSDALE	MILHAM ST	40	CO	R	424	464	40	1.2	48
30.3079	8	MONFARVILLE STREET	MILHAM ST	WILLIAM ST	98	CO	L	0	98	98	1.2	118
30.3079	9	MONFARVILLE STREET	WILLIAM ST	MOIRA CRES	87	CO	L	0	87	87	1.2	104
30.3079	10	MONFARVILLE STREET	MOIRA CRES	MITCHELL	33	CO	L	0	33	33	1.2	40
30.3079	11	MONFARVILLE STREET	MITCHELL	CARPENTER ST	100	CO	L	0	100	100	1.2	120
30.3079	12	MONFARVILLE STREET	CARPENTER ST	NANCY ST	85	CO	L	0	85	85	1.2	102
30.3079	13	MONFARVILLE STREET	NANCY ST	SADDINGTON	13	CO	L	0	13	13	1.2	16
30.3079	14	MONFARVILLE STREET	SADDINGTON	RYAN ST	71	CO	L	0	71	71	1.2	85
30.3079	15	MONFARVILLE STREET	RYAN ST	SWANSTON	68	CO	L	0	68	68	1.2	82
30.3079	16	MONFARVILLE STREET	SWANSTON	MORRIS ST	41	CO	L	0	41	41	1.2	49

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
30.3079	17	MONFARVILLE STREET	MORRIS ST	GT WESTERN	127	CO	L	0	127	127	1.2	152
10.2028	1	MOONBI ROAD	COOPER ST	KAREELA AV	141	CO	L	0	141	141	1.2	169
30.1189	1	MOORE STREET	MELVILLE	TODD ROW	218	CO	R	0	214	214	1.2	257
30.1189	1	MOORE STREET	MELVILLE	TODD ROW	218	CO	L	0	218	218	1.2	262
30.1189	2	MOORE STREET	TODD ROW	MACARTHUR	15	CO	R	222	233	11	1.2	13
30.1189	2	MOORE STREET	TODD ROW	MACARTHUR	15	CO	L	218	233	15	1.2	18
30.1189	3	MOORE STREET	MACARTHUR	ENDEAVOUR	167	CO	R	233	400	167	1.2	200
30.1189	3	MOORE STREET	MACARTHUR	ENDEAVOUR	167	CO	L	233	400	167	1.2	200
30.7061	2	MORPHETT STREET	ANTHONY	COSGROVE	123	CO	L	97	214	117	1.2	140
30.3126	1	MORRIS STREET	MONFARVILE	GORDON ST	199	CO	R	0	199	199	1.2	239
30.3126	2	MORRIS STREET	GORDON ST	KNOX ST	80	CO	R	199	279	80	1.2	96
30.3126	3	MORRIS STREET	KNOX ST	FLEMING ST	138	CO	R	279	417	138	1.2	166
30.3126	4	MORRIS STREET	FLEMING ST	JACKA ST	220	CO	R	417	637	220	1.2	264
30.3126	5	MORRIS STREET	JACKA ST	MARSDEN RD	199	CO	R	637	836	199	1.2	239
20.0286	1	MORRISON STREET	GLENMORE PARKWAY	WILLIAM HOWELL DRIVE	175	CO	R	0	175	175	1.2	210
31.2007	1	MOUNTAIN VIEW CRESCENT	CRESCENT	END ROAD	262	CO	R	0	262	262	0.9	236
90.0008	1	MULGOA ROAD	PARK ROAD	SILVERDALE ROAD	50	CO	R	0	50	50	1.2	60
90.0008	2	MULGOA ROAD	SILVERDALE ROAD	WATER STREET	400	CO	R	50	450	400	1.2	480
90.0008	2	MULGOA ROAD	SILVERDALE ROAD	WATER STREET	400	CO	L	50	450	400	1.2	480
90.0008	4	MULGOA ROAD	VINCENT AVE	ALLEN ROAD	575	CO	R	3250	3825	575	1.2	690
90.0008	6	MULGOA ROAD	FAIRLIGHT ROAD	LITTLEFIELDS ROAD	100	CO	L	4025	4125	100	1.5	150
90.0008	7	MULGOA ROAD	LITTLEFIELDS ROAD	ST THOMAS ROAD	200	CO	L	4125	4325	200	1.5	300
90.0008	13	MULGOA ROAD	SPENCER STREET	FACTORY ROAD	280	CO	R	12465	12745	280	1.2	336
90.0008	14	MULGOA ROAD	FACTORY ROAD	M4 MOTORWAY	150	CO	R	12745	12895	150	1.2	180
90.0008	15	MULGOA ROAD	M4 MOTORWAY	WOLSELEY STREET	390	CO	L	12895	13285	390	1.2	468
90.0008	16	MULGOA ROAD	WOLSELEY STREET	GLENBROOK STREET	200	CO	L	13285	13485	200	1.2	240
90.0008	17	MULGOA ROAD	GLENBROOK STREET	BLAIKIE ROAD	100	CO	R	13485	13585	100	1.2	120
90.0008	17	MULGOA ROAD	GLENBROOK STREET	BLAIKIE ROAD	100	CO	L	13485	13585	100	1.2	120
90.0008	18	MULGOA ROAD	BLAIKIE ROAD	WILLORING CRES	400	CO	R	13585	13985	400	1.2	480
90.0008	18	MULGOA ROAD	BLAIKIE ROAD	WILLORING CRES	400	CO	L	13585	13985	400	1.2	480
90.0008	19	MULGOA ROAD	WILLORING CRES	BATT ST	50	CO	R	13985	14035	50	1.2	60
90.0008	19	MULGOA ROAD	WILLORING CRES	BATT ST	50	CO	L	13985	14035	50	1.2	60
90.0008	20	MULGOA ROAD	BATT ST	STUART ST	300	CO	R	14035	14335	300	1.2	360
90.0008	20	MULGOA ROAD	BATT ST	STUART ST	300	CO	L	14035	14335	300	1.2	360
90.0008	21	MULGOA ROAD	STUART ST	PRESTON ST	180	CO	R	14335	14515	180	1.2	216
90.0008	21	MULGOA ROAD	STUART ST	PRESTON ST	180	CO	L	14335	14515	180	1.2	216
90.0008	22	MULGOA ROAD	PRESTON STREET	JAMISON ROAD	270	CO	R	14515	14785	270	1.2	324
90.0008	22	MULGOA ROAD	PRESTON STREET	JAMISON ROAD	270	CO	L	14515	14785	270	1.2	324
90.0008	23	MULGOA ROAD	JAMISON ROAD	PANTHER PL	200	CO	R	14785	14985	200	1.2	240
90.0008	23	MULGOA ROAD	JAMISON ROAD	PANTHER PL	200	CO	L	14785	14985	200	1.2	240
90.0008	24	MULGOA ROAD	PANTHER PL	RANSLEY ST	250	CO	R	14985	15235	250	1.2	300
90.0008	25	MULGOA ROAD	RANSLEY STREET	RODLEY AVE	250	CO	L	15235	15485	250	1.2	300
90.0008	25	MULGOA ROAD	RANSLEY STREET	RODLEY AVE	250	CO	R	15235	15485	250	1.2	300
90.0008	26	MULGOA ROAD	RODLEY AVE	UNION ROAD	300	CO	L	15485	15785	300	1.2	360
90.0008	26	MULGOA ROAD	RODLEY AVE	UNION ROAD	300	CO	R	15485	15785	300	1.2	360
90.0008	27	MULGOA ROAD	UNION ROAD	GREAT WESTERN HWY	180	CO	L	15785	15965	180	1.2	216
90.0008	27	MULGOA ROAD	UNION ROAD	GREAT WESTERN HWY	180	CO	R	15785	15965	180	1.2	216
20.0128	1	MURU DRIVE	GLENMORE PARKWAY	WOMRA CR	110	CO	L	0	110	110	1.2	132
20.0128	2	MURU DRIVE	WOMRA CR	KIBER DRIVE	44	CO	L	110	154	44	1.2	53
20.0128	3	MURU DRIVE	KIBER DRIVE	WOMRA CR	336	CO	L	154	490	336	1.2	403
20.0128	4	MURU DRIVE	WOMRA CR	MURU LANE	175	CO	L	490	665	175	1.2	210
20.0128	5	MURU DRIVE	MURU LANE	BUYU RD	198	CO	L	665	863	198	1.2	238
20.0128	6	MURU DRIVE	BUYU RD	BIJA DR	50	CO	L	863	913	50	1.2	60
20.0128	7	MURU DRIVE	BIJA DR	MIDIN CL	63	CO	R	913	976	63	1.2	76
20.0128	8	MURU DRIVE	MIDIN CL	KUTMUT ST	94	CO	R	976	1070	94	1.2	113
2539	1	MURU LANE	MURU DRIVE	MURU DRIVE	87	CO		0	87	87	2	174
11.6019	2	MUSCHARRY ROAD	TRAHLEE ST	CARRINGTON	140	CO	L	112	252	140	1.2	168
2513	1	MYRTLE LANE	MYRTLE ROAD	SUNFLOWER DRIVE	518	CO		0	518	518	2	1036
30.6012	1	MYRTLE ROAD	SUNFLOWER	LIMA	85	CO	R	0	85	85	1.2	102
30.6012	2	MYRTLE ROAD	LIMA	MUNDOWIE	114	CO	R	85	199	114	1.2	137
30.6012	3	MYRTLE ROAD	MUNDOWIE	SAN DIEGO STREET	124	CO	R	199	323	124	1.2	149
30.6012	4	MYRTLE ROAD	SAN DIEGO STREET	MASSA PLACE	176	CO	R	323	499	176	1.2	211
30.6012	5	MYRTLE ROAD	MASSA PLACE	SUNFLOWER DRIVE	74	CO	L	499	573	74	1.2	89

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.4035	1	NARIEL STREET	KALANG AVE	CARINYA AV	175	CO	R	0	175	175	1.2	210
10.4035	2	NARIEL STREET	CARINYA AV	WEST LANE	42	CO	R	182	217	35	1.2	42
10.4035	2	NARIEL STREET	CARINYA AV	WEST LANE	42	CO	L	182	217	35	1.2	42
10.4035	3	NARIEL STREET	WEST LANE	QUEEN ST	63	CO	L	224	278	54	1.2	65
10.4035	3	NARIEL STREET	WEST LANE	QUEEN ST	63	CO	R	224	278	54	3.4	184
20.2044	10	NEPEAN STREET	CARY ST	YODALLA A	75	CO	R	1052	1119	67	1.2	80
20.2044	11	NEPEAN STREET	YODALLA A	YODALLA A	124	CO	R	1127	1243	116	1.2	139
20.2044	12	NEPEAN STREET	YODALLA A	DEWDNEY RD	93	CO	R	1251	1336	85	1.2	102
10.007	2	NEREID ROAD	CLUSTER PL	ROBINSON	115	CO	R	172	287	115	3.6	414
10.5039	1	NEWPORT STREET	OXFORD ST	DORSET ST	139	CO	L	0	139	139	1.2	167
11.301	1	NINTH AVENUE	NORTHERN RD	TERRYBROOK	631	CO	R	0	631	631	2	1262
90.0009	16	NORTHERN ROAD	ANDREWS RD	TRINITY DRIVE	190	CO	R	13015	13205	190	1.2	228
90.0009	17	NORTHERN ROAD	TRINITY DRIVE	COOPER ST	180	CO	R	13205	13385	180	1.2	216
90.0009	18	NORTHERN ROAD	COOPER ST	BREWONGLE AVE	200	CO	R	13385	13585	200	1.2	240
90.0009	19	NORTHERN ROAD	BREWONGLE AVE	BOOMERANG PL	100	CO	R	13585	13685	100	1.2	120
90.0009	20	NORTHERN ROAD	BOOMERANG RD	DUNHEVED RD	180	CO	R	13685	13865	180	1.2	216
90.0009	21	NORTHERN ROAD	DUNHEVED RD	ETON RD	185	CO	L	13865	14050	185	1.2	222
90.0009	21	NORTHERN ROAD	DUNHEVED RD	ETON RD	185	CO	R	13865	14050	185	1.2	222
90.0009	22	NORTHERN ROAD	ETON RD	CALOOLA AVE	50	CO	R	14050	14100	50	1.2	60
90.0009	22	NORTHERN ROAD	ETON RD	CALOOLA AVE	50	CO	L	14050	14100	50	1.2	60
90.0009	23	NORTHERN ROAD	CALOOLA AVE	COREEN AVE	300	CO	R	14100	14400	300	1.2	360
90.0009	23	NORTHERN ROAD	CALOOLA AVE	COREEN AVE	300	CO	L	14100	14400	300	1.2	360
90.0009	24	NORTHERN ROAD	COREEN AVE	GLEBE PL	450	CO	R	14400	14850	450	1.2	540
90.0009	24	NORTHERN ROAD	COREEN AVE	GLEBE PL	450	CO	L	14400	14850	450	1.2	540
90.0009	25	NORTHERN ROAD	GLEBE PL	GASCOIGNE ST	140	CO	R	14850	14990	140	1.2	168
90.0009	25	NORTHERN ROAD	GLEBE PL	GASCOIGNE ST	140	CO	L	14850	14990	140	1.2	168
90.0009	26	NORTHERN ROAD	GASCOIGNE ST	COPELAND ST	200	CO	L	14990	15190	200	1.2	240
90.0009	26	NORTHERN ROAD	GASCOIGNE ST	COPELAND ST	200	CO	R	14990	15190	200	1.2	240
90.0009	27	NORTHERN ROAD	COPELAND ST	COX AVE	150	CO	R	15190	15340	150	1.2	180
90.0009	28	NORTHERN ROAD	COX AVE	GREAT WESTERN HWAY	100	CO	R	15340	15440	100	1.2	120
90.0009	29	NORTHERN ROAD	GREAT WESTERN HWAY	BARBER AVE	120	CO	R	15440	15560	120	1.2	144
90.0009	30	NORTHERN ROAD	BARBER AVE	LETHBRIDGE ST	100	CO	R	15560	15660	100	1.2	120
90.0009	31	NORTHERN ROAD	LETHBRIDGE ST	HOPE ST	160	CO	R	15660	15820	160	1.2	192
90.0009	32	NORTHERN ROAD	HOPE ST	DERBY ST	180	CO	R	15820	16000	180	1.2	216
90.0009	33	NORTHERN ROAD	DERBY ST	STAFFORD ST	200	CO	L	16000	16200	200	1.2	240
90.0009	33	NORTHERN ROAD	DERBY ST	STAFFORD ST	200	CO	R	16000	16200	200	1.2	240
90.0009	34	NORTHERN ROAD	STAFFORD ST	JAMISON RD	440	CO	L	16200	16640	440	1.2	528
90.0009	34	NORTHERN ROAD	STAFFORD ST	JAMISON RD	440	CO	R	16200	16640	440	1.2	528
90.0009	36	NORTHERN ROAD	SMITH ST	BRINGELLY RD	840	CO	L	17090	17930	840	1.2	1008
90.0009	55	NORTHERN ROAD	BLAXLAND ST	ROOTS AVE	90	CO	L	30730	30820	90	1.2	108
90.0009	56	NORTHERN ROAD	ROOTS AVE	COUNCIL BDY	200	CO	L	30820	31020	200	1.2	240
30.6043	1	NULLAGA WAY	SUNFLOWER DRIVE	GAGOOR CLOSE	91	CO	L	0	91	91	1.2	109
30.6043	2	NULLAGA WAY	GAGOOR CLOSE	PEARRA WAY	24	CO	L	91	115	24	1.2	29
30.6043	3	NULLAGA WAY	PEARRA WAY	GEEWAN PLACE	69	CO	L	115	184	69	1.2	83
10.3028	1	OAK STREET	JACKARANDA	END OF RD	199	CO	L	0	199	199	1.2	239
30.6014	1	O'CONNELL STREET	GREAT WESTERN HWY	ALGIE CR	210	CO	L	0	210	210	1.2	252
30.6014	2	O'CONNELL STREET	ALGIE CR	SECOND AVE	76	CO	L	210	286	76	1.2	91
30.6014	3	O'CONNELL STREET	SECOND AVE	CHN 142	142	CO	L	286	386	100	1.2	120
30.6014	9	O'CONNELL STREET	CHN 972	GERSHWIN CR	111	CO	R	1884	1995	111	1.2	133
30.6014	10	O'CONNELL STREET	GERSHWIN CR	SUNFLOWER DRIVE	80	CO	R	1995	2075	80	1.2	96
10.1063	1	O'FARRELL LANE	LETHBRIDGE	END OF RD	108	CO	L	0	108	108	1.2	130
20.105	6	OLD BATHURST ROAD	WEDMORE RD	RUSSELL ST	578	CO	L	705	1283	578	1.2	694
20.2046	1	OLD BATHURST ROAD	RUSSELL ST	SMITH ST	465	CO	L	0	1465	1465	1.2	1758
20.2046	2	OLD BATHURST ROAD	SMITH ST	GT WST HWY	289	CO	L	1465	1754	289	1.2	347
10.3029	1	OLEANDER STREET	ELM ST	WATTLE ST	327	CO	R	0	327	327	1.2	392
10.3029	2	OLEANDER STREET	WATTLE ST	WATTLE LAN	45	CO	L	327	363	36	1.2	43
10.3029	2	OLEANDER STREET	WATTLE ST	WATTLE LAN	45	CO	R	327	372	45	1.2	54
10.3029	3	OLEANDER STREET	WATTLE LAN	PARKLAWN L	47	CO	L	372	409	37	1.2	44
10.3029	3	OLEANDER STREET	WATTLE LAN	PARKLAWN L	47	CO	R	372	419	47	1.2	56
10.3029	4	OLEANDER STREET	PARKLAWN L	DEBRINCAT	46	CO	L	419	456	37	1.2	44
10.3029	4	OLEANDER STREET	PARKLAWN L	DEBRINCAT	46	CO	R	419	465	46	1.2	55
10.3029	5	OLEANDER STREET	DEBRINCAT	DEBRINCAT	57	CO	L	465	515	50	1.2	60
30.121	1	OLYMPUS DRIVE	BANKS DRIVE	ATHENA CT	88	CO	L	0	88	88	1.2	106

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
30.121	2	OLYMPUS DRIVE	ATHENA CT	OLYMPUS DRIVE	125	CO	L	88	213	125	1.2	150
30.121	3	OLYMPUS DRIVE	OLYMPUS DRIVE	FINCH PLACE	157	CO	L	213	370	157	1.2	188
30.121	6	OLYMPUS DRIVE	ANDYS CIRCUIT	APOLLO CLOSE	80	CO	R	578	658	80	1.2	96
30.121	7	OLYMPUS DRIVE	APOLLO CLOSE	DIONE COURT	60	CO	L	658	718	60	1.2	72
30.121	8	OLYMPUS DRIVE	DIONE COURT	HERA PLACE	10	CO	L	718	728	10	1.2	12
30.121	9	OLYMPUS DRIVE	HERA PACE	OLYMPUS DRIVE	72	CO	L	728	800	72	1.2	86
20.4037	1	ORIOLE STREET	WOODLANDS DRIVE	SITTELLA PLACE	62	CO	R	0	62	62	1.2	74
20.4037	2	ORIOLE STREET	SITTELLA PLACE	SILVEREYE CL	62	CO	R	62	124	62	1.2	74
20.4037	3	ORIOLE STREET	SILVEREYE CL	DILWYNIA DRIVE	124	CO	R	124	248	124	1.2	149
20.4037	4	ORIOLE STREET	DILLWYNIA DRIVE	GERANIUM CLOSE	57	CO	R	248	305	57	1.2	68
2546	1	ORTH LANE	ORTH STREET	HARGRAVE ROAD	163	CO		0	163	163	1.9	310
30.7067	1	ORTH STREET	SOMERSET	BRINGELLY	420	CO	R	150	420	270	1.2	324
10.5041	1	OXFORD STREET	WRENCH ST	JORDON ST	80	CO	R	0	76	76	1.2	91
10.5041	2	OXFORD STREET	JORDON ST	LINCOLN DR	24	CO	R	84	104	20	1.2	24
10.5041	3	OXFORD STREET	LINCOLN DR	CISSOLD ST	62	CO	R	104	163	59	1.2	71
10.5041	4	OXFORD STREET	CISSOLD ST	HAINING ST	86	CO	R	170	248	78	1.2	94
10.5041	5	OXFORD STREET	HAINING ST	BESLEY ST	87	CO	R	257	336	79	1.2	95
10.5041	6	OXFORD STREET	BESLEY ST	ABERDEEN	15	CO	R	343	354	11	1.2	13
10.5041	7	OXFORD STREET	ABERDEEN	NEWPORT ST	111	CO	L	358	462	104	1.2	125
10.5041	7	OXFORD STREET	ABERDEEN	NEWPORT ST	111	CO	R	354	465	111	1.2	133
10.5041	8	OXFORD STREET	NEWPORT ST	DEBORAH CR	67	CO	R	465	528	63	1.2	76
10.5041	8	OXFORD STREET	NEWPORT ST	DEBORAH CR	67	CO	L	469	532	63	1.2	76
10.5041	9	OXFORD STREET	DEBORAH CR	BREYLEY RD	47	CO	R	536	579	43	1.2	52
10.5041	9	OXFORD STREET	DEBORAH CR	BREYLEY RD	47	CO	L	532	575	43	1.2	52
10.5041	10	OXFORD STREET	BREYLEY RD	MELITA RD	87	CO	L	581	661	80	1.2	96
10.5041	10	OXFORD STREET	BREYLEY RD	MELITA RD	87	CO	R	579	666	87	1.2	104
10.5041	11	OXFORD STREET	MELITA RD	COLLEGE ST	101	AC	R	666	760	94	1.2	113
10.5041	11	OXFORD STREET	MELITA RD	COLLEGE ST	101	CO	L	669	760	91	1.2	109
10.5041	12	OXFORD STREET	COLLEGE ST	BARRY ST	141	CO	L	772	902	130	1.2	156
10.5041	12	OXFORD STREET	COLLEGE ST	BARRY ST	141	CO	R	772	902	130	1.2	156
10.5041	13	OXFORD STREET	BARRY ST	CAM STREET	141	CO	R	912	1042	130	1.2	156
10.5041	13	OXFORD STREET	BARRY ST	CAM STREET	141	CO	L	912	1042	130	1.2	156
10.5041	14	OXFORD STREET	CAM STREET	PEMBROKE	140	CO	L	1054	1183	129	1.2	155
10.5041	14	OXFORD STREET	CAM STREET	PEMBROKE	140	CO	R	1054	1183	129	1.2	155
10.5041	15	OXFORD STREET	PEMBROKE	BARKER ST	140	CO	R	1193	1323	130	1.2	156
10.5041	15	OXFORD STREET	PEMBROKE	BARKER ST	140	CO	L	1193	1323	130	1.2	156
10.5041	16	OXFORD STREET	BARKER ST	RICHMOND	123	CO	L	1333	1451	118	1.2	142
10.5041	16	OXFORD STREET	BARKER ST	RICHMOND	123	CO	R	1333	1452	119	1.2	143
10.5041	17	OXFORD STREET	RICHMOND	PARKER ST	21	CO	R	1457	1472	15	1.2	18
30.3087	1	OXFORD STREET	SHEPHERD	CARRINGTON	146	CO	R	0	146	146	1.2	175
10.4037	1	PAGES ROAD	GREAT WESTERN HWY	SAINSBURY ST	115	CO	R	0	115	115	1.2	138
10.4037	1	PAGES ROAD	GREAT WESTERN HWY	SAINSBURY ST	115	CO	L	0	110	110	1.2	132
10.4037	2	PAGES ROAD	SAINSBURY ST	PUTLAND ST	60	CO	R	115	175	60	1.2	72
10.4037	3	PAGES ROAD	PUTLAND ST	SADDINGTON ST	150	CO	R	175	325	150	1.2	180
10.4037	4	PAGES ROAD	SADDINGTON ST	ELLIS ST	139	CO	R	325	464	139	1.2	167
10.4037	5	PAGES ROAD	ELLIS ST	JOHN ST	95	CO	R	464	559	95	1.2	114
10.4037	6	PAGES ROAD	JOHN ST	VINCENT ST	10	CO	R	559	569	10	1.2	12
10.4037	7	PAGES ROAD	VINCENT ST	SMITH ST	123	CO	R	569	692	123	1.2	148
10.4037	8	PAGES ROAD	SMITH ST	PLAYER ST	92	CO	R	692	784	92	1.2	110
10.4037	9	PAGES ROAD	PLAYER ST	WILSON ST	53	CO	R	784	837	53	1.2	64
20.0306	1	PARAKEET GROVE	CHN 0	CHN 272	272	CO	R	0	272	272	1.5	408
30.7068	3	PARK AVENUE	WALTER ST	RICHMOND	480	CO	L	1356	1416	60	5.1	306
30.7068	3	PARK AVENUE	WALTER ST	RICHMOND	480	CO	R	942	1416	474	1.2	569
2514	1	PARK LANE	PATH 2	SUNFLOWER DRIVE	265	CO		0	265	265	2	530
10.805	1	PARKES AVENUE	VICTORIA ST	ALBERT ST	161	CO	R	0	161	161	1.2	193
10.303	1	PARKLAWN LANE	OLEANDER S	END OF RD	90	AC	R	0	90	90	3.3	297
10.303	1	PARKLAWN LANE	OLEANDER S	END OF RD	90	AC	L	0	90	90	3.6	324
2577	1	PARROO LANE	PARROO RD	COOK PDE	170	CO		0	170	170	2	340
10.7037	1	PASTUREGATE AVENUE	GREENBANK	RIVENDELL	107	CO	R	0	107	107	1.2	128
10.7037	3	PASTUREGATE AVENUE	WINTERCORN	HUNTINGDON	110	CO	R	148	251	103	1.2	124
10.7037	4	PASTUREGATE AVENUE	HUNTINGDON	TRINITY DR	76	CO	R	259	331	72	1.2	86
2515	1	PEARRA LANE	PEARRA WAY	ALDINGA PLACE	44	CO		0	44	44	2.4	106
30.707	1	PEARSON STREET	COSGROVE	ANTHONY	147	CO	L	0	144	144	1.2	173

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.0074	3	PENDOCK ROAD	SEATON CRS	PERSHORE	93	CO	L	226	266	40	1.2	48
10.0074	3	PENDOCK ROAD	SEATON CRS	PERSHORE	93	CO	R	173	266	93	1.2	112
10.0074	4	PENDOCK ROAD	PERSHORE	STOULTON	41	CO	L	270	304	34	1.2	41
10.0074	4	PENDOCK ROAD	PERSHORE	STOULTON	41	CO	R	266	304	38	1.2	46
10.0074	5	PENDOCK ROAD	STOULTON	OFFERTON	102	CO	L	310	406	96	1.2	115
10.0074	5	PENDOCK ROAD	STOULTON	OFFERTON	102	CO	R	310	406	96	1.2	115
10.0074	6	PENDOCK ROAD	OFFERTON	KINGTON PL	109	CO	L	412	515	103	1.2	124
10.0074	6	PENDOCK ROAD	OFFERTON	KINGTON PL	109	CO	R	412	518	106	1.2	127
10.0074	7	PENDOCK ROAD	KINGTON PL	WARNDON RD	41	CO	R	518	555	37	1.2	44
10.0074	7	PENDOCK ROAD	KINGTON PL	WARNDON RD	41	CO	L	521	559	38	1.2	46
10.0074	8	PENDOCK ROAD	WARNDON RD	BEDLEY PL	54	CO	R	562	613	51	1.2	61
10.0074	8	PENDOCK ROAD	WARNDON RD	BEDLEY PL	54	CO	L	559	610	51	1.2	61
10.0074	9	PENDOCK ROAD	WARNDON RD	MCGANN PL	140	CO	L	616	751	135	1.2	162
10.0074	9	PENDOCK ROAD	WARNDON RD	MCGANN PL	140	CO	R	613	753	140	1.2	168
10.0074	10	PENDOCK ROAD	MCGANN PL	SHERRINGHM	77	CO	L	759	829	70	1.2	84
500	1	PENRITH CEMETRY ROAD	COX AVE	BLOCK 002	119	GR	L	0	119	119	4	476
31.1117	2	PENROSE CRESCENT	TALOMA LANE	CHN 281 (PENROSE)	281	CO	L	35	316	281	1.2	337
30.4063	6	PEPPERTREE DRIVE	KAWANA PL	CAPELLA ST	88	CO	R	480	568	88	1.2	106
30.4063	6	PEPPERTREE DRIVE	KAWANA PL	CAPELLA ST	88	CO	L	480	568	88	1.2	106
30.4063	7	PEPPERTREE DRIVE	CAPELLA ST	PHOENIX CR	53	CO	R	568	621	53	1.2	64
30.4063	7	PEPPERTREE DRIVE	CAPELLA ST	PHOENIX CR	53	CO	L	568	621	53	1.2	64
30.4063	8	PEPPERTREE DRIVE	PHOENIX CR	SWALLOW DR	271	CO	R	621	892	271	1.2	325
30.4063	8	PEPPERTREE DRIVE	PHOENIX CR	SWALLOW DR	271	CO	L	621	892	271	1.2	325
10.0125	1	PERSHORE ROAD	PENDOCK RD	LYGON WAY	143	CO	R	0	137	137	1.2	164
11.1022	1	PERTH STREET	BRISBANE ST	CANBERRA ST	153	CO	L	0	153	153	1.2	184
11.1022	2	PERTH STREET	CANBERRA ST	ADELAIDE ST	153	CO	L	153	306	153	1.2	184
10.4038	1	PHILLIP STREET	QUEEN ST	EAST LANE	44	CO	R	0	40	40	3.8	152
10.4038	1	PHILLIP STREET	QUEEN ST	EAST LANE	44	CO	L	0	40	40	4.1	164
10.4038	2	PHILLIP STREET	EAST LANE	GIDLEY ST	72	CO	L	47	116	69	3.3	228
10.4038	2	PHILLIP STREET	EAST LANE	GIDLEY ST	72	CO	R	47	109	62	4.5	279
10.4038	3	PHILLIP STREET	GIDLEY ST	BLAIR AVE	89	BP	L	116	205	89	3.3	294
10.4038	4	PHILLIP STREET	BLAIR AVE	LETHBRIDGE	144	CO	R	207	345	138	1.2	166
10.4038	4	PHILLIP STREET	BLAIR AVE	LETHBRIDGE	144	CO	L	205	345	140	1.2	168
10.4038	5	PHILLIP STREET	LETHBRIDGE	GLOSSOP ST	209	CO	R	352	557	205	1.2	246
10.4038	5	PHILLIP STREET	LETHBRIDGE	GLOSSOP ST	209	CO	L	352	557	205	1.2	246
30.7072	1	PHILLIP STREET	COX AVE	COPELAND	172	CO	L	0	172	172	1.2	206
30.4064	1	PHOENIX CRESCENT	PEPPERTREE	FORD PL	126	CO	R	0	126	126	1.2	151
30.4064	2	PHOENIX CRESCENT	FORD PL	DILGA CR	72	CO	R	126	198	72	1.2	86
30.4064	3	PHOENIX CRESCENT	DILGA CR	PEARL CL	285	CO	R	198	483	285	1.2	342
2565	1	PINDARI LANE	PINDARI AVE	TUKARA ROAD	321	AC		0	321	321	2.5	803
10.3032	1	POPLAR STREET	KURRAJONG	MALLEE ST	200	CO	L	0	199	199	1.2	239
10.3032	2	POPLAR STREET	MALLEE ST	WILGA ST	75	CO	L	203	272	69	1.2	83
10.3032	3	POPLAR STREET	WILGA ST	DEBRINCAT	273	CO	L	278	547	269	1.2	323
2516	1	POPPY LANE	MISTLETOE AVE	GREAT WESTERN HWY	164	CO		0	164	164	1.2	197
11.0011	3	POWER STREET	ANNE ST	WORDOO ST	191	CO	L	410	601	191	1.2	229
2522	1	PRESCHOOL LANE	WEDMORE ROAD	SALERNO CLOSE	37	CO		0	37	37	1.2	44
30.6021	1	PRIMROSE CIRCUIT	SUNFLOWER	PRIMROSE	69	CO	R	0	127	127	1.2	152
2517	1	PRIMROSE LANE	PRIMROSE CIRCUIT	SUNFLOWER DRIVE	84	CO		0	84	84	1.2	101
10.404	1	PRINCESS MARY STREET	PUTLAND ST	SAINSBURY	79	CO	R	0	72	72	1.2	86
10.404	2	PRINCESS MARY STREET	SAINSBURY	GT WST HWY	119	CO	R	81	196	115	1.2	138
10.404	3	PRINCESS MARY STREET	GT WST HWY	GABRIELS L	99	CO	R	208	297	89	1.2	107
10.404	3	PRINCESS MARY STREET	GT WST HWY	GABRIELS L	99	AC	L	198	228	30	2.9	87
20.0051	1	PRUNUS CLOSE	CAMELLIA	VERONCIA	61	CO	R	0	61	61	1.2	73
20.0051	2	PRUNUS CLOSE	VERONCIA	MERIGOLD	45	CO	R	61	106	45	1.2	54
10.4041	4	PUTLAND STREET	PAGES RD	PRINCESS M	132	CO	R	391	510	119	1.2	143
10.4041	5	PUTLAND STREET	PRINCESS M	GARNER ST	108	CO	R	524	618	94	1.2	113
10.4041	6	PUTLAND STREET	GARNER ST	MAMRE RD	156	CO	R	636	774	138	1.2	166
20.2053	1	PYRAMID STREET	RUSSELL ST	MUNDY ST	227	CO	L	0	227	227	1.2	272
20.2053	2	PYRAMID STREET	MUNDY ST	ST PAULS C	108	CO	L	227	335	108	1.2	130
20.2053	3	PYRAMID STREET	ST PAULS C	NIXON ST	101	CO	L	335	436	101	1.2	121
20.2053	4	PYRAMID STREET	NIXON ST	WATER ST	118	CO	L	435	554	119	1.2	143
20.2053	5	PYRAMID STREET	WATER ST	WATT PL	63	CO	R	560	617	57	1.2	68
20.2053	5	PYRAMID STREET	WATER ST	WATT PL	63	CO	L	554	617	63	1.2	76

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.2053	6	PYRAMID STREET	WATT PL	LAWSON ST	81	CO	L	617	632	15	1.2	18
20.2053	6	PYRAMID STREET	WATT PL	LAWSON ST	81	CO	L	617	698	81	1.2	97
20.2053	7	PYRAMID STREET	LAWSON ST	GT WST HWY	67	CO	L	698	765	67	1.2	80
30.4107	1	QUARRY ROAD	JAMES ERSKINE DRIVE	END OF ROAD	619	GR	R	0	619	619	3.6	2228
10.4042	1	QUEEN STREET	END OF RD	STATION ST	32	BP	L	0	26	26	3.7	96
10.4042	1	QUEEN STREET	END OF RD	STATION ST	32	BP	R	0	32	32	3.8	122
10.4042	2	QUEEN STREET	STATION ST	NARIEL ST	38	BP	R	32	64	32	3.7	118
10.4042	2	QUEEN STREET	STATION ST	NARIEL ST	38	BP	L	38	70	32	3.7	118
10.4042	3	QUEEN STREET	NARIEL ST	PHILLIP ST	85	BP	L	70	149	79	3.7	292
10.4042	3	QUEEN STREET	NARIEL ST	PHILLIP ST	85	BP	R	75	155	80	3.7	296
10.4042	4	QUEEN STREET	PHILLIP ST	BELAIR ST	59	BP	L	160	214	54	3.7	200
10.4042	4	QUEEN STREET	PHILLIP ST	BELAIR ST	59	BP	R	155	209	54	3.8	205
10.4042	5	QUEEN STREET	BELAIR ST	CHARLES HACKETT DR	180	BP	R	219	388	169	7	1183
10.4042	5	QUEEN STREET	BELAIR ST	CHARLES HACKETT DR	180	BP	L	214	394	180	7	1260
10.4042	6	QUEEN STREET	CHARLES HACKETT DR	CHAPEL ST	115	BP	R	400	509	109	7	763
10.4042	6	QUEEN STREET	CHARLES HACKETT DR	CHAPEL ST	115	BP	L	394	504	110	7	770
10.4042	7	QUEEN STREET	CHAPEL ST	CRANA ST	64	BP	R	509	568	59	7	413
10.4042	7	QUEEN STREET	CHAPEL ST	CRANA ST	64	BP	L	512	572	60	7	420
10.4042	8	QUEEN STREET	CRANA ST	KING ST	187	BP	L	573	754	181	7	1267
10.4042	8	QUEEN STREET	CRANA ST	KING ST	187	BP	R	577	759	182	7	1274
10.4042	9	QUEEN STREET	KING ST	CARSON LNE	5	AC	R	760	765	5	7	35
10.4042	9	QUEEN STREET	KING ST	CARSON LNE	5	AC	L	760	765	5	7	35
10.4042	10	QUEEN STREET	CARSON ST	GT WST HWY	98	AC	R	767	862	95	7	665
10.4042	10	QUEEN STREET	CARSON ST	GT WST HWY	98	AC	L	765	862	97	7	679
20.2054	1	RAILWAY ROW	STATION ST	END OF RD	276	CO	R	0	276	276	1.2	331
10.1037	1	RAILWAY STREET	SHORT ST	BELMORE ST	55	CO	R	0	55	55	1.1	61
10.8053	1	RAILWAY STREET	LANDERS ST	RANCE RD	199	CO	L	0	199	199	1.2	239
10.8054	1	RANCE ROAD	WERRINGTON	WALKER ST	329	CO	L	0	324	324	1.2	389
10.8054	2	RANCE ROAD	WALKER ST	RAILWAY ST	286	CO	L	333	508	175	1.2	210
10.1083	1	RANSLEY ROAD	MULGOA ROAD	RETREAT DRIVE	131	CO	R	0	131	131	1.2	157
10.1083	1	RANSLEY ROAD	MULGOA ROAD	RETREAT DRIVE	131	CO	L	0	131	131	2	262
10.1038	1	RANSLEY STREET	STATION ST	MULGOA RD	333	CO	R	0	333	333	1.2	400
10.1038	1	RANSLEY STREET	STATION ST	MULGOA RD	333	CO	L	0	333	333	1.2	400
2578	1	REDDINGTON LANE	REDDINGTON AVE	PATH 1	355	AC		0	355	355	2	710
2560	1	RESERVE LANE	SHERRINGHAM ROAD	PATH A	388	CO		0	388	388	1.9	737
10.1042	1	RESERVE STREET	WOODRIFF	STATION ST	184	CO	L	0	184	184	1.2	221
20.0054	1	RICHARDSON PLACE	KENNETH	ATKINSON	83	CO	L	0	83	83	1.2	100
20.0054	2	RICHARDSON PLACE	ATKINSON	STEWART PL	34	CO	L	83	117	34	1.2	41
30.7074	1	RICHMOND ROAD	PARK AVE	COX AVE	79	CO	L	0	73	73	1.2	88
30.7074	1	RICHMOND ROAD	PARK AVE	COX AVE	79	CO	R	0	75	75	1.2	90
30.7074	2	RICHMOND ROAD	COX AVE	JOSEPH ST	141	CO	R	79	220	141	1.2	169
30.7074	2	RICHMOND ROAD	COX AVE	JOSEPH ST	141	CO	L	79	220	141	1.2	169
30.7074	3	RICHMOND ROAD	JOSEPH ST	COPELAND S	104	CO	R	220	324	104	1.2	125
30.7074	3	RICHMOND ROAD	JOSEPH ST	COPELAND S	104	CO	L	220	324	104	1.2	125
30.7074	4	RICHMOND ROAD	COPELAND S	COLLEGE ST	42	CO	R	324	366	42	1.2	50
10.0129	1	RIGNEY PLACE	BOUNDARY R	END OF RD	82	CO	R	0	82	82	1.2	98
10.1043	1	RILEY STREET	HIGH ST	HENRY ST	71	BP	R	0	71	71	3.3	234
10.1043	1	RILEY STREET	HIGH ST	HENRY ST	71	BP	L	0	71	71	3.45	245
10.1043	2	RILEY STREET	HENRY ST	JANE ST	158	BP	L	71	229	158	3.3	521
10.1043	2	RILEY STREET	HENRY ST	JANE ST	158	BP	R	71	229	158	3.3	521
2566	1	RIVER LANE	NEPEAN AVE	BELLEVUE ROAD 2	521	AC		1281	2521	1240	1.2	1488
2566	1	RIVER LANE	NEPEAN AVE	BELLEVUE ROAD 2	521	CO		0	1281	1281	1.2	1537
20.208	5	RIVER ROAD	DEWDNEY RD	HUNTER ST	317	CO	L	1362	1679	317	2.6	824
20.208	6	RIVER ROAD	HUNTER ST	NEPEAN ST	889	CO	L	1679	2568	889	2.6	2311
2561	1	ROBINSON LANE	ROBINSON ROAD	BORROWDALE WAY	98	CO		0	98	98	2	196
30.1237	1	ROCHFORD STREET	MELVILLE	SHADLOW CR	87	CO	L	0	87	87	1.2	104
30.1237	2	ROCHFORD STREET	SHADLOW CR	KEMERTON	145	CO	L	87	232	145	1.2	174
30.1237	3	ROCHFORD STREET	KEMERTON	GALAH CL	68	CO	L	232	300	68	1.2	82
30.1237	4	ROCHFORD STREET	GALAH CL	BOWER BIRD	121	CO	L	300	421	121	1.2	145
30.1237	5	ROCHFORD STREET	BOWER BIRD	DANIEL PDE	40	CO	L	421	461	40	1.2	48
30.1237	6	ROCHFORD STREET	DANIEL PDE	IRELAND ST	100	CO	L	461	561	100	1.2	120
30.1237	7	ROCHFORD STREET	IRELAND ST	ST CLAIR AVE	136	CO	L	561	697	136	1.2	163
30.7076	1	RODGERS STREET	SOMERSET	BRINGELLY	410	CO	L	0	410	410	1.2	492

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
10.1044	1	RODLEY AVENUE	MULGOA RD	WORTH ST	255	CO	L	0	255	255	1.2	306
10.1044	2	RODLEY AVENUE	WORTH ST	END OF RD	171	CO	L	255	426	171	1.2	205
30.3117	4	ROPER ROAD	HEWITT ST	FRANCIS ST	50	CO	L	1577	1627	50	1.2	60
30.3117	5	ROPER ROAD	FRANCIS ST	GT WESTERN	209	CO	L	1627	1836	209	1.2	251
20.0293	1	ROSECREA COURT	BRANKSOME WAY	STONESTONE DRIVE	272	CO	R	0	81	81	1.2	97
10.4057	1	ROSS PLACE	GIDLEY ST	BLAIR AVE	89	CO	L	0	81	81	1.2	97
10.4057	3	ROSS PLACE	BLAIR AVE	GIDLEY ST	84	CO	L	233	309	76	1.2	91
20.2056	1	RUSSELL STREET	GREAT WESTERN HWY	MARTIN ST	136	CO	R	0	136	136	1.2	163
20.2056	2	RUSSELL STREET	MARTIN ST	JAMIESON ST	79	CO	R	136	215	79	1.2	95
20.2056	3	RUSSELL STREET	JAMIESON ST	WATER ST	20	CO	R	215	235	20	1.2	24
20.2056	4	RUSSELL STREET	WATER ST	PYRAMID ST	206	CO	R	235	441	206	1.2	247
20.2056	6	RUSSELL STREET	PYRAMID ST	ITHACA ST	82	CO	R	450	532	82	1.2	98
90.0011	1	RUSSELL STREET	LEONAY PDE	LUCAS ST	349	BP	R	0	349	349	1.2	419
90.0011	1	RUSSELL STREET	LEONAY PDE	LUCAS ST	349	BP	L	0	349	349	1.2	419
90.0011	2	RUSSELL STREET	LUCAS ST	FORBES ST	104	CO	R	349	453	104	1.2	125
90.0011	3	RUSSELL STREET	FORBES ST	MACKAY ST	135	CO	L	453	588	135	1.3	176
90.0011	4	RUSSELL STREET	MACKAY ST	GREAT WESTERN HWY	99	CO	L	588	687	99	1.2	119
10.4043	1	SADDINGTON STREET	MAMRE RD	GARNER ST	163	CO	L	0	163	163	1.2	196
10.4043	2	SADDINGTON STREET	GARNER ST	PAGES RD	290	CO	L	163	453	290	1.2	348
30.3118	2	SADDINGTON STREET	COLLINS ST	MAMRE RD	157	CO	R	196	353	157	1.2	188
30.3118	2	SADDINGTON STREET	COLLINS ST	MAMRE RD	157	CO	L	196	353	157	1.2	188
2518	1	SAN DIEGO LANE	SAN DIEGO CR	GIPPS RD	111	CO		0	111	111	1.2	133
2519	1	SANDPIPER LANE	SANDPIPER CR	SUNFLOWER DRIVE	320	CO		0	320	320	2	640
30.7079	1	SANTLEY CRESCENT	BRINGELLY	FIRST	119	CO	L	0	119	119	1.2	143
30.7079	2	SANTLEY CRESCENT	FIRST ST	GT WESTERN	342	CO	L	119	461	342	1.2	410
20.5011	1	SCHOOLHOUSE ROAD	MULGOA RD	JEANETTE	495	CO	R	0	495	495	1.2	594
2508	1	SCHOOLS LANE	TRINITY DRIVE	A RESERVE	101	CO		0	101	101	1.2	121
30.7081	1	SECOND AVENUE	BRINGELLY	FIRST ST	117	CO	R	0	113	113	1.2	136
30.7081	2	SECOND AVENUE	FIRST ST	PASKIN ST	125	CO	R	121	242	121	1.2	145
30.7081	4	SECOND AVENUE	JONES ST	CALLOW LN	203	CO	R	304	507	203	1.2	244
30.7081	5	SECOND AVENUE	CALLOW LN	MANNING ST	56	CO	R	509	558	49	1.2	59
30.7081	6	SECOND AVENUE	MANNING ST	ANTHONY CR	156	CO	R	568	719	151	1.2	181
30.7081	7	SECOND AVENUE	ANTHONY CR	MORPHETT ST	407	CO	L	722	1122	400	1.2	480
30.7081	7	SECOND AVENUE	ANTHONY CR	MORPHETT ST	407	CO	R	719	1126	407	1.2	488
30.7081	8	SECOND AVENUE	MORPHETT ST	ALGIE CRS	117	CO	R	1126	1243	117	1.2	140
30.7081	9	SECOND AVENUE	ALGIE CRES	O'CONNELL ST	127	CO	R	1243	1370	127	1.2	152
10.8061	1	SHAW STREET	VICTORIA S	KERRAN CL	174	CO	L	0	174	174	1.2	209
10.8061	2	SHAW STREET	KERRAN CL	HERBERT ST	100	CO	L	174	274	100	1.2	120
30.125	1	SHEARER STREET	LEICESTER	FLEECE CLS	100	CO	L	0	100	100	1.2	120
30.125	2	SHEARER STREET	FLEECE CLS	DEAD END	142	CO	L	100	242	142	1.2	170
20.0218	2	SHEARWATER DRIVE	SUNBIRD TERRACE	WHIMBEL WAY	109	CO	L	48	157	109	1.2	131
20.0218	3	SHEARWATER DRIVE	WHIMBEL WAY	WATTLEBIRD CRESCENT	116	CO	L	157	273	116	1.2	139
20.0218	4	SHEARWATER DRIVE	WATTLEBIRD CRESCENT	JACANA WAY	153	CO	L	273	426	153	1.2	184
20.0218	5	SHEARWATER DRIVE	JUCANA WAY	BUTCHERBIRD PL	187	CO	L	426	613	187	1.2	224
20.0218	6	SHEARWATER DRIVE	BUTCHERBIRD CL	FAIRYWREN CL	30	CO	L	613	643	30	1.2	36
20.2058	4	SHEPPARD ROAD	WARRING A	CHALMERS	145	CO	R	296	433	137	1.2	164
20.2058	5	SHEPPARD ROAD	CHALMERS	FRANCIS	103	CO	R	441	536	95	1.2	114
20.2058	6	SHEPPARD ROAD	FRANCIS	VINCENT	103	CO	L	544	647	103	5.3	546
10.0087	6	SHERRINGHAM ROAD	PENDOCK RD	MCHENRY RD	77	CO	R	704	775	71	1.2	85
10.0087	6	SHERRINGHAM ROAD	PENDOCK RD	MCHENRY RD	77	CO	L	698	769	71	1.2	85
10.0087	7	SHERRINGHAM ROAD	MCHENRY RD	COLLEN PLC	105	CO	R	775	880	105	1.2	126
10.0087	7	SHERRINGHAM ROAD	MCHENRY RD	COLLEN PLC	105	CO	L	781	877	96	2	192
10.0087	8	SHERRINGHAM ROAD	COLLEN PLC	HEFFERMAN RD	87	CO	R	880	963	83	1.2	100
10.0087	8	SHERRINGHAM ROAD	COLLEN PLC	HEFFERMAN RD	87	CO	L	883	967	84	2	168
10.0087	9	SHERRINGHAM ROAD	HEFFERMAN RD	WOODGATE CR	125	CO	R	967	1092	125	1.2	150
10.0087	10	SHERRINGHAM ROAD	WOODGATE CR	ULPHA PLC	153	CO	R	1092	1245	153	1.2	184
10.0087	11	SHERRINGHAM ROAD	ULPHA PLC	BORROWDALE	80	CO	R	1245	1325	80	1.2	96
30.3098	1	SHIELDS ROAD	KENNELLY	BARR ST	80	CO	L	0	80	80	1.2	96
10.0141	1	SHOVELER WAY	WATERSIDE BOULEVARDE	GUILLEMONT STREET	61	CO	R	0	61	61	1.2	73
10.0141	2	SHOVELER WAY	GUILLEMONT STREET	KNOT STREET	58	CO	R	61	119	58	1.2	70
30.6069	1	SILVERWOOD WAY	CENTRAL PARK DRIVE	BURLINGTON STREET	77	CO	R	0	77	77	1.2	92
30.6069	2	SILVERWOOD WAY	BURLINGTON STREET	DONCASTER AVENUE	77	CO	R	77	154	77	1.2	92
20.0058	1	SIR JOHN JAMISON CIRCUIT	GLENMORE	REGENTVILE	125	CO	R	0	125	125	1.2	150

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20.0058	2	SIR JOHN JAMISON CIRCUIT	REGENTVILE	FLITCROFT	87	CO	R	125	212	87	1.2	104
20.0058	3	SIR JOHN JAMISON CIRCUIT	FLITCROFT	BUDGE CL	40	CO	R	212	252	40	1.2	48
20.0058	4	SIR JOHN JAMISON CIRCUIT	BUDGE CL	BRADYN PL	147	CO	R	252	399	147	1.2	176
20.0058	5	SIR JOHN JAMISON CIRCUIT	BRADYN PL	THE AVENUE	86	CO	R	399	485	86	1.2	103
20.4038	1	SITTELLA PLACE	ORIOLE STREET	END OF ROAD	172	CO	L	0	172	172	1.2	206
30.7082	1	SMITH STREET	BRINGELLY	PLUNKETT	96	CO	L	0	96	96	1.2	115
30.7082	2	SMITH STREET	PLUNKETT	STAPLEY ST	315	CO	L	96	410	314	1.2	377
30.7082	3	SMITH STREET	STAPLEY ST	TENT ST	25	CO	L	411	432	21	1.2	25
30.7082	3	SMITH STREET	STAPLEY ST	TENT ST	25	CO	R	411	436	25	1.2	30
30.7082	4	SMITH STREET	TENT ST	PARKER ST	250	CO	L	439	686	247	1.2	296
30.7082	4	SMITH STREET	TENT ST	PARKER ST	250	CO	R	436	686	250	1.2	300
31.1133	1	SMITH STREET	PARKER ST	MAZEPA AVE	86	CO	L	0	82	82	1.2	98
31.1133	2	SMITH STREET	MAZEPA AVE	FRAGAR RD	130	CO	L	90	216	126	1.2	151
31.1133	3	SMITH STREET	FRAGAR RD	BUTLER CRS	271	CO	L	228	487	259	1.2	311
31.1133	4	SMITH STREET	BUTLER CRS	ASTON AVE	15	CO	L	487	498	11	1.2	13
31.1133	4	SMITH STREET	BUTLER CRS	ASTON AVE	15	CO	R	490	502	12	1.2	14
31.1133	5	SMITH STREET	ASTON AVE	PENROSE	80	CO	L	506	582	76	1.2	91
31.1133	5	SMITH STREET	ASTON AVE	PENROSE	80	CO	R	502	579	77	1.2	92
31.1133	6	SMITH STREET	PENROSE	PENROSE	100	CO	R	586	679	93	1.2	112
31.1133	6	SMITH STREET	PENROSE	PENROSE	100	CO	L	582	682	100	1.2	120
31.1133	7	SMITH STREET	PENROSE	STEVENSON	49	CO	L	682	725	43	1.2	52
31.1133	7	SMITH STREET	PENROSE	STEVENSON	49	CO	R	685	731	46	1.2	55
31.1133	8	SMITH STREET	STEVENSON	TALOMA ST	47	CO	R	731	772	41	1.2	49
31.1133	9	SMITH STREET	TALOMA ST	EVAN ST	260	CO	R	784	1038	254	1.2	305
31.1133	9	SMITH STREET	TALOMA ST	EVAN ST	260	CO	L	778	1038	260	1.2	312
31.1133	10	SMITH STREET	EVAN ST	PARKVIEW	208	CO	R	1050	1246	196	1.2	235
31.1133	11	SMITH STREET	PARKVIEW	GREENHILLS	126	CO	R	1246	1372	126	1.2	151
31.1133	12	SMITH STREET	GREENHILLS	RACECOURSE	86	CO	R	1372	1458	86	1.2	103
30.1253	2	SOLANDER DRIVE	MADISON	NAOLI PLCE	100	CO	L	81	181	100	1.2	120
30.1253	3	SOLANDER DRIVE	NAOLI PLCE	SALEM CLSE	99	CO	L	181	280	99	1.2	119
30.1253	5	SOLANDER DRIVE	MADISON	CAMEO CRS	80	CO	L	396	476	80	1.2	96
30.1253	6	SOLANDER DRIVE	CAMEO CRS	CAMEO CRS	269	CO	L	476	745	269	1.2	323
30.1253	7	SOLANDER DRIVE	CAMEO CRS	AVON PLACE	98	CO	L	745	843	98	1.2	118
30.1253	8	SOLANDER DRIVE	AVON PLACE	COOK PDE	78	CO	L	843	921	78	1.2	94
2579	1	SOLANDER LANE	SOLANDER DRIVE	BANKS SCHOOL	291	CO		0	291	291	1.2	349
10.0089	1	SOLING CRESCENT	BLUEBIRD	CAMELOT DR	40	CO	L	0	40	40	1.2	48
30.7083	1	SOMERSET STREET	GT WESTERN	WAINWRIGHT	48	CO	R	0	48	48	1.2	58
30.7083	2	SOMERSET STREET	WAINWRIGHT	RODGERS ST	65	CO	R	48	113	65	1.2	78
30.7083	2	SOMERSET STREET	WAINWRIGHT	RODGERS ST	65	CO	L	48	113	65	1.2	78
30.7083	3	SOMERSET STREET	RODGERS ST	ORTH ST	117	CO	R	113	230	117	1.2	140
30.7083	3	SOMERSET STREET	RODGERS ST	ORTH ST	117	CO	L	113	230	117	1.2	140
30.7083	4	SOMERSET STREET	ORTH ST	HARGRAVE	96	CO	R	230	326	96	1.2	115
30.7083	4	SOMERSET STREET	ORTH ST	HARGRAVE	96	CO	L	230	326	96	1.2	115
30.7083	5	SOMERSET STREET	HARGRAVE	DERBY ST	88	CO	R	326	414	88	1.2	106
30.7083	5	SOMERSET STREET	HARGRAVE	DERBY ST	88	CO	L	326	414	88	1.2	106
10.1047	1	SOPER PLACE	LAWSON ST	WOODRIFF S	130	CO	L	0	130	130	2.75	358
2567	1	SOUTHSTONE LANE	PINDARI LANE	SOUTHSTONE CLOSE	108	AC		0	108	108	2.5	270
30.6073	1	SPRINGDALE STREET	DONCASTER AVNUE	BURLINGTON STREET	73	CO	R	0	73	73	1.2	88
30.6073	1	SPRINGDALE STREET	DONCASTER AVNUE	BURLINGTON STREET	73	CO	L	0	73	73	1.2	88
30.6073	2	SPRINGDALE STREET	BURLINGTON STREET	CENTRAL PARK DRIVE	83	CO	R	0	73	73	1.2	88
30.6073	2	SPRINGDALE STREET	BURLINGTON STREET	CENTRAL PARK DRIVE	83	CO	L	0	73	73	1.2	88
20.0189	1	ST ANDREWS DRIVE	GLENMORE PARKWAY	HUNTINGDALE DRIVE	118	CO	L	0	118	118	1.2	142
20.0189	2	ST ANDREWS DRIVE	HUNTINGDALE DRIVE	LAGUNA DRIVE	91	CO	L	118	209	91	1.2	109
20.0189	3	ST ANDREWS DRIVE	LAGUNA DRIVE	SUNNINGDALE DRIVE	207	CO	L	209	416	207	1.2	248
20.0189	4	ST ANDREWS DRIVE	SUNNINGDALE DRIVE	OAKMONT AVE	171	CO	L	416	587	171	1.2	205
20.0189	5	ST ANDREWS DRIVE	OAKMONT AVE	GARSWOOD ROAD	72	CO	L	587	659	72	1.2	86
2580	1	ST CLAIR LANE	ST CLAIR AVE	ENDEAVOUR AVE	355	CO		0	355	355	2.5	888
30.1254	17	ST. CLAIR AVENUE	ROCHFORD	GARRICK RD	44	CO	L	1621	1665	44	1.2	53
30.1254	18	ST. CLAIR AVENUE	GARRICK RD	BANKS DRVE	147	CO	L	1665	1812	147	1.2	176
10.1001	1	STAFFORD STREET	WOODRIFF	BROWN ST	103	CO	R	0	99	99	1.2	119
10.1001	2	STAFFORD STREET	BROWN ST	CASTLEREAG	100	CO	R	108	203	95	1.2	114
10.1001	3	STAFFORD STREET	CASTLEREAG	RAWSON AVE	66	CO	R	215	278	63	1.2	76
10.1001	4	STAFFORD STREET	RAWSON AVE	TORTON PL	109	CO	R	284	386	102	1.2	122

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10.1001	5	STAFFORD STREET	TORTON PL	WARWICK ST	113	CO	R	394	498	104	1.2	125
10.1001	6	STAFFORD STREET	WARWICK ST	HAND ST	149	CO	L	503	652	149	1.2	179
10.1001	7	STAFFORD STREET	HAND ST	EVAN ST	93	CO	L	652	745	93	1.2	112
10.1001	10	STAFFORD STREET	COLLESS	ROSEDALE	244	CO	R	1329	1567	238	3.6	857
10.4047	1	STAPLETON PARADE	KING ST	LETHBRIDGE	313	CO	R	0	313	313	1.2	376
30.7086	1	STAPLEY STREET	JAMISON RD	LUCY ST	331	CO	R	0	328	328	1.2	394
30.7086	2	STAPLEY STREET	LUCY ST	SMITH ST	86	CO	R	335	417	82	1.2	98
10.1049	1	STATION STREET	JANE ST	SHORT ST	54	CO	L	0	51	51	3.65	186
10.1049	1	STATION STREET	JANE ST	SHORT ST	54	CO	R	0	54	54	4	216
10.1049	2	STATION STREET	SHORT ST	HENRY ST	82	CO	L	59	130	71	3.65	259
10.1049	2	STATION STREET	SHORT ST	HENRY ST	82	CO	R	54	130	76	4	304
10.1049	3	STATION STREET	HENRY ST	ALLEN PL	69	CO	L	142	202	60	3.5	210
10.1049	3	STATION STREET	HENRY ST	ALLEN PL	69	CO	R	142	205	63	3.4	214
10.1049	4	STATION STREET	ALLEN PL	ALLEN PL	19	CO	L	207	220	13	3.5	46
10.1049	4	STATION STREET	ALLEN PL	ALLEN PL	19	CO	R	205	224	19	3.4	65
10.1049	5	STATION STREET	ALLEN PL	HIGH ST	55	CO	R	224	274	50	3.4	170
10.1049	5	STATION STREET	ALLEN PL	HIGH ST	55	CO	L	225	279	54	3.5	189
10.1049	6	STATION STREET	HIGH ST	UNION LANE	76	BP	L	279	352	73	3.4	248
10.1049	6	STATION STREET	HIGH ST	UNION LANE	76	CO	R	284	352	68	3.5	238
10.1049	7	STATION STREET	UNION LANE	UNION RD	81	BP	R	357	431	74	2.7	200
10.1049	7	STATION STREET	UNION LANE	UNION RD	81	CO	L	357	431	74	1.2	89
10.1049	8	STATION STREET	UNION RD	DERBY ST	127	BP	L	441	559	118	1.2	142
10.1049	8	STATION STREET	UNION RD	DERBY ST	127	CO	R	441	563	122	1.2	146
10.1049	9	STATION STREET	DERBY ST	RESERVE ST	82	CO	L	565	639	74	1.2	89
10.1049	9	STATION STREET	DERBY ST	RESERVE ST	82	CO	R	563	645	82	1.2	98
10.1049	10	STATION STREET	RESERVE ST	RANSLEY ST	402	CO	R	645	1041	396	1.2	475
10.1049	10	STATION STREET	RESERVE ST	RANSLEY ST	402	CO	L	650	1047	397	1.2	476
10.1049	11	STATION STREET	RANSLEY ST	JAMISON RD	438	CO	L	1053	1484	431	1.2	517
10.1049	11	STATION STREET	RANSLEY ST	JAMISON RD	438	CO	R	1047	1485	438	1.6	701
10.4048	1	STATION STREET	QUEEN ST	LETHBRIDGE ST	349	CO	R	0	349	349	1.2	419
20.0061	1	STEIN PLACE	LADY JAMI	CARTWRIGHT	77	CO	R	0	77	77	1.2	92
20.0061	2	STEIN PLACE	CARTWRIGHT	STAPLES PL	26	CO	R	77	103	26	1.2	31
20.0061	3	STEIN PLACE	STAPLES PL	SIR JOHN	153	CO	R	103	256	153	1.2	184
31.1135	3	STEVENSON STREET	GREENWAY	SANDRA	47	CO	R	42	89	47	1.2	56
31.1135	4	STEVENSON STREET	SANDRA	TREETOPS	56	CO	R	89	145	56	1.2	67
31.1135	5	STEVENSON STREET	TREETOPS	TIMGALEN	84	CO	R	145	229	84	1.2	101
31.1135	6	STEVENSON STREET	TIMGALEN	SMITH ST	80	CO	R	229	309	80	1.2	96
30.6023	1	SUNFLOWER DRIVE	GIPPS ST	WERONA AVE	113	CO	R	0	107	107	1.2	128
30.6023	1	SUNFLOWER DRIVE	GIPPS ST	WERONA AVE	113	CO	L	0	113	113	1.2	136
30.6023	2	SUNFLOWER DRIVE	WERONA AVE	MYRTLE RD	60	CO	R	114	173	59	1.2	71
30.6023	2	SUNFLOWER DRIVE	WERONA AVE	MYRTLE RD	60	CO	L	113	173	60	1.2	72
30.6023	3	SUNFLOWER DRIVE	MYRTLE RD	KULLERO CR	140	CO	R	173	228	55	1.2	66
30.6023	3	SUNFLOWER DRIVE	MYRTLE RD	KULLERO CR	140	CO	L	173	313	140	1.2	168
30.6023	4	SUNFLOWER DRIVE	KULLERO CR	PRIMROSE CIRCUIT	107	CO	L	313	420	107	1.2	128
30.6023	5	SUNFLOWER DRIVE	PRIMROSE CIRCUIT	MISTLETOE AVE	98	CO	L	420	518	98	1.2	118
30.6023	6	SUNFLOWER DRIVE	MISTLETOE AVE	CARNATION AVE	61	CO	L	518	579	61	1.2	73
30.6023	7	SUNFLOWER DRIVE	CARNATION AVE	DAISY PL	72	CO	L	579	651	72	1.2	86
30.6023	8	SUNFLOWER DRIVE	DAISY PL	PAMPAS PL	64	CO	L	651	715	64	1.2	77
30.6023	9	SUNFLOWER DRIVE	PAMPAS CL	YELLOW PL	65	CO	L	715	780	65	1.2	78
30.6023	10	SUNFLOWER DRIVE	YELLOW PL	REDWOOD PL	77	CO	L	780	857	77	1.2	92
30.6023	11	SUNFLOWER DRIVE	REDWOOD PL	ORANGE AVE	73	CO	L	857	930	73	1.2	88
30.6023	12	SUNFLOWER DRIVE	ORANGE AVE	PRAIRIE GLEN	68	CO	L	930	998	68	1.2	82
30.6023	13	SUNFLOWER DRIVE	PRAIRIE GLEN	WONNAI PLACE	192	CO	L	998	1190	192	1.2	230
30.6023	14	SUNFLOWER DRIVE	WONNAI PLACE	KARRONG STREET	104	CO	L	1190	1294	104	1.2	125
30.6023	15	SUNFLOWER DRIVE	KARRONG STREET	NULLAGA WAY	69	CO	L	1294	1363	69	1.2	83
30.6023	16	SUNFLOWER DRIVE	NULLAGA WAY	O'CONNELL ST	84	CO	L	1363	1447	84	1.2	101
30.6023	17	SUNFLOWER DRIVE	O'CONNELL ST	VIVALDI CRESCENT	355	CO	L	1447	1557	110	1.2	132
30.6023	17	SUNFLOWER DRIVE	O'CONNELL ST	VIVALDI CRESCENT	355	CO	R	1447	1802	355	1.2	426
30.6023	18	SUNFLOWER DRIVE	VIVALDI CRESCENT	SANDPIPER CRESCENT	205	CO	L	1802	2007	205	1.2	246
30.6023	18	SUNFLOWER DRIVE	VIVALDI CRESCENT	SANDPIPER CRESCENT	205	CO	R	1802	2007	205	1.2	246
30.6023	19	SUNFLOWER DRIVE	SANDPIPER CRESCENT	MYRTLE RD	67	CO	L	2007	2074	67	1.2	80
30.6023	20	SUNFLOWER DRIVE	MYRTLE RD	GIPPS STREET	177	CO	L	2074	2251	177	1.2	212
2520	1	SUNFLOWER LANE	MYRTLE RD	SUNFLOWER DRIVE	195	CO		0	195	195	2	390

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.015	4	SURVEYORS CREEK ROAD	WARI AVE	MURU DR	345	CO	R	492	837	345	1.2	414
20.015	5	SURVEYORS CREEK ROAD	MURU DR	GARSWOOD RD	99	CO	R	837	936	99	2	198
30.4078	5	SWALLOW DRIVE	HYDRA PL	TUCANA ST	64	CO	L	444	508	64	1.2	77
30.4078	6	SWALLOW DRIVE	TUCANA ST	LEO PL	201	CO	L	508	709	201	1.2	241
30.4078	7	SWALLOW DRIVE	LEO PL	REGULUS ST	54	CO	L	709	763	54	1.2	65
30.4078	8	SWALLOW DRIVE	REGULUS ST	CANOPUS CL	27	CO	L	763	790	27	1.2	32
30.4078	9	SWALLOW DRIVE	CANOPUS CL	SHAULA CRS	79	CO	L	792	869	77	1.2	92
30.4078	10	SWALLOW DRIVE	SHAULA CRS	SHAULA CRS	337	CO	L	869	1206	337	1.2	404
30.4078	11	SWALLOW DRIVE	SHAULA CRS	TAURUS ST	43	CO	L	1206	1244	38	1.2	46
30.4078	15	SWALLOW DRIVE	WEAVER ST	PEGASUS ST	118	CO	L	1463	1581	118	1.2	142
30.4078	16	SWALLOW DRIVE	PEGASUS ST	AQUARIUS	62	CO	L	1581	1643	62	1.2	74
30.4078	17	SWALLOW DRIVE	AQUARIUS	ADHARA ST	75	CO	L	1643	1718	75	1.2	90
30.4078	18	SWALLOW DRIVE	ADHARA ST	AQUARIUS	96	CO	L	1718	1814	96	1.2	115
30.4078	19	SWALLOW DRIVE	AQUARIUS	SENNAR RD	128	CO	L	1814	1942	128	1.2	154
30.4078	20	SWALLOW DRIVE	SENNAR RD	PEPPERTREE	316	CO	R	1942	2258	316	1.2	379
30.4078	20	SWALLOW DRIVE	SENNAR RD	PEPPERTREE	316	CO	L	1942	2258	316	1.2	379
30.4078	21	SWALLOW DRIVE	PEPPERTREE	FANTAIL CR	191	CO	R	2258	2449	191	1.2	229
30.4078	22	SWALLOW DRIVE	FANTAIL CR	PACIFIC RD	48	CO	R	2449	2497	48	1.2	58
30.4078	23	SWALLOW DRIVE	PACIFIC RD	COCKATOO	84	CO	R	2497	2581	84	1.2	101
30.4078	24	SWALLOW DRIVE	COCKATOO	WARBLER ST	153	CO	R	2581	2734	153	1.2	184
30.3119	2	SWANSTON STREET	COLLINS ST	MAMRE RD	179	CO	L	115	173	58	1.2	70
11.1024	1	SYDNEY STREET	HOBART ST	BRADDON ST	167	CO	L	0	161	161	1.2	193
11.1024	2	SYDNEY STREET	BRADDON ST	BRISBANE ST	144	CO	L	167	308	141	1.2	169
11.1024	3	SYDNEY STREET	BRISBANE ST	CANBERRA ST	164	CO	L	319	473	154	1.2	185
11.1024	4	SYDNEY STREET	CANBERRA ST	ADELAIDE ST	155	CO	L	482	630	148	1.2	178
11.1024	5	SYDNEY STREET	ADELAIDE ST	EDMONDSON ST	141	CO	L	642	771	129	1.2	155
11.1024	5	SYDNEY STREET	ADELAIDE ST	EDMONDSON ST	141	CO	R	630	771	141	1.2	169
11.1024	6	SYDNEY STREET	EDMONDSON ST	GREAT WESTERN HWY	166	CO	R	771	937	166	1.2	199
20.0236	1	TALARA AVENUE	LAKES DRIVE	COCO DRIVE	60	CO	R	0	60	60	1.2	72
20.0236	2	TALARA AVENUE	COCO DRIVE	KOBINA DRIVE	234	CO	R	60	294	234	1.2	281
20.0236	3	TALARA AVENUE	KOBINA DRIVE	WARINGA CRESCENT	130	CO	R	294	424	130	1.2	156
20.0236	4	TALARA AVENUE	WARINGA CRESCENT	TARRABUNDI DRIVE	82	CO	R	424	506	82	1.2	98
10.505	1	TASMAN STREET	ETON ROAD	DUNHEVED	108	CO	R	0	108	108	1.2	130
2540	1	TELOPEA LANE	TELOPEA CLOSE	GLENMORE PARKWAY	542	CO		0	542	542	2	1084
2541	1	TENCH LANE	TENCH PLACE	PATH 1	16	AC		0	16	16	2.1	34
11.8021	1	TENISON AVENUE	TRINITY DR	CORONATION	43	CO	L	0	43	43	1.2	52
10.1066	1	THE BROADWAY	STATION ST	JUDGES CARPARK	117	CO	R	0	117	117	1.2	140
20.0067	1	THE CARRIAGE- WAY	LADY JAMI	CARRIAGE	68	CO	R	0	68	68	1.2	82
20.0067	2	THE CARRIAGE- WAY	CARRIAGE	WILLMOTT	107	CO	R	68	175	107	1.2	128
20.0067	3	THE CARRIAGE- WAY	WILLMOTT	JESSUP PL	50	CO	R	175	225	50	1.2	60
20.0067	8	THE CARRIAGE- WAY	HARRIETT	NORTON PL	84	CO	R	554	638	84	1.2	101
20.0067	9	THE CARRIAGE- WAY	NORTON PL	CARRIAGE	120	CO	R	638	758	120	1.2	144
31.2009	3	THE CRESCENT CRESCENT	LEMONGROVE	MACQUARIE	105	CO	L	113	212	99	1.2	119
31.2009	4	THE CRESCENT CRESCENT	MACQUARIE	CHN 63	63	CO	L	224	275	51	1.2	61
31.2009	4	THE CRESCENT CRESCENT	MACQUARIE	CHN 63	63	CO	R	212	275	63	1.2	76
31.2009	5	THE CRESCENT CRESCENT	CHN 63	HEMMING ST	65	CO	L	275	340	65	1.2	78
31.2009	5	THE CRESCENT CRESCENT	CHN 63	HEMMING ST	65	CO	R	275	340	65	1.2	78
31.2009	6	THE CRESCENT CRESCENT	HEMMING ST	BLAXLAND AVE	110	CO	L	352	450	98	1.2	118
31.2009	7	THE CRESCENT CRESCENT	BLAXLAND AVE	HAYNES ST	109	CO	L	462	559	97	1.2	116
31.2009	8	THE CRESCENT CRESCENT	HAYNES	KING ST	122	CO	L	571	681	110	1.2	132
30.1264	1	THE GRANDSTAND ROAD	BLACKWELL	BENAUD CT	112	CO	L	0	112	112	1.2	134
30.1264	2	THE GRANDSTAND ROAD	BENAUD CT	HASSETT PL	73	CO	L	112	185	73	1.2	88
30.1264	3	THE GRANDSTAND ROAD	HASSETT PL	GRIMMETT	100	CO	L	185	285	100	1.2	120
30.1264	4	THE GRANDSTAND ROAD	GRIMMETT	MCCABE CL	82	CO	L	285	367	82	1.2	98
30.1264	5	THE GRANDSTAND ROAD	MCCABE CL	NOBLE PL	73	CO	L	367	440	73	1.2	88
30.1264	6	THE GRANDSTAND ROAD	NOBLE PL	LINDWELL	50	CO	L	440	490	50	1.2	60
30.1264	7	THE GRANDSTAND ROAD	LINDWELL	BRADMAN AV	60	CO	L	490	550	60	1.2	72
30.1264	8	THE GRANDSTAND ROAD	BRADMAN AV	BLACKWELL	62	CO	L	550	612	62	1.2	74
10.8064	1	THE KINGS WAY	CHARLES HACKETT DR	KUNGALA ST	75	CO	R	0	75	75	1.2	90
10.8064	2	THE KINGS WAY	KUNGALA ST	TENNANT RD	939	CO	R	75	500	425	1.2	510
20.3069	4	THURWOOD AVENUE	HENDERSON	GLENBROOK	235	CO	L	345	572	227	1.2	272
2568	1	THURWOOD LANE	THURWOOD AVE	YORK RD	230	CO		0	230	230	2	460
30.1265	1	TIMESWEEP DRIVE	HARVEY CRT	NEWMOON PL	89	CO	L	0	89	89	1.2	107

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30.1265	2	TIMESWEEP DRIVE	NEWMOON PL	AUTUMNLEAF	149	CO	L	89	234	145	1.2	174
30.1265	2	TIMESWEEP DRIVE	NEWMOON PL	AUTUMNLEAF	149	CO	R	89	189	100	1.2	120
2581	1	TIMESWEEP LANE	TIMESWEEP LANE	ENDEAVOUR AVE	285	CO		0	285	285	1.9	542
10.105	1	TINDALE STREET	WOODRIFF ST	MASTERS PL	132	CO	R	0	132	132	1.2	158
10.105	1	TINDALE STREET	WOODRIFF ST	MASTERS PL	132	CO	L	0	132	132	1.2	158
10.105	2	TINDALE STREET	MASTERS PL	CASTLEREAGH ST	50	CO	R	132	182	50	1.2	60
10.105	2	TINDALE STREET	MASTERS PL	CASTLEREAGH ST	50	CO	L	132	182	50	1.2	60
30.1266	3	TODD ROW	FLINTLOCK	BLIGH CRT	269	CO	L	700	773	73	1.2	88
30.1266	4	TODD ROW	BLIGH ST	MOORE ST	60	CO	L	773	833	60	1.2	72
20.028	1	TOWN TERRACE	GLENMORE PARKWAY	CHN 67	67	CO	R	0	67	67	4	268
20.028	2	TOWN TERRACE	CHN 67	CHN 122	55	CO	R	67	122	55	2	110
20.028	3	TOWN TERRACE	CHN 122	CHN 176	54	CO	R	122	176	54	2	108
20.028	3	TOWN TERRACE	CHN 122	CHN 176	54	CO	L	122	176	54	2	108
11.6036	2	TRAHLEE ROAD	MUSCHARRY	LONDONDERR	99	CO	R	79	178	99	1.2	119
11.8022	3	TRINITY DRIVE	LEWIS RD	CARLYLE CR	281	CO	L	104	377	273	1.2	328
11.8022	4	TRINITY DRIVE	CARLYLE CR	TENISON AVE	63	CO	L	385	444	59	1.2	71
11.8022	5	TRINITY DRIVE	TENISON AVE	HILTON RD	53	CO	L	444	493	49	1.2	59
11.8022	6	TRINITY DRIVE	HILTON RD	PASTUREGATE AVE	23	CO	L	501	520	19	1.2	23
11.8022	7	TRINITY DRIVE	PASTUREGATE AVE	ALLSOPP DR	72	CO	R	524	592	68	1.2	82
11.8022	7	TRINITY DRIVE	PASTUREGATE AVE	ALLSOPP DR	72	CO	L	520	588	68	1.2	82
11.8022	8	TRINITY DRIVE	ALLSOPP DR	HUNTINGTON PDE	254	CO	R	592	842	250	1.2	300
11.8022	8	TRINITY DRIVE	ALLSOPP DR	HUNTINGTON PDE	254	CO	L	596	846	250	1.2	300
11.8022	9	TRINITY DRIVE	HUNTINGDON PDE	SUMMERFIELD CCT	81	CO	L	846	927	81	1.2	97
11.8022	9	TRINITY DRIVE	HUNTINGDON PDE	SUMMERFIELD CCT	81	CO	R	846	927	81	1.2	97
11.8022	10	TRINITY DRIVE	SUMMERFIELD CCT	NEWHAM DR	67	CO	L	927	994	67	1.2	80
11.8022	11	TRINITY DRIVE	NEWHAM DR	MERTON AVE	97	CO	L	994	1091	97	1.2	116
11.8022	12	TRINITY DRIVE	MERTON AVE	GRANGE CRE	178	CO	L	1091	1269	178	1.2	214
11.8022	13	TRINITY DRIVE	GRANGE CRE	NEWHAM DR	59	CO	L	1269	1328	59	1.2	71
11.8022	14	TRINITY DRIVE	NEWHAM DR	CLEEVE PL	82	CO	L	1328	1410	82	1.2	98
11.8022	15	TRINITY DRIVE	CLEEVE PL	THE NORTHERN RD	24	CO	L	1410	1434	24	1.2	29
20.2068	4	TROY STREET	FORBES ST	GT WST HWY	284	CO	L	308	592	284	1.2	341
31.1148	1	TUKARA ROAD	YORK ROAD	MOOLANA	57	AC	L	0	57	57	2	114
10.1053	1	UNION LANE	WOODRIFF	STATION ST	226	CO	R	0	226	226	1.2	271
10.1053	1	UNION LANE	WOODRIFF	STATION ST	226	CO	L	0	226	226	1.2	271
10.1053	2	UNION LANE	STATION ST	WORTH ST	296	BP	R	238	522	284	1.2	341
10.1054	1	UNION ROAD	MULGOA RD	JOHN TIPPI	47	CO	R	0	47	47	1.2	56
10.1054	2	UNION ROAD	JOHN TIPP	WORTH ST	261	CO	R	47	308	261	1.2	313
10.1054	3	UNION ROAD	WORTH ST	STATION LN	306	CO	R	308	338	30	1.2	36
10.1054	3	UNION ROAD	WORTH ST	STATION LN	306	CO	L	308	614	306	1.2	367
10.1054	3	UNION ROAD	WORTH ST	STATION LN	306	CO	R	338	614	276	1.2	331
10.1054	4	UNION ROAD	STATION LN	STATION ST	68	CO	R	610	678	68	1.2	82
10.1054	4	UNION ROAD	STATION LN	STATION ST	68	CO	L	610	678	68	1.2	82
2547	1	UNIVERSITY LANE	SECOND AVE	GREAT WESTERN HWY	532	CO		0	532	532	1.2	638
2562	1	VERNON LANE	BACK OF HOUSES	PATH A	106	CO		0	106	106	1.7	180
10.8066	1	VICTORIA STREET	END OF RD	PARKES AVE	256	CO	L	86	256	170	1.2	204
10.8066	2	VICTORIA STREET	PARKES AVE	KAZANIS CT	30	CO	L	256	286	30	1.2	36
10.8066	3	VICTORIA STREET	KAZANIS CT	KAZANIS CT	20	CO	L	286	306	20	1.2	24
10.8066	4	VICTORIA STREET	KAZANIS CT	GIBSON AVE	319	CO	L	388	613	225	1.2	270
10.8066	4	VICTORIA STREET	KAZANIS CT	GIBSON AVE	319	CO	L	306	394	88	4	352
10.8066	5	VICTORIA STREET	GIBSON AVE	LETHBRIDGE AVE	361	CO	R	638	980	342	1.2	410
10.8066	5	VICTORIA STREET	GIBSON AVE	LETHBRIDGE AVE	361	CO	L	638	980	342	1.2	410
10.8066	6	VICTORIA STREET	LETHBRIDGE AVE	BURTON ST	716	CO	R	986	1188	202	1.2	242
10.8066	6	VICTORIA STREET	LETHBRIDGE AVE	BURTON ST	716	CO	R	1188	1702	514	1.2	617
30.7091	3	VICTORIA STREET	HEATH ST	WRENCH ST	227	CO	L	391	618	227	1.2	272
30.7091	4	VICTORIA STREET	WRENCH ST	WORCESTERD	103	CO	L	618	721	103	1.2	124
30.7091	5	VICTORIA STREET	WORCESTER	WALTER ST	109	CO	L	721	830	109	1.2	131
30.7091	6	VICTORIA STREET	WALTER ST	SANDRINGHAM	310	CO	L	830	1140	310	1.2	372
30.7091	7	VICTORIA STREET	SANDRINGHAM	RICHMOND RD	228	CO	L	1140	1368	228	1.2	274
11.2059	2	VINCENT ROAD	GREYS LANE	KERB&GUTTER	218	CO	R	1165	1383	218	1.2	262
11.2059	3	VINCENT ROAD	K&G	HYDRUS ST	127	CO	R	1383	1510	127	1.2	152
11.2059	4	VINCENT ROAD	HYDRUS ST	ANDROMEDA DR	256	CO	R	1510	1766	256	1.2	307
2542	1	VIOLA LANE	VIOLA PLACE	GLENMORE PARKWAY	77	CO		0	77	77	2	154
10.1055	1	VISTA STREET	WORTH ST	DE VILNITS	193	CO	R	0	193	193	1.2	232

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30.6053	1	VIVALDI CRESCENT	SUNFLOWER DRIVE	PAGANINI CRESCENT	83	CO	R	0	83	83	1.2	100
2582	1	WALKERS LANE	BARTOK GROVE	BLACKWELL AVE	220	AC		0	220	220	2.1	462
30.4091	1	WARBLER STREET	SWALLOW DR	CROWBILL P	108	CO	R	0	108	108	1.2	130
30.4091	2	WARBLER STREET	CROWBILL P	WHISTLER	66	CO	R	108	174	66	1.2	79
20.0145	1	WARI AVENUE	SURVEYORS CREEK RD	BUYU RD	71	CO	L	0	71	71	1.2	85
10.0132	1	WARNDON ROAD	PENDOCK RD	COLLITT CR	70	CO	R	0	64	64	1.2	77
10.0132	1	WARNDON ROAD	PENDOCK RD	COLLITT CR	70	CO	L	0	70	70	1.2	84
10.0132	2	WARNDON ROAD	COLLITT CR	COLLITT CR	34	CO	R	70	104	34	1.2	41
10.0132	2	WARNDON ROAD	COLLITT CR	COLLITT CR	34	CO	L	70	104	34	1.2	41
10.0132	3	WARNDON ROAD	COLLITT CR	GUNELL PL	43	CO	R	105	142	37	1.2	44
10.0132	3	WARNDON ROAD	COLLITT CR	GUNELL PL	43	CO	L	104	147	43	1.2	52
10.0132	4	WARNDON ROAD	GUNELL PL	DUNN PL	100	CO	L	147	237	90	1.2	108
10.0132	4	WARNDON ROAD	GUNELL PL	DUNN PL	100	CO	R	148	245	97	1.2	116
20.2072	3	WATER STREET	MARTIN ST	GOVT HS DR	338	CO	R	144	482	338	1.2	406
10.0147	1	WATERSIDE BOULEVARD	E CRANERBOOK ROAD	GANNET DRIVE	81	CO	R			0	1.2	0
10.0147	2	WATERSIDE BOULEVARD	E GANNET DRIVE	JABIRU WAY	104	CO	R	81	185	104	1.2	125
10.0147	3	WATERSIDE BOULEVARD	E JABIRU WAY	SHOVELER WAY	113	CO	R	185	298	113	1.2	136
10.0147	4	WATERSIDE BOULEVARD	E SHOVELER WAY	LAKEVIEW DRIVE	63	CO	R	298	361	63	1.2	76
2523	1	WATT LANE	WATT PLACE	SHORT STREET	57	CO		0	57	57	1.2	68
10.3047	1	WATTLE STREET	MAPLE ST	JACKARANDA	120	CO	L	0	113	113	1.2	136
10.3047	2	WATTLE STREET	JACKARANDA	GRIFFITH	63	CO	L	120	179	59	1.2	71
10.3047	3	WATTLE STREET	GRIFFITH	BANKSIA ST	45	CO	L	183	221	38	1.2	46
10.3047	4	WATTLE STREET	BANKSIA ST	ASH ST	108	CO	L	229	329	100	1.2	120
10.3047	5	WATTLE STREET	ASH ST	ANZAC ST	219	CO	L	336	548	212	1.2	254
10.3047	6	WATTLE STREET	ANZAC ST	OLEANDER	102	CO	R	555	650	95	1.2	114
10.3047	6	WATTLE STREET	ANZAC ST	OLEANDER	102	CO	L	555	650	95	1.2	114
10.3047	7	WATTLE STREET	OLEANDER	GLOSSOP ST	96	CO	R	657	749	92	1.2	110
20.1069	2	WEDMORE ROAD	ALMA CR	END TBL/DR	421	CO	L	136	557	421	1.2	505
20.1069	3	WEDMORE ROAD	END TBL/DR	BALACLAVA	121	CO	L	557	678	121	1.2	145
20.1069	4	WEDMORE ROAD	BALACLAVA	PALOMINO	281	CO	L	678	798	120	1.1	132
20.1069	5	WEDMORE ROAD	PALOMINO	LITTON ST	45	CO	L	959	1004	45	1.2	54
10.8069	4	WERRINGTON ROAD	RANCE RD	GIPPS ST	136	CO	R	1569	1705	136	1.2	163
10.8069	5	WERRINGTON ROAD	GIPPS ST	THE KINGSWAY	80	CO	R	1705	1785	80	1.2	96
10.8069	6	WERRINGTON ROAD	THE KINGSWAY	WATER ST	173	CO	R	1785	1958	173	1.2	208
10.8069	7	WERRINGTON ROAD	WATER ST	GREAT WESTERN HWY	124	CO	R	1962	2082	120	1.2	144
10.8069	7	WERRINGTON ROAD	WATER ST	GREAT WESTERN HWY	124	CO	L	1958	2082	124	1.2	149
20.026	1	WESTERLY WAY	BLUE HILLS DRIVE	TORQUAY TERRACE	37	CO	L	0	37	37	1.5	56
20.026	2	WESTERLY WAY	TORQUAY TERRACE	GLENGARRY DRIVE	165	CO	L	37	202	165	1.5	248
2543	1	WETLANDS LANE	PATH 2	PATH 3	165	CO		0	165	165	1.2	198
20.0287	1	WILLIAM HOWELL DRIVE	MORRISON STREET	MARCUS CLARKE CR	101	CO	R	0	101	101	1.2	121
20.0287	2	WILLIAM HOWELL DRIVE	MARCUS CLARKE CR	PRITCHARD PL	16	CO	R	101	117	16	1.2	19
20.0287	2	WILLIAM HOWELL DRIVE	MARCUS CLARKE CR	PRITCHARD PL	16	CO	L	101	117	16	1.2	19
20.0287	3	WILLIAM HOWELL DRIVE	PRITCHARD PL	THE LAKES DRIVE	215	CO	R	117	332	215	1.2	258
2569	1	WILLORING LANE	WILLORING CR	HARRIS STREET	172	CO		0	172	172	1.2	206
30.3111	1	WILLOUGHBY STREET	JENSEN ST	ALBANY LN	83	CO	R	0	83	83	1.2	100
10.3042	1	WILLOW STREET	WATTLE ST	WATTLE LAN	29	CO	R	0	26	26	1.2	31
10.3042	1	WILLOW STREET	WATTLE ST	WATTLE LAN	29	CO	L	0	29	29	1.2	35
10.3042	2	WILLOW STREET	WATTLE LAN	ASH ST	137	CO	L	29	163	134	1.2	161
10.3042	2	WILLOW STREET	WATTLE LAN	ASH ST	137	CO	R	31	166	135	1.2	162
10.3042	3	WILLOW STREET	ASH ST	BANKSIA ST	111	CO	L	169	274	105	1.2	126
10.3042	3	WILLOW STREET	ASH ST	BANKSIA ST	111	CO	R	166	277	111	1.2	133
10.3042	4	WILLOW STREET	BANKSIA ST	JACKARANDA	105	CO	L	281	382	101	1.2	121
10.3042	4	WILLOW STREET	BANKSIA ST	JACKARANDA	105	CO	R	277	382	105	1.2	126
10.4056	7	WILSON STREET	CHN 146	MAMRE RD	65	CO	R	772	830	58	1.2	70
20.0202	1	WOLARA AVENUE	GARSWOOD ROAD	BUKARI WAY	147	CO	L	0	147	147	1.2	176
20.0202	2	WOLARA AVENUE	BUKARI WAY	KUKUNDI DRIVE	228	CO	L	147	375	228	1.2	274
20.3077	1	WOLSELEY STREET	MULGOA ROAD	GIBBES STREET	113	CO	L	0	113	113	1.2	136
20.3077	1	WOLSELEY STREET	MULGOA ROAD	GIBBES STREET	113	CO	R	0	113	113	1.2	136
20.0089	1	WOMRA CRESCENT	MURU DRIVE	WOLLABI CR	66	CO	R	0	66	66	1.2	79
20.0089	2	WOMRA CRESCENT	WOLLABI CR	KULAMAN CR	89	CO	R	66	155	89	1.2	107
20.0089	3	WOMRA CRESCENT	KULAMAN CR	KURPUN PL	90	CO	R	155	245	90	1.2	108
20.0089	4	WOMRA CRESCENT	KURPUN PL	NAOI PL	89	CO	R	245	334	89	1.2	107
20.0089	5	WOMRA CRESCENT	NAOI PL	TUGA PL	92	CO	R	334	426	92	1.2	110

Street Index	Block Index	Street Name	From	To	Road Length (m)	Path Type	Side of road	Start Chain (m)	End Chain (m)	Path length (m)	Width (m)	Area (sqm)
20.0089	6	WOMRA CRESCENT	TUGA PL	WOLLABI CR	60	CO	R	426	486	60	1.2	72
20.0089	7	WOMRA CRESCENT	WOLLABI CR	BULU DRIVE	24	CO	R	486	510	24	1.2	29
20.0089	8	WOMRA CRESCENT	BULU DRIVE	WARGON CR	77	CO	L	510	587	77	1.2	92
20.0089	9	WOMRA CRESCENT	WARGON CR	MURU DRIVE	298	CO	R	587	885	298	1.2	358
20.0302	1	WOODBROOK GROVE	BARRON FIELD DRIVE	CEDAR COURT	223	CO	L	0	223	223	2	446
20.0087	1	WOODI CLOSE	BURRA CL	JARRA CRES	80	CO	L	0	80	80	1.2	96
20.0087	2	WOODI CLOSE	JARRA CRES	JARRA CRES	151	CO	L	80	231	151	1.2	181
20.0087	3	WOODI CLOSE	JARRA CRES	END OF RD	265	CO	R	231	311	80	1.2	96
20.0121	1	WOODLANDS DRIVE	GLENMORE PARKWAY	LINARA CIRCUIT	54	CO	L	459	513	54	1.2	65
20.0121	2	WOODLANDS DRIVE	LINARA CIRCUIT	ORIOLE ST	364	CO	L	513	877	364	1.2	437
20.0121	3	WOODLANDS DRIVE	ORIOLE ST	THORNBILL CRESCENT	128	CO	L	877	1005	128	1.2	154
20.0121	4	WOODLANDS DRIVE	THORNBILL CRESCENT	THORNBILL CRESCENT	187	CO	L	1005	1192	187	1.2	224
20.0121	5	WOODLANDS DRIVE	THORNBILL CRESCENT	FAIRYWREN CL	96	CO	L	1192	1288	96	1.2	115
10.1058	1	WOODRIFF STREET	JAMISON RD	STAFFORD ST	472	CO	L	0	472	472	1.2	566
10.1058	2	WOODRIFF STREET	STAFFORD ST	RESERVE ST	205	CO	L	478	677	199	1.1	219
10.1058	2	WOODRIFF STREET	STAFFORD ST	RESERVE ST	205	CO	R	472	677	205	1.2	246
10.1058	3	WOODRIFF STREET	RESERVE ST	DERBY ST	82	CO	L	677	753	76	1.1	84
10.1058	3	WOODRIFF STREET	RESERVE ST	DERBY ST	82	CO	R	677	759	82	1.2	98
10.1058	4	WOODRIFF STREET	DERBY ST	LETHBRIDGE ST	127	CO	R	765	880	115	1.1	127
10.1058	4	WOODRIFF STREET	DERBY ST	LETHBRIDGE ST	127	CO	L	765	886	121	1.1	133
10.1058	5	WOODRIFF STREET	LETHBRIDGE ST	TINDALE ST	127	CO	L	886	1013	127	1.1	140
10.1058	5	WOODRIFF STREET	LETHBRIDGE ST	TINDALE ST	127	CO	R	892	1007	115	3.5	403
10.1058	6	WOODRIFF STREET	TINDALE ST	UNION LN	40	CO	L	1013	1051	38	1.1	42
10.1058	6	WOODRIFF STREET	TINDALE ST	UNION LN	40	CO	R	1019	1051	32	3.5	112
10.1058	7	WOODRIFF STREET	UNION LN	MASTERS PL	40	CO	R	1056	1091	35	1.1	39
10.1058	7	WOODRIFF STREET	UNION LN	MASTERS PL	40	CO	L	1056	1093	37	3.5	130
10.1058	8	WOODRIFF STREET	MASTERS PL	HIGH ST	53	CO	R	1096	1146	50	2	100
10.1058	8	WOODRIFF STREET	MASTERS PL	HIGH ST	53	CO	L	1093	1146	53	3.5	186
10.1058	9	WOODRIFF STREET	EDWARD PL	ALLEN PL	45	CO	L	0	45	45	1.7	77
10.1058	10	WOODRIFF STREET	ALLEN PL	HENRY ST	48	CO	L	45	93	48	1.7	82
10.1058	10	WOODRIFF STREET	ALLEN PL	HENRY ST	48	CO	R	45	93	48	1.5	72
10.1058	11	WOODRIFF STREET	HENRY ST	SOPER PL	45	CO	L	93	138	45	3.05	137
10.1058	11	WOODRIFF STREET	HENRY ST	SOPER PL	45	CO	R	93	138	45	2.8	126
11.0016	1	WORDOO STREET	POWER ST	FORRESTER	95	CO	L	0	95	95	1.2	114
10.1059	1	WORTH STREET	RODLEY AVE	VISTA ST	63	CO	L	0	63	63	1.2	76
10.1059	2	WORTH STREET	VISTA ST	UNION RD	92	CO	L	63	155	92	1.2	110
10.1059	3	WORTH STREET	UNION RD	UNION LN	63	CO	L	163	218	55	1.2	66
10.1059	4	WORTH STREET	UNION LN	GT WST HWY	66	AC	L	226	284	58	3	174
10.1059	4	WORTH STREET	UNION LN	GT WST HWY	66	BP	R	218	284	66	1.2	79
10.5061	6	WRENCH STREET	WILLIAM ST	HARROW ST	223	CO	L	400	611	211	1.2	253
10.5061	7	WRENCH STREET	HARROW ST	CAMBRIDGE ST	128	CO	L	623	745	122	1.2	146
10.5061	8	WRENCH STREET	CAMBRIDGE	CAMPTON ST	73	CO	L	745	814	69	1.2	83
10.5061	9	WRENCH STREET	CAMPTON ST	DEVON RD	20	CO	L	822	838	16	1.2	19
10.5061	10	WRENCH STREET	DEVON RD	HERBERT ST	319	CO	L	838	1151	313	1.2	376
10.5061	11	WRENCH STREET	HERBERT ST	VICTORIA	69	CO	R	1157	1226	69	1.2	83
31.1155	1	YORK ROAD	JAMISON RD	PRESTON ST	236	CO	R	0	236	236	1.2	283
31.1155	1	YORK ROAD	JAMISON RD	PRESTON ST	236	CO	L	0	236	236	1.2	283
31.1155	2	YORK ROAD	PRESTON ST	ABEL ST	269	CO	L	236	505	269	1.2	323
31.1155	3	YORK ROAD	ABEL ST	BATT ST	270	CO	L	505	775	270	1.2	324
31.1155	3	YORK ROAD	ABEL ST	BATT ST	270	GR	R	505	775	270	1.9	513
31.1155	6	YORK ROAD	MAXWELL ST	DENINTEND	143	CO	L	1188	1331	143	1.2	172
31.1155	15	YORK ROAD	TUKARA RD	STOKE CRES	236	AC	R	2730	2966	236	2.1	496
31.1155	16	YORK ROAD	STOKE CRES	BLACKFORD	85	AC	R	2966	3051	85	2.1	179
31.1155	17	YORK ROAD	BLACKFORD	OBADIAH PL	108	AC	R	3051	3159	108	2.1	227
31.1155	18	YORK ROAD	OBADIAH PL	COPAIN PL	100	AC	R	3159	3259	100	2.1	210
31.1155	19	YORK ROAD	COPAIN PL	BIRMINGHAM	61	AC	R	3259	3320	61	2.1	128
TOTAL										**301180**		**423649**

APPENDIX 5-D

EXISTING FOOTPATHS

SLA		On State & Regional Roads				On Council Roads				On All Roads			
		km	%##	km/ 1000 People	km/km^2	km	%##	km/ 1000 People	km/km^2	km	%##	km/ 1000 People	km/km^2
St Clair		0.4	1%	0.0	0.0	17.3	7%	0.6	0.9	17.8	6%	0.6	0.9
St Marys		10.5	44%	0.5	1.1	31.3	17%	1.6	3.2	41.8	20%	2.1	4.2
Emu Plains		6.3	32%	0.4	0.5	9.1	6%	0.7	0.7	15.4	9%	1.1	1.1
North Werrington		2.2	14%	0.1	0.2	15.6	9%	0.8	1.3	17.8	9%	0.9	1.5
South Werrington		1.5	8%	0.3	0.1	6.4	8%	1.2	0.6	7.9	8%	1.5	0.7
Penrith		17.0	46%	0.6	1.1	46.9	17%	1.7	3.0	63.9	20%	2.4	4.0
Glenmore Park		0.7	3%	0.0	0.0	32.8	16%	1.7	2.1	33.5	14%	1.7	2.2
Cranebrook		6.3	12%	0.3	0.3	28.2	14%	1.4	1.4	34.5	13%	1.8	1.8
North St Marys		3.9	44%	1.0	0.5	9.1	14%	2.3	1.2	13.0	17%	3.3	1.7
Sub-Total Urban	**Sum***	**48.7**	**21%**	**0.3**	**0.4**	**196.8**	**12%**	**1.2**	**1.6**	**245.6**	**13%**	**1.6**	**2.0**
	Actual**	**46.9**	**23%**	**0.3**	**0.4**	**195.6**	**12%**	**1.2**	**1.6**	**242.5**	**13%**	**1.5**	**2.0**
South Rural		0.0	0%	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.0	0.0
North Rural		0.4	0%	0.1	0.0	0.0	0%	0.0	0.0	0.4	0%	0.1	0.0
Sub-Total Rural	**Sum***	**0.4**	**0%**	**0.0**	**0.0**	**0.0**	**0%**	**0.0**	**0.0**	**0.4**	**0%**	**0.0**	**0.0**
	Actual**	**0.4**	**0%**	**0.0**	**0.0**	**0.0**	**0%**	**0.0**	**0.0**	**0.4**	**0%**	**0.0**	**0.0**
TOTAL LGA	**Sum***	**49.2**	**10%**	**0.3**	**0.1**	**196.8**	**9%**	**1.1**	**0.5**	**246.0**	**9%**	**1.4**	**0.6**
	Actual**	**46.9**	**12%**	**0.3**	**0.1**	**195.6**	**9%**	**1.1**	**0.5**	**242.5**	**9%**	**1.4**	**0.6**

* Sum of individual SLA values may exceed the actual total as some footpaths are on roads that form SLA boundaries and hence are considered in more than one SLA

** Actual total with no duplication of footpaths

\# Source: Council GIS existing footpath data sets (dated: 2005)

Proportion of road that is covered by footpaths

APPENDIX 5-E

EXISTING & PROPOSED FOOTPATHS

SLA		On State & Regional Roads				On Council Roads				On All Roads			
		km	%##	km/ 1000 People	km/km^2	km	%##	km/ 1000 People	km/km^2	km	%##	km/ 1000 People	km/km^2
St Clair		2.8	10%	0.1	0.1	35.3	14%	1.2	1.8	38.1	14%	1.3	1.9
St Marys		12.5	52%	0.6	1.3	40.3	22%	2.1	4.1	52.9	26%	2.7	5.4
Emu Plains		9.1	46%	0.6	0.7	20.2	14%	1.4	1.5	29.3	18%	2.1	2.2
North Werrington		4.5	30%	0.2	0.4	26.6	15%	1.3	2.2	31.1	16%	1.5	2.6
South Werrington		3.6	19%	0.7	0.3	11.3	13%	2.1	1.0	14.9	14%	2.8	1.4
Penrith		23.5	64%	0.9	1.5	68.5	25%	2.5	4.3	92.0	29%	3.4	5.8
Glenmore Park		0.7	3%	0.0	0.0	34.7	17%	1.8	2.3	35.4	15%	1.8	2.3
Cranebrook		14.3	27%	0.7	0.7	35.3	17%	1.8	1.8	49.6	19%	2.5	2.5
North St Marys		4.6	53%	1.2	0.6	17.6	26%	4.4	2.4	22.2	30%	5.6	3.0
Sub-Total Urban	**Sum***	**75.6**	**33%**	**0.5**	**0.6**	**289.9**	**18%**	**1.8**	**2.3**	**365.5**	**20%**	**2.3**	**2.9**
	Actual**	**71.4**	**35%**	**0.5**	**0.6**	**284.2**	**18%**	**1.8**	**2.3**	**355.6**	**20%**	**2.2**	**2.9**
South Rural		0.0	0%	0.0	0.0	0.0	0%	0.0	0.0	0.0	0%	0.0	0.0
North Rural		1.0	1%	0.1	0.0	0.0	0%	0.0	0.0	1.0	0%	0.1	0.0
Sub-Total Rural	**Sum***	**1.0**	**0%**	**0.1**	**0.0**	**0.0**	**0%**	**0.0**	**0.0**	**1.0**	**0%**	**0.1**	**0.0**
	Actual**	**1.0**	**0%**	**0.1**	**0.0**	**0.0**	**0%**	**0.0**	**0.0**	**1.0**	**0%**	**0.1**	**0.0**
TOTAL LGA	**Sum***	**76.6**	**16%**	**0.4**	**0.2**	**289.9**	**13%**	**1.7**	**0.7**	**366.5**	**14%**	**2.1**	**0.9**
	Actual**	**71.4**	**18%**	**0.4**	**0.2**	**284.2**	**13%**	**1.6**	**0.7**	**355.6**	**14%**	**2.1**	**0.9**

* Sum of individual SLA values may exceed the actual total as some footpaths are on roads that form SLA boundaries and hence are considered in more than one SLA

** Actual total with no duplication of footpaths

\# Source: Council GIS existing and proposed footpath data sets (dated: 2005)

Proportion of road that is covered by footpaths

APPENDIX 5-F

RAILWAY STATION~ 800m CATCHMENT AREA

SLA	Within SLA Area		Within Existing Developed Area		Within Urban Release Area		Within Future Developed Area	
	km^2	% *	km^2	% **	km^2	% #	km^2	% ##
St Clair	0.0	0%	0.0	0%	0.0	0%	0.0	0%
St Marys	1.0	10%	0.9	11%	0.0	-	0.9	11%
Emu Plains	2.7	20%	2.0	25%	0.0	-	2.0	25%
North Werrington	1.5	13%	1.0	15%	0.0	0%	1.0	10%
South Werrington	1.0	9%	0.4	11%	0.2	8%	0.6	10%
Penrith	2.0	13%	2.1	16%	0.0	-	2.1	16%
Glenmore Park	0.0	0%	0.0	0%	0.0	0%	0.0	0%
Cranebrook	1.5	8%	0.7	5%	0.5	12%	1.2	7%
North St Marys	1.0	14%	0.9	20%	0.0	0%	0.9	20%
Sub-Total Urban	**10.8**	**9%**	**8.0**	**11%**	**0.7**	**4%**	**8.7**	**10%**
South Rural	0.3	0%	0.0	-	0.0	0%	0.0	0%
South Rural	0.0	0%	0.0	-	0.0	0%	0.0	0%
Sub-Total Rural	**0.3**	**0%**	**0.0**	**-**	**0.0**	**0%**	**0.0**	**0%**
TOTAL LGA	**11.1**	**3%**	**8.0**	**11%**	**0.7**	**2%**	**8.7**	**8%**

~ Includes existing railway stations (Lapstone, Emu Plains, Penrith, Kingswood, Werrington and St Marys)
* % is the proportion of the SLA covered by the rail station 800m catchment
** % is the proportion of the existing developed areas covered by the rail station 800m catchment
# % is the proportion of the URA covered by the rail station 800m catchment
% is the proportion of the future developed areas covered by the rail station 800m catchment

- **Frequency of Service** - is a key attribute in the quality and practicality of a public transport service. Frequency in each of six adopted periods of the day was reported for each of the bus routes. The time periods adopted correspond to those adopted in the MoT's new Service Planning Guidelines and are:

  - Pre Peak. The period from first service until patronage warrants commuter peak time frequencies.
  - Commuter Peaks. Periods during the morning and afternoon where patronage warrants the operation of peak time frequencies.
  - Day Time. The period between the morning and afternoon commuter peak times (a ramping down and up of commuter peak frequency should apply before and after day time frequencies operate.
  - Night Time. The period following the afternoon commuter peak time (a ramping down of the commuter peak frequency should apply before night time frequencies commence) and the period following Saturday and Sunday daytime services.
  - Saturday Daytime. The period from first morning service to when Patronage warrants the operation of night time frequencies.
  - Sunday Daytime. The period from first morning service to when Patronage warrants the operation of night time frequencies.

  The frequencies sometimes varied within each of the time periods described above. In these cases an average over the period was calculated. This variation could be for a number of reasons including coordination with train services and other connection or timing issues.

  The definitions above were generally useful and practical in grouping service frequencies at various times of the day and week. It is noted that specific times of the day are not used and accordingly a peak period may occur earlier or later in different parts of Sydney.

- **Walking Distance to Transport Service.** The distance from a place of residence to a public transport service is key determining attribute of service availability. The area in hectares and percentage of each of the 11 study areas that is within a 400m distance of a bus service or 800m of a rail station has been measured. The distance to a bus service has been defined as a corridor rather than as circles around the bus stops due to the variability of the bus stop locations. In addition, the MoT's Guidelines adopt the same methodology and it was considered that using the same approach would assist in evaluation and negotiation in future bus contract processes. It is noted however, that this approach is limited in that a service with long distances between bus stops may not affectively be within walking distance even for those within the "corridor". A 800 metre wide corridor (400m either side of a bus route) was adopted for the purposes of this study as being within an area accessible to a bus route. Natural barriers to walking such as a river or freeway have been taken into consideration in defining the corridors. The areas contained within walking distance corridors were used to determine areas served by public transport.

- **Area Served by Public Transport.** The area in hectares and percentages of the study areas that is within the walking distances to bus routes and rail stations detailed above has been measured and reported. Correspondingly, the areas not served have also been reported.

- **Area Served by Frequency.** The area in hectares and percentage of each study area that is served by each of five service frequency groupings (during peak periods) has been measured. Services and their routes were examined together to determine what frequency of service is enjoyed by all locations in the Penrith LGA (and comparison areas). In some locations more than one service may serve an area. A determination was made of whether those services generally served the same key destinations. If so, the timetables were combined to measure combined service frequency. The frequency groupings are listed below.

- Less than or equal to every 15 minutes.
- Greater than 15, but less than or equal to 30 minutes.
- Greater than 30, but less than or equal to 60 minutes.
- Greater than 60 minutes.
- No service.

These results add greater understanding of public transport availability than if only the percentage of an area that is within walking distance of a service was reported.

- **Directness of Route.** Many bus services depart from the most direct route so that the route is more accessible and has a greater spatial coverage than if a direct route was used. However, these deviations involve a trade-off in that they often increase the travelling time for the service. The most direct route that would theoretically service the relevant suburbs without bypassing them has been determined. The length of this most direct route was compared to the actual route and the variance reported.

  The methodology for determining Directness of Route was developed following consultation with the Ministry of Transport. While their new Service Planning Guidelines discuss this measure as being subject to reporting and review under the new bus contracts each year, a method of measuring it has not yet been developed.

  For the purposes of this study, the route length was measured and divided by the length of what was determined as being the most direct route. This provides a "directness of route" value for each bus route with the most direct route having a value of 1.00 and less direct routes having a higher value.

  The determination of what is the most direct route is subject to opinion and therefore challenge. The most direct route from the origin to destination in an absolute sense is of no value as it would for follow as close to an "as the crow flies" route and would by definition not travel anywhere near most residential or employment areas. A definition has been adopted of the most direct route being that which serves a suburb in the most direct route possible. However, this still leaves room for interpretation and accordingly, a table has been included for future reference in Attachment D (2Plan 2005) showing which sections of each route were decided to not be direct.

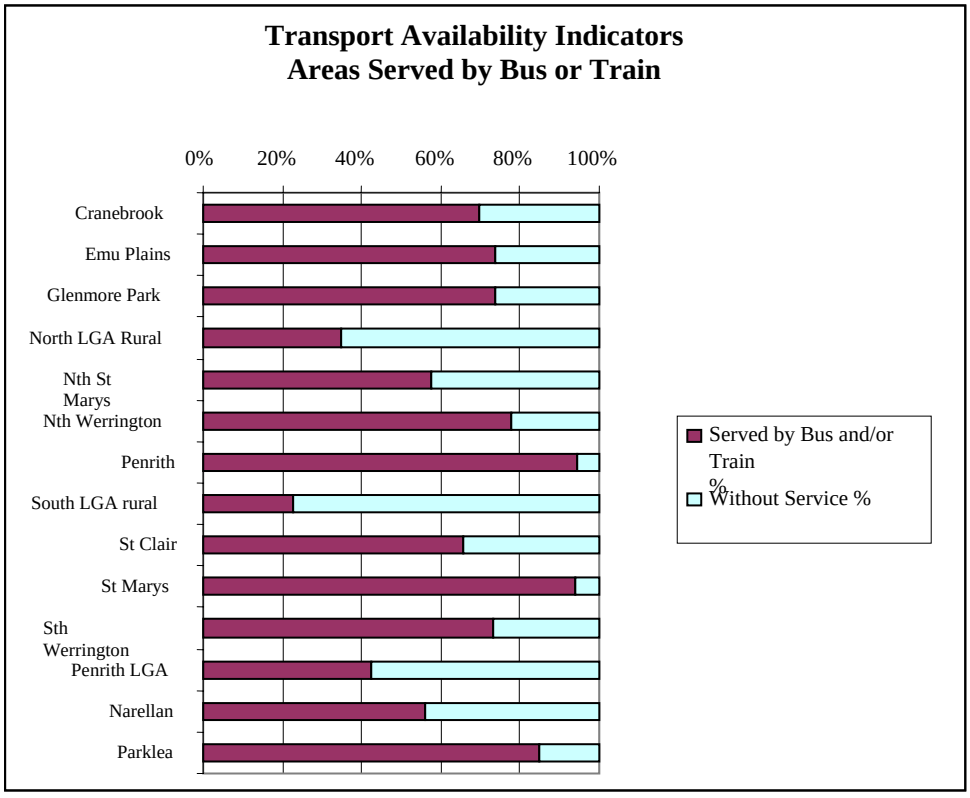
APPENDIX 5-H

TRANSPORT AVAILABILITY INDICATOR RESULTS

The Table and Figure below show the areas served by bus and/or train in each study area. It is noted that the definition of an area that is served by bus is that it is within 400 metres walking distance from a bus route. Areas defined as being served by train are within 800 metres of a train station.

Transport Availability Indicators - Areas Served by Bus or Train (within walking distance) based on bus routes as at 9 June 2004

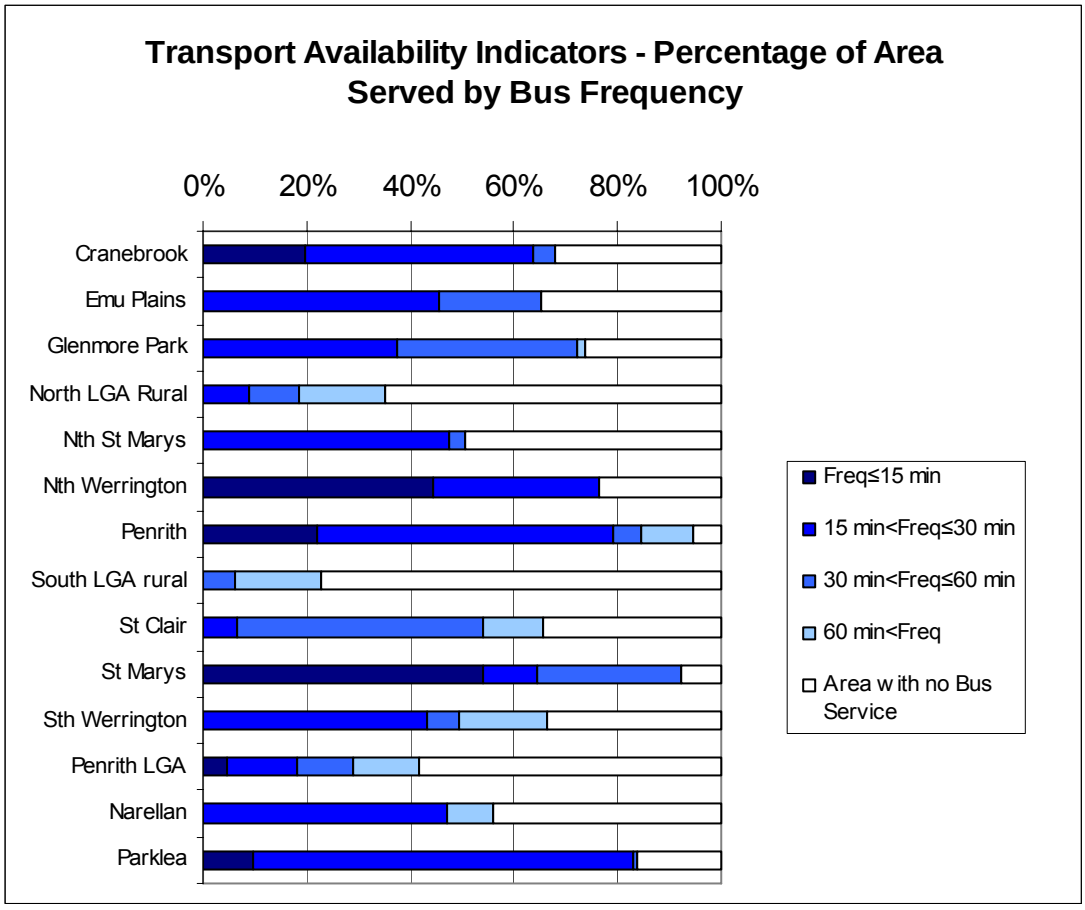
Study Area	Served by Bus and/or Train		Without Service		Total Area
	ha	%	ha	%	ha
Cranebrook	1372	69.9%	591	30.1%	1963
Emu Plains	1010	73.8%	359	26.2%	1369
Glenmore Park	1084	73.7%	386	26.3%	1470
North LGA Rural	4350	35.0%	8077	65.0%	12427
Nth St Marys	444	57.8%	324	42.2%	768
Nth Werrington	929	77.5%	269	22.5%	1198
Penrith	1525	94.6%	87	5.4%	1612
South LGA rural	3653	22.8%	12356	77.2%	16009
St Clair	1289	65.5%	680	34.5%	1969
St Marys	972	94.0%	62	6.0%	1034
Sth Werrington	817	73.4%	296	26.6%	1113
Penrith LGA	17445	42.6%	23487	57.4%	40932
Narellan	1707	55.9%	1344	44.1%	3051
Parklea	2043	84.7%	368	15.3%	2411



The areas in hectares and percentages of the study areas served by bus frequency are shown in the table and figure below.

Transport Availability Indicators - Areas Served by Bus Frequency based on routes as at 9 June 2004

Study Area	Area Served by Frequency Categories								Area with no Bus Service		Total Area
	Freq≤15 min		15 min<Freq≤ 30 min		30 min<Freq≤ 60 min		60 min<Freq				
	ha	%	ha	%	ha	%	ha	%	ha	%	ha
Cranebrook	385	19.6%	867	44.2%	83	4.2%	0	0.0%	628	32.0%	1963
Emu Plains	0	0.0%	625	45.7%	269	19.6%	0	0.0%	475	34.7%	1369
Glenmore Park	0	0.0%	552	37.6%	509	34.6%	23	1.6%	386	26.3%	1470
North LGA Rural	0	0.0%	1123	9.0%	1170	9.4%	2057	16.6%	8077	65.0%	12427
Nth St Marys	0	0.0%	364	47.4%	24	3.1%	0	0.0%	380	49.5%	768
Nth Werrington	530	44.2%	384	32.1%	0	0.0%	0	0.0%	284	23.7%	1198
Penrith	355	22.0%	918	56.9%	87	5.4%	165	10.2%	87	5.4%	1612
South LGA rural	0	0.0%	0	0.0%	959	6.0%	2694	16.8%	12356	77.2%	16009
St Clair	0	0.0%	131	6.7%	935	47.5%	223	11.3%	680	34.5%	1969
St Marys	559	54.1%	108	10.4%	289	27.9%	0	0.0%	78	7.5%	1034
Sth Werrington	0	0.0%	483	43.4%	66	5.9%	190	17.1%	374	33.6%	1113
Penrith LGA	1829	4.5%	5555	13.6%	4391	10.7%	5352	13.1%	23805	58.2%	40932
Narellan	0	0.0%	1441	47.2%	0	0.0%	266	8.7%	1344	44.1%	3051
Parklea	231	9.6%	1769	73.4%	19	0.8%	0	0.0%	392	16.3%	2411



The bus routes, their frequencies in the time periods adopted in the Ministry of Transport's Service Planning Guidelines and their directness of route are shown in the table below. It is noted that the directness of route is a factor of the actual length of the route divided by the most direct route. Accordingly direct routes have a value of 1.00 and less direct routes have increasingly greater values.

Transport Availability Indicators - Directness of Bus Route based on routes as at 9 June 2004

Area	Bus Route	Frequency						Directness of Route
		Pre Peak	Commuter peaks	Day time	Night time	Saturday Daytime	Sunday daytime	
Cranebrook	673	na	83	155	na	na	na	1.11
	677	na	43	102	na	na	na	1.00
	678	na	29	60	na	na	na	1.00
	782	30	28	32	NA	60	60	1.08
	784	NA	35	na	na	na	na	1.08
	785	38	30	30	27 then na	60	60	1.31
	786	42	27	30	30 then na	30	60	1.14
Emu Plains	688	na	30	60	na	49	106	1.50
	689	na	41	60	60 then na	53	na	1.06
Glenmore Pk	789	na	1service	na	na	na	na	1.04
	795	na	51	120	na	120	1 service	1.19
	797	30	30	30	60	60	60	1.17
	798	na	36	60	na	60	60	1.17
North LGA rural	673	na	83	155	na	na	na	1.11
	674	na	3 services	1 service	na	na	na	1.23
	677	na	43	102	na	na	na	1.00
	678	na	29	60	na	na	na	1.00
Nth St Marys	769	na	31	30	30 then na	30	60	1.00
	782	30	28	60*	na	60	60	1.08
Nth Werrington	673	na	83	155	na	na	na	1.11
	677	na	43	102	na	na	na	1.00
	782	30	28	32	na	60	60	1.08
	783	na	38	na	na	na	na	1.46
	785	38	30	30	27 then na	60	60	1.31
Penrith	673	na	83	155	na	na	na	1.11
	677	na	43	102	na	na	na	1.00
	688		na	27	4 services	40	60	1.50
	781	na	4 services	na	na	na	na	1.24
	782	30	28	32	na	60	60	1.08
	789	na	1 service	na	na	na	na	1.04
	790	na	28	30	55 then na	60	60	1.33
	791	30	26	30	30 then na	na	na	1.00
	794	na	30	60	na	na	na	1.00
	795	na	51	120	na	120	1 service	1.19
	797	30	30	30	60	60	60	1.17
	798	na	36	60	na	60	60	1.17
	835	na	3 services	na	na	na	na	1.03
South LGA rural	781	na	4 services	na	na	na	na	1.24
	789	na	1 service	na	na	na	na	1.04
	795	na	51	120	na	120	1 service	1.19
	798	na	36	60	na	60	60	1.17
	835	na	3 services	na	na	na	na	1.03
	836	na	3 services	na	na	na	na	1.00
St Clair	772	35	32	30	30 then na	60	60	1.00
	773	30	32	30	40 then na	60	60	1.51
	835	na	3 services	na	na	na	na	1.03
St Marys	769	na	31	30	30 then na	30	60	1.00
	770	na	48	60	na	120	120	1.15
	771	30	28	30	30 then na	60	60	1.11
	772	35	32	30	30 then na	60	60	1.00
	773	30	32	30	40 then na	60	60	1.51
	781	na	4 services	na	na	na	na	1.24
	782	30	28	60*	na	60	60	1.08
	790	na	28	30	55 then na	60	60	1.33
Sth Werrington	781	na	4 services	na	na	na	na	1.24
	789	na	1 service	na	na	na	na	1.04
	790	na	28	30	55 then na	60	60	1.33
	798	na	36	60	na	60	60	1.17
	835	na	3 services	na	na	na	na	1.03
Narellan	850 Busabout	na	62	111	na	na	na	1.00
	894 Camden Busways	na	na	60	na	60	na	1.13

Area	Bus Route	Frequency						Directness of Route
		Pre Peak	Commuter peaks	Day time	Night time	Saturday Daytime	Sunday daytime	
	894 N Vale Busways	29	26	30	60	30	60	1.15
	895 Busways	30	29	60	na	60	120	1.00
	896 Narellan Busways	30	28	30	60	30	60	1.05
	896 Harr Pk Busways	35	27	60	60	60	120	1.10
	900 Picton Coaches	na	Only 1 service	Only 2 services	na	Only 2 services	na	1.00
Parklea	730 Busways	na	50	na	na	na	na	1.00
	735 Busways	na	Only 2 services	na	na	na	na	1.00
	740 Busways	30	27	37	60	30	60	1.00
	741,R,S Busways	60	23	30	60	30	30	1.72
	745	na	42	60	na	Only 4 services	na	
	751/752 Busways	30	20	30	60	30	30	1.46
	753 Busways	30	21	22	60	20	30	1.19
	754/756 Busways	20	17	24	60	20	60	1.24

APPENDIX 5-I

BUS STOP~ 400m CATCHMENT AREA

SLA	Within SLA Area		Within Existing Developed Area		Within Urban Release Area		Within Future Developed Area	
	km²	% *	km²	% **	km²	% #	km²	% ##
St Clair	10.8	55%	9.0	94%	0.8	16%	9.8	67%
St Marys	8.7	88%	7.6	95%	0.0	-	7.6	95%
Emu Plains	9.0	67%	6.7	87%	0.0	-	6.7	87%
North Werrington	8.7	72%	6.8	97%	1.1	32%	7.9	76%
South Werrington	6.7	61%	3.3	81%	1.2	51%	4.5	70%
Penrith	13.9	87%	13.1	98%	0.0	-	13.1	98%
Glenmore Park	9.7	64%	7.9	95%	0.2	10%	8.1	81%
Cranebrook	11.5	59%	9.0	74%	0.7	19%	9.8	61%
North St Marys	3.3	44%	2.7	59%	0.0	0%	2.7	58%
Sub-Total Urban	**82.4**	**66%**	**66.1**	**88%**	**4.0**	**24%**	**70.1**	**77%**
South Rural	14.7	9%	0.0	-	0.0	0%	0.0	0%
South Rural	19.3	16%	0.0	-	0.7	3%	0.7	3%
Sub-Total Rural	34.0	12%	0.0	-	0.7	3%	0.7	3%
TOTAL LGA	**116.4**	**29%**	**66.1**	**88%**	**4.7**	**12%**	**70.8**	**61%**

~ Includes all bus stops included in MoT GIS database (TSN)
* % is the proportion of the SLA covered by the bus stop 400m catchment
** % is the proportion of the existing developed areas covered by the bus stop 400m catchment
# % is the proportion of the URA covered by the bus stop 400m catchment
% is the proportion of the future developed areas covered by the bus stop 400m catchment

BIKES ON BUSES

It is important to enable easy interchange between different modes, particularly walking, cycling and public transport. The integration between walking and public transport is pursued through improved connectivity to public transport stops, however there is limited opportunities to interchange between cycling and public transport, particularly buses. Bike parking facilities can be provided at major station (i.e. rail) and interchanges; however there is little opportunity for this at regular bus stops. 'Bikes on buses' is therefore an opportunity to improve integration of cycling and buses. This concept is currently being pursued in Brisbane, Queensland, and involves installing special bike racks on the front of buses. These racks need to enable quick and easy loading and unloading of bikes and generally can hold two bikes. Bus routes which have bike racks on the front require special consideration of the traffic network (i.e. traffic management devices) to ensure that buses can still easily make their way along the route.

BICYCLE USER GROUPS

Bicycle User Groups (BUGs) are active, local groups involved in various cycling activities. Examples of some BUG activities include:

- organise group rides;
- organise and keep members up to date on other cycling events (e.g. promotional events, charity rides);
- advocacy work, including campaigning for better cycling facilities;
- working with local councils to achieve good outcomes for cycling;
- provide information about cycling facilities, particularly in their local areas

BUGs are an effective way to support existing cyclists in an area as well as encourage more people to cycle in their local area and to work. In Sydney, these groups are supported by Bicycle NSW.

CAR POOLING

Car pooling, also known as ride sharing, is the sharing of a car journey by two or more people, commonly to the same destination (e.g. a workplace) or within the same area. These can be formal or informal arrangements (i.e. organised between co-workers or by a private company that matches riders). The sharing of trips, particularly by co-workers, is an efficient and cost-saving way to travel for those involved and can reduce the number of cars travelling every day. This type of travel allows people to maintain having the flexibility of a private car, whilst travelling in a more sustainable manner than if they had travelled as a single vehicle occupant.

Some potential issues that should be considered with car pooling include:

- participants require a guaranteed ride home (e.g. if they have to work late and they miss their ride, they receive a free taxi ride);
- the pooling service takes people to where they want to go;
- the service needs to be reliable (e.g. on time, regular, informed if any changes);
- social interactions should be managed to avoid potential conflict (e.g. smoking, non-smoking, radio stations etc.);
- incentives should be provided to encourage people to participate (e.g. preferential parking at the destination);
- provide trip origin suburban/sub-regional commuter parking areas such as in the Gosford/Wyong LGAs along the approaches to the F3 freeway;
- provide alternative travel for use during the day if necessary (e.g. shuttle service if not in walking distance to shops).

CAR SHARING

Car sharing schemes are car rental systems which have a membership basis. The vehicles can be rented out by members for long or short periods (i.e. some schemes even allow half and hour to an hour rental) at affordable rates. Rates should be kept at an affordable cost even for low income earners in order to increase the population that can use the system as well as providing travel choices for these groups. These 'user pays' systems are usually introduced in close proximity to residential areas and effectively provide a viable alternative to private car ownership. In addition to being nearby residential uses, car share systems could be most effectively used in mixed-use areas. A mix of land uses will increase the type of use of the vehicles. For example, a car may be used for business trips during the day and recreational trips at nights and on weekends.

Typically, such schemes are most effective as a replacement to the private car for users that travel less than around 10,000km a year. Furthermore, such a system should be supported by high quality public transport services. These systems are intended to reduce the need to own a car when it is only being used infrequently and not for day to day travel. Therefore, there is a need to provide for day to day travel needs with high quality public transport, walking and cycling networks.

A car share system also needs to be easily accessible for all potential users. One of the options to increase access to the system, which is being implemented in some inner Sydney LGAs, is to provide designated on street parking spaces for these vehicles. Designated parking means that users will always be able to find a parking space and will also make the system more visible to a wider range of users. For example, on street parking spaces could be provided in close proximity to a public transport station to enable easy interchange.

Important elements in a car sharing system include:

- economic viability of the system – this relates to the catchment using the system. The broader the catchment, the more a vehicle will be used;
- proximity to public transport – these systems support reduced car ownership however public transport cannot meet all travel needs. Therefore, locating these services close to major public transport stops/stations encourages people to change between modes rather than driving the full distance;
- convenience – this also relates to proximity to public transport as well as location of the service within a centre. The service must be easily accessible for users to make it a convenient travel option;
- fleet quality and mix – the fleet of shared cars should be good quality and provide mix of vehicle types (e.g. recreational vehicles, small city cars and so forth).

COMMERCIAL CAR PARKS

Commercial car parks are common structures within city centres and provide large amounts of parking at a cost for people travelling to the centre for work, recreation and other purposes. In a transit oriented development, extensive commercial car parks are inappropriate development. TODs are intended to increase use of public transport, walking and cycling to access the centre, and as such large amounts of parking would not support this. A policy approach to the provision of commercial car parks in TODs could be considered.

COMMUNITY BASED TRANSPORT

Community based transport can be provided where the needs of individuals, groups or communities are not met by conventional transport systems, including private vehicle, public transport, commercial transport or taxis. These conventional systems may not be available or suitable in some communities or situations. It is therefore necessary to fill these transport gaps with other options to deliver access to the necessary services, facilities and even recreational needs. Community based transport may help to bridge this gap and is often provided in the form of community cars, community buses, taxis (with subsidised fares for particular users), or brokering existing commercial vehicles/services. Common features of community based transport include:

- transport that meets the needs of a specific target group (e.g. elderly, youth, people with disabilities);
- the structure of the transport is tailored towards the users of the service (i.e. timetable, fare structure, vehicle type);
- transport services usually operate on-demand, door to door and/or on fixed routes and at certain times/days;
- transport services will run either short or long distance, depending on the needs of the users (refer to Councils bus demand study).

'CYCLOVIA'

'Cyclovia' is an innovative concept being implemented throughout the world where a street, or section of street, is temporarily closed to motorised vehicles on a regular basis (e.g. every Sunday). Pedestrians and cyclists are then free to roam the street. Car access can still be gained to some properties in special circumstances; however these cars are usually escorted at a very low speed (i.e. walking speed, approximately 8km/h). In addition, vehicles can still gain access across the street, typically only at signalised intersections, to allow the continued functioning of the wider street network.

The cyclovia concept is a fun and festive way to promote walking and cycling. Festivals and other community events often form part of a cyclovia, and as such these are great activities to encourage more people to walk and cycle. Some of the key characteristics of a cyclovia, as highlighted on the 'cyclovia' website (http://www.cyclovia.org/), are as follows:

- characteristics of the road/s selected - boulevards, local streets, arterial roads and even highways can be used for Cyclovias. The key is to select roads attractive to locals, accessible and long enough for people to enjoy cycling, rollerblading or walking;
- intersections - during a Cyclovia, cars are still able to cross at signalised intersections, minimising the impact on private car use and mobility in the surrounding areas. In most cases, signalised intersections maintain normal operation with the support of marshals;
- volunteers - Cyclovias are usually run by volunteers. They are commonly responsible for supporting intersections, providing information to participants and, in some cases, are also trained to provide first aid. Volunteers are fundamental to making Cyclovias sustainable in the future. The size of the Cyclovia will determine the number of volunteers required.

END OF TRIP FACILITIES

Bicycle parking is a cheap and effective way to encourage more people to cycle. Bike parking facilities should be provided within a development (i.e. for residents and workers through DCP requirements) as well as throughout an area. The provision of casual parking for people travelling to an area ensures that it is convenient for them to ride to the area. A range of short stay and long stay parking should be provided for these users (e.g. inverted 'u' racks, bike cages, lockers).

End of trip facilities (i.e. showers, lockers) should also be provided in conjunction with bike parking, particularly in workplaces. Major public end of trip facilities can also be provided in key activity areas, such as the city centre. Brisbane is currently constructing a Cycle Centre beneath King George Square in the CBD. This Cycle Centre will provide parking, showers, lockers and laundering services for commuters in the CBD. A lack of end of trip facilities for short stay and long stay users is a significant barrier to walking and cycling.

HIGH DENSITY DEVELOPMENT

High density development around key activity nodes increases opportunities for walking and cycling trips. If higher densities are achieved around these nodes, for example retail areas or public transport stations, that node has a higher catchment within walking distance. Demand for trips by car is therefore reduced as more people are closer to their destination.

IMPROVE PASSENGER FACILITIES

Improved passenger facilities at public transport stops, stations and interchanges can increase comfort and convenience for these users. Improvements can be low cost with a high gain, making it more comfortable and safe to catch public transport. Improvements may include the provision of:

- bus shelters;
- timetable and route information;
- real time information (i.e. minutes to next bus);
- directional and way-finding signage;
- lighting at the stop/station and on key routes leading to it;
- improved pedestrian access to stops/stations/interchanges.

INTEGRATED PUBLIC TRANSPORT TICKETING

An integrated ticketing system for the Sydney metropolitan region is to be implemented by the end of 2007. 'Tcard' will be a cashless system, using contactless smart card technology, which will allow more efficient loading onto public transport, particularly buses. Furthermore, the system will allow more seamless interchange between the different modes, including train, bus, ferry, light rail and monorail. This system will enhance the pricing reform that took place in 2005 with a single fare scale for all public transport operators.

LOBBYING

It is important for Local Government to act as an advocate to the State Government and remain ever vigilant in lobbying and pursuing the State Government for good sustainable transport options. The State Government owns much of the infrastructure and controls the public transport services. However, Local Government often understands the needs of its community better and is in a position to act on behalf the community toward the State Government.

LOCAL BUS PRIORITY MEASURES

The reliability of public transport service can often be a deterrent to changing travel behaviour. This is particularly the case with buses which must compete with traffic, especially in peak periods. There is therefore the potential to provide more adequately for buses through priority measures in the road network. Some potential priority measures include:

- dedicated bus lanes on approaches to congested intersections to enable buses to get to the front of the queue;
- bus bypass lanes (e.g. left turn only, buses excepted);
- bus priority at traffic signals (i.e. queue jumps);
- bus only links;
- additional bus lanes, transit lanes and clearways.

MONETARY CONTRIBUTIONS IN LIEU OF PARKING

Contributions in lieu of parking are common throughout Australia and overseas. Typically, these contributions are used to fund the provision of the required number of parking spaces in another location, usually a parking station located nearby. Thus the development provides the necessary amount of parking, however not on site. This has some benefits as it adds to the pool of public parking available in an area with parking stations are typically located close to key activity areas, thus limiting the need for additional trips. Another option that has been implemented in Inner city Councils in Sydney, is to use the monetary contributions to fund the provision of public transport, walking and cycling infrastructure through a Section 94 transport fund.

NEW HOME OWNER PACKAGE

It is important to target new home owners in new development areas as this group of the population has not yet established travel patterns and habits. A lack of information or misperceptions about sustainable travel choices are often deterrents to using these travel modes. The early provision of correct and abundant information in the form of a new home owner's package is therefore an important tool in establishing sustainable travel behaviour in growth areas.

The package is intended to be an information package as well as providing incentives for sustainable travel. Examples of the contents of a home owner's package include:

- information on available public transport services;
- information on existing and proposed (including timing for delivery) pedestrian and cycle networks;
- information on cost savings associated with reduced use of a car, especially doing away with a second household car;
- a one or two year public transport pass;
- subsidised public transport passes for residents after the first one or two years;
- a free bike with each home purchase.

These are some of the possibilities for a home owner's package. The provision of information and incentives at an early stage may greatly increase the chance to instil in new areas a culture of sustainable travel. It is assumed that sustainable transport infrastructure is in place (ie bike paths, footpaths, bus services etc) is in place for use.

OFF STREET PARKING

Cost is one the key factors in people's travel choices. To encourage more people to use public transport, these costs should be competitive with the cost of parking, particularly in the city centre. Off street parking station fees can be increased to achieve this.

PARK AND RIDE STATIONS

Park and ride stations along major public transport routes (typically rail and busway corridors) are common throughout Australia and overseas. These stations provide the opportunity for people to catch public transport to their final destination, leaving their car at a convenient location. There is some mixed debate about park and ride stations and whether or not it results in desired outcomes. This option can be explored, particularly for areas on the urban edge beyond which there is little public transport service. Providing park and ride facilities in these outlying areas may reduce the number of people choosing to drive all the way to their final destination, such as the CBD. It is also convenient to place park and ride facilities near shopping and other services in order to reduce multiple trips (e.g. people picking up groceries on the way home from work).

The Sydney Metropolitan Strategy identifies that additional or upgraded park and ride commuter stations will be considered in areas where there are limited access options and already high demands for commuter parking at rail stations. In addition, the Urban Transport Statement identifies the need to investigate private sector investment in commuter car parks.

PARKING LICENSING SCHEMES

Parking licensing schemes require owners or users of parking spaces to pay an annual fee for a parking license. These schemes are already in place in Australia, including Sydney and Perth. Special exemptions are required in these schemes so that certain people/groups are not unfairly disadvantaged. Exemptions typically include disabled parking, emergency vehicles, residential units, loading bays for businesses and so forth. The funds received from parking licensing schemes may be used for a number of other travel behaviour change programs or infrastructure. For example, in some existing case studies, the revenue from these licensing schemes is used to fund the provision of public transport infrastructure and services.

The Sydney Metropolitan Strategy has identified that the Parking Space Levy should be extended to major centres.

PARKING PRICING SCHEMES

The cost of travel is one of the key factors in the travel mode decision. Parking pricing is therefore a potential leverage in encouraging more people to use sustainable modes. Differential parking pricing schemes have been implemented within Australia and overseas, based on the locality. For instance, higher parking fees (on and off street) have been charged for car parks that are more convenient, for car parks located in close proximity to public transport, and for long stay parking. Increasing parking fees in these localities can be a way of shifting the cost of providing car parking to those who directly use it, rather than general tax and rate payers. More importantly however, increasing parking costs where there is high public transport accessibility makes public transport more attractive, thus encouraging people to use sustainable modes, particularly in congested areas.

REDUCED PARKING SUPPLY AT TRIP END

Reduced parking supply can be required in areas with high public transport accessibility, for example in transit oriented developments. This approach has been implemented in Australia and overseas (e.g. Sydney City Council, North Sydney City Council, Vincent WA, Denver USA). In Sydney, maximum and minimum parking rates are applied for areas with high, medium and low public transport accessibility (these areas are mapped). These reduced rates reflect the travel options for people living and working in the area, allowing for increased use of public transport, walking and cycling. In Vincent, the reduction of parking supply is applied through a percentage reduction to normal parking rates. Reductions are applied according to proximity to public transport, publicly available parking, provision of end of trip cycling facilities and the mix of land uses.

Research (the Warren Centre research for Greater Sydney) has shown that people's travel choices are most influenced by parking supply at the trip end and the cost of travel. Therefore, a reduced supply of parking at a trip end with high quality public transport facilities can encourage greater use of public transport.

SELF-CONTAINMENT

For new growth or redeveloping areas, achieving a level of self-containment could assist in reducing car reliance, particularly for longer distance commuter trips. The aim of self-containment is to provide a mix of land uses within a catchment to meet the daily needs of the population within. For example, this may include work, shopping and recreation needs. If sufficient land is designated to these uses, there will be reduced demand for local residents to travel outside of their local area to meet their daily needs. Self-containment is more difficult to achieve in terms of employment, particularly in outlying areas in an urban region where there are major and suburban business centres already established. It is more difficult for emerging areas to compete with the established business centres. Therefore, effective land use planning is necessary to understand the needs of future populations in order to meet these demands and ultimately reduce long distance trips by car.

TAXI SERVICES

Taxi services, as public use vehicles, complement public transport networks and extend access beyond centres. A State government review of the taxi industry in NSW was conducted in 2004, with the result that the following options to improve taxi services are being examined (as stated in the Sydney Metropolitan Strategy):

- encouraging the shared use of taxis;
- alternative fare structures that may increase demand and revenue, such as 'loyalty pricing';
- increased numbers of taxi vehicles;
- better integration with public transport services.

TELECOMMUTING/ WORK FROM HOME

In general, people are travelling further to get to work every day as residential areas continue to spread out from city centres. However, with advances in technology, there is now greater flexibility in what can be achieved away from work. Improved communication systems now enable people to work from home where possible and submit work electronically. Encouraging employers to allow employees to work from home may consequently reduce every day demands for private car commuting (even if only minimally).

TEMPORAL SHARING OF PARKING

Temporal sharing of parking spaces is usually applied in mixed use areas or City Centre areas. The mix of land uses means that there is a range of peak parking demands. Where these peak demands do not overlap, parking spaces can be shared. For example, office parking may be used by restaurant patrons at night. Temporal sharing of parking requires appropriate management to ensure that the system operates effectively and protect against undesirable outcomes (e.g. overspill parking if demand times overlap).

TRANSIT ORIENTED DEVELOPMENT

The planning and development of transit oriented developments (TODs) throughout a region can impact on overall mode shares with increased walking, cycling and public transport use in these areas. A TOD should be based around a high quality and high frequency transit service, such as a rail station or busway station. Development in these areas should be higher density and mixed use. The mix of land uses should be transit supportive, for example a mix of residential, retail, commercial and convenience uses (e.g. dry cleaner, newsagent). This mix of uses will provide employment for some local residents within walking or cycling distance. The convenience land uses will also reduce demands for vehicle trips after work (e.g. need to buy milk on the way home). Highly accessible public transport in close proximity to residential uses also reduces driving demands for trips to work and school by providing a convenient alternative to the private car.

TRANSPORT ACCESS GUIDE (TAG)

A Transport Access Guide presents ways to reach a site or venue using low-energy forms of transport such as public transport, walking or cycling. It can take many forms - from a map printed on the back of business cards or invitations, to more comprehensive information provided, for example, to new staff as part of an induction kit.

TRANSPORTATION MANAGEMENT ASSOCIATIONS

Transportation Management Associations are a mechanism that has arisen in the US in response to major transport issues in suburban employment nodes. These groups, generally made up of volunteers from various employers, seek to promote change and improvement in transport systems in their area as well as provide services to address transport issues specific to their area. Typically, these groups are non-profit organisations self funded through levies. Examples of programs and initiatives that can be implemented by TMAs include:

- rideshare or car pooling;
- guaranteed ride home;
- walking and cycling network improvements;
- financial incentives for 'sustainable' commuters;
- shuttle services;
- transport access guides.

In summary, TMAs are small organisations that can be set up to implement and manage travel behaviour change programs in specific areas, usually major employment nodes.

TRAVEL BEHAVIOUR CHANGE PROGRAMS

Travel behaviour change programs are being used increasingly throughout Australia, implemented under the TravelSmart branding in all states. TravelSmart programs encourage voluntary travel behaviour change through increasing awareness, improved access to information and other opportunities. Typical TravelSmart programs target workplaces, schools, destinations and communities. Each program operates differently, however each is data intensive, requiring detailed information about people's travel needs, particularly in the community and workplace programs. This data collection helps to identify people that are willing to change their travel behaviour and consequently to develop individualised packages of information to assist them in doing this. Information provided to participants in a communities program can include:

- public transport timetables;
- journey planners;
- cycling and walking maps;
- information on bicycle care and maintenance;
- healthy lifestyle information;
- local access maps (showing community facilities, cycleways, and public transport information);
- more personalised assistance (such as visits by public transport operators).

The Sydney Metropolitan Strategy identified that TravelSmart programs would be targeted in future in regional cities (including Penrith), subject to availability of funding. Key programs include:

- households;
- centres with workplaces and major trip generators;
- schools.

TRAVEL COORDINATOR

In order to implement a range of travel behaviour change programs and mechanisms successfully, there is a need to employ a responsible person or group. This person or group would fulfil the role of a travel coordinator and would be responsible for the delivery and management of all travel behaviour programs. Potential responsibilities for a travel coordinator include:

- marketing of travel behaviour programs, public transport and walking and cycling networks;
- liaising with government, developers, the community and other relevant groups;
- provide information to residents and businesses in a timely manner (e.g. of new public transport services);
- coordinate/manage travel behaviour programs (e.g. new home owner's package).

TRAVEL PLAN

Employee travel programs, or green travel plans, are workplace initiatives undertaken by the employer and are generally appropriate in large workplaces. The aim of these programs is to provide transport options and encouragement for employees in a workplace to encourage more sustainable travel. In order to develop a comprehensive travel plan, surveys are undertaken to understand travel modes to work, JTW origins and times, barriers to using sustainable modes, and so forth. This data helps to develop initiatives that are responsive to employees needs.

Some of the minor measures that could be introduced through a green travel plan include:

- bike parking and end of trip facilities;
- facilitate group JTW walk and cycle travel;
- training sessions for cyclists (including bike maintenance);
- providing a fleet of work bicycles and/or public transport passes for employees to travel to meetings;
- extra leave (e.g. two days) for employees that walk/cycle to work.

Some major initiatives that could be considered in a workplace include free yearly public transport passes for employees, a free employee shuttle bus from the nearest public transport station/s to the workplace and so forth. Other measures may also need to be implemented by the employer to encourage more sustainable travel, such as flexible work hours to fit in with convenient public transport travel times.

WALKING AND CYCLING NETWORKS

Walking and cycling are generally viable alternatives for travel over short distances. As such, short trips can be targeted for change to walking and cycling. This can be achieved by providing high quality walking and cycling networks throughout all areas, particularly with 5-10km of key activity areas. Some of the key aims in providing walking and cycling networks include the following:

- connectivity – routes should connect to surrounding networks and to common attractions and services (e.g. shopping, public transport);
- attractiveness – routes should provide a high level of amenity in the path environment to attract people to use the facility;
- safety – the network design and construction prevents against accidental and intentional injury (i.e. crime prevention through environmental design);
- convenience – the route provides a quick and easy mode of transport;
- comfort – the route and associated infrastructure (e.g. seating, shade) makes users comfortable and provides protection from the weather;

- legibility – the route is navigable and users understand the flow and function of the route;
- accessibility – the route caters for all potential users, including those with limited mobility;
- social activity – the street environment does not prioritise traffic movements and places for emphasis on an active walking environment (this is more appropriate in centres/on main streets).

Walking and cycling is also important outside of key centres and should be provided for recreational and long distance commuters. Examples of initiatives being pursued in the area include rail trails, and grade separation at major barriers (e.g. rail line, major road).

WAY-FINDING SIGNAGE

A way-finding signage strategy for a city centre is a simple method for encouraging people to walk, cycle or catch public transport. People often rely on the car for trips that can easily be made by other modes due to a lack of or poor access to information. A way-finding signage strategy can provide easy access to this information and would include key destinations, walking and cycling routes, public transport information, walking distances, key points of interest and so forth. Signage typically includes two types of signs, including map-based signs (i.e. 'you are here') to help orient people, and show routes and pointer/directional signs to help people along the route.

UN-BUNDLED PARKING

To encourage reduced car ownership and use, un-bundled parking provision can be investigated in residential and commercial development. In this approach to parking supply, the parking spaces are excluded from a lease and/or purchase, thus requiring the person taking a lease or making a purchase to pay an additional cost for a car park on the site. Residents and businesses are thus provided with a choice about whether or not to have a car space.

This is a potential cost saving for residents and businesses (e.g. purchase price of a unit is lower without a car space) and therefore aim to encourage people to choose sustainable modes of transport. This approach to parking supply is particularly appropriate in highly accessible, high density activity centres where these centres will allow more trips to be taken by walking, cycling and public transport, thereby reducing the need for private car ownership.

UNDERGROUND PARKING

The location of parking can impact directly on the pedestrian and cycle network with an area. In particular, parking at street level, while highly prized by car drivers, can be unattractive, thus detracting from the urban walking environment. In addition, parking at grade can increase conflict between pedestrians, cyclists and vehicles. Locating car parking underground can assist in reducing these conflicts, thus making the area a more safe and attractive environment to walk in. In cases where underground parking is provided, it is common practice to provide retail parking at the level closest to the street to ensure convenient parking is provided for these short stay users (i.e. priority is provided to short stay retail users rather than long stay commuter parkers).

APPENDIX 7-B
PARS REPORT RECOMMENDATIONS

The initial PARS report recommended the following actions:

- Council endorse the findings of the Study (with minor corrections) as the basis for negotiations with release area developers and the RTA for monetary contributions towards upgrading the regional infrastructure road networks
- A deputation be made to the Minister for Roads to expedite the RTA network upgrading of the existing network deficiencies identified in the Study
- A deputation be made to the Minister for Roads and to the Minister for Planning to develop a funding strategy for the timely delivery of future upgrades to meet the demands of growth as identified in the study

In addition, PARS identified a list of improvements to the arterial road network that would need to take place between 2004 and 2016 to provide adequate capacity on the arterial road network. The revision of PARS with specific focus on the proposed urban release areas yielded the same recommendations:

- **Improvements 2004**
  - Great Western Highway/Parker Street – install dual right turn bays on all approaches
  - Great Western Highway/Castlereagh Rd – extend Jane Street to Victoria Bridge approach
  - Western (M4) Motorway /Leonay Pde – reconstruct intersection to provide traffic signals and dual westbound right turn lanes
  - Great Western Highway/Bennett Road – provide dual right-turn bays into Bennett Road
  - Great Western Highway/Old Bathurst Road – provide dual left-turn lanes into Great Western Highway
  - Mulgoa Road/Glenmore Parkway – install northbound slip lane for Mulgoa Road through traffic

- **Improvements 2004-2006**
  - The Northern Road/Glenmore Parkway – replace roundabout with traffic signals
  - Castlereagh Road/Andrews Road/Old Castlereagh Road – replace roundabout with traffic signals
  - Palmyra Avenue/St Marys Eastern Village Northern Access – construct signalised intersection
  - Forrester Road/Palmyra Avenue – replace roundabout with traffic signals
  - Forrester Road/Links Road – replace roundabout with traffic signals
  - Forrester Road/Christie Street – replace roundabout with traffic signals
  - Castlereagh Road (Nepean Street to Andrews Road) – widen to six lanes
  - Castlereagh Road (Andrews Road to Great Western Highway) – widen to six lanes
  - Castlereagh Road/Mulgoa Road/High Street – bad southbound right-turn with opening of Jane Street Extension
  - Great Western Highway/Mamre Road – reconstruct traffic signals
  - Werrington Road/Dunheved Road – replace roundabout with signals

- **Improvements 2006-2011**
  - Werrington Arterial Stage 1 – Great Western Highway to Western (M4) Motorway
  - The Northern Road/Bradley Street – install roundabout
  - The Northern Road (Bradley Street to Glenmore Parkway) – widen to four lanes
  - The Northern Road/St Marys Western Village Southern Access – construct signalised intersection
  - The Northern Road/Borrowdale Way – construct Northern Access to St Marys Western Village
  - The Northern Road (Andrews Road to Borrowdale Way) – widen to four lanes
  - The Northern Road (Coreen Avenue to Andrews Road) – localised intersection widening
  - Parker Street/Coreen Avenue – install dual southbound right-turn lane
  - Christie Street (Forrester Road to South Creek) – widen to four lanes
  - Andrews Road (Castlereagh Road to The Northern Road) – widen to four lanes

- **Improvements 2011-2016**
  - Great Western Highway/Parker Street – duplicate rail overpass to provide seven-lane southbound approach
  - Mulgoa Road/Jamison Road – replace roundabout with traffic signals
  - Coreen Avenue (Castlereagh Road to Richmond Road) – widen to four lanes

Site Specific Recommendations

The first group of recommendations are extensive and are responses to individual issues raised by bus drivers and are listed in the table in Attachment A of the Bus Service Analysis Study Stage 3 Report (2Plan, February 2006).

Recommendations for Bus Priority on Mulgoa Road:

- Possible avenues for improving bus travels times include bus detectors, bus phases, bus lanes and widening.
- Bus detectors may offer some improvement if they could be utilised to either bring up a bus phase or to extend or bring up a phase that would allow an approaching bus to enjoy a green light.
- At Glenbrook St consideration of a bus detector to bring up a priority RT phase may assist route 794. However, this route only makes the RT on some occasions as its substantive route does not require this turn. Accordingly a bus detector to bring up the RT phase at this location is not recommended.
- Widening for buses only with B detectors or general traffic lanes with advance (well before stop line) elevated bus detectors to bring up priority bus phases could be effective. If the widening is not continuous, early start bus phases could give bus priority where bus lanes end.
- The introduction of a PTIPS scheme for Mulgoa Rd (as well as The Northern Rd/ Parker St & Mamre Rd) should be investigated. Through the use of GPS equipment, pre-warning of bus arrival could trigger appropriate phases to reduce bus travel times and delays.
- Bus priority lanes could be provided on Mulgoa Rd at the M4 intersections. This would provide for increased capacity, the ability to move to the front of the queue or if the widening cannot be continued downstream, an early start to allow buses to move ahead of the general traffic.
- Widening of Mulgoa Rd can be accommodated along some of its length due to a suitable road reserve. Constrained road reserve sections such as between Jamison Rd and Prestons St and near Batt St would require acquisition and property adjustments. However, some widening could occur in the median at these locations. South of Jamison Rd, widening in the median would impact the significant avenue of peppercorn trees that have considerable value in terms of urban design and gateway effect. The most established of these are located north of the bus depot.
- Widening between Wolseley St and Blaikie Rd would have a direct impact on some of the significant Grey Gums and some potential impact on the root zones of others.
- The culvert/bridges at Surveyors Ck would need to be widened.
- It is noted that lengthening of the RT bay into Batt St has recently been completed.
- Widening for bus priority lanes at the M4 overbridges could be undertaken by excavating and retaining outside the supportive piers.
- Widening between the M4 and Glenbrook St on the east side would impact the local access street (Hatchinson Cr).
- Widening between School House Drive and The Glenmore Parkway may be achievable without acquisition and this is understood to be currently under investigation by the RTA.

- The intersection of Jamieson Road and Mulgoa Road provides for a relatively efficient flow of traffic at most times. However, during peak periods both during weekends and weekdays, delays occur.
- The roundabout at this intersection could be signalised at peak periods to provide phased gaps and increased priority for the through movements on Mulgoa Rd.
- However, signalising roundabouts is not generally pursued and alternatively, the roundabout could removed and replaced with traffic signals. Modelling of this intersection in coordination with the other signals on Mulgoa Rd is required to determine if capacity improvements along Mulgoa Rd are possible without widening.
- Investigation of SCATS and modelling is required to identify potential sites where capacity improvements would result in significant improvements. However, generalised widening of Mulgoa Rd so that general traffic flows can be improved will be necessary at some time. A key issue for investigation and policy direction is whether widening of Mulgoa Road should be for general traffic movement or for bus priority.

Recommendations for Bus Priority on The Northern Road:

- Without bus lanes many forms of bus priority are not effective. Bus lanes may be able to be accommodated between Oxford St/ Coreen Ave and Glebe Place. Further investigation is required to determine if the limited length of widening possible without significant acquisition at this location will significantly contribute to transit priority. This widening could facilitate early start bus priority phasing in either the north or south bound direction.
- However, while some widening may be possible to the south of Coreen Avenue, further widening would be needed to the north of this intersection to allow for buses to either diverge before being given an early start or to diverge after taking advantage of an early start. This may require acquisition.
- Regardless of widening for bus lanes, it is strongly recommended that the PTIPS system be investigated for possible introduction to the Northern Rd/ Parker St. The extension of phases and early introduction and responsive coordination of phases to allow for less disrupted bus travel through signalised intersections could be of benefit in giving public transport some priority. It is noted that should a PTIPS systems be possible, it is likely that its introduction to Mulgoa, The Northern and Mamre Roads would provide greater justification of the costs of installing the equipment necessary on the local bus fleet.

Recommendations for Bus Priority on Mamre Road:

- Investigation of the conversion to a bus lane, of the south bound kerbside lane on the approach to M4 bridge and signals should occur. It is considered that this may not reduce capacity at the intersection for general traffic due the merge immediately downstream of the signals due to the narrow bridge. If a bus lane was introduced, an early start green could give buses priority and move them ahead of the traffic.
- Again, investigation of the possible benefits of a PTIPS system at this location is recommended.

APPENDIX 9-A
IMPLEMENTATION PLAN

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	LAND USE PLANNING	LUP1	PCC to adopt policy principles to avoid poorly integrated development - see report for full version of text	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		LUP2	Prepare a detailed Public Transport Accessibility Levels Analysis (PTAL) and mapping to provide a basis for future land use planning and parking policy.	PP	PCC	Pr	-	-	-	Sec	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		LUP3	Plan for increased residential densities throughout the existing urban area where increased densities are compatible within the urban fabric and amenity.	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		LUP4	Inclusion of policies in the DCP/LEP to deliver the integration of appropriate land uses and transportation and to reduce the need to travel by car. See report for full text.	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		LUP5	Carry out research into the appropriate standards and levels of provision of cycle facilities for different land uses, then adopt standards for the provision of cycle parking and end of trip facilities at for all new developments within the LGA .	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		LUP6	Provide increased public transport and active transport links to existing neighbourhood shopping facilities within residential areas. Identify locations for the addition of neighbourhood shopping facilities.	SI	PCC	Pr	-	-	-	Pr	-	-	-	-	Sec	PCC/ MOT	Hi	Hi	Med	-	-
		LUP7	Require new developments over a specified threshold to be accompanied by a transport assessment	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	-	PCC	Sc	Hi	Sh	-	-
		LUP8	Require developers to make appropriate provision for access by a range of transport modes and where appropriate by way of planning conditions, make infrastructure contributions to a more sustainable transport system	PP	PCC	Pr	-	-	-	-	-	-	-	Sec	-	PCC	Sc	Hi	Sh	-	-
		LUP9	Set a planning policy context to ensure accessibility to the built environment for people with disabilities	PP	PCC	Pr	-	-	-	-	-	-	-	-	-	PCC	Sc	Hi	Sh	-	-
		LUP10	Undertake a detailed analysis of land within the 800m rail catchment of Penrith station to determine the under-utilised development potential and where appropriate consider zoning land within the catchment to a zone that permits high density and mixed uses.	PP	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		LUP11	Council's Residential Strategy Review should incorporate a detailed analysis of land within the 800m rail catchment of all other rail stations within the LGA to determine the under-utilised development potential and where appropriate consider zoning land within the catchment to catchment to a zone that permits high density and mixed uses	PP	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		LUP12	Council's Residential Strategy Review should incorporate a detailed analysis of land adjoining Strategic Bus corridors for the potential to develop higher density development and in particular the suitability of areas for a zone that permits mixed uses or medium and high density residential development.	PP	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	ROAD MANAGEMENT	RM1	Determine a functional road hierarchy and corresponding priorities and performance standards for all modes on all roads within the LGA taking on board their traffic and public transport function, adjacent land uses safety risk and people moving ability.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		RM2	Review the status of all major roads in the Penrith LGA for classification as State or Regional roads under the care and control of the Roads and Traffic Authority, including any new road links to growth areas particularly major employment centres such as the Erskine Park Employment Area and other WSEH areas.	PP	PCC/ RTA	Pr	-	Pr	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		RM3	Road Authorities (RTA and Council) need to work in partnership to develop a priority of works on classified roads	PP	PCC/ RTA	Pr	-	Pr	-	-	-	-	-	-	-	PCC/RTA	Sc	Hi	Sh	-	-
		RM4	Progress road improvements on State and Regional roads as proposed in the PARS study - see text for full list of locations	Inf	RTA	Sec	Pr	Pr	-	-	-	-	-	Pr	-	Dev/RTA	Sc	Hi	Med	-	-
		RM5	Progress the road improvements proposed in the PARS study for non-classified arterial roads.	Inf	DoP/PCC/RTA	Pr	Pr	Sec	-	-	-	-	-	Pr	-	Dev	Hi	Hi	Med	-	-
		RM6	Establish road network performance standards.	PP	PCC/ RTA	Pr	-	Pr	-	Sec	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		RM7	Conduct a program of road space reallocation on arterial roads to give priority to the non-car modes and to support other actions in this strategy.	Inf	RTA	Sec	-	Pr	-	Pr	Sec	-	-	-	Sec	RTA/ MOT	Sc	Hi	Med	-	-
		RM8	Conduct a program of road space reallocation on Council roads where road space should be reallocated to pedestrians, cyclists, and public transport.	Inf	PCC	Pr	-	Sec	-	Pr	Sec	-	-	-	Sec	PCC/ MOT	Hi	Hi	Med	-	-
		RM9	Carry out an audit and update of Councils Road Safety Plan every 5 years	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC	Sc	Hi	On	-	-
		RM10	Identify LATM study locations for crash analysis and speed and volumes surveys.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC	Sc	Med	On	-	-
		RM11	In the locations determined by RM9 & RM10, implement treatments to improve local amenity and cycle and pedestrian provisions.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	-	PCC/ RTA	Med	Med	On	-	-
		RM12	Carry out research to establish the needs of freight transportation in Penrith	PP	PCC/ RTA	Pr	Sec	Pr	-	Sec	-	-	-	Sec	Sec	PCC/ RTA	Sc	Med	Sh	-	-
		RM13	Maintain adequate access for heavy vehicles to employment lands and for deliveries to neighbourhood/town centres.	Inf	PCC	Pr	Sec	Pr	-	Sec	-	-	-	Sec	Sec	PCC/ RTA/ Dev	Med	Med	Med	-	-

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	ACTIVE TRANSPORT	CYCLING																			
		AT1	Establish a hierarchy of bicycle friendly provisions to guide planning for new roads and for retro-fitting existing roads. On State & Regional roads and within subject sub-divisions, appropriate contributions or facilities are provided by developers where major new land releases are planned.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		AT2	Conduct an audit of existing mapped bike routes and facilities to determine condition and extent of infrastructure provision. Update the current GIS system to accurately map facilities and routes.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		AT3	Following the audit of facilities, review the Bike Plan for the LGA which complies with State best practice in bicycle facility planning and facilitate with a prioritised engineering works and behavioral program. Cycle facilities should be provided on all major residential collector roads in accordance with current standards and guidelines established in AT1. In addition, cycle facilities should provide access to key bicycle trip attractors (e.g. schools, shops, recreational facilities).	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		AT4	Priority for works should consider connections to key cycle trip attractors such as residential areas, employment centres, commercial, hospitals and educational facilities as well as key recreational destinations.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		AT5	Prioritise roads requiring treatments to become bicycle friendly within the Bike Plan. For State and Regional roads establish a priority work plan for the provision on segregated cycle facilities.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		AT6	Provide a variety of secure bike parking at all railway stations, with priority at Penrith Station and the proposed UWS Station.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		AT7	To ensure adequate parking, showers, lockers and other facilities are provided in new developments, adopt cycle standards contained in current guidance (NSW Planning Guidelines foe Cycling & Walking) for all new development within the LGA in planning policy.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	ACTIVE TRANSPORT	WALKING																			
		AT8	Conduct an audit of existing footpaths and other pedestrian facilities (such as crossings, pram ramps etc) to determine condition and extent of infrastructure provision. Update the current GIS system to accurately map facilities and infrastructure.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Sc	Hi	Sh	-	-
		AT9	Review the Pedestrian Access and Mobility Plan (PAMP), previously undertaken for the whole of the Urban LGA to expand and improve pedestrian facilities taking on board road safety, personal safety and pedestrian amenity.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Low	Hi	Sh	-	-
		AT10	Priority for works should redress the imbalance of footpath provisions in differing areas and consider connections in residential areas especially within walking catchments of local attractors such as railway stations, school and shops.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Hi	Hi	Med	-	-
		AT11	Evaluate and implement pedestrian accessibility within 800m of each railway station. These audits can be used to develop pedestrian facilities that comply with Australian Standards for the mobility impaired.	Inf	PCC	Pr	-	-	Sec	-	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		AT12	Undertake 'Safer Routes to Schools' projects at all primary schools with a view to develop appropriate behaviour programs (eg walking, buses) and an engineering program of works for implementation as required.	Inf/Beh	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Hi	Med	Med	-	-
		AT13	Undertake pedestrian crash analysis on a bi-annual basis to identify pedestrian black spots throughout the LGA.	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Sc	Med	On	-	-
		AT14	Improve safety at pedestrian crossings by providing more appropriate phasing at signalised intersections and installing cautionary devices at school crossings, such as flashing lights and high friction surfaces.	Inf	PCC/RTA	Sec	-	Pr	-	-	-	-	-	-	Sec	RTA	Sc	Hi	Med	-	-
		AT15	Audit and update the access maps for Penrith and St Marys centres as required	PP	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group		Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
							PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	PUBLIC TRANSPORT	Rail	PT1	Work in partnership with authorities to deliver the proposed UWS railway station in Werrington between the existing Werrington Station and Kingswood Station.	Inf	RC	Sec	Sec	Sec	Pr	Pr	Sec	-	Sec	Sec	Sec	MoT/RC/Dev	Sc	Hi	Med	-	-
			PT2	Ensure that associated transport infrastructure, such as a bus interchange, cycling facilities and commuter parking is provided at the proposed UWS station. Accessible walking routes to/from the station within an 800m catchment should be incorporated into the design.	Inf	PCC/MOT	Pr	-	Sec	Sec	Pr	Sec	-	Sec	Sec	Sec	PCC/RTA/MOT	Hi	Hi	Med	-	-
			PT3	In conjunction with MoT, RailCorp and DoP investigate the provision of a new railway station in Oxley Park between St Marys and Mt Druitt Stations (opposite the intersection of Sydney Street & Hobart Street) to achieve TOD and value capture.	Lob	PCC	Pr	Sec	Sec	Pr	Pr	Sec	-	Sec	Sec	Sec	RC	Sc	Low	Long	-	-
			PT4	Seek advancement of the upgrade of the Western line corridor from St Marys to Westmead from Railcorp.	Lob	PCC	Pr	-	-	Pr	-	-	-	-	-	-	PCC	Sc	Hi	On	-	-
			PT5	Seek advancement of the upgrade and duplication of the Western line corridor from St Marys to Penrith from Railcorp.	Lob	PCC	Pr	-	-	Pr	-	-	-	-	-	-	PCC	Sc	Hi	On	-	-
			PT6	Railcorp to upgrade Penrith Rail Station, to include an additional platform and a yard upgrade with additional stabling.	Inf	RC	Sec	-	-	Pr	Sec	Sec	-	Sec	-	-	RC	Sc	Med	Med	-	-
			PT7	Prepare a planned program to replace existing stock with trains designed for access for people with disabilities	Inf	RC	Sec	2	2	Pr	Sec	Sec	-	Sec	-	-	RC	Sc	Med	Med	-	-
			PT8	Complete an accessibility audit then design and implement a rolling program of physical improvements to walking and cycling routes between railway stations and key residential areas within an 800m catchment of stations. - See text for full list of locations	Inf	PCC	Pr	-	Sec	Sec	Sec	-	-	-	-	Sec	PCC	Hi	Med	Med	-	-
			PT9	In association with rail authorities, identify easy access infrastructure improvements to stations to remove barriers and allow equitable access to facilities. Non-infrastructure improvements must also be included.	Inf	RC	Sec	-	-	Pr	-	-	-	-	-	-	RC	Nil	Hi	Med	-	-
			PT10	Design and implement a rolling programme of physical improvement to the principal walking routes between the railway stations and town centres / residential areas within ten minutes walk	Inf	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC/RTA/Dev	Med	Hi	Med	-	-
			PT11	Implement the adopted Cycling Strategy proposals by identifying and implementing a rolling Program of designated principal routes between railway stations and residential areas served by these stations which are within 15 minutes cycle ride (as part of AT3)	Inf	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC/RTA/Dev	Med	Hi	Med	-	-
			PT12	Identify the need for additional frequency of service or additional capacity on trains to meet the projected growth of the LGA	SI	MOT	-	-	-	Pr	Pr	-	-	-	-	Sec	PCC/RC	Sc	Med	Med	-	-
			PT13	Continue lobbying of State and Federal Government by Council in support of a fast rail link to Sydney CBD	Inf	MOT	-	Sec	-	Pr	Pr	-	-	-	-	Sec	MOT	Sc	Low	Long	-	-

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						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	PUBLIC TRANSPORT	Bus	PT14 Upon completion of the Ministry of Transport's bus reforms in the Penrith area, a review of Councils bus strategy actions contained within this document should be carried out to ensure consistency and relevance.	PP	PCC	Pr	-	-	-	Sec	Sec	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
			PT15 Seek advancement of the implementation of strategic bus corridors for the area by the Ministry of Transport and review strategic corridor routes and destinations.	SI	PCC/ MOT	Sec	-	-	-	Pr	Sec	-	-	Pr	Sec	MOT	Sc	Hi	Sh	-	-
			PT16 Implement the express bus service and bus priority measures from St Marys URA to Penrith and St Marys rail stations in accordance with the St Marys Development Agreement	PP	PCC/MOT	Pr	-	-	-	Pr	Sec	-	-	Pr	Sec	Dev/MoT	Sc	Hi	Sh	-	-
			PT17 In partnership with the MoT investigate the feasibility and demand for providing an Express Bus service and bus priority on Mamre Rd from the proposed Erskine Park Employment Area to St Marys Rail Station.	PP	PCC/MOT	Pr	-	-	-	Pr	Sec	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
			PT18 Work in partnership with the RTA to provide Bus Priority measures on key road links (as described in the Bus Service Analysis Study) - see report for list of locations.	Inf	PCC/ RTA/ MOT	Pr	-	Pr	-	Pr	Sec	-	-	Sec	Sec	MoT/RTA/Dev	Sc	Hi	Med	-	-
			PT19 Commission an area review to identify local activity nodes within suburban areas that are not served by bus routes and highlight these as part of the Ministry of Transports bus reform process. This should include transport to recreational facilities.	PP	PCC	Pr	-	-	-	Sec	Sec	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
			PT20 Conduct an audit of all bus stops and shelters. Establish a hierarchy of bus stop facilities for implementation that comply with State best practice in bus infrastructure provision including shelter, signage, access etc. Investigate advertising revenue to fund bus stop infrastructure improvements and a bus shelter maintenance program.	PP	PCC	Pr	-	-	-	Sec	Sec	-	-	-	Sec	PCC/dev	Low	Med	Med	-	-
			PT21 Investigate the feasibility of introducing the 'Bikes on Buses' initiative in Penrith LGA.	Inf	MOT	Sec	-	-	-	Pr	Sec	-	-	-	Sec	MOT/Bus	Sc	Low	Long	-	-
			PT22 Work in partnership to encourage the development of a comprehensive timetable which combines all bus services including private, subsidised and voluntary services	PP	MOT/ Bus	Sec	-	-	-	Pr	Pr	-	-	-	Sec	MOT	Nil	Med	Med	-	-
			PT23 Promote with partners measures to ensure adequate timetable information is displayed at all bus stops	Inf	PCC/MOT	Pr	-	-	-	Pr	Sec	-	-	-	-	PCC/MOT	Low	Med	Med	-	-
			PT24 Encourage operators to prepare a planned program to replace existing stock with buses designed for access for people with disabilities	Inf	MOT/Bus	Sec	-	-	-	Pr	Pr	-	-	-	-	MOT/Bus	Sc	Low	Med	-	-

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							PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	PUBLIC TRANSPORT	Bus/Rail	PT25	Undertake planning for a new or expanded Bus-Rail Interchange at Penrith and St Marys stations - see text for list of considerations	Inf	MOT	Pr	Sec	Sec	Sec	Pr	Pr	Sec	Pr	Sec	Sec	MOT	Sc	Hi	Long	-	-
			PT26	Conduct audits of all bus-rail interchanges for compliance with minimum best practice standards provided in the Ministry of Transport's Draft Interchange Design Guidelines.	Inf	MOT	Sec	Sec	Sec	Sec	Pr	Pr	Sec	Pr	Sec	Sec	MOT	Sc	Hi	Long	-	-
			PT27	Create better co-ordination of bus and rail services to maximize interchange and integration for passengers.	SI	RC/ MOT/ BUS	Sec	-	-	Pr	Pr	Pr	-	-	-	Sec	MOT	Sc	Hi	Sh	-	-
			PT28	In conjunction with authorities and bus operators, support the development and implement an integrated ticketing system.	SI	MOT	Sec	-	-	Sec	Pr	Pr	-	-	-	Sec	MOT	Sc	Hi	On	-	-
			PT29	Support the implementation of an integrated fares system	SI	MOT	Sec	-	-	-	Pr	-	-	-	-	Sec	MOT	Sc	Hi	On	-	-
			PT30	Work in partnership with public transport providers to better co-ordinate publication of timetables for bus and rail interchange at rail stations and improve publicity and signing for interchange possibilities at all rail stations and adjacent bus stops in Penrith	SI	MoT/ RC/ Bus	Sec	-	-	Sec	Pr	Sec	-	-	-	Sec	MOT	Sc	Hi	On	-	-
		PPT	PT31	Investigate a fixed route mini-cab or mini-bus to operate a route between locations within the LGA where distance and timing or mobility issues may be an issue for public transport users, such as evening events at Penrith Panthers, mobility impaired access for patrons from Nepean Hospital to Kingswood Station, UWS campus to UWS Station.	Inf	PCC/Bus	Pr	-	-	-	Pr	Pr	Sec	-	Sec	Pr	PCC/MOT	Sc	Hi	Med	-	-
			PT32	Develop and implement a demand responsive PPT service incorporating a wheelchair accessible bus for use by all members of the community to access amenities and facilities where the existing public transport system does meet currently their needs.	Inf	MOT	Sec	-	-	-	Pr	Sec	Pr	Sec	Sec	Pr	MOT	Sc	Hi	Sh	-	-
			PT33	Investigate the gaps in access provision for people with disabilities and assess the potential for a minibus service	PP	MOT	Sec	-	-	-	Pr	Sec	Pr	Sec	Sec	Pr	MOT	Sc	Hi	Sh	-	-
		TAXI	PT34	Review adequacy of designated legal taxi pick up and set down areas in Penrith. The areas do not have to be exclusive taxi ranks but a system that allows taxis to stop for 1 minute in a no stopping zone for pick up/set down (similar to that in Sydney CBD) should be investigated.	PP	PCC/Tax	Pr	-	-	-	Sec	Sec	-	Pr	-	Pr	PCC	Sc	Hi	Sh	-	-
			PT35	In conjunction with the taxi council and taxi operators, prepare an action plan to implement the key recommendations determined in the Sydney Metropolitan Strategy (e.g. shared use of taxis, alternative fare structures, increased numbers of taxi vehicles).	PP	PCC/Tax	Pr	-	-	-	Sec	Sec	-	Pr	-	Pr	PCC/MOT	Sc	Hi	Sh	-	-
			PT36	Investigate the gaps in access provision for people with disabilities and assess the potential to provide subsidised taxi or a minibus service for people with disabilities where access to public transport is not feasible to a range of destinations including hospitals.	SI	MOT	Sec	-	-	-	Pr	Sec	Pr	Pr	-	Pr	MOT	Sc	Hi	Sh	-	-
			PT37	Work with the Taxi Council to provide a greater number of taxi vehicles servicing the LGA	SI	MoT/Tax	Sec	-	-	-	Pr	-	Sec	Pr	-	Sec	MOT	Sc	Hi	Med	-	-
			PT38	Work with the Taxi Council & Operators to encourage greater provision of accessible taxi vehicles	SI	PCC/ MOT	Sec	-	-	-	Pr	-	Sec	Pr	-	Pr	MOT	Sc	Hi	Sh	-	-

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						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	PARKING	PK1	Review all of the following actions after the Metropolitan Parking Strategy has been finalised to ensure consistency with the Strategy.	PP	PCC	Pr	Pr	-	-	-	-	-	-	Sec	Sec	DOP	Sc	Hi	Sh	-	-
		PK2	Upon publication of the Metropolitan Parking Strategy, Council should carry out a complete review of parking rates for all land uses in the LGA for inclusion in planning policy. Cognisance should be given to proximity to public transport accessibility and provision, specific land use, maximum standards and any guidance provided in the Metropolitan Parking Strategy. This is likely to result in area specific rates and rates for motorcycle, bicycle and disabled parking must be included.	PP	PCC	Pr	Sec	-	-	-	-	-	-	Sec	Sec	PCC	Low	Hi	Sh	-	-
		PK3	Investigate parking provision linked to Public Transport Accessible Locations (PTAL) outcomes for major transport nodes	PP	PCC	Pr	Sec	-	Sec	Sec	Sec	-	-	-	Sec	PCC	Low	Hi	Sh	-	-
		PK4	In conjunction with CityRail, Railcorp and the MoT examine needs and opportunities for commuter parking at all stations. See report for full text.	PP	PCC	Pr	Sec	-	Sec	Sec	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		PK5	Examine options for implementation to ensure commuter parking is available for commuters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		PK6	Investigate & implement Park & Ride Satellite Parking Stations along the strategic bus corridors	Inf	PCC/MoT/RC	Sec	-	-	Pr	Pr	Sec	-	-	-	Sec	MoT/RC	Sc	Med	Med	-	-
		PK7	Undertake a detailed parking survey of all parking spaces within Penrith City Centre and St Marys town centre. Parking surveys should include supply, occupancy, turnover, length of stay and management.	PP	PCC	Pr	-	-	-	-	-	-	-	Sec	-	PCC	Low	Hi	Sh	-	-
		PK8	Develop a parking policy which ensures a gradual shift away from the provision of private parking towards access by non private vehicle modes. This policy should have a target for ultimate mode split of travel to the centres for all purposes including rail commuter.	PP	PCC	Pr	Sec	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		PK9	Undertake a review of the parking rates for new developments in commercial centres - see report for full list of considerations	PP	PCC	Pr	Sec	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		PK10	Investigate the opportunities and costs of providing multi-deck satellite car parking on the fringe of the city, linked by shuttle buses.	PP	PCC	Pr	-	-	-	-	-	-	-	Pr	Sec	PCC/DEV	Sc	Hi	Med	-	-
		PK11	Investigate introducing un-bundled parking schemes for higher density residential developments whereby parking spaces are excluded from a lease/purchase requiring the person to pay an additional cost to park on site.	PP	PCC	Pr	Sec	-	-	-	-	-	-	Pr	Sec	PCC/DEV	Sc	Hi	Med	-	-
		PK12	Investigate introducing residential parking schemes around transit nodes	PP	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Med	-	-
		PK13	Investigate introducing additional disabled parking spaces at public buildings within the LGA in accordance with any changes in standards outlined in PK2.	PP	PCC	Pr	-	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Med	-	-

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						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
CITYWIDE STRATEGY	TDM/EDUCATIONAL	TDM1	Prepare access maps for active transport modes (walking and cycling). Provide maps via the internet to minimise costs and save paper, seek constant feedback from the community, and be aware of access issues and changes in the area.	PP	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		TDM2	Update accessibility maps for Penrith and St Marys and prepare accessibility maps for selected areas within LGA. Provide maps via the internet to for the reasons listed under TDM1.	PP	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		TDM3	Transport Access Guides (TAGs) to and from key sites or venues. See report for list of suggested sites	PP	PCC	Pr	-	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		TDM4	Encourage existing major trip attractors such as Nepean Hospital, UWS, TAFE and Penrith Panthers to produce TAGs and voluntary Travel Plans.	Lob	Dev	Sec	-	-	-	Sec	-	-	-	Pr	Sec	DEV	Sc	Hi	Sh	-	-
		TDM5	Require the submission of Travel Plans as part of the Development Application process for all new commercial, industrial and residential developments. Thresholds for the requirement of Travel Plans must be set by Council. Council should establish guidelines for when this is required and whose responsibility it is.	PP	Dev	Pr	-	-	-	-	-	-	-	Pr	Sec	DEV	Sc	Med	Med	-	-
		TDM6	Require new major trip attractors to produce TAGs as part of Travel Plans secured in the development application process. Council should establish guidelines for when this is required and whose responsibility it is.	PP	Dev	Pr	Pr	-	-	Pr	-	-	-	Pr	Sec	DEV	Sc	Med	Med	-	-
		TDM7	Host an internet based car pooling (ride sharing) site, allowing people living and/or working in the LGA to find a car pooling partner for regular or occasional trips. Following the development of the site, publicise the service through a variety of media and via other community services. Members of the community without access to the internet should be able to access the service at Council's offices and at facilities such as libraries.	Inn	PCC/dev	Pr	Sec	-	-	-	-	-	Sec	Pr	Sec	DEV	Sc	Hi	Sh	-	-
		TDM8	Investigate the demand for a car sharing service for Penrith LGA with Car Sharing Operators. The service would operate on a membership basis and provides residents and visitors with alternative travel choices. There are a number of successful car share schemes already in operation in the Sydney Metropolitan region.	Inn	Dev	Sec	Sec	-	-	Sec	-	-	Sec	Pr	Sec	DEV	Sc	Hi	Sh	-	-
		TDM9	Support Bicycle User Groups (BUGs) to encourage more people to cycle in their local area and to work. Investigate providing support to the groups' activities.	PP	PCC	Sec	-	-	-	-	-	-	-	-	Pr	Com	Sc	Low	Med	-	-
		TDM10	Actively promote the health and financial benefits of walking and cycling	Inf	PCC	Pr	-	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		TDM11	Establish TravelSmart program pilots in targeted workplaces, schools, destinations, and communities. In addition, TravelSmart programs can be undertaken for individual households as part of residential travel plans.	Inn	PCC	Pr	Sec	-	-	-	-	-	-	-	Pr	PCC	Low	Hi	Med	-	-
		TDM12	Work in partnership with local schools to reduce the proportion of students traveling to and from school by car, and increase the proportion traveling by active transport (walking and cycling) using School Travel Plans and TravelSmart Programs and introducing 'Safer Routes to Schools' schemes	Inn	PCC/ RTA/ MOT	Pr	-	Sec	-	Pr	Sec	-	-	-	Pr	PCC/ RTA/ MOT	Low	Hi	Med	-	-

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CITYWIDE STRATEGY	OTHER	OTH1	Implement and adopt a Council Travel Plan - see text for a full list of suggested actions	Inn	PCC	Pr	-	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		OTH2	Prepare 'Resident' transport information packages	Beh	PCC/ Dev	Pr	-	-	Sec	Sec	Sec	-	Sec	Pr	Sec	PCC/ Dev	Sc	Hi	Sh	-	-
		OTH3	Investigate opportunities to implement 'cyclovia.' This is an innovative concept utilised in many international locations where a street, or section of street, is temporarily closed to motorised vehicles on a regular basis (eg every Sunday) and is open to alternative forms of transportation, eg pedestrians and cyclists.	Inn	PCC/RTA	Pr	-	Pr	-	-	Sec	-	-	-	Pr	PCC	Low	Hi	Sh	-	-
		OTH4	Promote the development of transportation management associations. Groups can comprise volunteers from the local community or various employers, these associations advocate the change and advancement of local transport systems, as well as provide services to address transport issues specific to their area.	Inn	Dev	Sec	-	-	-	-	-	-	-	Pr	Pr	DEV	Sc	Hi	Med	-	-
		OTH5	Form a PITLUS Steering Committee for the on-going, monitoring and review of the Strategy, its implementation and effectiveness.	PP	PCC	Pr	Pr	Pr	-	Pr	Sec	Sec	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		OTH6	Employ a person or group to implement and manage travel behaviour programs and mechanisms. This person or group would fulfil the role of a travel coordinator and encourage alternative forms of transportation.	INN	PCC/ RTA/ MOT	Pr	-	Pr	Sec	Pr	Sec	Sec	Sec	Sec	Sec	PCC/ RTA/ MOT	Med	Hi	Sh	-	-

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						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
LOCAL STRATEGY	SUBURBAN	ST CLAIR																			
			SUB1	The planning for the HUB lands should consider the inclusion of a local neighbourhood centre to serve employees in the HUB areas of the St Clair community. Consider opportunities to provide higher density dwellings surrounding the HUB lands.	PP	PCC	Pr	Pr	Sec	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
			SUB2	Ensure the LGA bike plan (AT4) addresses the missing links in the St Clair bike network (eg Erskine Park Rd), and due consideration is given to the connection of new residential and employment areas to the network.	Inf	PCC/ RTA	Pr	-	Pr	-	-	-	-	-	Sec	Sec	PCC/RTA	Med	Hi	Sh	-	-
			SUB3	Provide an Express Bus lane/service on Mamre Rd from the proposed Erskine Business Park to St Marys Station (refer PT14) & connecting to all WSEH lands; through Mount Druitt and Blacktown.	Inf	PCC/DoP/RTA/MOT/Dev	Sec	Pr	Pr	-	Pr	Pr	-	-	Sec	Sec	DoP/RTA/MOT/Dev	Sc	Hi	Med	-	-
			SUB4	Improve accessibility to local facilities by (active ??) and public transport by implementing the proposed PAMP (AT9), new cycle routes and facilities and reviewing bus routes.	Inf	PCC/RTA	Pr	-	Pr	-	-	-	-	-	Sec	Sec	PCC/RTA	Med	Hi	On	-	-
			SUB5	Develop a rolling programme of Safer Routes to School projects and encourage the provision of secure cycle parking at all schools where a need is identified through the programme (AT12).	Inf	PCC/ RTA	Pr	-	Pr	-	-	-	-	-	-	Sec	PCC/RTA	Med	Med	On	-	-
		ST MARYS																			
			SUB6	In conjunction with MoT, RailCorp and DoP investigate the provision of a new railway station in Oxley Park between St Marys and Mt Druitt Stations (opposite the intersection of Sydney Street & Hobart Street) (refer PT3).	Lob	PCC	Pr	Sec	Sec	Pr	Pr	Sec	-	Sec	Sec	Sec	RC	Sc	Low	Long	-	-
			SUB7	In conjunction with above review the development densities in Oxley Park within 800m walking distance from the above proposed new railway station in order to introduce higher density housing opportunities with links over the railway line to the major employment area in North St Marys. The City wide draft LEP should utilise a zone that permits high density residential development in such areas adjoining key activity nodes and identified as transport accessible.	PP	PCC	Pr	Pr	Sec	Sec	Pr	Sec	-	-	-	Sec	PCC	Sc	Low	Long	-	-
			SUB8	Prioritise Colyton and Oxley Park LATM studies, to establish residential amenity on the long straight de-facto collector road system.	Inf	PCC/RTA	Pr	-	Sec	-	-	Sec	-	-	-	Pr	PCC	Med	Hi	Sh	-	-
			SUB9	Implement proposed footpaths and increase the coverage as established under relevant PAMP (refer AT9) and Safer Routes to School programs (AT12).	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
			SUB10	Address the following in the LGA bike plan (AT4): Lack of bike facilities in Oxley Park; Links to St Marys Town Centre from the existing bikeways	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA/Dev	Med	Hi	Med	-	-
			SUB11	Identify and implement new active transport links to the CBD	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA/Dev	Med	Hi	Med	-	-
			SUB12	Improve accessibility to local facilities by active and public transport by implementing the proposed PAMP, new cycle routes and facilities and reviewing bus routes.	Inf	PCC/RTA	Pr	-	Pr	-	-	-	-	-	Sec	Sec	PCC/RTA	Med	Hi	On	-	-
			SUB13	Develop a rolling programme of Safer Routes to School projects and encourage the provision of secure cycle parking at all schools where a need is identified through the programme.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Med	On	-	-

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LOCAL STRATEGY	SUBURBAN	EMU PLAINS	SUB14	Implement commuter parking at Emu Plains Railway Station (refer PK6) in the short term to utilise the existing undeveloped land adjoining and within close proximity of the station. Future development should ensure the long term provision of commuter parking.	Inf	PCC	Pr	-	-	Sec	-	-	-	-	-	Sec	PCC	Med	Hi	Sh	-	-
			SUB15	Increase land use densities surrounding the railway station.	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	Sec	PCC	Sc	Hi	Med	-	-
			SUB16	Implement proposed footpaths and increase the coverage and connectivity as established under relevant PAMP (refer AT9) with particular emphasis on: The 800m walking catchments to existing stations; and Connections to the shopping facilities.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
			SUB17	Ensure the LGA bike plan (AT4) affords a high priority in Emu Plains due to the existing lack of facilities with particular emphasis on the flatter areas around the river, with links to the shops and railway station.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	-	PCC/RTA	Low	Hi	Sh	-	-
		NTH WERRINGTON	SUB18	Prioritise implementation of the proposed new railway station in Werrington (UWS) (refer PT1).	Inf	RC	Sec	Sec	Sec	Pr	Sec	Sec	-	Sec	Sec	Sec	RC	Sc	Hi	Med	-	-
			SUB19	Extend the bus network to provide direct north-south links to existing railway stations during peak periods.	Inf	MOT/ Bus	Sec	-	-	-	Pr	Pr	-	-	-	Sec	MOT	Sc	Hi	Sh	-	-
			SUB20	Implement proposed footpaths and increase the coverage as established under relevant PAMP (AT9). With emphasis placed on: The 800m walking catchments to existing stations; Dunheved Road; and Connections to the shopping facilities.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
			SUB21	Address the following in the LGA bike plan (AT4): Continuous bike route along Dunheved Road onto which existing local routes converge; and Continue existing routes to Werrington Station.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	-	PCC/RTA	Low	Hi	Sh	-	-
			SUB22	Undertake LATM studies in Cambridge Park as a priority in order to create residential amenity on the long straight de-facto collector road system (refer RM10 & RM11).	Inf	PCC/RTA	Pr	-	Sec	-	-	Sec	-	-	-	Pr	PCC	Med	Hi	Sh	-	-
		STH WERR.	SUB23	Prioritise implementation of the new railway station in Werrington (UWS) (refer PT01).	Inf	RC	Sec	Sec	Sec	Pr	Sec	Sec	-	Sec	Sec	Sec	RC	Sc	Hi	Med	-	-
			SUB24	Provide a PPT (fixed route) link serving the new UWS rail station and internal road systems and stops of the TAFE and UWS campuses (refer PT22). TAFE and UWS will be required to provide associated safe facilities within the ground at stops and linkages to these stops.	Inf	MOT/ Bus	Pr	-	-	-	Pr	Sec	-	-	-	-	PCC/MOT	Low	Med	Med	-	-
			SUB25	Establish a well-defined bike network in the URA on the de-facto collector road network which should link up to Werrington, Kingswood, St Marys Urban Release Area and the proposed UWS Stations.	PP	PCC	Pr	-	Sec	-	-	-	-	-	Sec	Sec	PCC/RTA/Dev	Med	Med	Med	-	-

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group		Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
							PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
LOCAL STRATEGY	SUBURBAN	PENRITH	SUB26	Extend bus network coverage into the residential area west of Mulgoa Road through Willoring Crescent.	Inf	MOT/ Bus	Sec	-	-	-	-	Pr	-	-	-	Sec	MOT	Sc	Hi	Sh	-	-
			SUB27	Address the following in the LGA bike plan (AT4): Existing on-road gaps; An off-road shared path system for bikes/pedestrian is investigated in the extensive & continuous reserves (in the South Penrith & Jamisontown area) with a link across Mulgoa Road to the Nepean River; and Connections between future residential and employment release areas and major activity generators.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	-	PCC/RTA	Med	Hi	Sh	-	-
			SUB28	Implement proposed footpaths and increase the coverage as established under the relevant PAMP (AT9) with particular emphasis around the schools in South Penrith (AT12).	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
			SUB29	Investigate the provision of a bus link between the Panthers Stadium, Panthers club and Penrith town centre, especially on special events day.	Inf	PCC/Bus	Pr	-	-	-	Pr	Pr	Sec	-	Sec	Pr	PCC/MOT	Sc	Hi	Med	-	-
		GLENMORE PARK	SUB30	Provide an Express Bus lane/service on Mulgoa Rd from the residential area to Penrith Station.	Inf	MOT/ Bus	Sec	-	-	-	Pr	Sec	-	-	-	-	RTA/MOT	Low	Hi	Med	-	-
			SUB31	Ensure the LGA bike plan (AT4) affords a high priority in the Glenmore Park area due to the existence of minimal facilities at present.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	-	PCC/RTA	Med	Hi	Sh	-	-
			SUB32	Provide pedestrian crossing facilities as required after undertaking the relevant PAMP (refer AT9) with particular emphasis on accessing the open spaces and shopping facilities.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
			SUB33	Establish traffic calming methods and pedestrian crossing facilities along the long continuous de-facto residential collector roads (refer RM10 & RM11).	Inf	PCC/RTA	Pr	-	Sec	-	-	Sec	-	-	-	Pr	PCC	Med	Hi	Sh	-	-
			SUB34	Identify new active and public transport links to the southern expansion area	Inf	PCC	Pr	-	Sec	-	-	-	-	-	Sec	Sec	PCC/RTA/Dev	Med	Med	Med	-	-
			SUB35	Improve access to Penrith by bus and install bus stops on the (M4 ???)	Inf	MOT/ Bus	Sec	-	-	-	Pr	Pr	-	-	-	Pr	RTA/MOT	Sc	Med	Med	-	-
		CRANE-BROOK	SUB36	Implement proposed footpaths and increase the coverage as required after undertaking the relevant PAMP (refer AT9) with particular emphasis on: The residential area between Andrews Road and Coreen Avenue; The residential area between Boundary Road and Laycock St; and Connections to the shopping facilities and Penrith Station.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
			SUB37	Extend bus network coverage into the industrial areas around Mullins Road, Coombes Drive, and Borec Rd-Leland St to connect with Penrith railway station during peak periods.	Inf	MOT/ Bus	Sec	-	-	-	Pr	Pr	-	-	-	Pr	MOT	Sc	Med	Med	-	-
			SUB38	Address the following in the LGA bike plan (AT4): The residential area between Andrews Road and Coreen Avenue; The residential area between Boundary Road and Laycock St; and continuous connections throughout the de-facto collector road network.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	-	PCC/RTA	Med	Hi	Sh	-	-
			SUB39	Establish traffic calming methods along the long continuous de-facto residential collector roads (refer RM10 & RM11).	Inf	PCC/ RTA	Pr	-	Sec	-	-	Sec	-	-	-	Pr	PCC	Med	Hi	Sh	-	-

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Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
LOCAL STRATEGY	SUBURBAN	NTH ST MARYS																			
		SUB40	Provide high quality pedestrian and cycle links in the industrial and residential areas within 800m of this study's proposed railway station in Oxley Park, in conjunction with provision of the station.	Inf	PCC/ RTA	Pr	-	Sec	-	-	-	-	-	Sec	Sec	PCC/RTA/Dev	Sc	Low	Long	-	-
		SUB41	Provide a major commuter car park in the North St Marys industrial areas adjoining the proposed new railway station in Oxley Park, in conjunction with provision of the station. Appropriate developments within close proximity to and adjoining a proposed commuter car park should be carefully considered to maximise the car park benefits and to improve user safety.	Inf	PCC/RC	-	-	-	Pr	Pr	-	-	-	Sec	Sec	PCC/RC	Sc	Low	Long	-	-
		SUB42	Subject to analysis by the MoT, extend bus network coverage into the industrial estates of Dunheved and St Marys (Lee Holm Drive) to connect with St Marys and ultimately Oxley Park railway station. Further connections to the St Marys Urban Release Area should be provided.	Inf	MOT/ Bus	Sec	-	Sec	-	Pr	Pr	-	-	Sec	Sec	MOT	Sc	Hi	Sh	-	-
		SUB43	Implement proposed footpaths and increase the coverage as established under relevant PAMP (refer AT9). Emphasis should be placed on the industrial estates of Dunheved and St Marys (Lee Holm Drive) and connections to the proposed bus network extensions.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
		SUB44	Ensure the LGA bike plan (AT4) addresses the following: Lack of bike facilities in the industrial estates of Dunheved and St Marys (Lee Holm Drive); Links to St Marys Town Centre and Railway Station (future Oxley Park Station) and St Marys Urban Release Area; and Lack of coverage in the residential area and connections to the industrial employment areas.	Inf	PCC	Pr	-	Sec	-	-	-	-	-	-	Sec	PCC/RTA	Med	Hi	Med	-	-
		SUB45	Link public transport and active transport infrastructure in new release area (St Marys Release Area) and industrial area	Inf	PCC/MOT	Pr	-	Sec	-	Pr	Pr	-	-	Pr	Sec	PCC/MOT/Dev	Med	Low	Long	-	-
	RURAL																				
		RUR1	Perform a 'transport needs analysis' for public transport in rural areas.	PP	PCC	Pr	Sec	Sec	-	Sec	Sec	Sec	Sec	Sec	Pr	PCC/MOT	Sc	Hi	Sh	-	-
		RUR2	Plan and consult to determine the most appropriate form and methodology for implementation of a demand responsive service. The study should develop an action/business plan defining the fundamentals for implementation of the preferred option.	PP	PCC	Pr	-	-	-	Sec	Sec	Sec	Sec	Sec	Pr	PCC/MOT	Sc	Hi	Sh	-	-
		RUR3	Identify improvements to the rural walking and cycling network	Inf	PCC/RTA	Pr	-	Pr	-	-	-	-	-	-	Sec	PCC/RTA	Med	Med	Sh	-	-
		RUR4	Provide information on transport facilities in rural areas for planning purposes	Beh	PCC	Pr	-	Sec	-	Sec	Sec	-	-	-	Sec	PCC	Sc	Hi	Sh	-	-
		RUR5	Gather information on facilities in rural areas for planning purposes	PP	PCC	Pr	Sec	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Med	-	-
		RUR6	Prepare maintenanace program for road infrastructure	Inf	PCC	Pr	-	Sec	-	-	Sec	-	-	-	Sec	PCC/RTA	Med	Med	On	-	-
		RUR7	Inclusion of policies in the DCP/LEP to Restrict major trip generators from locating in rural areas (eg schools, employment providers) and Limit rural residential development unless complimented by new neighbourhood centres and employment facilities	PP	PCC	Pr	Sec	-	-	-	-	-	-	-	Sec	PCC/DOP	Sc	Hi	Sh	-	-

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						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
LOCAL STRATEGY	PENRITH CITY CENTRE	PCC1	Develop a hierarchy of movement strategy and corresponding program of works. See report for full text.	PP	PCC	Pr	-	Sec	-	-	Sec	-	-	Sec	Sec	PCC	Low	Hi	Sh	-	-
		PCC2	Provide way finding signage to include popular destinations, walking and cycling routes, public transport information, walking distances, and key points of interest, etc. Signage should include two types of signs, map-based signs for orientation (eg 'you are here'), and route signs to help people along the route (pointer/directional signs).	Inf	PCC	Pr	-	-	-	-	-	-	-	Sec	Sec	PCC	Low	Hi	Sh	-	-
		PCC3	Reduce speed limit within the city centre to maximum of 40kph, with lower speeds on shared routes.	Inf	PCC	Pr	-	Pr	-	-	-	-	-	-	Sec	PCC/RTA	Sc	Hi	Sh	-	-
		PCC4	Audit accessibility within the city centre to ensure all facilities meet mobility impaired pedestrians standards and guidelines	PP	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		PCC5	Perform pedestrian accessibility audits to assess & recommend options to include: Weather protection; Seating; Lighting; and Crime prevention	PP	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		PCC6	Infrastructure improvements identified in the PAMP to be implemented	Inf	PCC	Pr	-	Sec	-	-	-	-	-	Sec	-	PCC/RTA/Dev	Med	Hi	Med	-	-
		PCC7	Perform audits and gap analysis of cycle facilities to identify locations for new or improved facilities such as bike parking facilities.	PP	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		PCC8	Upgrade public domain space to provide improved amenities for pedestrians and cyclists.	Inf	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC/dev	Med	Hi	Med	-	-
		PCC9	Provide a free shuttle bus service that loops through the city centre and connects local destinations such as Penrith Panthers, the Penrith Football Stadium, Mulgoa Road Bulky Goods precinct, and Nepean River. The service could operate as a public private partnership.	Inf	PCC	Pr	-	Sec	-	Sec	Sec	Sec	Sec	Sec	Sec	PCC/dev	Med	Med	Med	-	-
		PCC10	Review taxi ranks within the centre to ensure adequate provisions and appropriateness of locations.	Inf	PCC	Pr	-	Sec	-	Sec	-	-	Sec	Sec	Sec	PCC	Low	Med	Med	-	-
		PCC11	Provide an adequate number of spaces in town centre car parks for drivers with disabilities	Inf	PCC	Pr	-	-	-	-	-	-	-	Sec	Pr	PCC/dev	Low	Hi	Sh	-	-

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Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
LOCAL STRATEGY	ST MARYS TOWN CENTRE	SMTC1	Provide way finding signage to include popular destinations, walking and cycling routes, public transport information, walking distances, and key points of interest, etc. Signage should include two types of signs, map-based signs for orientation (eg 'you are here'), and route signs to help people along the route (pointer/directional signs).	Inf	PCC	Pr	-	-	-	-	-	-	-	Sec	Sec	PCC	Low	Hi	Sh	-	-
		SMTC2	Reduce speed limit within the town centre to maximum of 40kph, with lower speeds on shared routes.	Inf	PCC	Pr	-	Pr	-	-	-	-	-	-	Sec	PCC/RTA	Sc	Hi	Sh	-	-
		SMTC3	Audit accessibility within the town centre to ensure all facilities meet standards and guidelines for mobility impaired pedestrians.	PP	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	-	Sc	Hi	Sh	-	-
		SMTC4	Perform pedestrian accessibility audits to assess & recommend options to include: Weather protection; Seating; Lighting; and Crime prevention	PP	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		SMTC5	Perform audits and gap analysis of cycle facilities to identify locations for new or improved facilities such as bike parking facilities.	PP	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		SMTC6	Upgrade public domain space to provide improved amenities for pedestrians and cyclists.	Inf	PCC	Pr	-	Sec	Sec	-	-	-	-	Sec	Sec	PCC/dev	Med	Hi	Med	-	-
		SMTC7	Establish guidelines and enforcement measures for the private use of public footpaths eg cafes, display areas. This will ensure that public footpaths retain sufficient space for good pedestrian circulation.	PP	PCC	Pr	-	-	-	-	-	-	-	Sec	Sec	PCC	Sc	Hi	Sh	-	-
		SMTC8	Review taxi ranks within the centre to ensure adequate provisions and appropriateness of locations.	Inf	PCC	Pr	-	Sec	-	Sec	-	-	Sec	Sec	Sec	PCC	Low	Med	Med	-	-
		SMTC9	Provide an adequate number of spaces in town centre car parks for drivers with disabilities	Inf	PCC	Pr	-	-	-	-	-	-	-	Sec	Pr	PCC/dev	Low	Hi	Sh	-	-
		SMTC10	Convert part of current off-street long stay parking spaces to commuter parking; limit access to valid rail ticket holders.	Inf	PCC	Pr	-	-	Sec	-	-	-	-	-	Sec	PCC	Low	Hi	Sh	-	-

Penrith Integrated Transport & Land Use Strategy Implementation Plan

Strategy	Action Group	Action No.	Description	Type of Action	Lead Agency	Stakeholders										Funding Responsibility	Cost to PCC	Priority	Timing	Reference	Status
						PCC	DOP	RTA	RC	MOT	Bus	CT	Tax	Dev	Com						
LOCAL STRATEGY	RESIDENTIAL URA	RURA1	Continue to regularly update knowledge base to include best practice in residential design incorporating land use/transport integration and the provision of active transport and public transport infrastructure.	PP	PCC	Pr	-	-	-	-	-	-	-	-	-	PCC	Sc	Med	On	-	-
		RURA2	Continue to encourage self sufficient URAs by integrating and providing diverse land uses, such as local shopping and community facilities.	PP	PCC	Pr	-	-	-	-	-	-	-	Sec	-	PCC	Sc	Med	Oda	-	-
		RURA3	Provide bus infrastructure in residential areas to key destinations (eg closest City Centre, rail line, or high school) on the first day of residents' occupation of dwellings.	Inf	MOT/BUS	Sec	-	-	-	-	Pr	-	-	Sec	-	PCC/MOT/Dev	Sc	Med	On	-	-
		RURA4	Prepare and distribute 'Welcome Packs' to new residents which include TAGs of the Penrith Town Centre, local bus route and services (obtained from the bus operator) and Nepean Hospital TAG (prepared by the Department of Health / Nepean Hospital).	Beh	PCC	Pr	-	-	-	-	-	-	-	-	-	PCC/dev	Sc	Hi	On	-	-
		RURA5	Provide a legible and permeable street network that enables good access for pedestrians, cyclists and buses in new residential areas.	Inf	PCC/dev	Pr	-	-	-	Sec	Sec	-	-	Pr	-	PCC/Dev	Sc	Hi	Oda	-	-
	EMPLOYMENT URA	EMP1	Within each employment URA, encourage land uses that obviate the need for unnecessary travel outside the employment area, such as Day Care centres, and/or Pre Schools by private operators or employers and local shopping facilities.	Inf	PCC/dev	Pr	-	-	-	Sec	Sec	-	-	Pr	Sec	PCC/Dev	Sc	Hi	Oda	-	-
		EMP2	Provide bus services during AM/PM peaks from the first day of occupation of employment premises to the closest rail line.	Inf	MOT/Bus	Sec	-	-	-	Pr	Pr	-	-	Sec	Sec	MOT	Sc	Hi	On	-	-
		EMP3	Prepare and distribute 'Welcome Packs' to employers which include the local bus route and services (obtained from the bus operator) to the closest rail station and other key locations on bus routes such as shopping centres and schools.	Beh	PCC	Pr	-	-	-	-	-	-	-	-	-	PCC/dev	Sc	Hi	On	-	-
		EMP4	Investigate suitable locations for the provision of an intermodal terminal within the LGA, located on the main road and rail network.	PP	PCC	Pr	Sec	Sec	-	Sec	-	-	-	Sec	Sec	PCC/RTA/MOT	Sc	Hi	On	-	-

PITLUS Implementation Plan Codes

Type of Action	
SI	Service Improvement
Inf	Infrastructure
Beh	Behavioural
PP	Planning Policy/Study
Lob	Lobbying
Inn	Innovations
Stakeholders	
PCC	Penrith City Council
DOP	Department of Planning, NSW
RTA	Roads and Traffic Authority, NSW
RC	RailCorp
MOT	Ministry of Transport, NSW
Bus	Bus Operators
CT	Community Transport
Tax	Taxi Operators
Dev	Developers
Com	Community
Stakeholder Category	
Pr	Primary
Sec	Secondary
NA	Not Applicable

Cost to PCC	
Nil	None
Sc	Staff Costs
Low	Low (up to $50,000)
Med	Medium ($50,000 - $500,000)
Hi	High (greater than $500,000)
Priority	
Hi	High
Med	Medium
Low	Low
Timing	
Sh	Short Term (0-5 years)
Med	Medium (5-10 years)
Long	Long Term (10-20 years)
On	Ongoing
Oda	Ongoing with DA approvals
Status	
No	Not Started
Part	Partially Complete
Com	Completed
On	On-Going