Picton Town Centre
Transport Master Plan

TDG
in association with:
Gennaoui Consulting

Wollondilly
Shire Council

Wollondilly Shire

Picton Town Centre

Transport Master Plan

September 2017

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Wollondilly Shire

Picton Town Centre

Transport Master Plan

Quality Assurance Statement

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1. Executive Summary

Historic Picton Town is facing unprecedented proposed land development. Geographical constraints, steep grades and being traversed by the Stonequarry Creek present significant network challenges. Current intersections at critical locations on the network are at or nearing capacity. Council has determined to investigate the potential extent of future land development on its transport infrastructure and to develop a future-proofed framework for managing the potential impacts.

The challenge is to realise the community voice, its vision for a balanced approach to growth which maintains "*rural living and a network of sustainable, prosperous and resilient towns and villages.*" The Community's Strategic Plan 2033 charts a clear direction and desire to value rural character, a "*sense of belonging to caring communities that have been at its core for generations*". Solution development in the Master Planning delivers on this and goes beyond traditional "big-city" solutions.

The Study brief is focussed on evaluation of the corresponding degree of impact arising from four similarly timed development proposals impacting on the Town Centre environment. Key elements of the Brief include:

- A review of the Draft Wollondilly Traffic Network Deficiency Assessment report;
- Integrated evaluation of the effects generated by each of the four development proposals both individually and cumulatively;
- Identification of key and necessary multi-modal transport improvements;
- Development of a targeted Transport Master Plan encompassing Access and Movement Structure Plans and Strategies;
- Development of a Town Centre Parking Strategy; and
- Preparation of recommendations in relation to funding and timing of the Master Plan implementation works for Council consideration and adoption.

Stakeholder consultation and an engagement workshop was undertaken to provide the opportunity for key interest groups to have input to the process, to identify the critical community interest issues and to capture the substantial local knowledge of and experience about the current and historic network operation.

Key objective Principles were developed and considered by the Stakeholders. Following that engagement, the following Principles were developed for Picton's transport network planning:

A Picton Town Centre that delivers:

- *Connected, integrated and efficient networks and facilities;*
- *Well-developed walking and cycling connections;*
- *Accessible and safe environments;*
- *Efficient parking supply and distribution; and*
- *Integrated culture, spirit and story.*

A deep understanding has been developed about the transport network operation, the interactions and constraints that exist. Underlying factors of influence have been examined through demographic evaluations; local movement and interactive constraints have been quantified though a program of traffic counting capturing multi-modal demands including those by walking, cycling, and public transport.

The Master Plan assessments have considered all modes of transport against the background of the existing and character based transport environment. Key improvement areas where recommendations have identified a need for focus are:

- Town centre connectivity to separate and redistribute local access traffic demands from those strategic through traffic movements;
- Enhanced accessibility and multi-modal movement connections and amenity to, from and around the future Town Centre;
- Continued efficiency for strategic, through and long-haul commercial movements;
- The removal of transport network failure risk and the creation of resilience for traffic movements, both local and wider movement based;
- A safer and more convenient transport environment, especially in and around the Town Centre;
- A focus of providing access to local services and amenities and the recognition of and respect for the Town's culture and heritage;
- A long term sustainable transport network outcome for Picton, taking into account future growth demands and the ability of the community's ability to provide for its needs.

A comprehensive range of Strategies has been determined to address Picton's current challenges, with a horizon performance assessment established at 2026. Structure Plans have been developed to meet the forecast demands for each mode of transport. The range of interactions, and the opportunities for shared infrastructure investment to achieve an optimum economic investment outcome have been evaluated and the overall outcome established in a Transport Master Plan.

Key and broadly summarised findings and recommendations detailed in the Master Plan include:

- Planning and protection for the growing and long term, long stay parking demands generated within the Town Centre area;
- Town Centre servicing management through the introduction/extension of service lane provisions, also providing for key internal pedestrian and cycle connections in the CBD;
- Establishment of a CBD traffic network ring network that removes critical congestion points and provides for effective distribution and accessibility for the Town Centre;
- Definition and protection of pedestrian environment and amenity areas to have regard for the Town's culture, amenity and to support retail function.
- Build on current facilities and further provide for and facilitate tourism and the type of vehicle demands it generates by identifying dedicated parking for larger vehicles and signing access and circulation routes for those movements;

- Providing for and establishing additional transport network capacity at critical intersection locations to accommodate future demands, including:
  - Argyle Street / Menangle Street signals;
  - Argyle Street / Barkers Lodge Road signals;
  - Menangle Street / Colden Street signals;
  - Argyle Street / Prince Street roundabout;
  - Menangle Street / Prince Street signals;
  - Walton Lane / Menangle Street mini-roundabout;
  - Walton Lane / Cliffe Street mini-roundabout; and
  - Priority change at Margaret Street / Colden Street.
- Connection and integration of shared and off-street pedestrian and cycle links, connecting the local community areas and establishing key connectivity between the Town Centre and the Train Station;
- The provision of cycle infrastructure to support end of journey needs;
- Introduction of personal movement services in the form of Taxi and / or community van services to meet movement demands for those less mobile or able;
- Ongoing development of public transport infrastructure and its accessibility; and
- Resolution of the Prince Street one lane bridge height and weight constraints to improve strategic traffic efficiency and enable the realisation of amenity, safety and performance outcomes for the Town Centre.

Overall, there is significant opportunity to deliver a necessary step-change in network performance, and to realise changes to community amenity, its interaction, personal safety and build on the potential for a resilient future Picton Town Centre.

The Prince Street bridge is a significant item, and has been an ongoing feature of Council's Development Contributions Plan. It is a current constraint to the realisation of the key Principles identified and established in consultation with stakeholders i.e.: what the community wants to see as outcomes for Picton. The capacity of the current one lane bridge to commute traffic movements itself is expected to approach the end of its practical application within the next 10 years. The Arterial road connections at each end of Princes Street will first require additional capacity and this will in turn place added demand on the bridge structure.

Without height and weight improvements to the bridge, large, heavy commercial vehicle movements will continue to be forced into the Town Centre and main street environment. Public Transport movements are also constrained to current routes. Furthermore, critical safety, accessibility improvements to the Argyle Street / Menangle Street intersection are not physically able to be achieved without the redistributed traffic changes that the Prince Street bridge delivers. The network improvement changes and interconnected and therefore require careful and considered planning and staging.

Picton Town Centre can realise significant improvement to its network performance, safety, amenity, connectedness, and community feel with measured investment and an incremental approach to its transport demands over the next 10 years.

2. Introduction

2.1 Motivation and Need for the Study

Picton Town is the centre for administration of the Wollondilly Shire. It's strategically located at the intersection of three key road transport corridors as follows:

- The Old Hume Highway connecting south to Tahmoor, Bargo and the M31 motorway;
- The Old Hume Highway linking north to Camden, Narellan (including the southern Sydney growth area) and the A9 Highway; and
- Menangle Street (B88) which provides the strategic link east to the M31 motorway interchange.

The wide area locality of Picton is shown on **Figure 1** as follows:

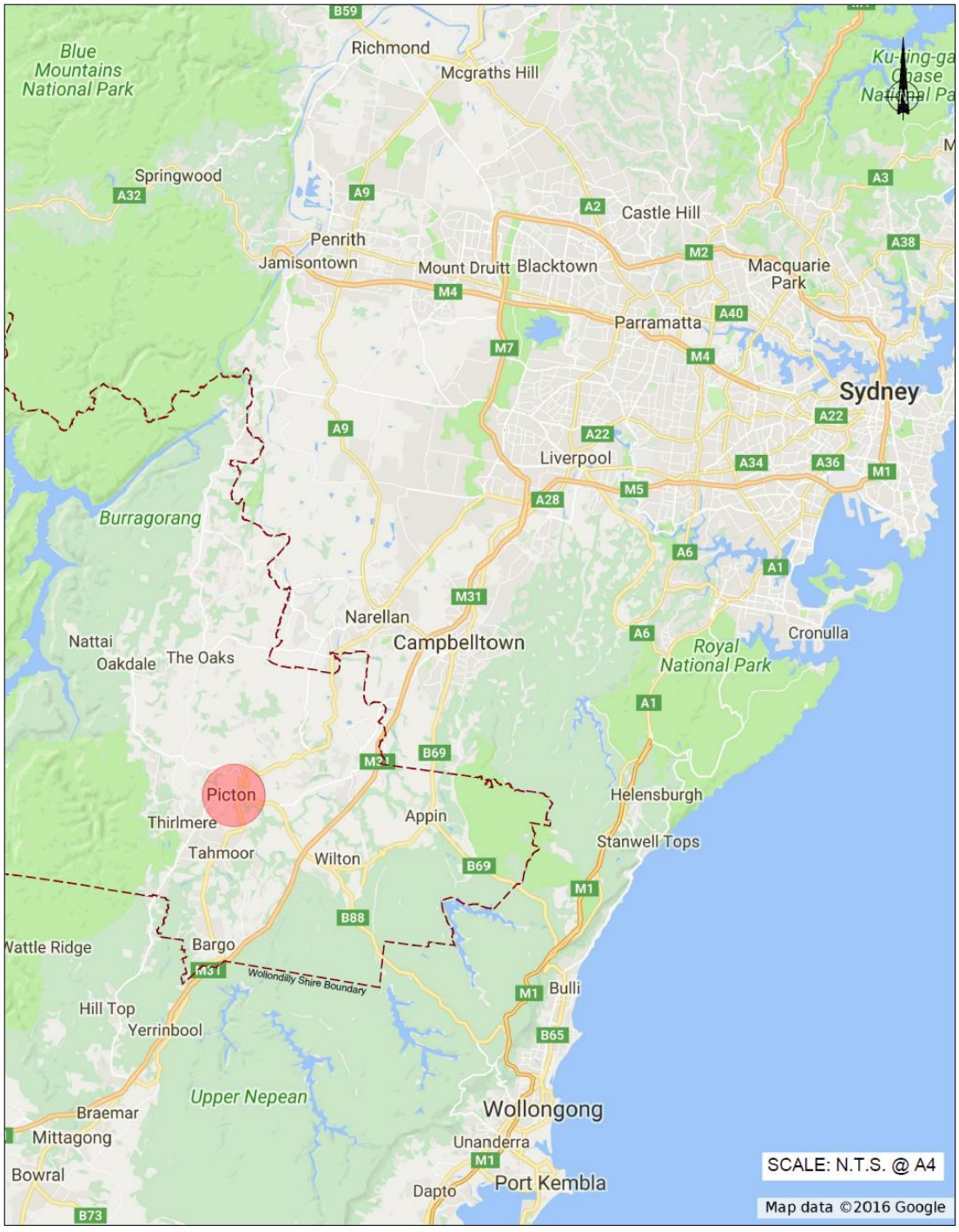


Figure 1: Locality Plan

Picton is a historic town in the Wollondilly Local Government Area, the township is geographically constrained with steep grades and the traversal of the Stonequarry Creek.

Council has identified that Picton, and Wollondilly generally, are facing unprecedented proposed land development. Council needs to review impacts on its existing transport infrastructure and develop a framework for managing proposed developments and their impacts on the transport network.

Council is well aware of the demands and performance of existing intersections in the Picton main street. Council has a programme to address current safety and capacity issues through:

- The installation of traffic signals at the Argyle Street / Cliffe Street / Margaret Street intersection; and
- The installation of a roundabout at the intersection of Argyle St and Regreme Rd.

These works are programmed for the 2015/16 Financial Year.

However, beyond this, Council has recognised that without further transport network planning and improvement, it is questionable whether the current planning proposals surrounding Picton can be supported.

Accordingly, it has determined that a comprehensive assessment of a range of traffic options, in terms of the overall integration of Town Centre parking and traffic management will ensure that the most community benefit is achieved from proposed growth around the Town Centre. Objectively, it is to define the things that are to be done to enable Picton Town Centre to survive without substantial and major investment in external works for as long as it reasonably can. The investigations are also to inform Council with respect to the determination of the planning proposals it is to assess.

2.2 The Project Brief

The comprehensive Consultant Brief is set out in the Wollondilly Shire Council "*Picton Town Centre Transport Master Plan*" Consultant Brief (the "*Brief*") dated February 2016. The Brief described in its Section 1 comprises:

- Project description;
- Background to the study;
- Concerns and options;
- A scope of works;
- Tasks, described in four stages; along with the
- Study timings and milestones, established at the time of the tendering and revised with progress of the Study.

The Scope of Works is defined at Section 1.3 as follows:

- Conduct a project inception meeting with Council representatives;
- Review existing documentation, in particular, the various traffic reports, plus Councils consolidated traffic model;
- Identify and summarise key stakeholders and their expectations;
- Carry out detailed traffic study of the Picton Town Centre including proposed and potential planning proposals;
- Carry out a pedestrian movement/connection assessment;
- Detail proposed works that can be included as directly conditioned works or Voluntary Planning Agreements or in Councils Section 94 contribution plan;

- Detail the appropriate cost attributed to Council and applicants for proposed works.

The following assessments have been based on the defined Scope and the on-going interactions with the Client through the course of the Study.

2.3 Picton Town Centre

Picton is a town in the Macarthur Region of New South Wales, Australia, in the Wollondilly Shire. The town is located 80 kilometres south-west of Sydney, close to Camden and Campbelltown. It is also the administrative centre of Wollondilly Shire.

It is home to many historic buildings, including two types of bridges not easily found anymore elsewhere in the state, for example the Victoria Bridge a timber trestle bridge that crosses Stonequarry Creek, opened in 1897, and the 'Picton Railway Viaduct' a stone viaduct opened in 1863 to also cross Stonequarry Creek.

The Town Centre commercial area is currently established around two key elements; the traditional Main Street strip shopping precinct on Argyle Street and the adjacent Margaret Street shopping centre comprising a supermarket, department store and other smaller retail stores and community support services.

The Argyle Street retail area is traffic calmed with kerb extension islands containing specimen trees and also with marked pedestrian crossing points. Traffic speeds are low and kerbside parallel parking is recessed with the landscaped area.

Argyle Street, in addition to servicing the strip retail shopping precinct, is also the main north – south arterial road providing for the traversal of high volumes of commuter through traffic along with heavy and commercial vehicle movements, most of which have origins / destinations outside of the commercial Town Centre area.

The supermarket and shopping centre complex is located to the east of Argyle Street. It has primary road frontage to Margaret Street and Colden Street. Primary servicing access is located directly off Colden Street. Off-street and internalised transport connections rely on private land parcels and provide connection with the Argyle Street retail precinct. Its principal parking is established across the front of the main entrance to the centre (leading from Margaret Street) and also within an under-croft parking area beneath the mall.

Key regional community facilities are located within the Town Centre area including the Library, Information Service and Wollondilly Shire Council Offices. These have primary frontage to Menangle Street, also a key commuter/ commercial transport route. The principal public car parking area related to these community services is located with access off Colden Street.

2.4 Study Area

Figure 2 shows the Study Area specified in the Consultant Brief. The Study area comprises coverage over the area of principal interest to Council.

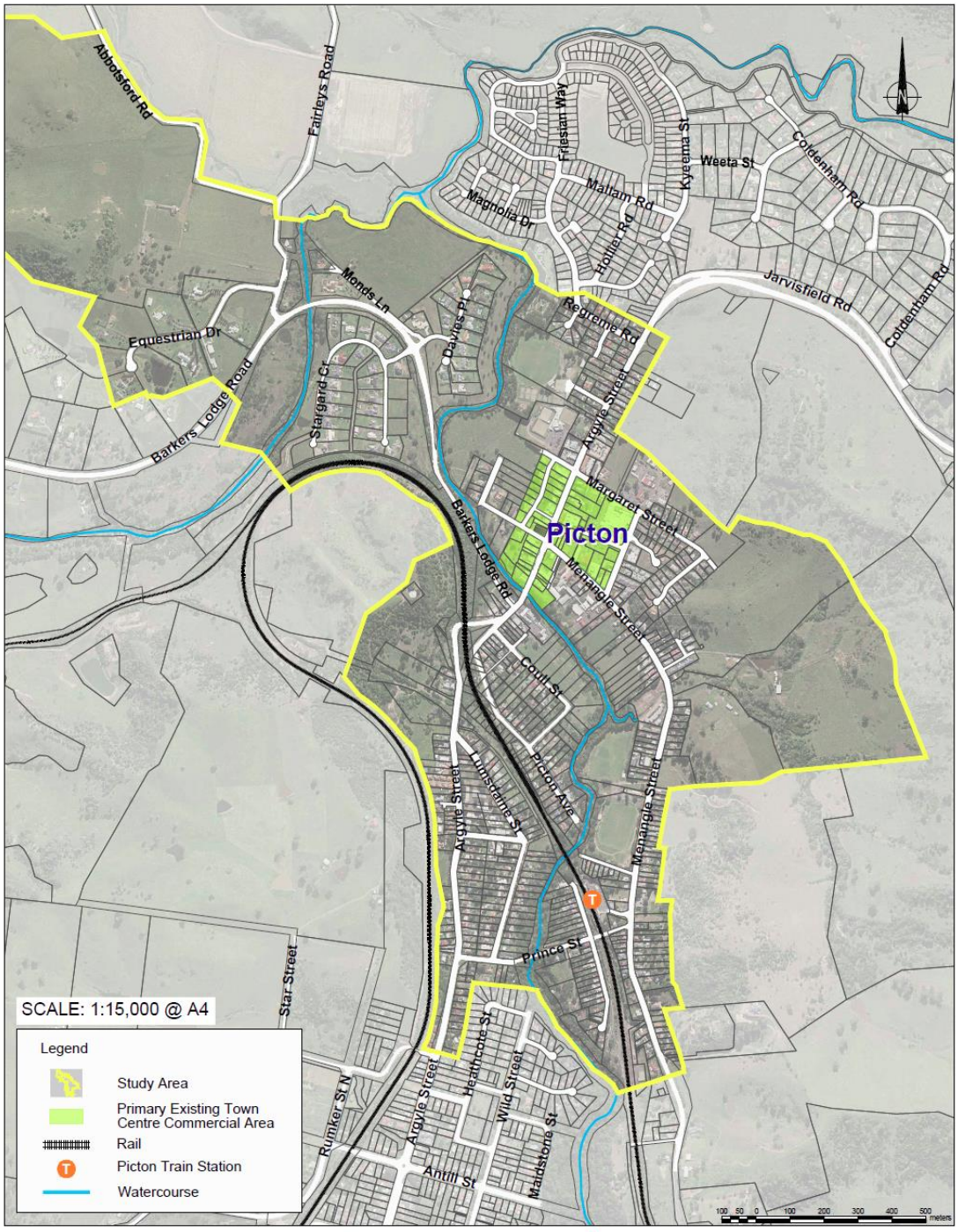


Figure 2: Study Area

It incorporates the key areas identified as "*Concerns and Options*" at Section 1.2 of the Brief. Specifically, the Brief also states:

"We note that Council has considered the need for a Picton Bypass and will be pursuing as a medium to long term project. However, a Picton Bypass would not be achievable in the short term and as such is not to be considered in the Picton Town Centre investigation."[1]

[1] Consultant Brief, Section 1.2

Accordingly, the assessments that follow, while recognising the longer term potential impact of the Bypass proposal, has not had regard for this in assessing the shorter term Town Centre effects and corresponding mitigation.

Similarly, and as already indicated, Council has committed to addressing core and pre-existing safety and capacity constraints in the Picton Main Street through installation of traffic lights at the Argyle Street / Cliffe Street / Margaret Street intersection; as well as a roundabout at the intersection of Argyle St and Regreme Rd, both constructed during the course of this Study. Accordingly, it is appropriate that these works form part of the baseline transport environment.

Key features of the Study Area can be summarised as follows:

- The following four current planning proposals:
  - Picton East comprising 200 to 400 lots;
  - Mushroom Tunnel – 30 lots;
  - Abbotsford – 40 large lots; and the
  - Stonequarry Commercial development proposal.
- The Town Centre Commercial Area;
- Local Town Centre Schools;
- Community Library and Council services;
- The Hume Oval;
- Showgrounds and Victoria Park;
- Train Station; and
- The Prince Street east – west bridge connection in the south of the Study Area.

2.5 Report Structure Outline

The overall report is structured as follows:

- Section 1: Executive Summary providing a snapshot of the key findings of the report;
- Section 2: Introduction, understanding the Brief, Study Area, Methodology and overall approach;
- Section 3: Development of the Master Plan transport planning principles including understanding the relationship with other Strategies and Studies;
- Section 4: Picton Town Centre Environment, developing an understanding of the local community context, its transport indicators and trends and the related demographic characteristics that contribute to development of an understanding of the Picton transport environment;
- Section 5: Identify key stakeholder and community issues affecting the Town Centre, taking guidance from other and earlier investigations and engagements and drawing from the stakeholder workshop to understand the principal transport issues and challenges;

- Section 6: Growth and Development Demands, describing the current and Brief specified growth demands to be taken into account within the Study Area;
- Section 7: Parking Strategy, development of a strategy for parking within the Town Centre and Study Areas;
- Section 8: Transport Modelling, The development of a transport modelling tool, its application to the identification of transport effects and assessment of alternative scenarios to 2026;
- Section 9: Access and Movement Structure Plan development, transport and access consideration in the development of Structure Plans and Strategies for integrated land use and multi-modal transport outcomes;
- Section 10: Picton Town Centre Transport Master Plan, the aggregation of Structure Plans and Strategies into a comprehensive Transport Master Plan recommendation for Picton;
- Section 11: Transport Master Plan Funding Considerations, assessment and forecast funding considerations for short to medium term Transport outcomes in Picton;
- Section 12: Conclusions

2.6 The Study Methodology

The study methodology is generally described in the preceding Report Structure outline. Overall it intends a well-planned, clear, concise and methodical approach, providing a reference point for ensuring the Study's progress. Key milestones deliver staged achievement of the Study objects. In broad terms it can be described as comprising the following 4-stage elements:

- Inception, Background Reports and Local Knowledge;
- Base Modelling and Concept Development;
- Draft Master Plan; and
- Completion.

The methodology adopted is integrated with the following sections, investigations, alternatives development, findings and recommendations.

3. Master Plan Principles

3.1 Relationship with Other Strategies

This section collates and describes the relationship of other transport and land use strategies with planning for the Picton Town Centre.

Higher level policy and direction exists within a range of other Strategies and Plans. The key and informing elements are captured in the following Table:

Strategy / Study	Key Guiding Transport Policy, Principle or Direction
NSW Long Term Transport Master Plan	<u>Overall Transport Objectives</u> ■ Improve quality of service ■ Improve liveability ■ Support economic growth and productivity ■ Support regional development ■ Improve safety and security ■ Reduce social disadvantage ■ Improve sustainability – by maintaining and optimising the use of the transport network, easing congestion, growing the proportion of travel by sustainable modes such as public transport, walking and cycling, and becoming more energy efficient ■ Strengthen transport planning processes <u>20 Year Vision – Providing Essential Access for Regional NSW</u> ■ Integrate land use and transport planning ■ Connect communities ■ Make our regional roads safer ■ Move regional freight more efficiently ■ Partner with local government
Wollondilly Submission Issues to the NSW Long Term Transport Master Plan	■ Need for enhanced passenger rail services ■ Road safety challenges ■ Growing traffic congestion ■ Long travel distances and times
Wollondilly Community Strategic Plan 2033	■ Wollondilly, a great place to live, work and visit ■ Each town has its own personalities, stories ■ Access to services and facilities for all ■ Alternative transport options in Wollondilly local area (increase of the proportion of people walking, riding, using trains, buses and park & ride rather than cars) ■ Reduction of unacceptable traffic congestion in Wollondilly local area
Wollondilly Growth Management Strategy	■ Support growth that incorporates infrastructure ■ Support growth in existing towns ■ Minimise dispersed populations

Strategy / Study	Key Guiding Transport Policy, Principle or Direction
	■ Focus growth for Picton and other identified centres
Wollondilly Development Control Plan 2016	■ To provide for development that protects the scenic qualities of the Wollondilly Shire Area ■ To provide employment opportunities that significantly contribute to economic activity within Wollondilly Shire ■ To ensure the most efficient use of industrial land that is consistent with the existing amenity of the area ■ To ensure the orderly provision of services and infrastructure ■ To ensure good vehicular access, circulation and loading facilities on industrial sites to avoid impacts on pedestrian and vehicular mobility in the locality ■ To ensure adequate on-site car parking is provided ■ To ensure access to adequate services is provided for the disposal of waste ■ To encourage the integration of land use and transport, and provide for environments that are highly accessible and conducive to walking, cycling and the use of public transport
Sustainable Wollondilly Plan	■ Challenges related to an ageing transport infrastructure ■ Expectations for a safe and efficient transport ■ Integrated transport services including public transport and alternative modes ■ Connected cycleways, and cycle parking ■ Integrated public transport including rail and local bus services ■ Support for sustainable shift from road to rail freight movement
Wollondilly Bike Plan	■ Create a safe and attractive environment for cycling ■ All user groups ■ Coherence ■ Safety ■ Directness ■ Amenity ■ Parking ■ Sustainability ■ End of trip facilities

Table 1: Guiding Transport Policy

These key transport policy directions impact on transport planning for Picton Town Centre. The overall transport themes can be reflected in the Picton Town Centre Transport Master Plan Principles developed as follows.

3.2 Master Plan Principles

The stakeholder workshop engaged with a draft set of Master Plan principles. Key themes to emerge from the workshop included:

- Strong support for emphasising the development of walking and cycling facilities and networks;
- Emphasis on the need for external relief for the town centre, in particular the potential to bring forward in time major bypasses of the town;
- The importance of accessibility and mobility outcomes for the community;
- Understanding external growth demands and the potential for their impact on the town centre and commercial area access;
- Acknowledgement of periodic and high intensity activities, such as the touch rugby, that occurs just outside the Study area on Fairleys Road, but which impacts the Study area network operation;
- Recognition for current and planned Council capital works programs, and in particular the imminent timing of the walkway/cycleway bridge (near the northern end of Magnolia Drive) to the Sports Ground, and future extensions of the network;
- The value in preserving the Town's culture and heritage through the development of solutions/strategies.

These key themes, along with those developed through other influential strategies have l materially influenced the development of the Master Plan traffic and transport principles.

The developed Picton Town Centre Transport Master Plan Principles will provide for:

A Picton Town Centre that delivers:

- Connected, integrated and efficient networks and facilities;
- Well-developed walking and cycling connections;
- Accessible and safe environments;
- Efficient parking supply and distribution; and
- Integrated culture, spirit and story.

These key themes are considered further in the development of both the Master Plan and Access and Movement Strategy for the Town Centre.

4. Picton Town Centre Environment

The Picton Town Centre is characterised by its physical form and geographic location as much as it is by the way it is accessed, serviced and utilised by residents, workers and visitors. A broad summary of the local environmental characteristics is set out in this section to develop a deeper understanding of the Town Centre transport environment.

4.1 Demographic Profile

The demographic characteristics particular to Picton and the corresponding local centres, the wider Shire, and more broadly, comparisons with the built environments of Greater Sydney and the State are described in the following sections. The summary information is substantially drawn from the public "*id*" demographic resources website and correspondingly compiled by id from information held and produced by the Australian Bureau of Statistics, and the Census of Population and Housing 2006 and 2011.

4.1.1 Population

The development of population and its corresponding growth is shown in the following Figure.

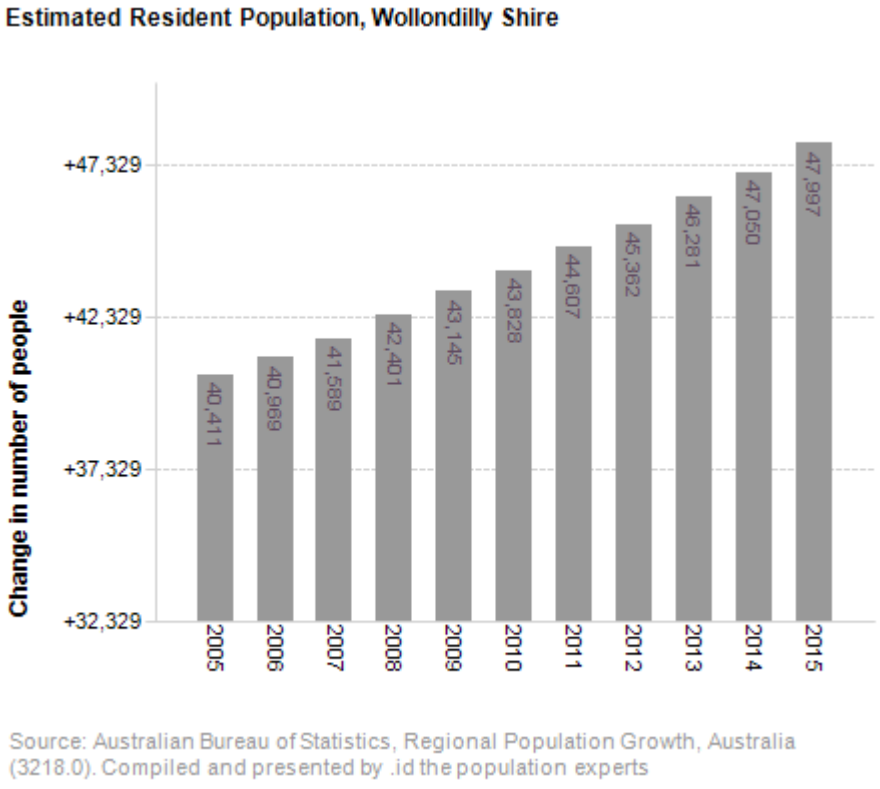


Figure 3: Estimated Resident Population Wollondilly Shire

It is evident that population has grown steadily in recent years. The Shire population currently sits at about 48,000 persons (2015). The corresponding numerical change and associated percentage growth characteristics are depicted in the following Figure.

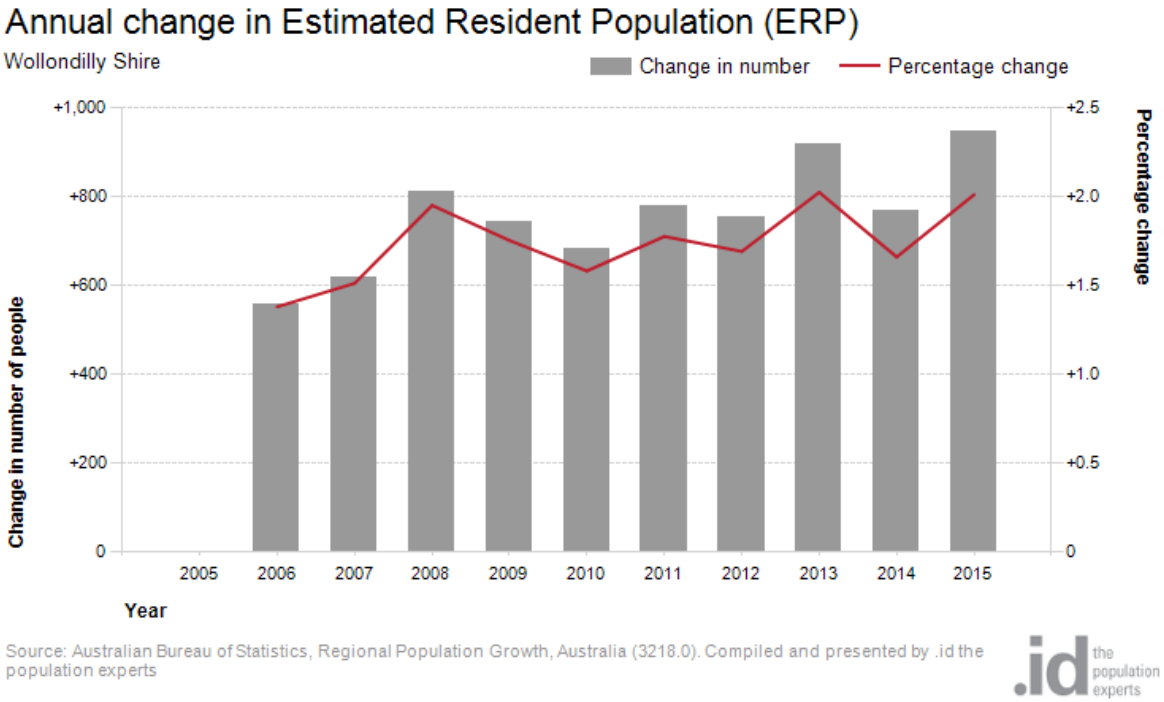


Figure 4: Annual Change in Estimated Resident Population

It is evident that there has been steady and relatively constant growth in the Shire, in the range 1.5 to 2.0% per annum over the last 10 years.

4.1.2 Age Structure

A summary of the age structure of the local area (Picton – Mowbray – Maldon), by way of a comparison with the wider Wollondilly Shire is shown in the following Figure.

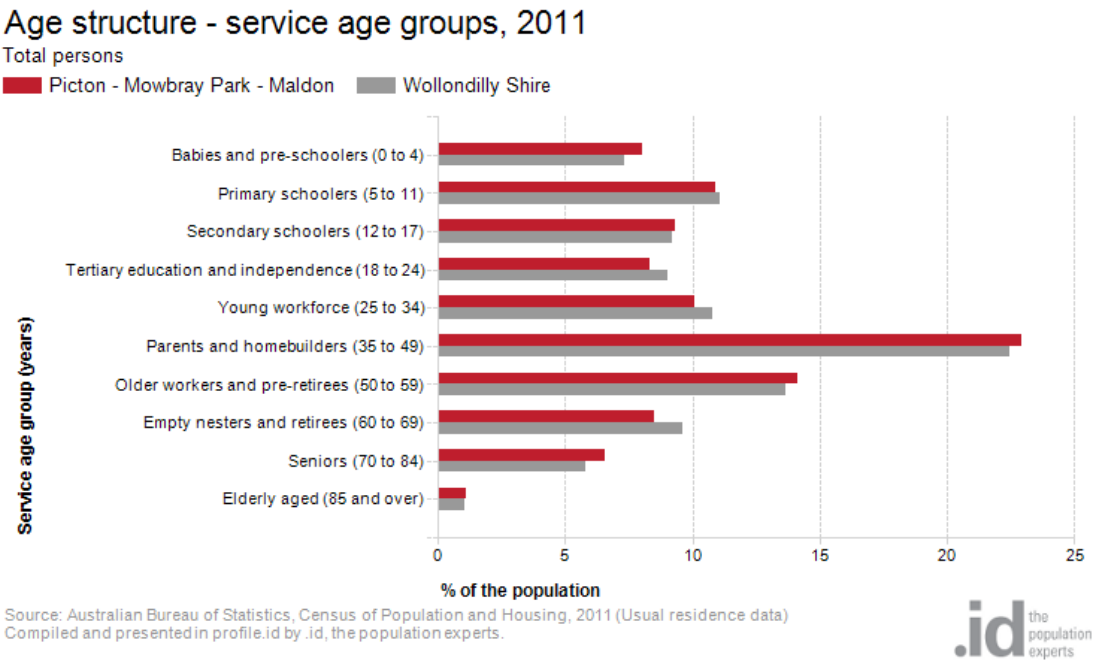


Figure 5: Population Age Structure by Service Age Groups

Analysis of the service age groups of Picton - Mowbray Park - Maldon in 2011 compared to Wollondilly Shire shows that there was a higher proportion of people in the younger age groups (0 to 17 years), a higher proportion in the 35 to 60 years age group and a similar proportion of people in the older age groups (60+ years).

Overall, 28.3% of the population was aged between 0 and 17, and 16.2% were aged 60 years and over, compared with 27.6% and 16.5% respectively for Wollondilly Shire.

The major differences between the age structure of Picton - Mowbray Park - Maldon and Wollondilly Shire were:

- A *larger* percentage of 'Seniors' (6.6% compared to 5.8%);
- A *smaller* percentage of 'Empty nesters (18 to 35) and retirees' (8.5% compared to 9.6%).

An evaluation of the changing nature of the community between recent census periods (2006 – 2011) is as follows:

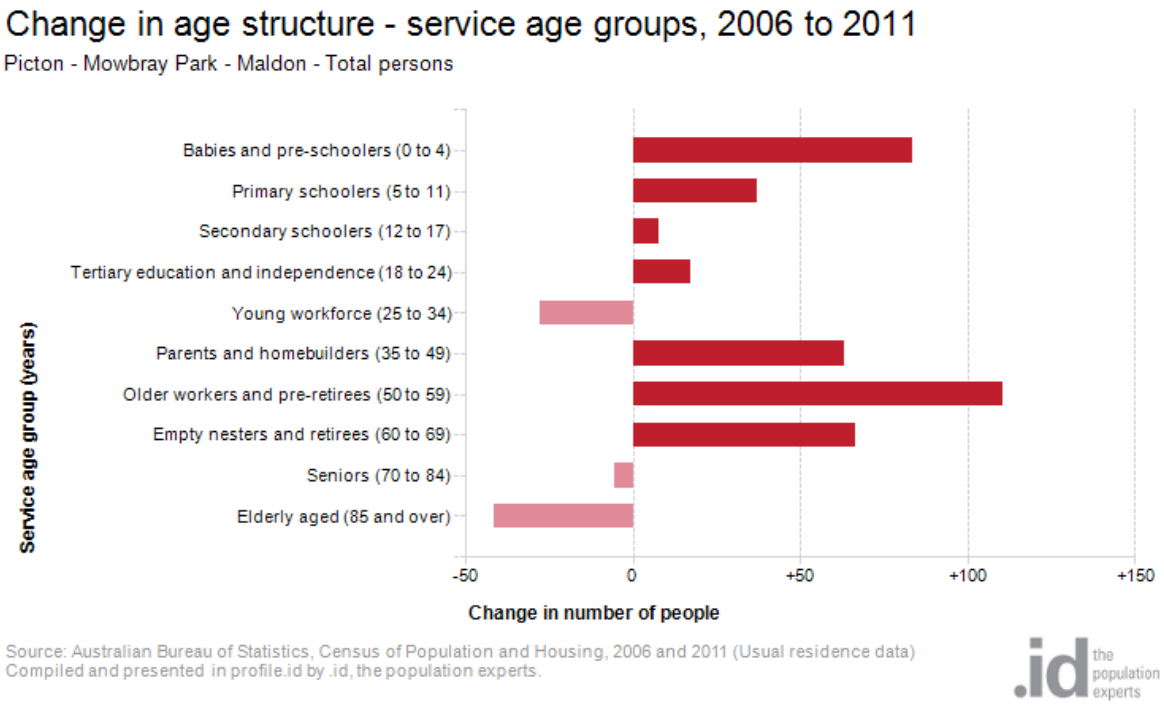


Figure 6: Change in Age Structure Between 2006 and 2011 Census Periods

From 2006 to 2011, Picton - Mowbray Park - Maldon's population increased by 311 people (7.3%). This represents an average annual population change of 1.41% per year over the period.

The largest increase changes in the age structure in this area between 2006 and 2011 were in the age groups:

- Older workers and pre-retirees (50 to 59) (+111 people);
- Babies and pre-schoolers (0 to 4) (+84 people);
- Empty nesters and retirees (60 to 69) (+67 people); and

- Parents and homebuilders (35 to 49) (+63 people).

Correspondingly there was an apparent decline in those age groupings across the young workforce (25-34) and Seniors and Elderly aged 70 and over.

4.1.3 Employment

Employment characteristics for the local Picton Area by way of a comparison with those across the Shire are represented in the following Figures:

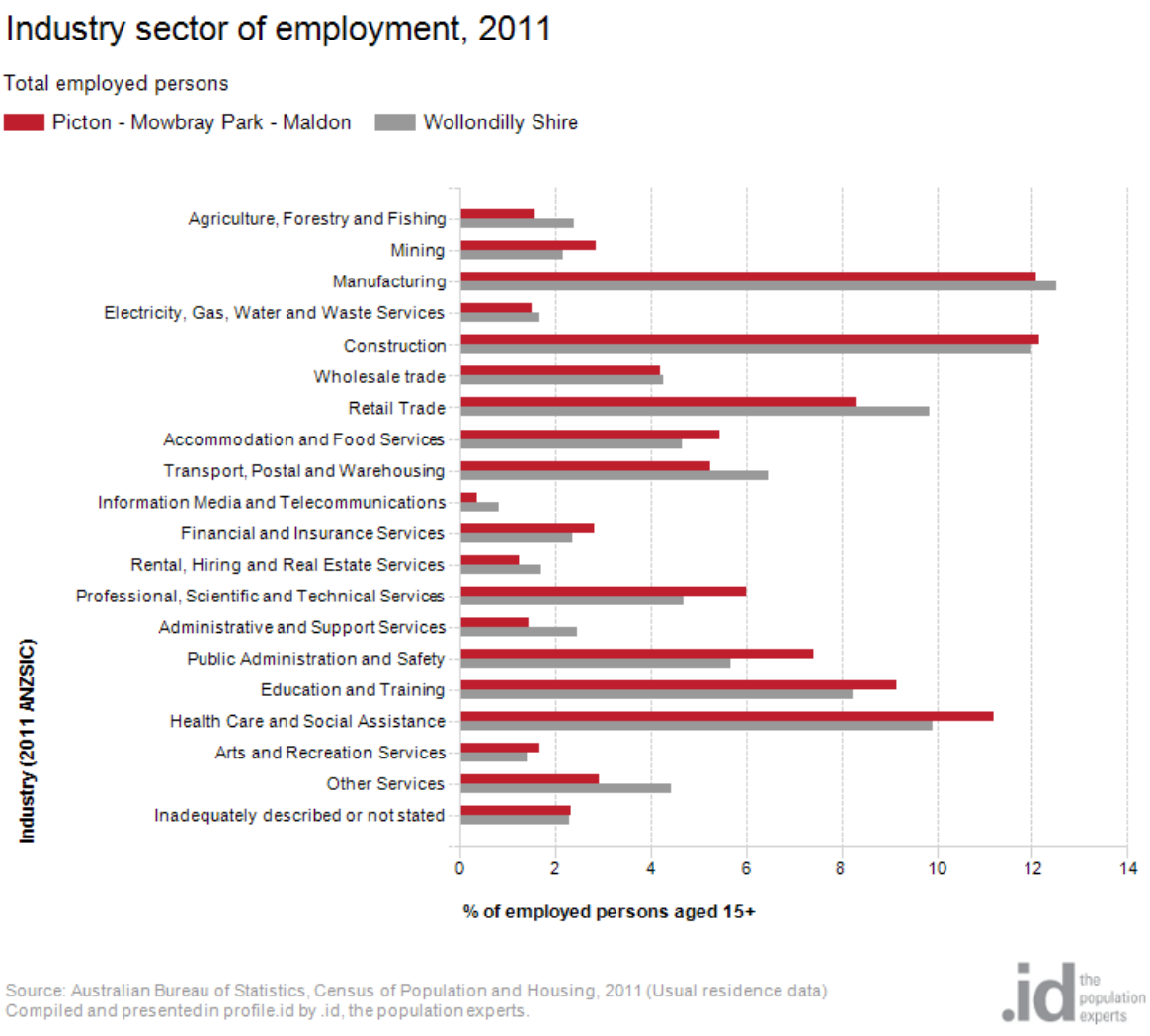


Figure 7: Industry Sector of Employment Comparison – Picton Area with the Shire

An analysis of the jobs held by the resident population in Picton - Mowbray Park - Maldon in 2011 shows the three most popular industry sectors were:

- Construction (275 people or 12.2%);
- Manufacturing (273 people or 12.1%); and
- Health Care and Social Assistance (253 people or 11.2%).

In combination, these three industries employed 801 people in total or 35.4% of the total employed resident population.

In comparison, Wollondilly Shire employed 12.0% in Construction; 12.5% in Manufacturing; and 9.9% in Health Care and Social Assistance, 34.4% in total.

The major differences between the jobs held by the population of Picton - Mowbray Park - Maldon and Wollondilly Shire were:

- A *larger* percentage of persons employed in public administration and safety (7.4% compared to 5.7%);
- A *larger* percentage of persons employed in professional, scientific and technical services (6.0% compared to 4.7%);
- A *smaller* percentage of persons employed in retail trade (8.3% compared to 9.8%); and
- A *smaller* percentage of persons employed in other services (2.9% compared to 4.4%).

The corresponding and recent changing nature of employment is represented by the following Figure:

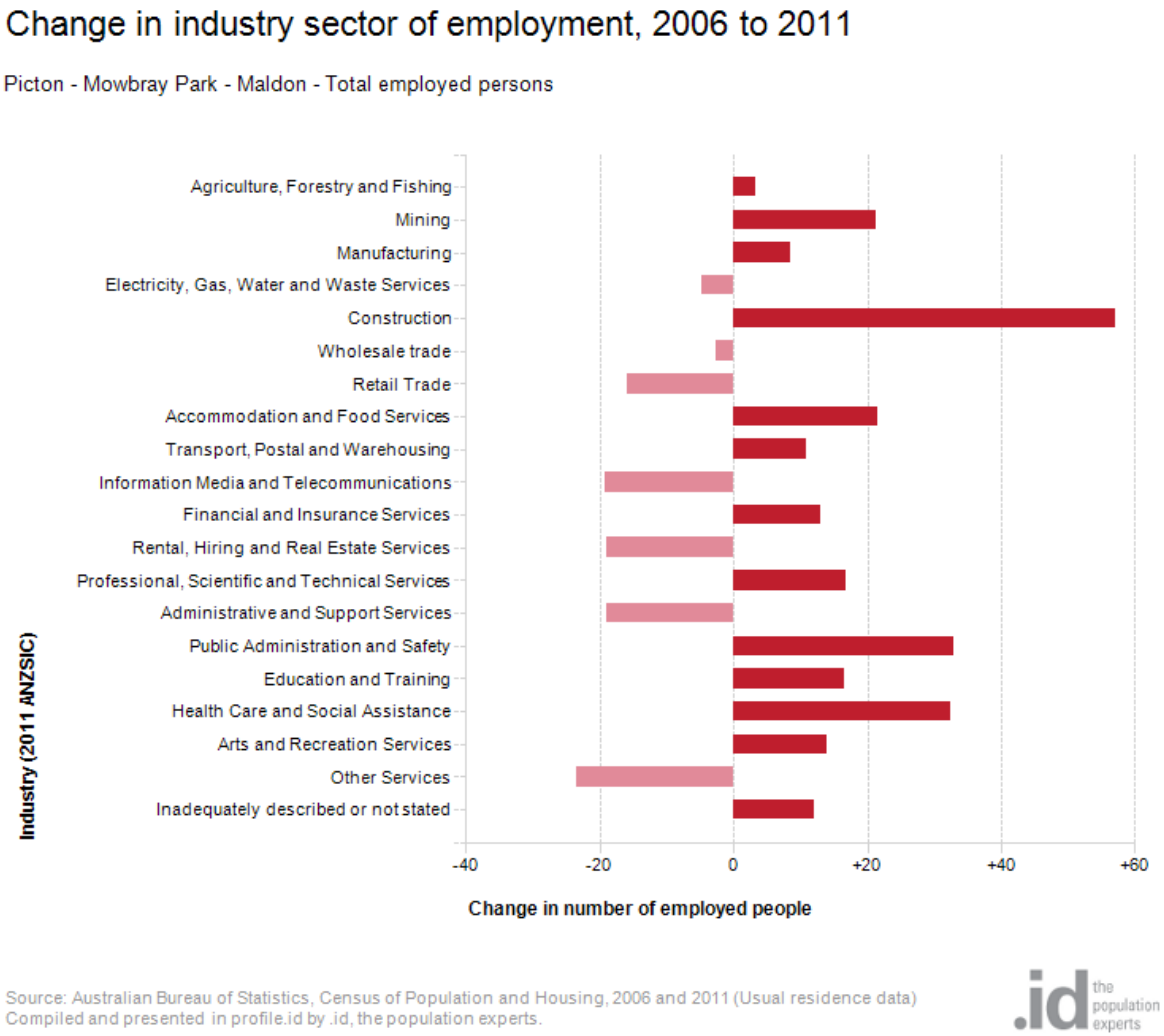


Figure 8: Change in Industry Sector of Employment – 2006 to 2011

The number of employed people in Picton - Mowbray Park - Maldon increased by 157 between 2006 and 2011.

The largest change in the jobs held by the resident population between 2006 and 2011 in Picton - Mowbray Park - Maldon was for those employed in:

- Construction (+57 persons)

Other growth areas included mining, public administration, accommodation and food and also in health care.

4.1.4 Method of Travel to Work

The method of travel to work analyses show a comparison of the Wollondilly Shire area with that for Greater Sydney as follows:

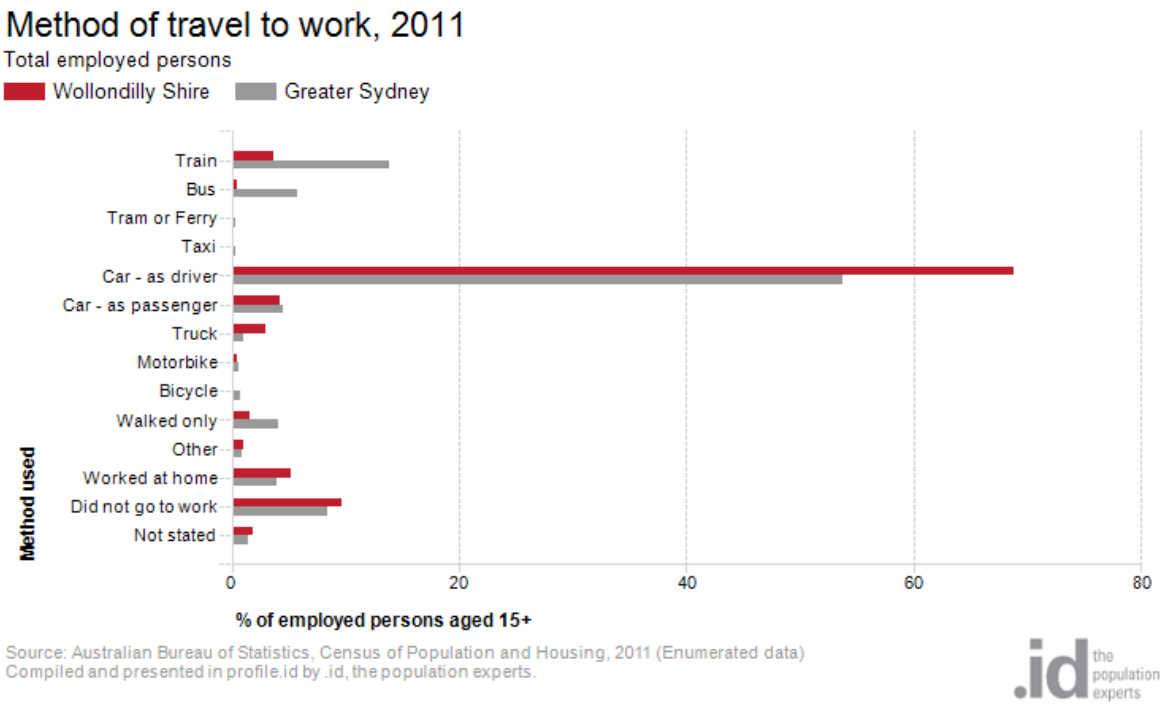


Figure 9: Method of Travel to Work - 2011

In 2011, there were 870 people who caught public transport to work (train, bus, tram or ferry) in Wollondilly Shire, compared with 15,985 who drove in private vehicles (car – as driver, car – as passenger, motorbike, or truck).

Analysis of the method of travel to work of the residents in Wollondilly Shire in 2011, compared to Greater Sydney, shows that 4.2% used public transport, while 76.5% used a private vehicle, compared with 20.0% and 60.0% respectively in Greater Sydney.

The major differences in persons between the method of travel to work of Wollondilly Shire and Greater Sydney were:

- A *larger* percentage of persons who travelled by car (as driver) (68.8% compared to 53.8%);

- A *smaller* percentage of persons who travelled by train (3.7% compared to 13.8%);
- A *smaller* percentage of persons who travelled by bus (0.4% compared to 5.8%); and
- A *smaller* percentage of persons who walked only (1.5% compared to 4.1%).

An evaluation of how travel mode demands have changed between the last two census periods is summarised as follows:

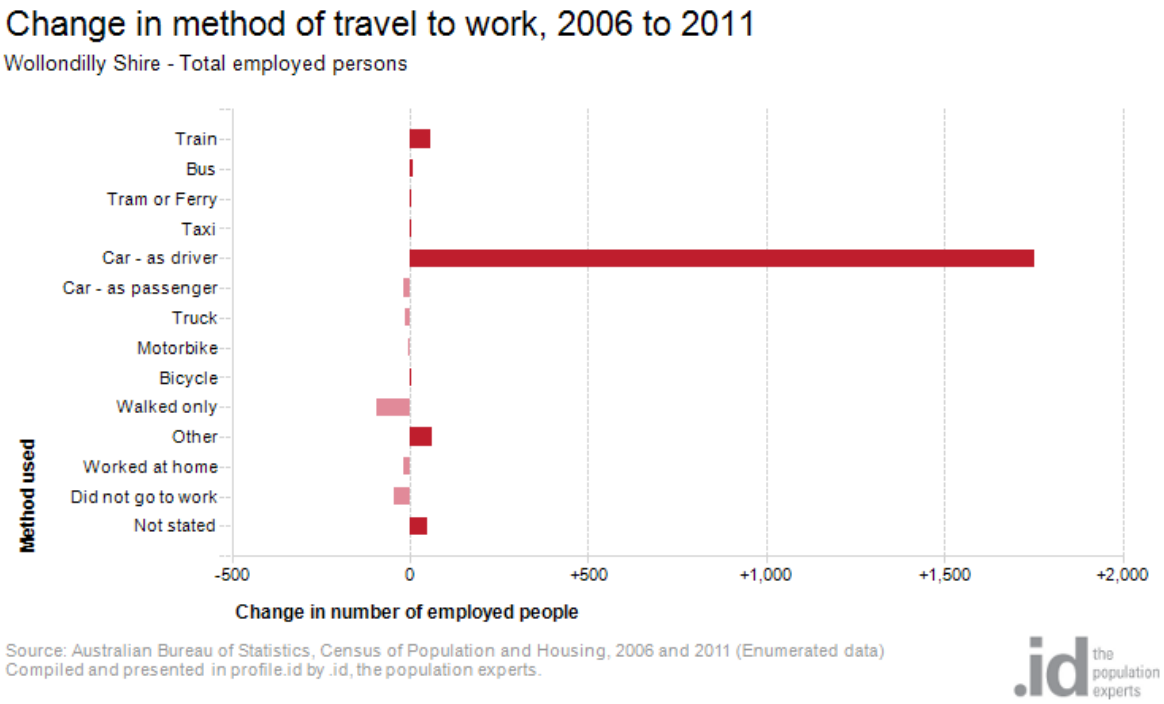


Figure 10: Change in Method of Travel to Work – 2006 to 2011

The number of employed people in Wollondilly Shire increased by 1,744 between 2006 and 2011.

The largest changes in the method of travel to work by resident population in Wollondilly Shire between 2006 and 2011 were for those nominated:

- Car - as driver (+1,752 persons);
- Walked only (-93 persons);
- Other (+63 persons); and
- Train (+56 persons).

By way of a further comparison, the method of travel to work for the local Picton area when compared with Wollondilly Shire is represented as follows:

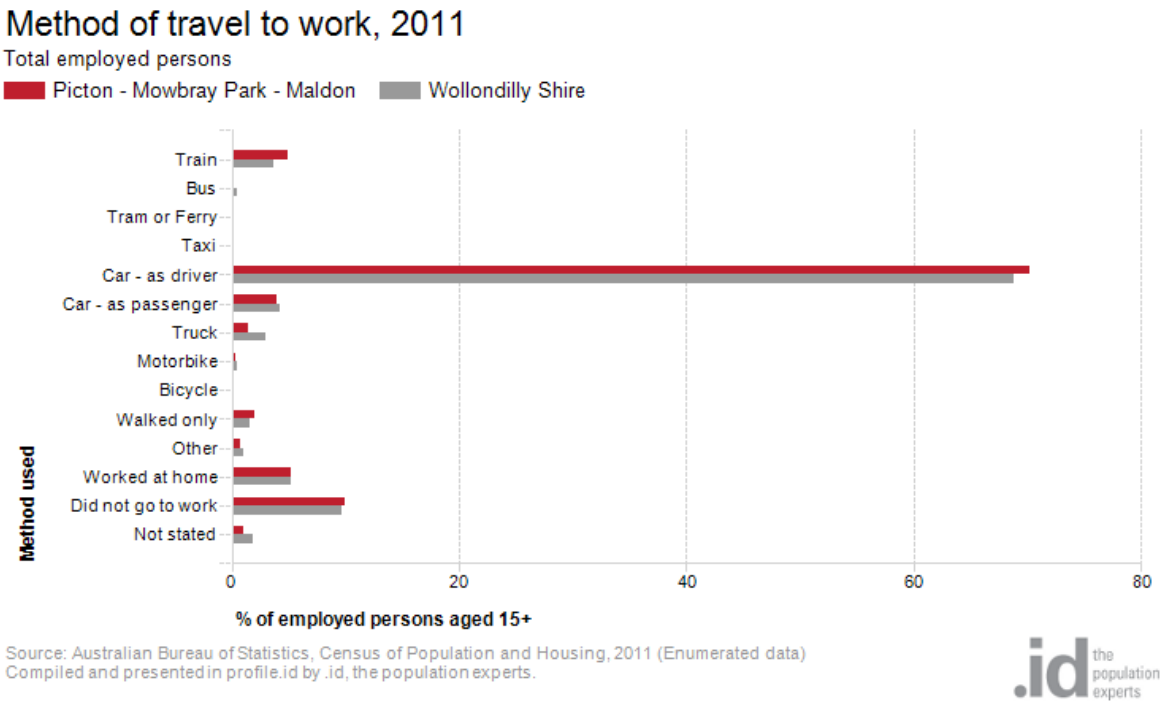


Figure 11: Method of Travel to Work, Picton – Mowbray Park – Maldon Compared With Wollondilly Shire - 2011

In 2011, there were 112 people who caught public transport to work (train, bus, tram or ferry) in Picton - Mowbray Park - Maldon, compared with 1,684 who drove in private vehicles (car – as driver, car – as passenger, motorbike, or truck).

Analysis of the method of travel to work of the residents in Picton - Mowbray Park - Maldon in 2011, compared to Wollondilly Shire, shows that 5.0% used public transport, while 75.8% used a private vehicle, compared with 4.2% and 76.5% respectively in Wollondilly Shire. The urban areas therefore demonstrate a higher rate of public transport usage.

The major differences in persons between the method of travel to work of Picton - Mowbray Park - Maldon and Wollondilly Shire were:

- A *larger* percentage of persons who travelled by car (as driver) (70.2% compared to 68.8%);
- A *larger* percentage of persons who travelled by train (4.9% compared to 3.7%); and
- A *smaller* percentage of persons who travelled by truck (1.4% compared to 3.0%).

An examination of how the distribution of travel modes has changed between recent census periods is set out as follows:

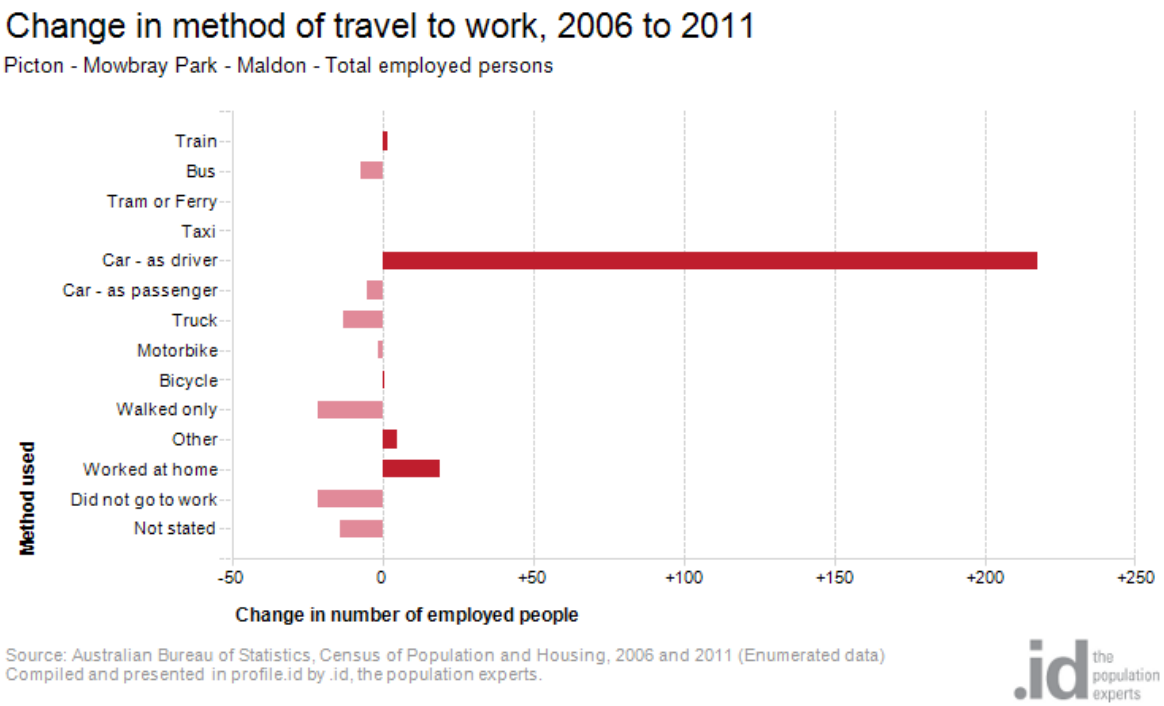


Figure 12: Change in Method of Travel to Work – 2006 to 2011

The number of employed people in Picton - Mowbray Park - Maldon increased by 160 between 2006 and 2011.

The largest change in the method of travel to work by resident population in Picton - Mowbray Park - Maldon between 2006 and 2011 was for those who nominated:

- Car - as driver (+218 persons)

Notably, there was a marginal increase in travel by train, however a decline in travel by bus and also for those who walked. This is indicative of increasing reliance on personal travel by car.

4.1.5 Car Ownership

An evaluation of the comparative level of car ownership in the Wollondilly Shire when compared with that for the Greater Sydney area is as follows:

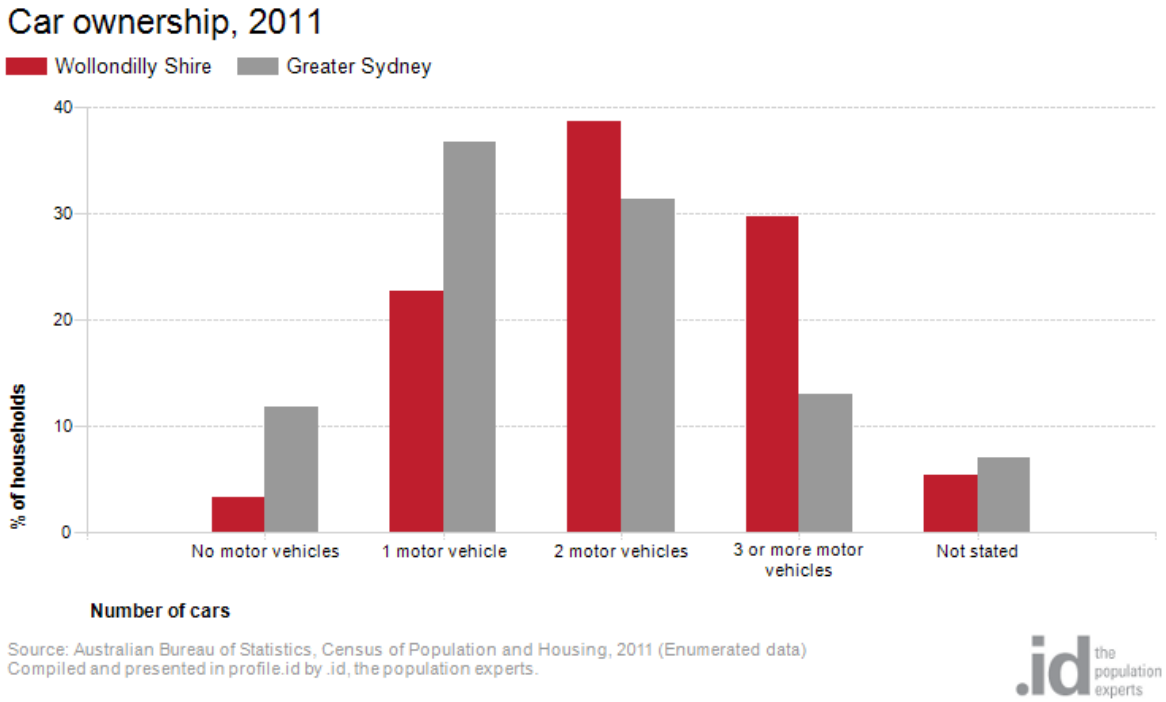


Figure 13: Car Ownership Levels - 2011

Analysis of the car ownership of the households in Wollondilly Shire in 2011 compared to Greater Sydney shows that 91.3% of the households owned at least one car, while 3.3% did not, compared with 81.2% and 11.8% respectively in Greater Sydney.

Of those that owned at least one vehicle, there was a smaller proportion who owned just one car; a larger proportion who owned two cars; and a larger proportion who owned three cars or more.

Overall, 22.8% of the households owned one car; 38.8% owned two cars; and 29.7% owned three cars or more, compared with 36.8%; 31.4% and 13.0% respectively for Greater Sydney. There is a higher car ownership in the more than one vehicle per household category in Wollondilly Shire, indicating a much stronger reliance on travel by private motor vehicle.

An examination of the changing trends in this area is summarised in the following Figure:

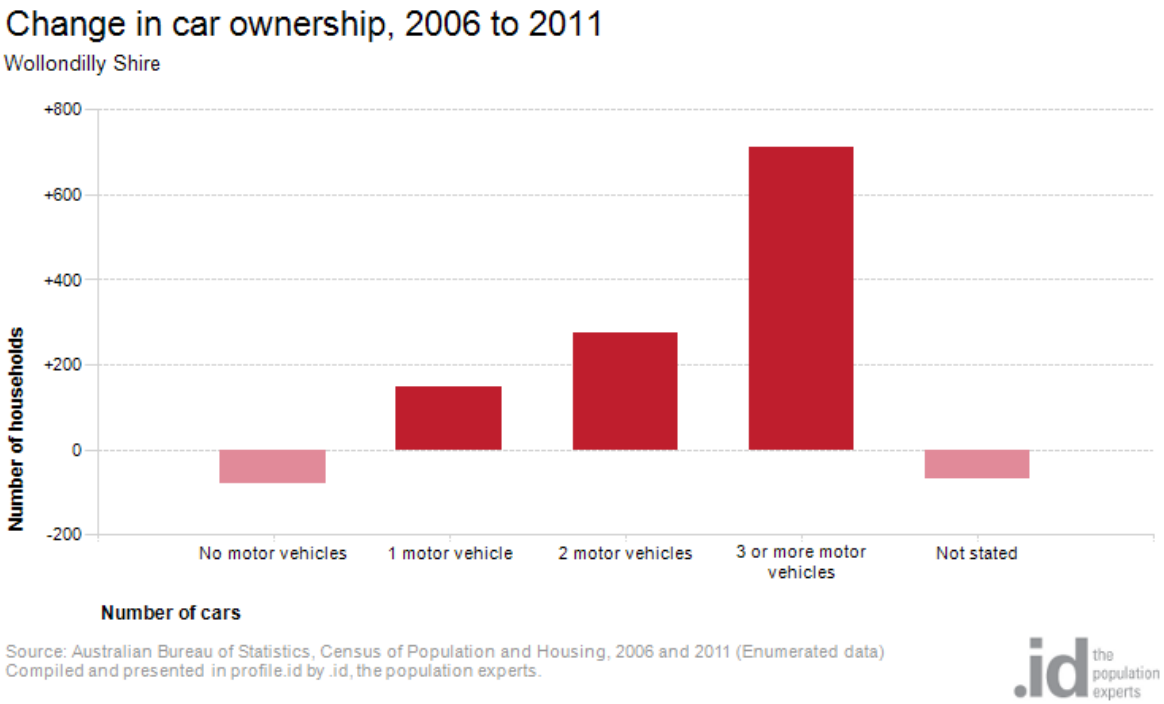


Figure 14: Change in Car Ownership – 2006 to 2011

The largest changes in the household car ownership in Wollondilly Shire between 2006 and 2011 were:

- 3 or more motor vehicles (+712 households);
- 2 motor vehicles (+276 households);
- 1 motor vehicle (+148 households);
- No motor vehicles (-79 households).

The results indicate an increased uptake in vehicle ownership right across the board, including for those who have not previously owned a vehicle.

4.1.6 Residential Location of Workers

An assessment and understanding of the residential location of workers in the Shire is set out as follows:

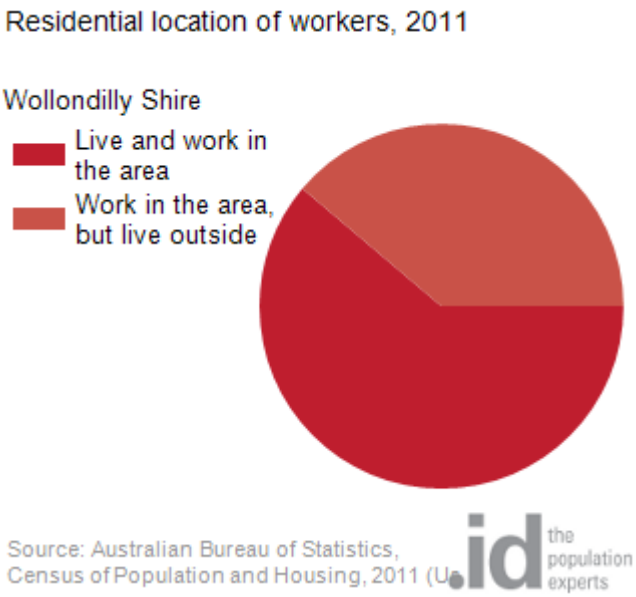


Figure 15: Workers' Place of Residence - 2011

The residential location of workers in the Shire showed the following results at the 2011 census:

- Of the 9,363 people who work in Wollondilly Shire, 5,727 or 61.2% also live in the area;
- This indicates that of the population who work in the Shire, 38.8% live outside it.

4.1.7 Employment Location of Residents

By way of a contrast to section 4.1.6, the following employment location of residents has been identified as follows:

Figure 16: Employment Location of Residents - 2011

The employment location of residents in the Shire showed the following results at the 2011 census:

- Of the 21,292 employed residents in Wollondilly Shire, 5,727 or 26.9% also live in the area;
- This indicates that of the population who live in the Shire, 12,443 or 58.4% work outside it.

4.1.8 Need for Assistance

The "Need for Assistance" measure is an indicator of the degree of accessibility capability the community has. The 2011 census indicates the following accessibility levels:

- 1,623 people or 3.8% of the population in Wollondilly Shire in 2011, reported needing help in their day-to-day lives due to disability.

Wollondilly Shire's disability statistics relate directly to need for assistance due to a severe or profound disability.

An assessment of how this translates across the community age groupings and also how it compares with the Greater Sydney area is set out as follows:

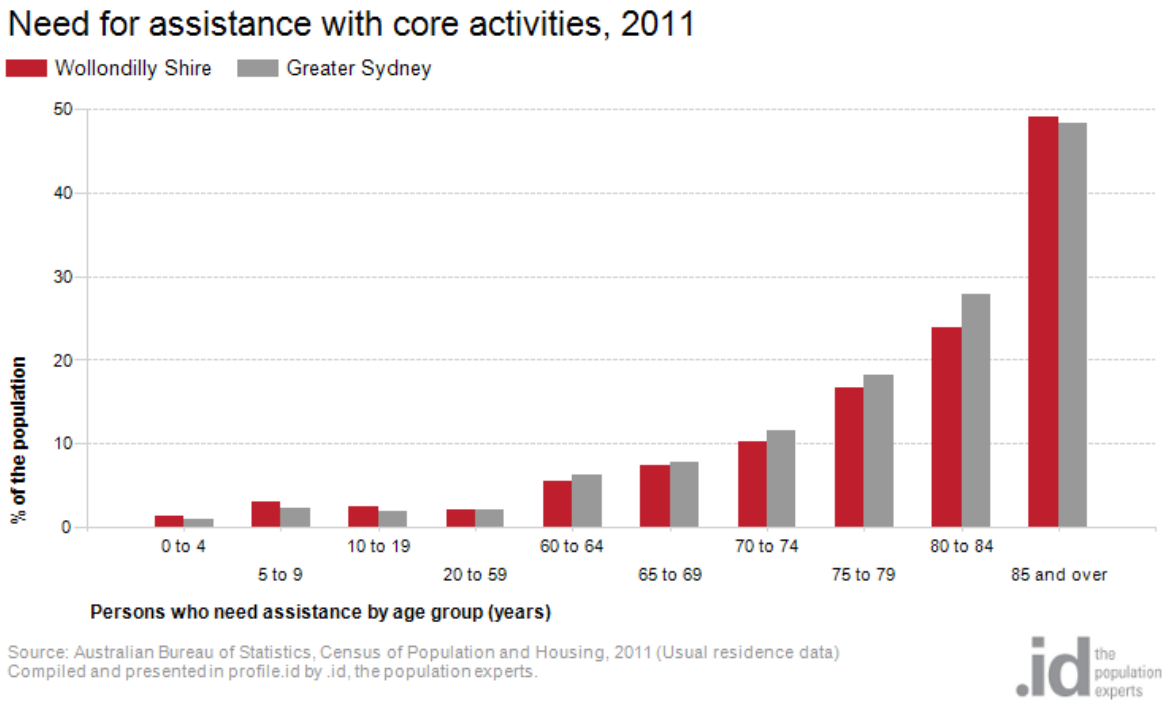


Figure 17: Need for Assistance with Core Activities - 2011

Analysis of the need for assistance of people in Wollondilly Shire compared to Greater Sydney shows that there was a lower proportion of people who reported needing assistance with core activities when compared with that for the Greater Sydney area. This is indicative of a higher level of mobility within the community.

Overall, 3.8% of the population reported needing assistance with core activities, compared with 4.4% for Greater Sydney.

The major differences in the age groups reporting a need for assistance in Wollondilly Shire and Greater Sydney were:

- A *smaller* percentage of persons aged 80 to 84 (23.8% compared to 27.7%);
- A *smaller* percentage of persons aged 75 to 79 (16.6% compared to 18.1%); and
- A *smaller* percentage of persons aged 70 to 74 (10.2% compared to 11.4%).

An evaluation of how that need for assistance is changing with time I set out in the following Figure:

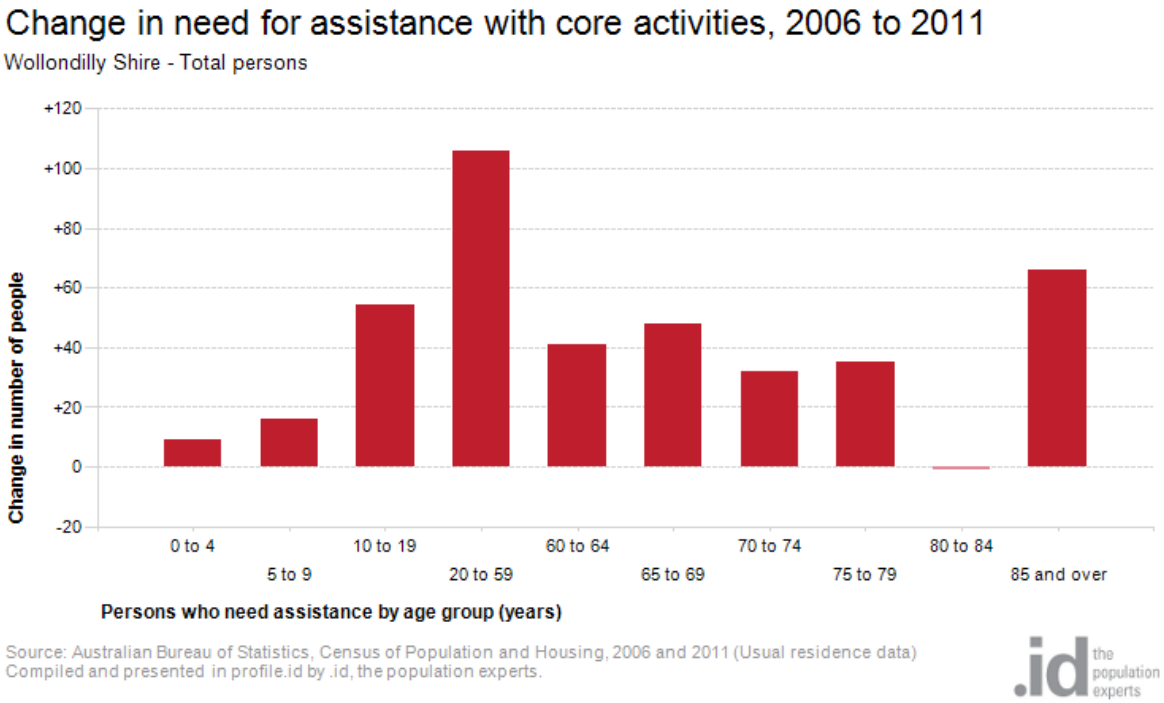


Figure 18: Change in Need for Assistance with Core Activities – 2006 to 2011

The major differences in the age groups reporting a need for assistance between 2006 and 2011 in Wollondilly Shire were in the age groups:

- 20 to 59 (+106 persons);
- 85 and over (+66 persons); and
- 10 to 19 (+54 persons).

Overall, and while levels of mobility were less than for Greater Sydney by comparison in 2011, it is evident that there is an increasing demand for a need for assistance in the Shire. This is indicative of a closing of the gap with the Greater Sydney statistics and potentially indicates a need for enhanced accessibility in coming years.

4.2 Land Use Environment

Current Land Uses within the Study Area are well defined. The current allocation of Land Uses is shown on the following Figure.

Figure 19: Study Area Land Use Zoning

Key characteristics of the Land Use Zoning are as follows:

- By way of observation, current activities align relatively consistently with the corresponding zoning provisions;
- The central Business 2 zoned area predominantly defines the principal central commercial business area;
- Small areas of Primary Production zoned land adjoin the western side of the commercial town centre, although site observation indicates these are not currently utilised for this purpose;
- The higher density residential zoned areas adjoin the southern and eastern sides of the town centre, with decreasing density zoning radiating away from the centre;
- Much of the Study Area is subject to a heritage Conservation Area General overlay, indicative of the relative significance of heritage and conservation in this area.

4.3 Town Centre Accessibility

Overall, the Town Centre area is relatively level and generally accessible. There are many laneways and connecting links within the commercial centre area that make for an accessible environment.

The broader study area is however relatively steep and characterised by some key accessibility constraints such as:

- The degree of severance resulting from the railway passing longitudinally through the catchment;

- A similar constraint generated by the presence of the Stonequarry Creek;
- Discontinuity in connectedness such as the restricted pedestrian access on Argyle Street west, under the rail bridge and through to the commercial Town Centre Area; and
- The apparent constrained degree of integration and connectedness of the Train Station with the wider community.

The provision of alternate connections across the railway line at a number of locations is recognised, however it remains evident that accessibility and connectedness within the study area is materially constrained. By way of a comparison with the rail crossing facilities, the Stonequarry Creek presents a higher degree of severance and constraint on connectivity and integration.

Internally within the commercial Town Centre area there is little in the way of dedicated facility to support or assist persons with mobility or disability challenges. Perhaps, as is indicated in the demographic findings, there has been little demand for this in the past. Notwithstanding, the changing nature of the demographic is indicative of a need for increased focus on wayfinding assistance, pathway guidance, clear and uncluttered mobility pathways, street crossing assistance and supportive facilities such as places of rest, respite and shelter.

4.4 Transport Network Safety

The following subsections describe and summarise the findings of the local reported crash history for the Town Centre as drawn from the most recent full five year crash history. Data has been sourced from and provided by NSW Rods and Maritime Services (RMS).

4.4.1 Geographic Crash Representation

The following results of the local crash history cover the five year period 2011 to 2015 inclusive. **Figure 20** shows the spread of crash locations by injury type.

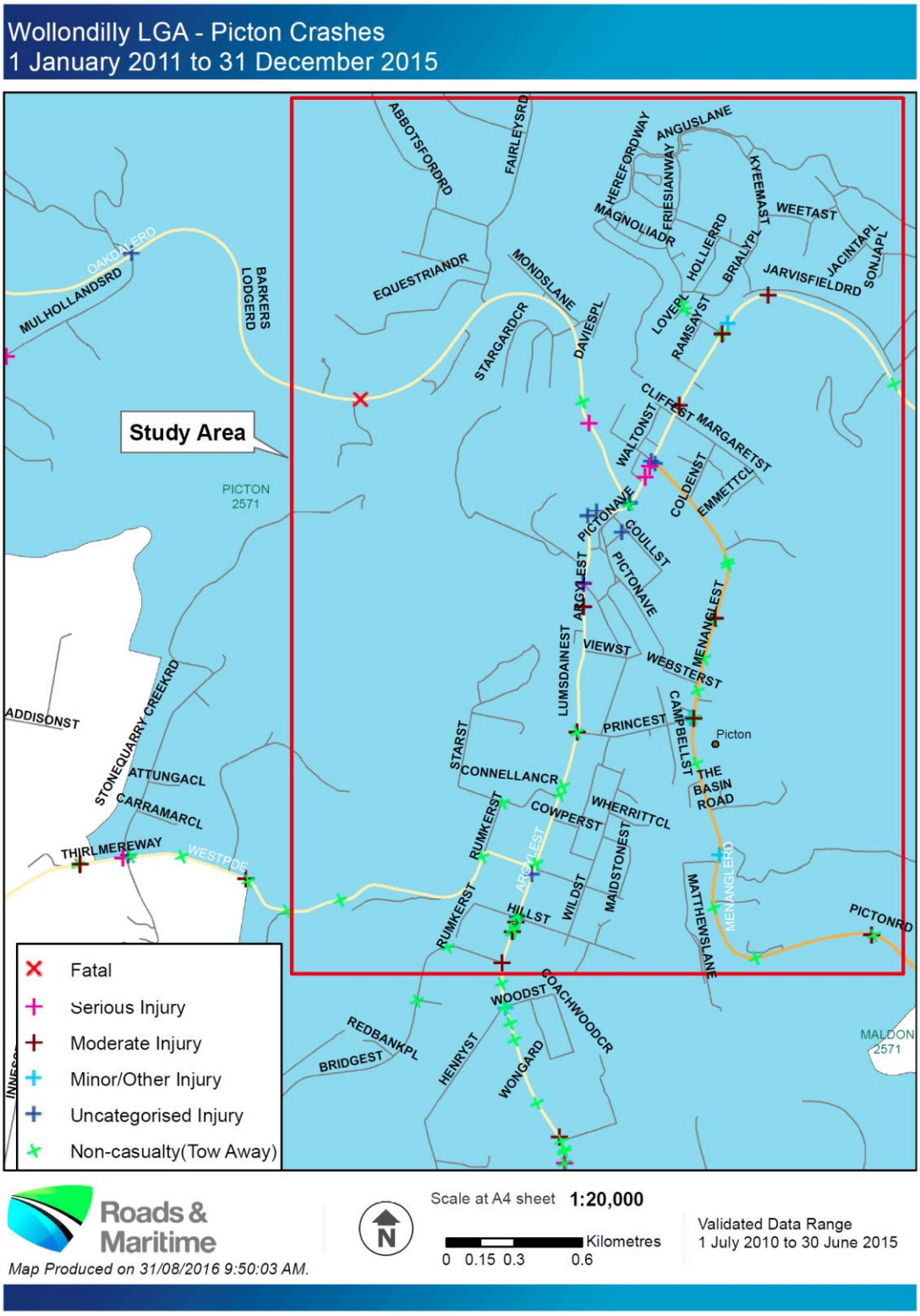


Figure 20: Geographic location of crashes by severity

Key geographic features can be summarised as follows:

- Predominant intersections that feature in the Study Area are:

- Argyle Street / Menangle Street;
- Argyle Street / Barkers Lodge Road;
- Argyle Street / Regreme Road;
- Princes Street / Argyle Street; and
- Princes Street / Menangle Street.

- The one fatal crash is recorded outside the commercial urban area on Barkers Lodge Road. Barkers Lodge Road also shows an indication of collision events located about 300 to 400m from Argyle Street;
- Serious injury crashes are evident in the Town Centre on Argyle Street, west of Menangle Street;
- Moderate injury crashes are evident at both the end intersections of Princes Street; and
- Of the three reported crashes involving pedestrians, two occurred on Argyle Street near Menangle Street. One non-casualty crash occurred at the intersection and a serious injury occurred 70m west in the main Town Centre area. The third pedestrian crash involved moderate injury and occurred on Menangle Street 70m north of Webster Street;
- There are a range of injury crash events distributed along Argyle Street between View Street and Barkers Lodge Road;
- Menangle Street also shows a distribution of mid-block crashes, predominantly non-casualty in nature.

4.4.2 Crash Characteristic Groupings

The crash characteristics are further detailed in the Summary Crash Report at **Appendix A.** Key and summarised features of the summary are as follows:

- A total of 75 crashes resulting in 39 casualties;
- 1 fatal and 5 serious incidents accounting for 8% of crashes;
- 12 incidents involving moderate injury accounting for 16% of crashes;
- 88% of incidents involving cars and light vehicles;
- 39% of crashes at intersections;
- 88% of crashes occurred on Classified Roads;
- The principle contributing factors are speed (20%), fatigue (11%), and alcohol (4%);
- 51% of crashes occurred in a 60km/h speed zone and 39% in the 50km/h speed zone;
- A disproportionately higher percentage of crashes (20%) occurred on Saturdays;
- A higher proportion of collisions occurred in the 2:00pm to 4:00pm and 5:00pm to 7:00pm time periods; and
- Overall, the annual trend indicated a declining crash rate involving injury over the past 4 years (2012 to 2015).

4.4.3 Crash Indicator Comparisons

Crash comparison Graphs have been produced and show visually the key trends. These are included at **Appendix B**. Key and further observations from these are as follows:

- Crashes involving injury, injure about 1.2 persons per incident;
- The predominant crash vehicle types involve in order, cars, light trucks and motorcycles;
- Pedestrian and cycle incidents are relatively small in number by comparison, but yet are a material feature of the crash type indicators;
- Intersections appear as the predominant risk factor for the area. School travel time and weekend travel also feature as predominant risk travel times;
- Rear end collisions are by far the predominant crash movement type. Notably this does not manifest on intersection approaches as significantly as might be expected. This indicates congestion queuing presents safety risk issues, where congestion extends beyond predominant intersection approach areas;
- Single vehicle and off-road crashes, both on curves and straight travelling environments also feature predominantly;
- In the vulnerable user groups, pedestrians are evident in the crash movement summary, however cycle movements do not feature. Notwithstanding, there is a very small representation of cyclists in the overall Crash Characteristic grouping.

4.5 The Walking Environment

The walking environment is relatively well established within the commercial Town Centre environment. Some of the connectivity appears to rely on access across integrated commercial development and private land. This is generally reasonable in the current and local context but remains subject to potential future disruption for public access.

An enhanced level of walkability could be established through improvements to the appearance, feeling of personal safety and visual surveillance of some of the routes. Connectivity to the Town Centre area is somewhat more fragmented. The Town Centre and wider Study Area pedestrian and walking facilities are shown on **Figure 21**.

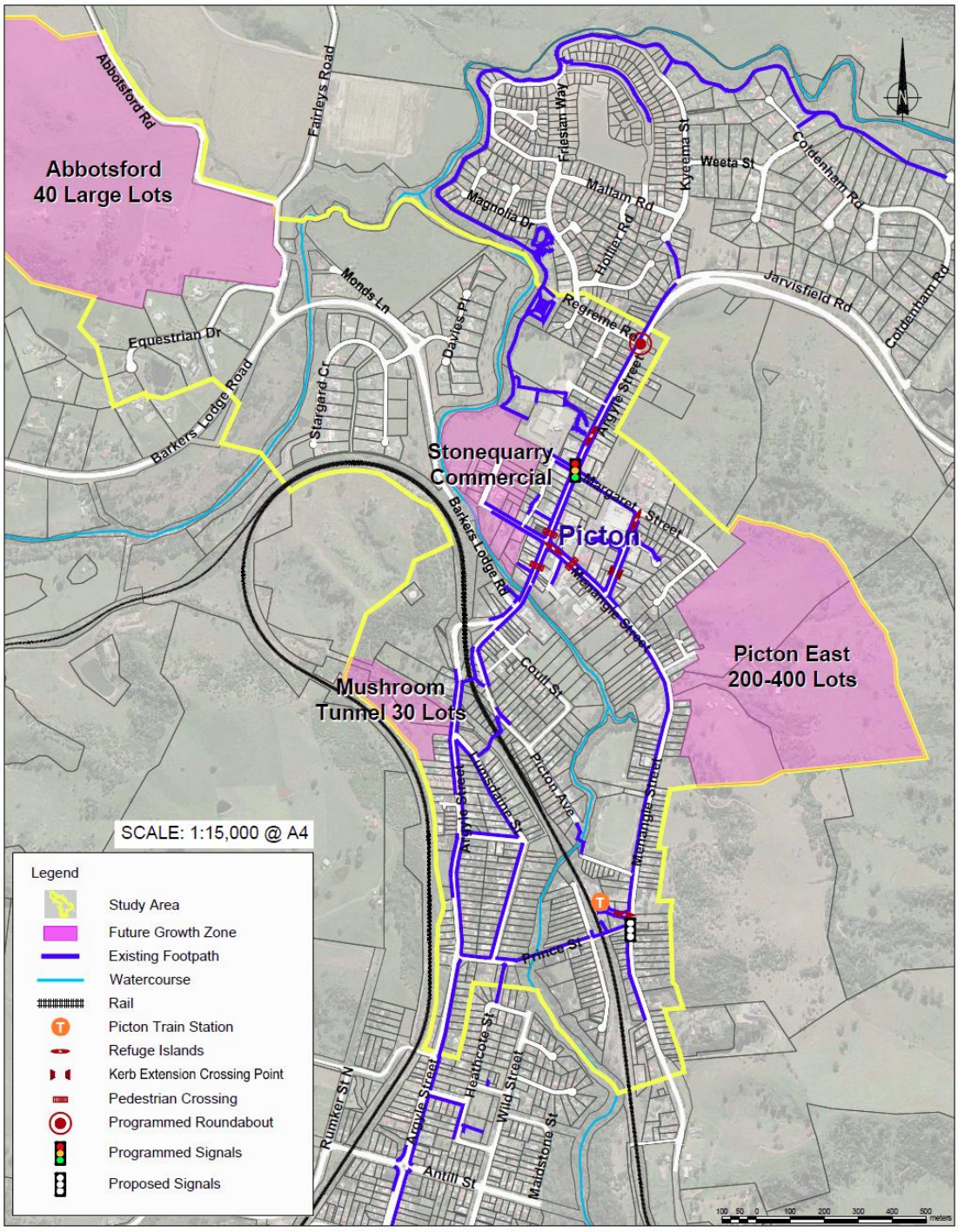


Figure 21: Picton - Existing Town Centre Pedestrian Routes

Key connections are established with the localised living community environments. These include pedestrian connections across the railway corridor and Stonequarry Creek.

While the structural framework is in place, the study area indicates a number of gaps in the safe walking network. There is no current Pedestrian Access and Mobility Plan (PMAP) for Picton. Many of the routes within the study area are, for example, reliant on pedestrian access within the road carriageway. The principal issue for pedestrian safety is that these environments establish priority for motor vehicles and therefore expose pedestrians to safety risk.

On-site observations also indicate minimal provision for additional pedestrian facilities such as intermittent seating and resting points, amenity such as drinking fountains and some of the access areas could be relatively simply enhanced in terms of personal safety and security with vegetation control and/or lighting. Accessible facilities at cross points are generally not established, however shop fronts are generally maintained clear of clutter providing for enhanced wayfinding for vision impaired persons within the Town centre.

The traffic counting data sets included capture for pedestrian demands. Overall demands are evident, and in particularly at Town Centre crossing facilities and in isolated pockets of demand, such as around schools. An overall indictor of demanded routes for pedestrian movement (be it walking, jogging, running) can be represented in part by the web-based Strava Run Tool Map. A more full and local picture will of course need to have regard to the counted results. Notwithstanding this, evidential and popular pedestrian routes are indicated on the following Strava Map.

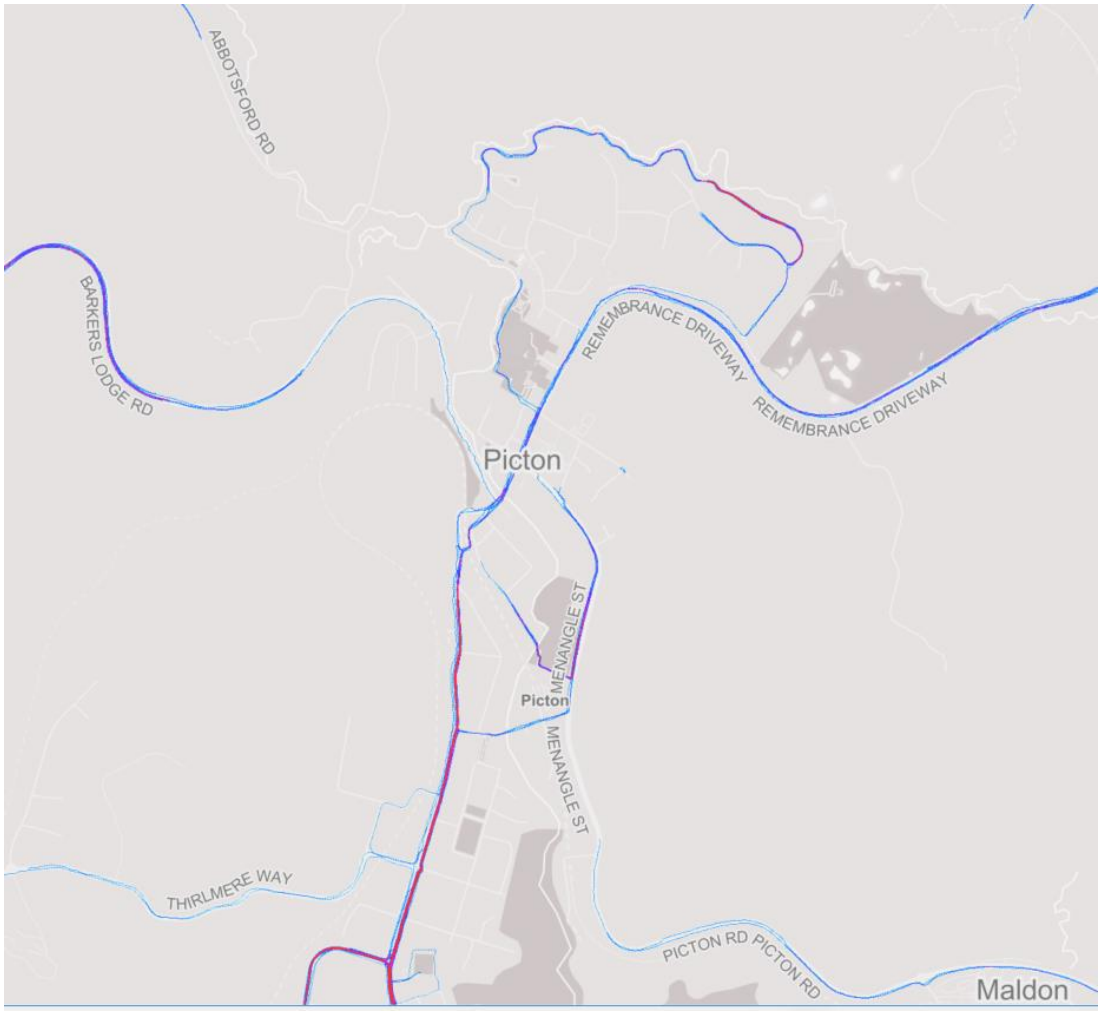


Figure 22: Picton – Strava Heatmap Pedestrian Demands[2]

Key observations from the Map, that can supplement an overall understanding of current pedestrian movements, are as follows:

- Cross connection over the Stonequarry Creek and across the railway are utilised;

[2] http://labs.strava.com/heatmap/#14/150.60604/-34.17101/gray/run

- Longitudinal connectivity along both Argyle Street and Menangle Street are desired;
- Prince Street provides a key cross connection facility;
- The Botanical Gardens link to the Town Centre is well utilised; and
- There is some demand along the currently unserviced Barkers Lodge Road.

These and other factors are considered further in the development of the Pedestrian Structure Plan.

4.6 The Cycling Environment

The Picton cycle and shared pathway routes are shown on the following **Figure 23**. The routes show a range of relatively well-connected and defined cycling routes.

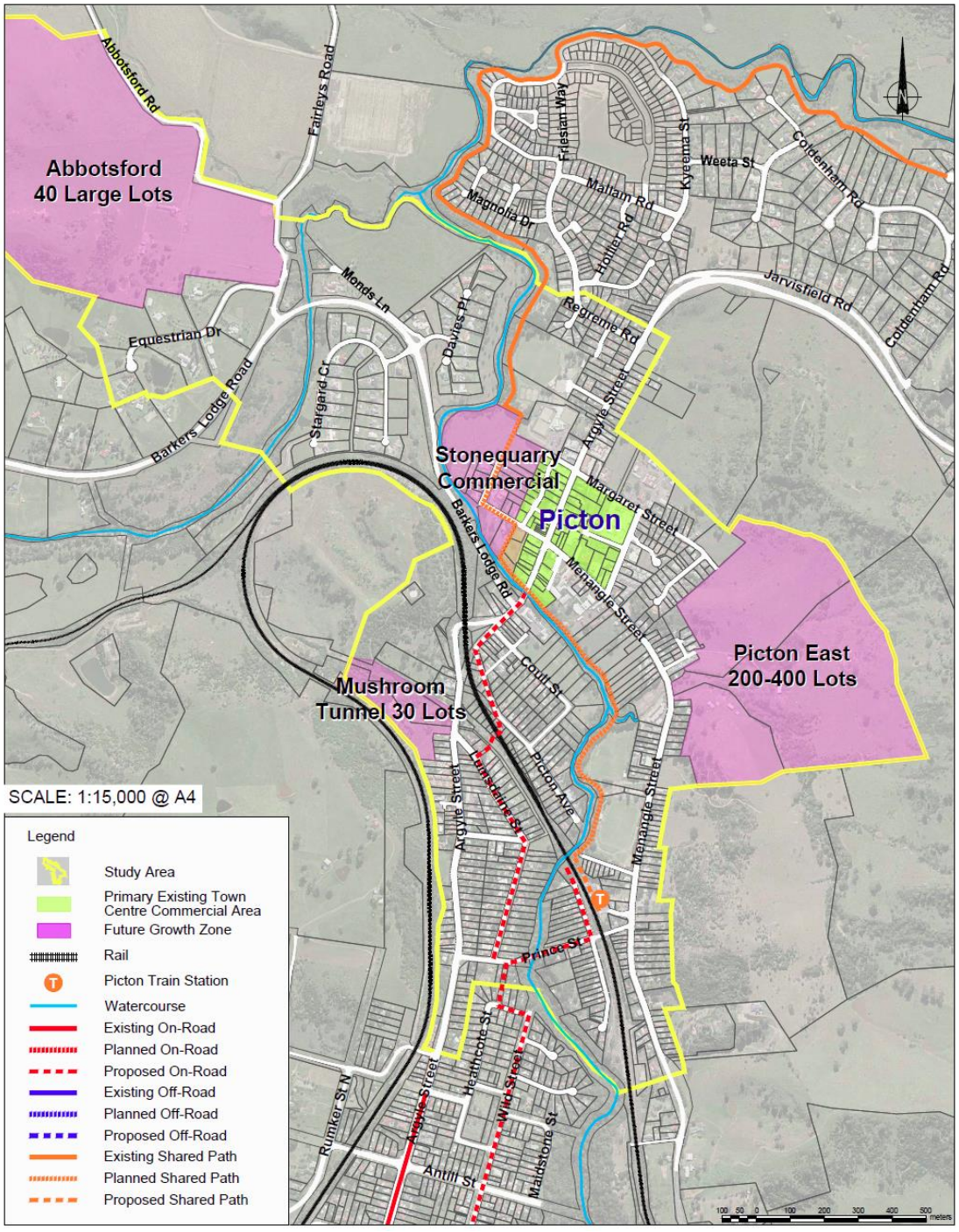


Figure 23: Wollondilly Bike Plan – Existing and Proposed Routes in Picton

Most cycle facilities are currently represented in a planned or proposed state. Limited features exist at present in all categories of cycle facility. This includes on and off-road facilities, shared paths, integrated facilities such as with buses, and also the provision of end of journey facilities for safe and secure lock-up and even protected facilities.

As is the case with the measured pedestrian demands, the traffic counts undertaken captured the incidence of cycling in the overall movement demands. Cycling is evidentially under-represented by comparison with its potential as a mode of travel. Anecdotal

evidence is that some of the local schools actively discourage cycling due to the risk environment that exists.

The overall pattern of demand can in part be represented by the heat maps represented on the Strava website. While any evaluation will necessarily need to rely on the evidential demands counted, some indicative patterns can be identified from the Map that follows.

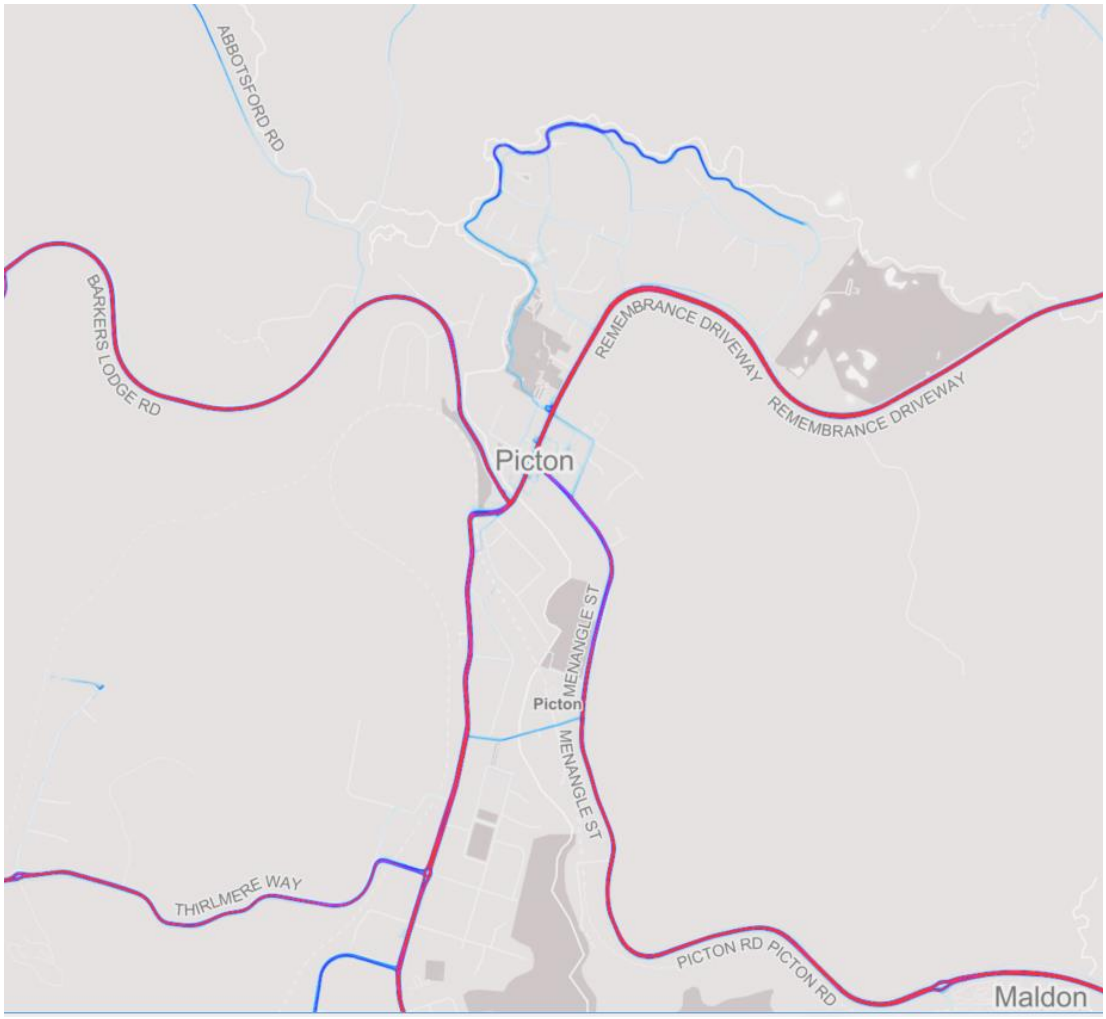


Figure 24: Strava Heatmap Cycling Demands[3]

Key observations from the cycling Map can be observed as follows:

- Positive demands exist on all the main traffic routes including: Argyle Street, Menangle Street, Remembrance Drive and Barkers Lodge Road;
- Demands are also evident on the cross rail / cross Creek routes, which are currently provisioned as pedestrian paths;
- The Botanic Gardens link is well utilised as a key connection with the northern and eastern living environments;

[3] http://labs.strava.com/heatmap/#14/150.60604/-34.17101/gray/bike

- The Town Centre street environment is also well demanded, notably the local roading routes through and around the main street. These include Colden Street, Margaret Street, Walton Lane and Cliffe Street.

Overall, the existing environment presents a significant opportunity for development of cycle facilities and this appears to correspond with some evidence of demand.

4.7 The Public Transport Environment

Figure 25 shows the existing public transport network for Picton.

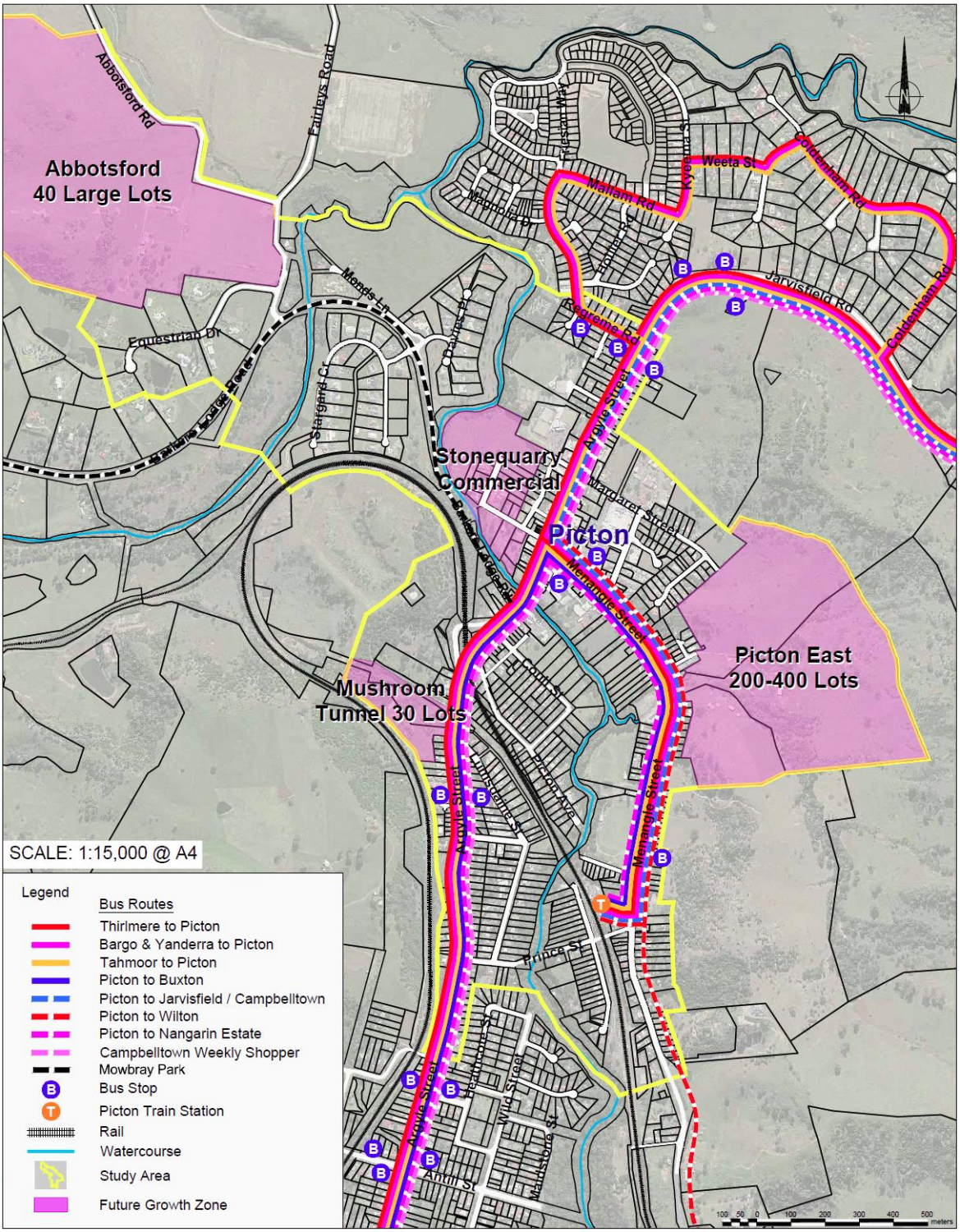


Figure 25: Picton Public Transport Network

Public transport is established in a way that focusses on connecting Picton and its key centres of destination with other centres in Wollondilly and further afield. The current routes are most efficiently established along the State arterial roading corridors. Services connect the Train Station with the commercial Town Centre and beyond.

Some facilities exist at a few locations for waiting passengers. Predominantly however there is a need for investment in sheltered bus stop facilities with waste collection and

seating facilities. The seating facilities have the potential to add value to the pedestrian transport network and its utilisation.

The Train Station is relatively well and comprehensively established. There is evidence of recent investment and also of the station's corresponding utilisation. The carpark area is substantially occupied for long periods through the day. Site observations indicate a current and emerging need for further investment in the supply of safe and secure parking related to use of the Train service. The train station is substantially accessible although does not include a Taxi facility.

Domestic bus services currently and generally run at about 50 minute to an hour intervals from the Train Station. Most services are accessible. Intercity services depart 6 times daily, twice in the morning, at 1:30pm and three times in the evening. Train services generally operate on an hourly timetable during weekdays, with distributions reducing to 30 to 45 minutes in some of the peak periods. Weekend and public holiday train service operations are variably 1 to 2 hour intervals.

4.8 Parking and Traffic Environments Data Collection

4.8.1 Parking and Traffic Survey Brief

Traffic surveys have been undertaken across the Study Area to inform the overall Study and to establish baseline traffic movements for the transport modelling. The comprehensive traffic survey brief specified counting as follows:

Task 1 – Classified Intersection Count:

- 15 minute intervals;
- Hourly and daily summaries;
- Peak hours identified and reported;
  - Classification: Cars / Trucks / Buses / Cyclists / Pedestrians; and
- Video provided.

- Survey Location, Traffic and Pedestrian Sites:
  - Argyle Street with Barkers Lodge Road;
  - Argyle Street with Menangle Street;
  - Margaret Street with Cliffe Street and Argyle Street;
  - Menangle Street with Prince Street;
  - Picton Avenue with Coull Street and Argyle Street;
  - Colden Street with Menangle Street; and
  - Colden Street with Margaret Street.
- Pedestrian and Cyclist Counts:
  - Menangle Street near Victoria Park; and
  - Argyle Street in vicinity of Mushroom Tunnel and Picton Primary School.

- Time Periods:
  - Weekday 2 Hr AM, 2 Hrs Midday, 2 Hrs PM (6 Hours); and
  - Saturday 2 Hours.

Task 2 – Parking Survey:

- Parking Inventory: Capacity and restrictions;
- Parking Occupancy Survey: Hourly Intervals;
- Length of Stay Survey: 15 Minute Interval;
- Hourly and daily summaries: Peak hours identified and reported;
- Survey subject:
  - Occupancy Survey;
  - Length of Stay Survey – 4 sample locations;
- Time Periods:
  - Thursday 09:00-18:00 (9 Hours) – Occupancy;
  - Thursday 09:00-17:00 (8 Hours) - Length of Stay;
  - Saturday 09:00-14:00 (5 Hours) – Occupancy.

Task 3 – Shopper Interview Surveys:

- Face to face interviews;
- 2 interviewers required;
- Time Period: 09:00-17:00 (8 Hours).

Task 4 – Business Surveys:

- Face to face interviews;
- 2 interviewers undertaken as follows:
- Interview Every business within the Study Area should be approached to establish the type of business, on-site number of parking spaces, number of staff (total on the day of survey), their mode of travel and their parking location. Information on how delivery vehicles access their site will also be sought to establish the need or otherwise for loading facilities;
- Time Period: 09:00-17:00 (8 Hours).

Task 5 – Travel Time Surveys:

- GPS Travel Time Survey;
- Delay at signalised intersection along the travel time survey route recorded; and
- 10 runs in each direct per peak period;
- Routes, 3 routes;
- Time Period: 2 Hours AM and 2 Hours PM (4 Hours).

Task 6 – Queue Length Survey:

- Queue lengths videoed by approach.

- Survey Locations:
  - Menangle Street / Argyle St Intersection – for the Menangle Street approach;
  - Menangle Street / Prince Street Intersection – for the Prince Street approach;
  - Argyle Street / Prince Street Intersection – for the Prince Street approach;
  - Argyle Street / Margaret Street Intersection – for the Margaret Street approach; and
  - Argyle Street / Barkers Lodge Road – for the Barkers Lodge Road approach.
- Time Period: 2 Hours AM and 2 Hours PM (4 Hours).

The results from the parking and traffic surveys defining the current environments are set out in the following sections.

4.9 Parking Environment

Picton Town Centre is characterised by a number of smaller pockets of off-street parking (some public and some private), a predominance of parallel on-street parking and some larger private facilities associated with private enterprise such as the Picton Mall. An indication of the location and distribution of off-street parking in the Study Area is shown on the following Figure.

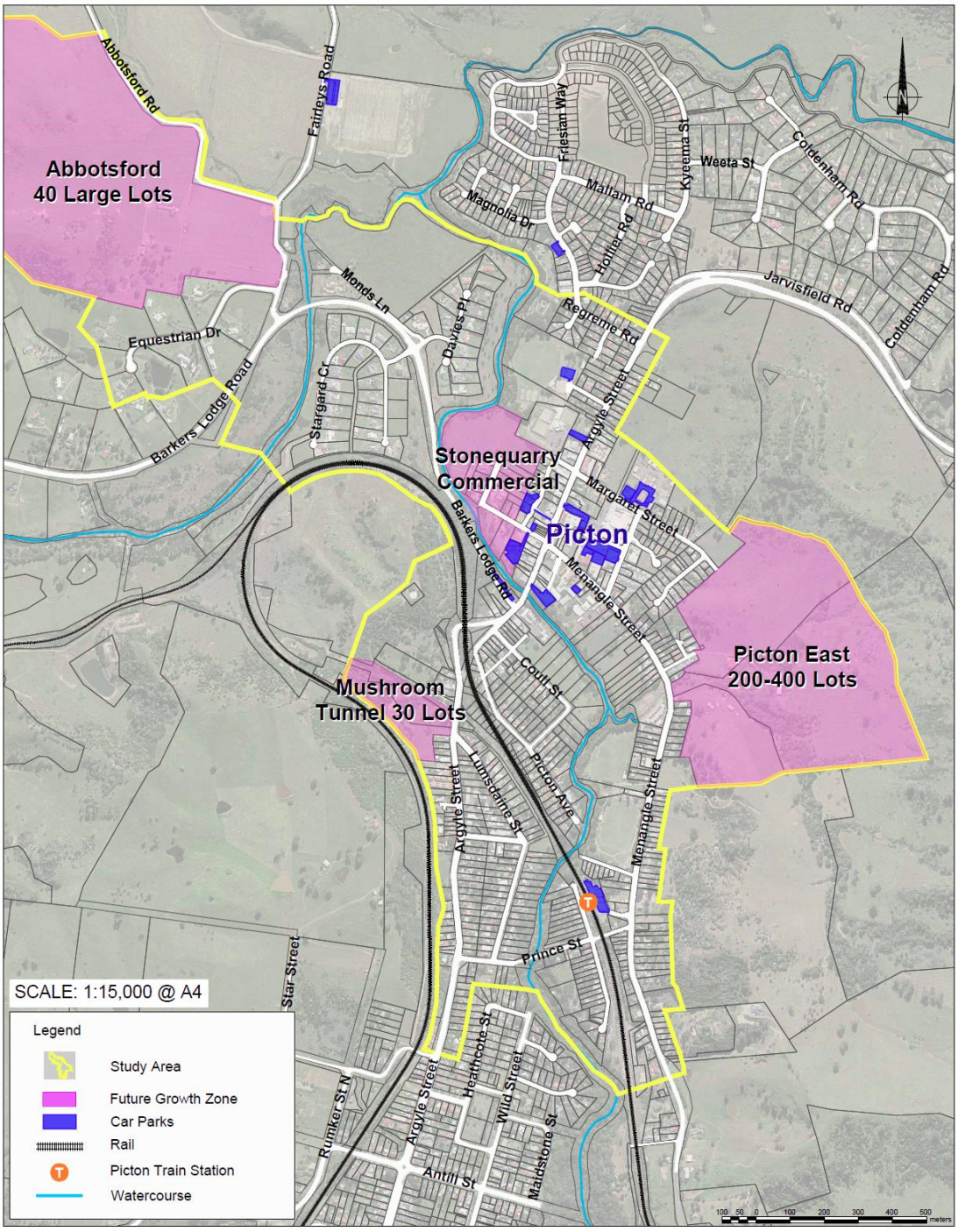


Figure 26: Notable Off-street Public Parking Areas within the Study Area

Comprehensive parking surveys were undertaken to capture and describe the current parking environment. These were coordinated with interview surveys of local businesses and also of visitors to the Town Centre. The Parking Study Area the focus of assessment and survey is shown on the following Figure.

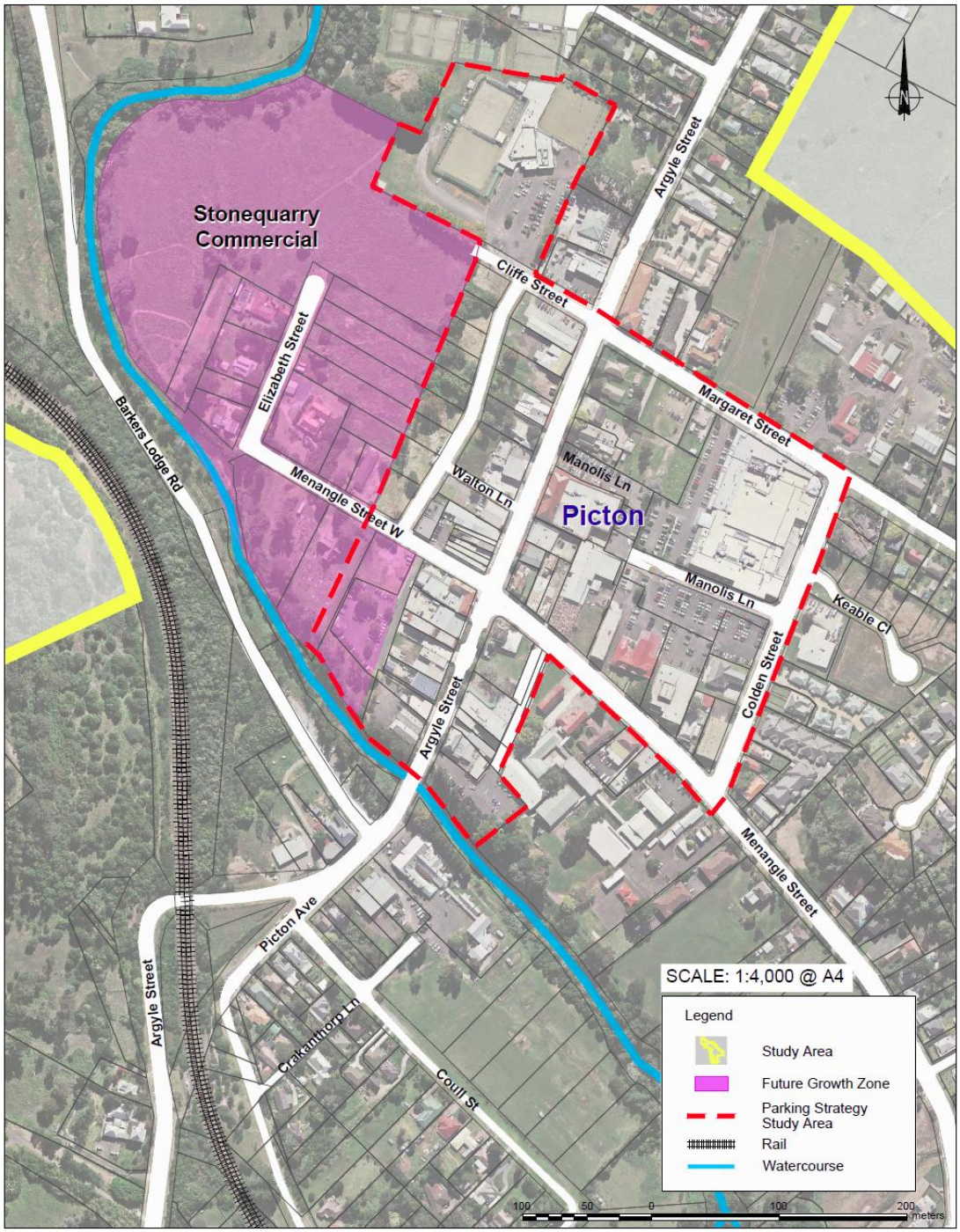


Figure 27: Parking Survey Study Area

The key findings from the surveys of parking are as follows:

4.9.1 Business Survey

The results of the Business Surveys defining the current parking environment are as follows:

4.9.1.1 Land Use and Employees

In order to establish the long stay (employee) parking requirements for the Picton Town Centre, every business within the Centre was directly approached to establish its land use and hours of operation, the number of employees, their mode of travel and parking location, and also the location where delivery vehicles stop. A sample of the questionnaire is included as **Appendix C.**

There are about 100 business premises within the Picton Town Centre as noted is **Table 2**. On the day of survey 21 businesses were closed; a further seven businesses refused to participate. Retail land uses account for about 29% of all businesses. Office type land use accounts for about 33%. Coffee lounges and restaurants account for about 13% of establishments. Personal services establishments including most other land uses such as post office, hairdressing, and medical services account for about 16% of businesses.

Land Use	Establishments						
	Responded	No. Response	Closed	Total	%	No. Employees	%
Retail Grocery/Food	2	1	1	4	4%	3	1%
Retail Other	19	1	6	26	25%	44	14%
Office	25	2	7	35	33%	99	31%
Council Offices	1			1	1%	58	18%
Bank / Post Office	5	1		6	6%	20	6%
Hairdresser/Barber	7		2	9	9%	21	7%
Milk Bar / Coffee Lounge / Restaurant	7	1	5	13	13%	35	11%
Medical Services	5			5	5%	29	9%
Recreational Club / Hotels	1	1		2	2%	7	2%
Gymnasium	1			1	1%	4	1%
Family Day Care	1			1	1%	2	1%
Total	**74**	**7**	**21**	**102**	**100%**	**322**	**100%**

Table 2: Type of Establishments in Picton Town Centre

The number of staff employed by the establishments which responded to the survey by land use type is also summarised in **Table 2**. On the day of survey, the 74 businesses who responded to the survey employed about 320 persons (4.4 persons / business on average). Council is the largest employer in Town employing about 18% of all jobs. Retail employment accounted for about 15% of all jobs. Office and refreshments facilities employed about 31 and 11% of all workers respectively.

4.9.1.2 On-Site Parking

The surveyed businesses indicated that they had a total of 345 on-site parking spaces as noted in **Table 3**. This is equivalent to about 0.75 per employee on average.

Land Use	Surveyed	Percentage
Retail Grocery / Food	11	3%
Retail Other	19	6%
Office	50	14%
Council Offices	58	17%
Bank / Post Office	15	4%
Hairdresser / Barber	6	2%
Milk Bar / Coffee Lounge / Restaurant	32	9%
Medical Services	10	3%
Recreational Club / Hotels	144	42%
Gymnasium	0	0%
Family Day Care	0	0%
Total	**345**	**100.0%**

Table 3: Businesses On-Site Parking

4.9.1.3 Mode of Travel of Permanent Employees

About 96% of permanent employees (those with place of employment within the Centre) travelled by car with a car occupancy of 1.02. The mode of travel of permanent employees to the Centre is summarised in **Table 4**.

Mode of Travel of Employees	No.	Percentage
Car as Driver	303	94%
Car as Passenger	6	2%
Passenger (dropped off)	1	0%
Motorcycle	0	0%
Bus	2	1%
Train	2	1%
Taxi	0	0%
Bicycle	1	0%
Walk	7	2%
Total	**322**	**100.0%**

Table 4: Mode of Travel of Permanent Employees to Blaxland

Travelling by bus and train to the Centre accounted for about 2% of all travel modes by permanent employees. About 2% of employees walked to the Centre. Bicycles were used by only one employee.

4.9.1.4 Parking Location of Employees

Managers of establishments were asked to indicate the parking location of their employees. The location and type of space where employees parked their vehicle is summarised in **Table 5**.

Parking Location	No.	Percentage
On-Site	105	35%
Council Car Park	86	29%
Other private Car park	46	15%
On-Street-Time Restrictions	22	7%
On-Street-No limit	28	9%
Other	**12**	**4%**
Total	**242**	**100%**

Table 5: Parking Location of Employees

About 35% of employees who drove to work parked on-site; an additional 29% of employees parked in Council's car parks. About 10% of parkers were recorded as parking in unrestricted on-street spaces.

About 7% of all staff parked in restricted on-street spaces; under normal circumstances, they would be parking illegally if exceeding the time limit, or if they kept on moving their car.

4.9.2 Visitors Survey

4.9.2.1 Questionnaire Surveys

One important feature of developing a parking strategy for a Town Centre is the determination of the characteristics of visitors to the Centre. This information was obtained by means of a questionnaire survey of Centre users in September 2016. The questionnaire, a sample of which is included as **Appendix D,** obtained information on:

- Suburbs of origin;
- Mode of travel to the Centre;
- Group size;
- Parking locations;
- Difficulty in parking;
- Trip purposes; and
- Estimated length of stay in the Centre.

Some 179 questionnaires were obtained from the Centre users survey. Taking into account the group size of respondents (that is the number of persons covered by each questionnaire) the patterns of about 273 Centre users has been determined.

4.9.2.2 Suburbs of Origin

Respondents were asked to indicate the suburb where they started their trip to Picton. The responses are summarised in **Table 6.** About 32% came from the Picton Township with an additional 23% from Tahmoor and Thirlmere.

Suburb of Origin	No.	Percentage
Picton Township	84	32%
Tahmoor	58	22%
Thirlmere	29	11%
Cooridja	2	1%
Douglass Park	8	3%
Maldon	4	2%
Mowbray Park	4	2%
Pheasant Nest	8	3%
Razorback	7	3%
Buxton	17	6%
Wilton	16	6%
Bargo	9	3%
Areas north of Wollondilly	15	6%
Areas East/south of Wollondilly	3	1%
Total	**264**	**100%**

Table 6: Suburbs of Origin of Respondents

4.9.2.3 Mode of Travel

About 98% of visitors travelled by car to the Centre with an average car occupancy of 1.53. The mode of travel used by those travelling to the Centre is summarised in **Table 7**. Trains were used by a small number of respondents, being less than one percent. Buses, bicycles and taxis were not used by respondents in any of the cases surveyed.

Mode of Travel	Visitors		Permanent Employees		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
Car – As Driver	156	63.2%	21	80.8%	177	64.8%
Car – As Passenger	90	36.4%	4	15.4%	94	34.4%
Motorcycle	0	0%	0	0%	0	0%
Bus	0	0%	0	0%	0	0%
Train	1	0.4%	0	0%	1	0.43%

Mode of Travel	Visitors		Permanent Employees		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
Taxi	0	0%	0	0%	0	0%
Bicycle	0	0%	0	0%	0	0%
Walk	0	0%	1	3.8%	1	0.4%
TOTAL	**247**	**100.0%**	**26**	**100.0%**	**273**	**100.0%**

Table 7: Mode of Travel to Picton Town Centre

Overall therefore, about 65% of people drove to the Centre with a further 35% arriving as a passenger in a car, (98% in total). Public transport accounted for less than 1% of trips.

4.9.2.4 Approach Roads to Town Centre

About 36 % of respondents used Barkers Lodge Road to access the Centre as noted in **Table 8.** Trips were generally well distributed by location and direction.

Approach Roads	No.	%
Menangle St, south of Colden St	54	31%
Argyle St, west of Barkers Lodge Rd	29	17%
Barkers Lodge Rd, north of Argyle St	63	36%
Argyle St, north of Downing St	28	16%
Total	**174**	**100%**

Table 8: Approach Roads

An additional 31% travelled from south of the Centre along Menangle Road. This is a curious arrival pattern in that earlier access is expected to be available via Colden Street. It suggests that trips to Picton Town Centre are multi-purpose in nature. The remaining 33% equally travels along Argyle Street from the east and west of the Centre.

4.9.2.5 Main Purpose of Trips

The main purposes of trips are summarised in **Table 9.** About 50% of respondents indicated shopping as their main purpose for being in the Centre. Professional personal services, bank and post office trip types were patronised by about 15% of respondents.

Purpose of Trips	By Car		Other Modes		Total	
	No.	%	No.	%	No.	%
Work (Retail / Shops)	23	8%		0%	23	8%
Work (Office)	15	6%	1	50%	16	6%
Shopping (Food / Groceries)	73	27%		0%	73	27%
Shopping (Other)	63	23%		0%	63	23%
Medical	16	6%	1	50%	17	6%
Personal Services (e.g. Hairdressing)	12	4%		0%	12	4%

Purpose of Trips	By Car		Other Modes		Total	
	No.	%	No.	%	No.	%
Bank / Post Office	26	10%		0%	26	10%
Professional Services (e.g. Solicitors)	1	0%		0%	1	1%
Recreational (coffee shop/restaurant)	24	9%		0%	24	9%
Dance Class	15	6%		0%	15	5%
Pick Up children	3	1%		0%	3	1%
Total	**271**	**100%**	**2**	**100%**	**273**	**100%**

Table 9: Main Purpose of Trips to Picton

Recreational retailing such as coffee shops and restaurants were patronised by an additional 9% of visitors. Medical services were attended by about 6%. About 14% of respondents stated work as their main purpose of being in the Centre.

4.9.2.6 Parking Location of Visitors

Respondents who travelled to the Centre by car were asked to indicate the location where they parked their vehicle. This information is summarised in **Table 10.**

Parking Location	Drivers	Percentage
Off-Street Spaces		
Council Car Park (Staff)	5	2.8%
Council Car Park	25	14.1%
Picton Mall	50	28.2%
Khan's Super IGA	28	15.8%
Other Private Off-Street Car Parks	42	23.7%
Sub-Total	**150**	**84.7%**
On-Street Restricted Spaces		
Up to 30 minutes	3	1.7%
1 hr spaces	20	11.3%
2 & 3 hrs spaces	3	1.7%
No restriction	1	0.6%
Sub-Total	**27**	**15.3%**
Total	177	**100.0%**

Table 10: Parking Location of Visitors

About 17% of respondents parked in council's car parks. About 15% parked in time period restricted on-street spaces. About (14%) parked in Council's unrestricted parking area and (1%) parked in on-street spaces.

The largest number of respondents (28%) parked in the Picton Mall car park during their visit. Overall, about 85% of parking occurred off-street and 15% in on-street parking areas.

4.9.2.7 Parking Difficulty

Respondents who travelled by car were asked how they found parking in Picton. About 70% of respondents indicated that parking spaces were easy or very easy to find as noted in **Table 11**.

About a quarter of respondents had some difficulty in finding a parking space. About 5% of additional respondents stated that finding a parking space was very difficult. In this regard, it is interesting to note overall that about 40% of all spaces in the Town Centre were vacant at any time.

Purpose of Trips	Parking Difficulty				
	Very Easy	Easy	Somewhat Difficult	Very Difficult	Total
Work (Retail / Shops)	2	10	3		15
Work (Office)	4	2	5	3	14
Shopping (Food / Groceries)	13	28	6		47
Shopping (Other)	7	24	8	1	40
Medical	1	4	6	1	12
Personal Services (e.g. Hairdressing)	2	3	3		8
Bank / Post Office	1	7	7	2	17
Professional Services (e.g. Solicitors)	1				1
Recreational (Coffee Shop / Restaurant	1	10	3	1	15
Dance Class	1	3	2		6
Pick Up children				1	1
Total	**33**	**91**	**43**	**9**	**176**
Total Percentage	**19%**	**52%**	**24%**	**5%**	**100%**

Table 11: Parking Difficulty

An overall assessment could reasonably conclude as follows:

- 71% of respondents found parking easy or very easy to access; and
- 29% found it somewhat or very difficult to access.

4.9.2.8 Length of Stay of Car Drivers

Table 12 summarises the length of stay of surveyed drivers. The distribution of length of stay showed that about 90% of drivers and their passengers visiting the centre stayed up to one hour.

Length of Stay	No.	%	No.	%	No.	%
Up to 15 minutes	37	23.3%	0	0.0%	37	20.7%
15 to 30 minutes	54	34.0%	0	0.0%	54	30.2%
30 to 60 minutes	51	32.1%	0	0.0%	51	28.5%

Length of Stay	No.	%	No.	%	No.	%
1 to 2 hours	14	8.8%	0	0.0%	14	7.8%
2 to 3 hours	1	0.6%	2	10.0%	3	1.7%
3 to 4 hours	0	0.0%	2	10.0%	2	1.1%
4 to 6 hours	1	0.6%	8	40.0%	9	5.0%
Over 6 hours	1	0.6%	8	40.0%	9	5.0%
Total	**159**	**100.0%**	**20**	**100.0%**	**179**	**100.0%**
Average Length of Stay	**46 mins**		**324 mins**		**77 mins**	

Table 12: Length of Stay of Car Drivers Visiting the Centre

The majority of respondents who stayed over four (4) hours worked in the Centre.

The average length of stay of all respondents in the Centre was found to be about 80 minutes (1 hour and 20 minutes).

4.10 Traffic Environment

The traffic results are described in detail within the relevant sections of this Study. By way of a summary, overall results can be summarised as follows:

4.10.1 Weekday Traffic Volume Profiles

The following graph summarises the typical weekday traffic movement profiles based on key intersection counts.

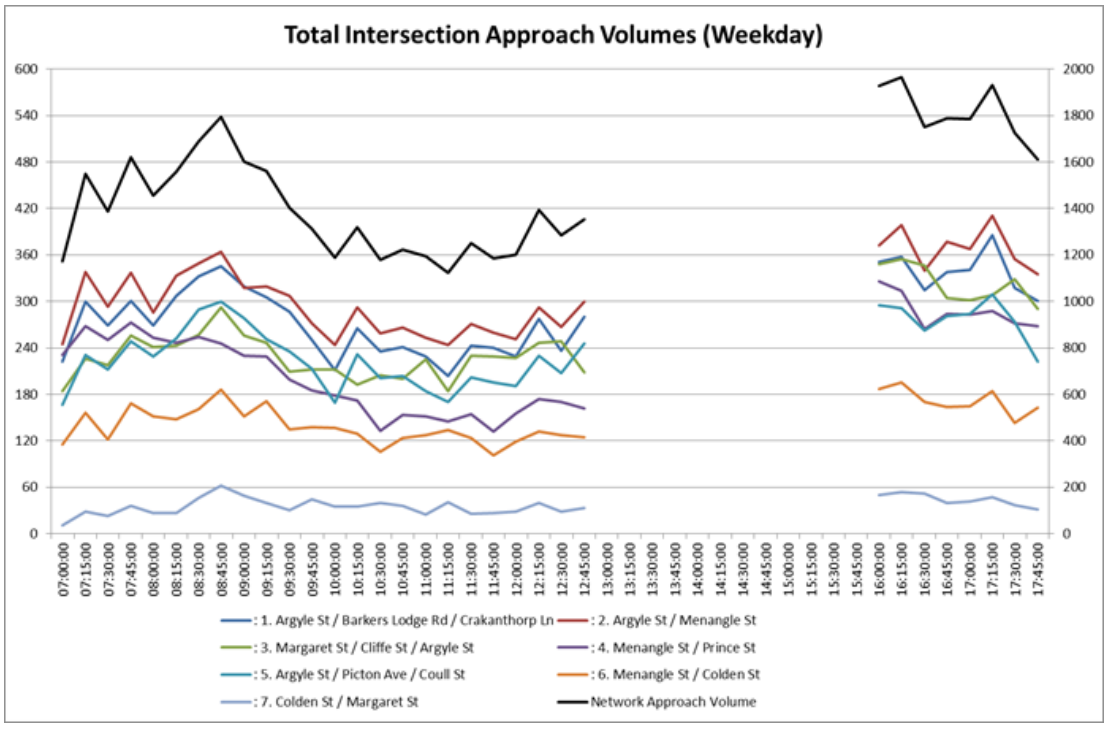


Figure 28: Weekday Peak Traffic Volumes

The lower coloured lines in the graph all represent intersection approach volumes. The upper black line represents the sum of all the approach volumes and is referenced on the right-hand side axis. The volumes shown for each intersection profile (and for the totals) represent the quarter hour demands that correspond with the time period on the horizontal axis. The graph displays the following key weekday traffic characteristics:

- All intersections surveyed follow a similar daily profile, rising to a morning peak, easing in the midday period and then rising to a higher peak in the late afternoon;
- Argyle Street / Menangle Street intersection is the most highly trafficked intersection surveyed, closely followed by Argyle Street / Barkers Lodge Road;
- Peak hour periods typically occur between:
  - AM: 8:00am to 9:00am;
  - Midday: 12:00pm to 1:00pm; and
  - PM: 4:00pm to 5:00pm and again between 4:30pm and 5:30pm.
- Argyle Street and Menangle Street arterial roads are the primary drivers of demand, indicating external traffic has a significant effect on the local environments.

4.10.2 Weekend (Saturday) Traffic Volume Profiles

The following graph summarises the typical weekend (Saturday) midday traffic movement profiles based on key intersection counts.

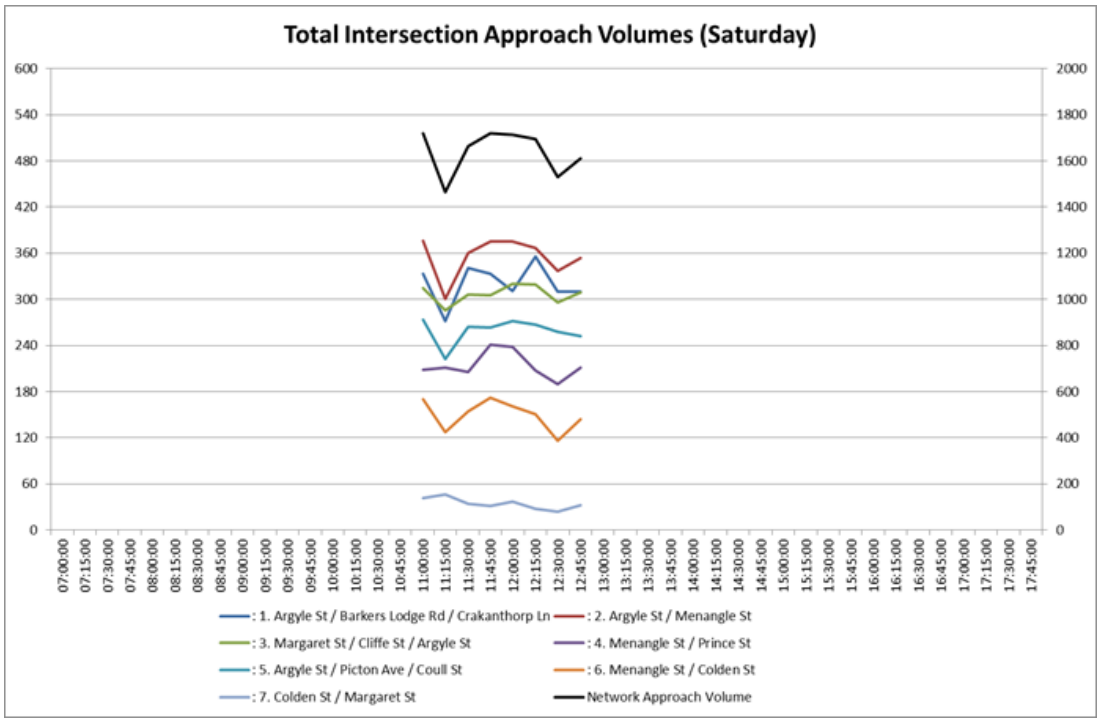


Figure 29: Weekend (Saturday) Midday Peak Traffic Volumes

Again, the graphed lines are presented consistently with the weekday volume profiles described above. The graph displays the following key Saturday midday traffic characteristics:

- Intersection profiles are relatively consistent with some minor variations to the quarter hour volumes;
- Argyle Street / Menangle Street intersection is the most highly trafficked intersection surveyed, closely followed by Argyle Street / Barkers Lodge Road. This corresponds with the weekday order and shows how strongly movement on Argyle Street and Menangle Street drive the local traffic environment outcomes;
- The peak hour is generally represented by the demands between 11:30am and 12:30pm. A comparison of historic (2012) tube count data for Menangle Street (in the 60kph speed zone south of the Town Centre) indicates that Saturday demands peak around the midday period generally coinciding with the period represented in the graph;
- Saturday midday traffic demands are typically similar to, or slightly higher than the weekday AM and Midday demands. Collectively however they fall below the weekday PM peak demands surveyed.

4.11 Town Centre Traffic Management and Control

The Study Area traffic environment is defined by a range of traffic management measures. These have been observed on-site and are recorded on the following **Figure 30**:

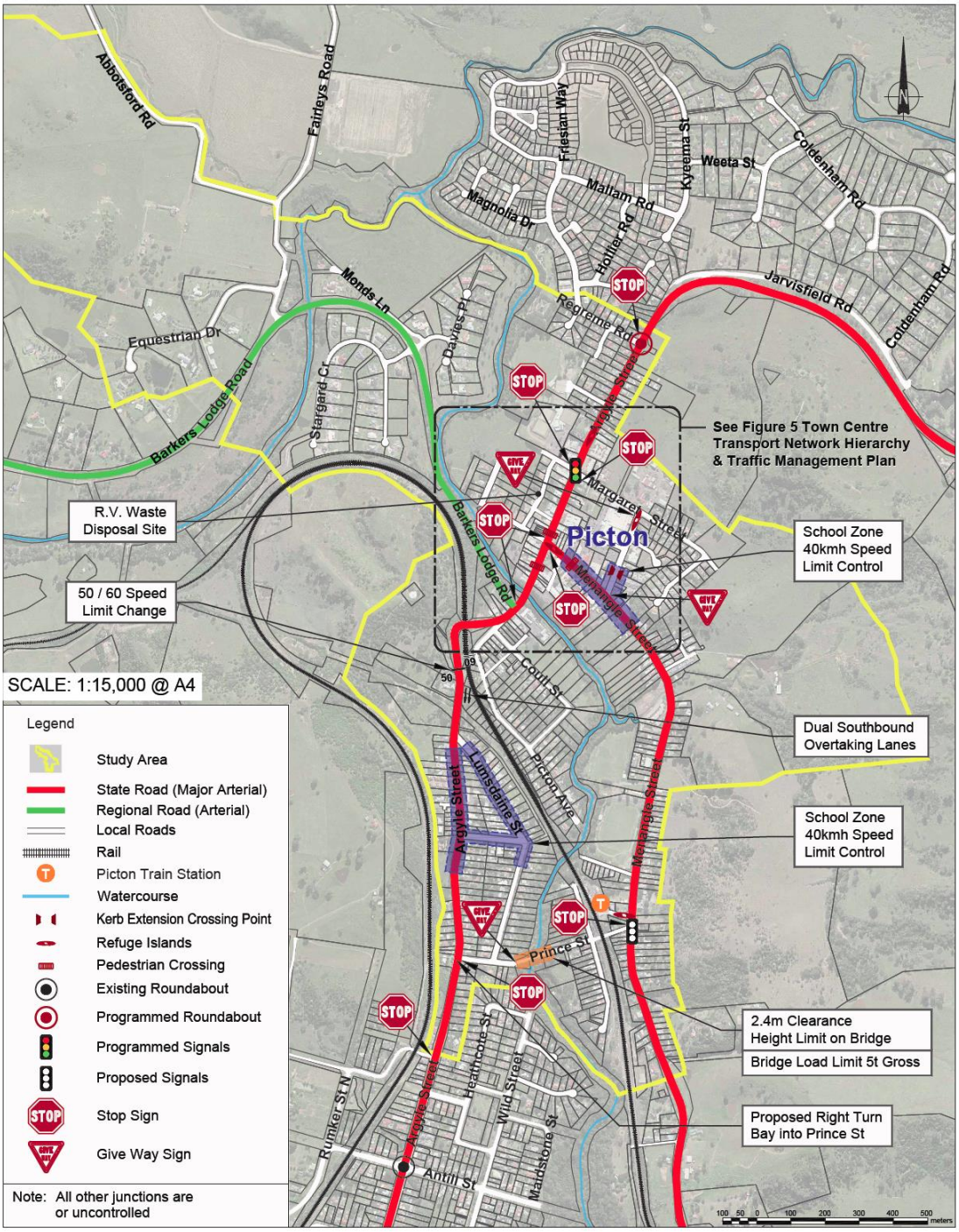


Figure 30: Town Centre Traffic Management and Control

Key elements of traffic management can be summarised as follows:

- Predominantly a 40km/h or 50km/h signed speed environment;
- 60km/h speed on the principal arterial roads;
- School speed zones in operation through the morning and afternoon school periods;
- Threshold traffic controls through the Main Street;
- A predominance of priority intersection controls;

- A few strategically located pedestrian refuge crossings and painted crossings in the Main Street.

Overall, traffic management control is minimally present in the Study Area.

4.12 Planned and Programmed Works

The status of planned road, traffic and movement improvements proposed or programmed are summarised as follows:

- The installation of traffic signals at the Argyle Street / Cliffe Street / Margaret Street intersection, now completed; and
- The installation of a roundabout at the intersection of Argyle St and Regreme Rd, also now completed; and
- The installation of a pedestrian/cycle bridge over Racecourse Creek, connecting the Botanic Gardens and Regreme Road with the Picton Sports Ground, commencing January 2017.

These works were all programmed for the 2016/17 Financial Year.

5. Community, Stakeholder and Network Issues Affecting the Town Centre

5.1 Wollondilly Traffic Network Deficiency Assessment Report

Wollondilly Shire Council commissioned a Future Network Deficiency Assessment Report in February 2015. The analysis was based on an analysis of the performance expectations defined in the Shire Transport Model. The key findings of that report are summarised as follows:

When a level of service (LOS) of E or worse was predicted for an intersection or length of road at the end of a future period, it indicated the likely need for construction of an improvement work aimed at resolving that deficiency within that future period. It is possible that a suggested improvement may either relieve other deficiencies during later periods or introduce unforeseen additional deficiencies.

Table 13 *and* ***Table 14*** *show the possible implementation timing of each of the proposed improvement works as a result of this analysis.*

	INTERSECTION IMPROVEMENT TIMING		
Location	**By 2011**	**By 2026**	**By 2036**
Prince Street / Menangle Road upgraded to traffic signals		✓	
Picton Road / Hume Highway ramp intersections upgraded to traffic signals		✓	
Picton Road intersections outside the Wilton development upgraded		✓	
Farnsworth Avenue / Silverdale Road roundabout upgraded		✓	
Silverdale Road / Waterhouse Drive upgraded to roundabout		✓	
Lewis Road / Silverdale Road upgraded to roundabout		✓	
Menangle Road / Camden Road upgraded to roundabout			✓
Menangle Road / Finns Road upgraded to roundabout			✓
Menangle Road / Woodbridge Road upgraded to roundabout			✓
Remembrance Drive / Finns Road upgraded to roundabout			✓
Appin Road / Rixon Road upgraded to dual circulation roundabout			✓
Appin Road / Brian Road upgraded to roundabout			✓

Table 13: Intersection Improvement Timing

ROAD IMPROVEMENT TIMING			
Location	**By 2011**	**By 2026**	**By 2036**
Silverdale Road four laning		✓	
Menangle Road between Picton Road and Prince Street four laning		✓	
Picton Road between Menangle Road and Hume Highway four laning			✓
Picton Road between Pembroke Parade and Hume Highway four laning			✓
Argyle Street between Thirlmere Way and Prince Street four laning		✓	
Prince Street bridge upgraded		✓	
Hume Highway northbound from Picton Road three laning		✓	
Hume Highway southbound to Picton Road three laning			✓
Appin Road north from Appin four laning			✓

Table 14: Road Improvement Timing

It is suggested that to further refine the timing of improvements a process of introducing network improvements at a regular interval of five years be considered. This refined method would determine deficiencies for the first future year, implement improvements for that year, use that improved network as a base for the following future year and repeat the improvement process until all future years have been analysed in order. This method would permit follow-on impacts of improvements to be considered for each analysis year and provide a more accurate sequence of possible infrastructure improvements.

The following local improvements summary Table has been prepared to assist with identification of those potential deficiencies that relate to the Picton Town Centre and development of a Transport Master Plan for it:

INTERSECTION IMPROVEMENT TIMING			
Location	**By 2011**	**By 2026**	**By 2036**
Prince Street / Menangle Road upgraded to traffic signals		✓	
ROAD IMPROVEMENT TIMING			
Location	**By 2011**	**By 2026**	**By 2036**
Menangle Road between Picton Road and Prince Street four laning		✓	
Argyle Street between Thirlmere Way and Prince Street four laning		✓	
Prince Street bridge upgraded		✓	

Table 15: Intersection Improvement Timing

It's evident that the analysis is developed on a district wide basis and there is the potential for more localised effects, such as are impacted by way of localised growth and development planning, to necessitate further localised network improvement needs.

5.2 Past Consultations

Past consultations have been undertaken in relation to other strategy development processes. The key traffic and transport outcomes are summarised in the **Section 3.1** Relationship with other Strategies assessment. Some further and specific interventions are established in the Wollondilly Bike Plan 2011 as follows:

- Facility provision for a variety of users such as recreational cyclists, school children and the elderly;
- Maintenance challenges;
- Safety issues;
- Network connectivity;
- Current cycle way to high school is poorly marked – linked to Tahmoor;
- Picton High School currently has a 'no bike' policy due to security issues;
- Pedestrians accessing the school currently walk on road shoulder – which could cause conflict with cyclists.

Further to these and the more broad outcomes set out in other strategies, a stakeholder engagement workshop was undertaken to focus identification of key concerns within the Study area. These findings are set out in the following section.

5.3 Previous Studies

Reference has been made in this Study, to earlier local area studies and their related findings and recommendations, including the following:

- 2005 Gabites Porter Picton Town Centre Traffic Study;
- 2005 Forbes and Rigby Feasibility Traffic Modelling Assessment; and the
- 2011 Cardno Bypass Scenario Modelling.

5.4 Key Issues Identified in the Brief

The project Brief outlined a range of key issues warranting investigation to determine merit or otherwise. These are summarised in the following Figure.

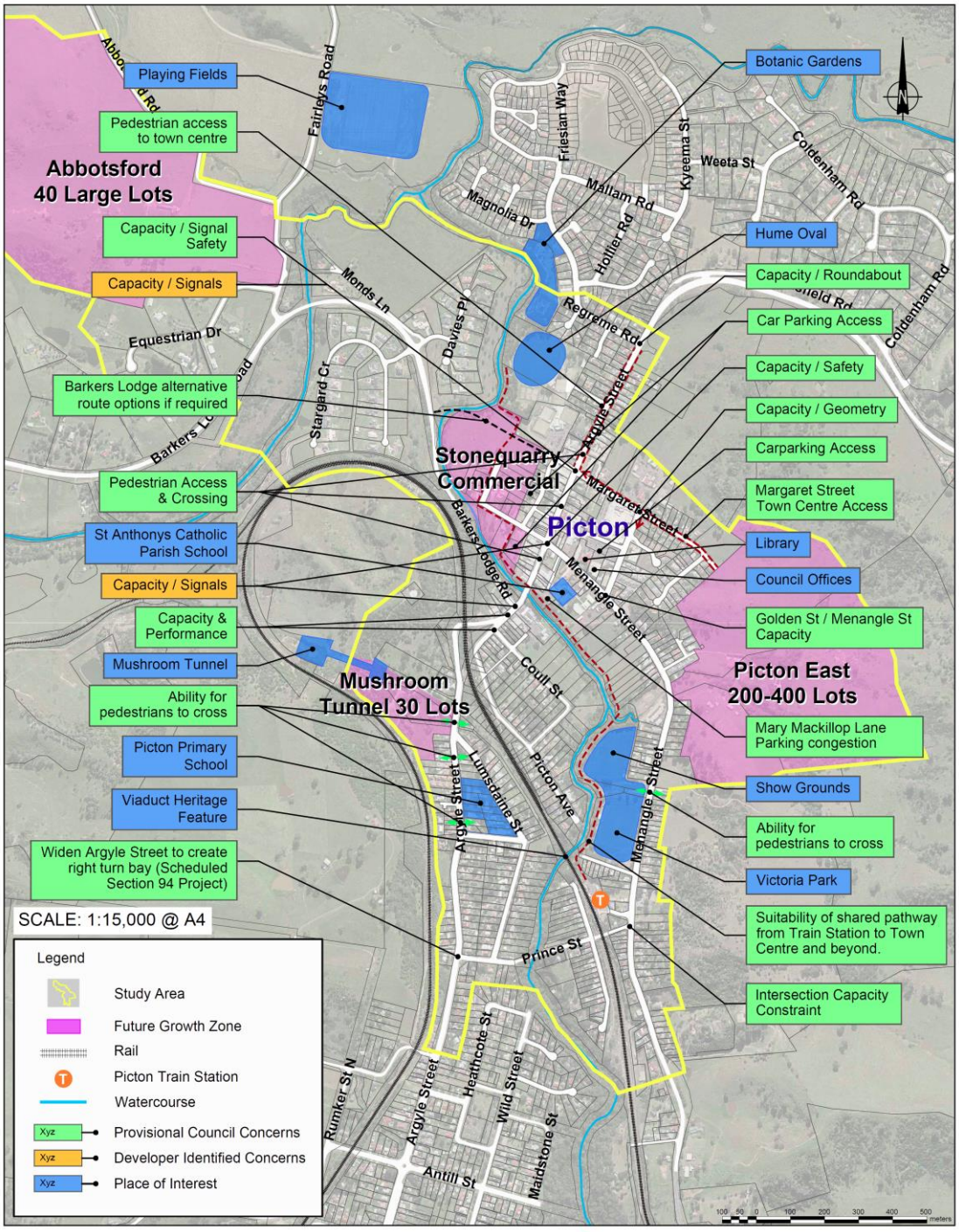


Figure 31: Key Issues Identified in the Brief

5.5 Stakeholder Engagement

The stakeholder workshop (Tuesday 6 December 2016) examined a wide range of characteristics that define the existing transport environment, its use and users. It considered the provisional development of Master Plan Principles and identified a range of desired interventions for each transport mode.

Stakeholder representation was sought from:

- Councillors;
- Chamber of Commerce;
- Police;
- Roads and Maritime Services;
- Growth and development proponents and their technical advisors;
- Walk and cycle advocates;
- Accessibility, Ageing and Disability representatives
- Council's Strategic Planning, Infrastructure and Land-use Planning representations.

The Mayor opened the workshop with words of wisdom and encouragement in support of the development of concepts, ideas, suggestions and outcomes that were to be focused on.

The Master Plan Principles as set out in **Section 3.2** have had regard for the consulted inputs. The following describes the broad themes to arise from the workshop:

- A strong focus on pedestrian and cycling connectivity and integration;
- Preference for off-street facilities;
- Pedestrian accessibility audit within the Town Centre to address kerb drop-down, surfacing and other hazards;
- Strengthened connections between the Train Station and Town Centre;
- Enhanced east-west transport network connectivity;
- Improved intersection operational clarity;
- Connected parking facilities in the Town Centre;
- Improved parking supply and distribution in relation to demand sources;
- Revised bus network to optimise network coverage and access.

The following **Figures 32** and **33** depict the detailed range of workshop comments.

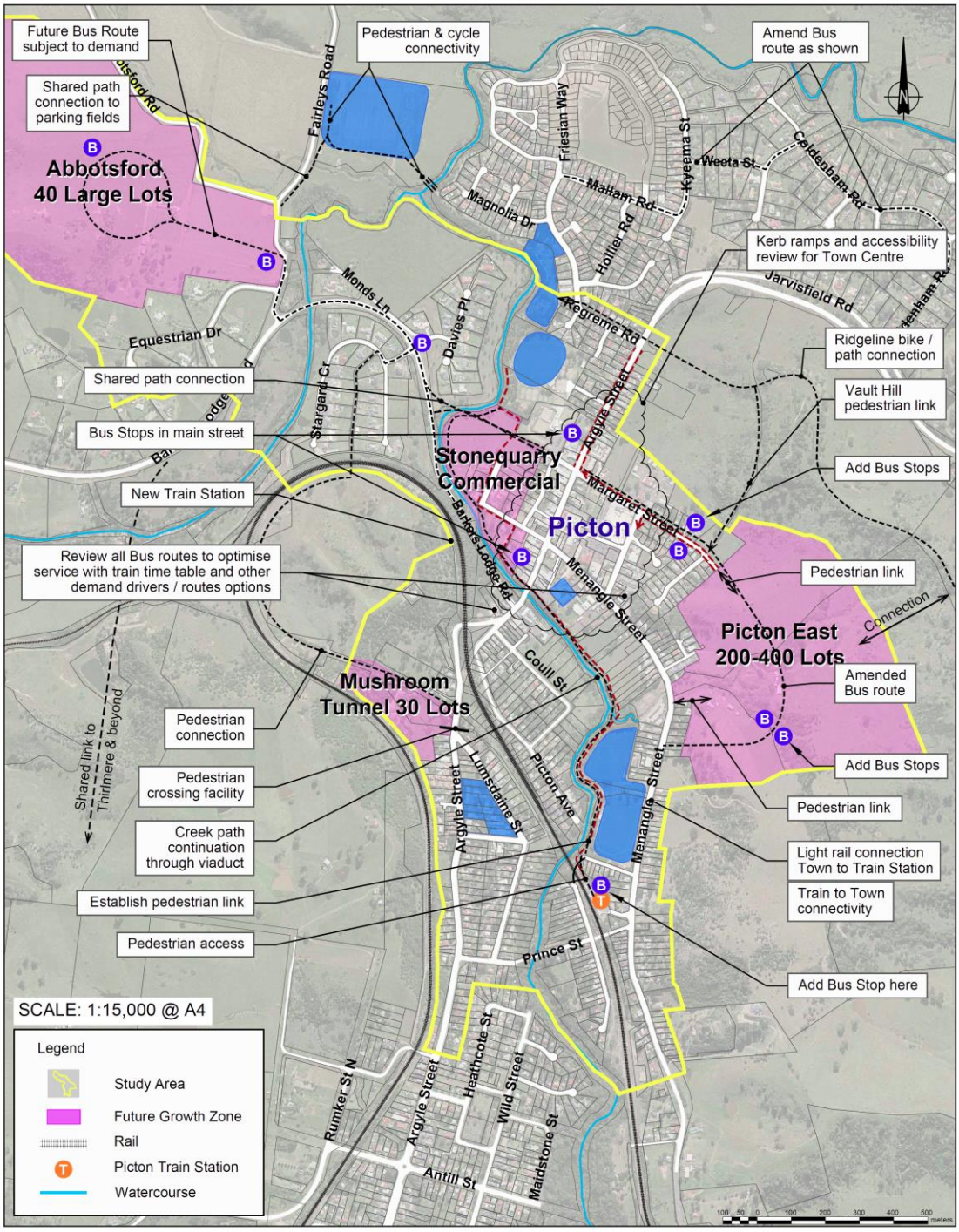


Figure 32: Stakeholder Workshop Comments

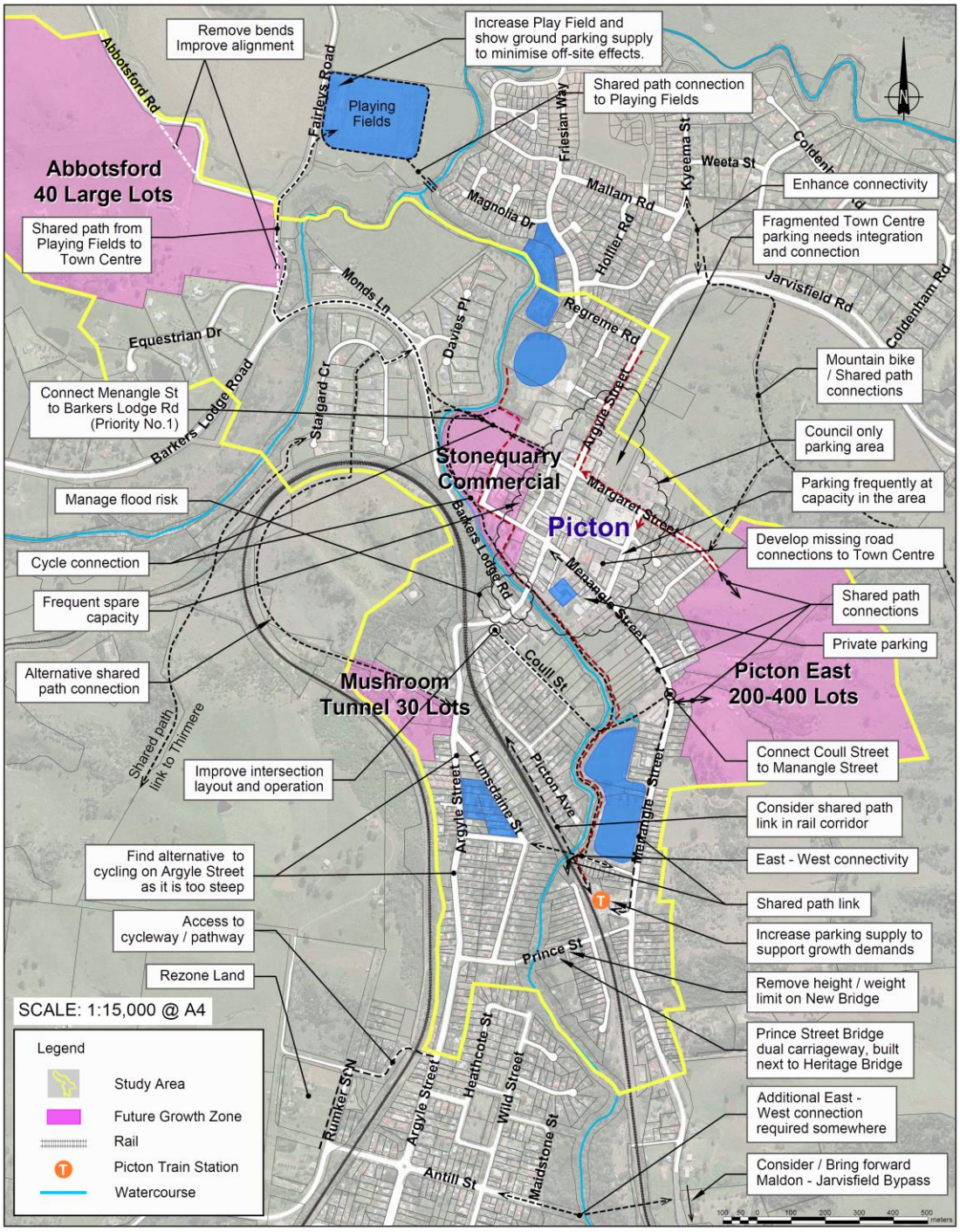


Figure 33: Stakeholder Workshop Comments - Continued

A range of comments related to external connectivity with the defined Study Area, or further afield transport network responses with the potential to impact the Town Centre operation. These included:

- Addressing the parking shortfall effects that occur in conjunction with activities at the Abbotsford Sports Fields;
- Straightening some of the rural curves to address safety on Abbotsford Road;

- East – west transport network connections, for example at Antill Street south of Princes Street;
- Bring forward the east – west link in the form of the Maldon – Jarusfield Bypass;
- Pedestrian and cycle connectivity between the surrounding areas and the Study Area;
- Pedestrian and cycle connections west and south to Thirlmere; and
- Pedestrian and cycle links east to Vault Hill and south along the ridge line.

These initiatives are recorded for record, but fall outside the direct realm of this Study Area. Nonetheless, they represent a group of measures that may contribute to further enhancement of the outcomes sought through the purpose of this Study, and therefore should not be lost sight of.

5.6 Bus Service Provider – Direct Engagement

Specific and direct engagement has been had with Picton Busline service provider to establish comprehensively the key public transport issues, challenges and opportunities. Key observations and findings are summarised as follows:

- Menangle Street stop is the CBD Terminus facility, and a similar timing facility is established at the Train Station;
- Bus services are assessed to operate effectively along the Argyle Section of the CBD, once they've accessed the corridor;
- Council has been effective in supporting the amendments to Terminal capacity on Menangle Street, particularly in relation to the temporary requirements of the recent floods. Current school demands are however such that long term stop capacity is in need of an increase from the current 2 stops up to 4;
- Access along Station Street to the Train Station is constrained to one lane of movement for buses when cars are parked both sides and this presents as a safety and timing restriction for bus services;
- Service stop capacity at the Train Station is in need of additional capacity. The service provider suggested that ideally the bus services would be able to access both sides of the Train Station. While the Station itself is equipped to accommodate this, Campbell Street does not currently provide for bus turning within the street;
- Additional car parking at or near the station may create the opportunity for additional bus service capacity at the Train Station in future;
- The Menangle Street / Argyle Street intersection is a major disruption to service timing at peak times and can delay buses up to 10 minutes, resulting in late running and erratic timing of services;
- There are currently significant safety and interactive concerns for bus operators at the Menangle Street Terminus as it relates to the Mary McKillop Lane driveway operation at Menangle Street. The issue particularly arises during school bus pick-up and drop-off times. The is opportunity to improve the operation and directional flows of Mary McKillop Lane to better facilitate bus service operation and safety;
- Barkers Lodge Road intersection presents as a disruption to bus service timing at peak times in the mornings and afternoons. Queuing on Barkers Lodge Road due to

demands on Argyle Street affect both left and right turning movements resulting in significant queuing and delay to the bus services. It was suggested there would be merit in linking Barkers Lodge Road across to the back of the Town's shopping precinct (the Walton Lane area) to better accommodate the public transport movement timing and also to assist other movement distributions.

6. Growth and Development Demands

Four key growth and development proposals are currently being considered, each with the potential to individually or cumulatively impact the Town Centre. Underlying or what might be referred to as other background growth demands exist as well. These may arise as a result of brownfield re-development, infill, or as external to the Town development but which otherwise relies on the services and facilities the Town Centre provides.

The four key and current locations of the planning proposals are shown in **Figure 34** as follows:

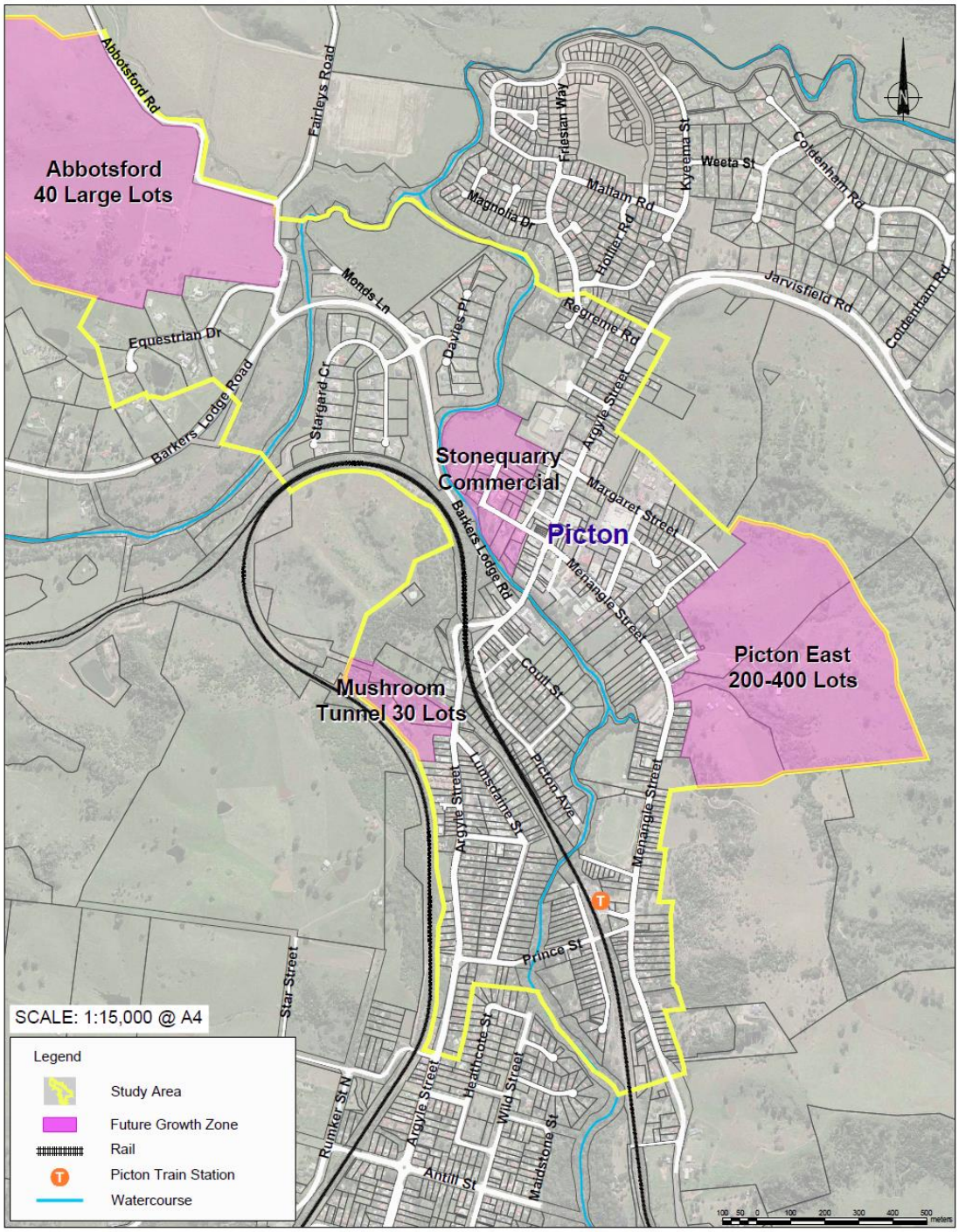


Figure 34: Location of Current Key Development Planning Proposals

A description of each of the four planning proposals is as follows:

6.1 Stonequarry Commercial Planning Proposal

The Stonequarry planning proposal is located on land at the western side of the town centre adjacent to Stonequarry Creek. The site is accessed via Cliffe Street and Menangle Street West. The planning proposal aims to rezone approximately 6.2 ha of Rural Land to a Business Zone.

Following rezoning the land is anticipated to be developed with a shopping centre and related businesses. The Economic Impact Assessment undertaken for the planning proposal indicates that the proposed rezoning could support 7,500m^2 of retail floor space plus additional commercial and other non-retail uses. A traffic study was undertaken based on a development gross floor area of 4,400m^2 of commercial floor space and 18,500m^2 of retail floor space, (22,900m^2 in total) resulting in the need for a total of 524 parking spaces.

By way of a comparison, Picton Town Centre currently has around 15,000m^2 of commercial floor space which includes 11,000m^2 of retail floor space. Potentially the Stonequarry site if developed as anticipated would add significantly to existing Picton retail/commercial floor space, in the order of a 79% to 153% increase in supply depending on the ultimate development undertaken. An estimated 450 to 580 jobs were estimated to be generated by the rezoning.

The development has been identified as having the potential for significant implications with regard to traffic generation, impacts on existing road infrastructure and traffic management around the town centre. It is expected to significantly increase westbound turning movements from Argyle Street.

The Traffic Report submitted with this proposal identified a need for:

- Traffic signals at the Argyle Street / Barkers Lodge Road;
- Traffic signals at Argyle Street / Menangle Street; and
- Traffic signals at Argyle Street / Margaret Street / Cliffe Street intersections.

6.2 Picton East Planning Proposal

The Picton East planning proposal is located on the eastern side of the town centre with access from Margaret Street and proposed access from Menangle Street. The planning proposal has a Gateway determination from the NSW government to rezone around 29ha of rural land to a residential zone which would result in the development of approximately 200 residential lots (6 to 7 lots per ha.).

The proponents are seeking to include additional land to increase the site area to 39ha and increase the density which would potentially result in 300-400 lots (about 10 lots per ha.). Development of the site has been assessed as having the potential to generate a significant additional change in the amount of traffic on the network, at key intersections and to create potential issues for traffic management through the Town Centre.

It is forecast to increase eastbound turning movements from Argyle Street. The Traffic Report submitted with this planning proposal confirms the need for:

- Traffic signals at the Argyle Street/Menangle Street intersection; and
- Acceptable levels of service at the Margaret Street / Cliffe Street / Argyle Street intersection.

6.3 Abbotsford Planning Proposal

The Abbotsford planning proposal is located around 1km north west from the Picton Town Centre along Abbotsford and Fairley Roads and aims to rezone around 70ha of rural land to provide approximately 40 environmental living lots.

The Traffic Report for this proposal indicated that the:

- Barkers Lodge Road / Argyle Street intersection performs poorly and would require upgrade in the medium term.

6.4 Land Adjacent Mushroom Tunnel Planning Proposal

This planning proposal is located around 400 metres south west of the Town Centre with a frontage to Argyle Street and adjoins land on which the Mushroom Tunnel is located. An area of 4.1ha of rural land is proposed to be zoned to provide around 26 low density and large lot residential sites.

The assessment investigated the cross roads intersection to be established between the new site access road and Lumsdaine Street. The lowest level of service assessed, with the development and based on 2015 traffic flows occurred in the PM and resulted in LOS C performance.

Both pedestrian crossing and vehicle access movements present safety challenges with respect to the subdivision location. Argyle Street presents a “barrier” to safe and well-integrated development. Right turn egress movements from the site potentially conflict with opposing turning movements from Lumisdaine Street. There is no safe pedestrian or cycle crossing access connecting the site with the Town centre, that does not involve crossing Argyle Street. Mitigation is recommended in the form of either a signalised pedestrian/cycle crossing between the subdivision access and Lumisdaine Street or an integrated approach by way of signalisation of the Lumisdaine Street intersection with Argyle Street. Pedestrian/cycle paths will be necessary in the latter to link with the signal controlled intersection.

7. Parking Strategy

An analysis of the parking survey findings has been made. The results of the assessment and the implications for the Town Centre are set out in the following sections.

7.1 Parking Inventory

There are approximately 1,110 parking spaces within the Picton Town Centre. The current number, location, type and time restrictions all of available spaces are summarised in **Table 16.**

Type of Spaces	Supply	Percentage
On-Street Spaces		
Disabled	**5**	0.45%
5 mins	**2**	0.18%
30 mins	**3**	0.27%
1 Hour	**104**	9.34%
2 Hours	**39**	3.50%
Sub-Total	**153**	**13.73%**
Unrestricted Spaces	**65**	5.83%
Loading Zones	**7**	0.63%
Total On-street	**225**	**20.20%**
Off-Street Spaces For Public		
Short Stay Spaces		
Council Car Parks		
McKillop Lane 15 mins	**2**	0.18%
McKillop Lane 2 Hours	**23**	2.06%
McKillop lane 3 Hours	**46**	4.13%
Sub-Total Council Short Stay Spaces	**71**	**6.37%**
The Picton Mall		
Disabled	**5**	0.45%
2 & 3 hours Surface Car Park	**82**	7.36%
3 hours Basement Car Park	**111**	9.96%
Sub-Total	**198**	**17.77%**
Total Off-Street Short Stay	**269**	**24.15%**
Long Stay Spaces		
Council Car Parks		
Off Manolis Lane	**83**	7.45%

Type of Spaces	Supply	Percentage
Near St Mark's Church	**67**	6.01%
Walton Lane	**50**	4.49%
Sub-Total Council Long Stay	**200**	**17.95%**
Public Spaces in Private Car Parks		
Khan's Supermarket	**18**	1.62%
Other Private Spaces for Patrons and Staff	**166**	14.90%
Vacant Land Near Margaret St		
Sub-Total	**184**	**16.52%**
Total Long Stay	**384**	**34.47%**
Non-Public Spaces		
Council's Staff Parking Manolis Lane	**58**	5.21%
The Picton Mall Staff	**34**	3.05%
Picton Bowling Club	**144**	12.93%
Sub-Total Non-Public	**236**	**21.18%**
Total Off-Street	**889**	**79.80%**
Total	**1,114**	**100.00%**

Table 16: Picton Town Centre Parking Inventory

Key observations from the Table are as follows:

- On-street parking accounts for about 225 spaces (20%) of the total supply. Just over two thirds is currently time restricted in some way;
- Picton Mall contains about 269 spaces (24%) of the total supply;
- Non-public (or private) parking accounts for about 889 spaces (80%) of the total supply;

7.1.1 On-Street Parking

On-street parking spaces, noted on **Figure 26**, include:

- Short stay spaces where vehicles are allowed to park only for the sign posted time limit (up to two hours); and
- Long stay spaces where parking is allowed without a time limit.

Approximately 225 spaces are available on–street for general parking accounting for about 20 percent of all available spaces. About 68% of all on-street parking is short stay including two spaces for 5 minutes stay, and 114 on-street spaces subject to time limits up to one hour. Three 30 minutes spaces in Walton Lane are available for recreational vehicles only. In addition, five (5) spaces are designated for persons with “Mobility Permits”.

Mobility Permitted parking is currently provided at a rate of about 1 space for every 45 spaces provided. This accords well with the typical supply requirements.

7.1.2 Off-Street Parking

The location of all off-street parking facilities in the Picton Town Centre are shown on **Figure 26**. Off-street spaces are categorised as follows:

- Parking facilities under Council's control where public can park unrestricted;
- Private commercial spaces where short term parking is available to the public; and
- Private commercial spaces, restricted to employees and members of these establishments only.

Public Council controlled off-street parking facilities account for 271 spaces or about 30% of all off-street spaces within the Study Area. Picton Mall has the largest car park supply where 232 spaces are provided; 85% of these are short stay spaces (up to 3 hours).

Mobility Permit Holder parking is provided at a rate of about 1 space for every 50 spaces in the off-street parking environment.

7.2 Parking Occupancy Survey

7.2.1 Purpose of Survey

Parking problems associated with a Town Centre may result from one or more of the following conditions:

- Shortfall of parking spaces within a reasonable walking distance from the core of the Centre or specific areas;
- Poor location of off-street parking facilities.

The data collected from field surveys was therefore used to:

- Identify the location and composition of parking demands;
- Identify the parking demand for long stay (employees) and short stay (shoppers);
- Identify deficiencies and imbalances in the existing parking provisions both on-street and off-street;
- Develop a parking strategy and determine the need for any additional off-street parking which may be required including parking strategies;
- It should also be noted that 90% occupancy indicates that short stay parking spaces are operating at practical capacity; for long stay spaces, 95% occupancy indicates capacity operation. These levels of occupancies allow for parking and un-parking manoeuvres; the allowance of 10% for parking and un-parking for short stay spaces represents the greater percentage of time taken for those manoeuvres by short stay parkers.

7.2.2 Purpose and Method of Occupancy Survey

The basis of any parking analysis rests on the determination of demand for parking in relation to the corresponding supply. The existing peak parking demand was determined by means of a Parking Occupancy Survey. This survey was used to:

- Ascertain the weekday and Saturday demand for parking; and
- Determine the peak demand for different types of parking facilities (on-street vs off-street and short stay vs long stay).

The total number of vehicles parked in each type of on-street and off-street public parking space within the Picton Town Centre were recorded at hourly intervals on Saturday 17 September from 9:00 am to 2:00pm and on Thursday 22 September, between 9:00am and 6:00pm.

7.2.3 Overall Occupancy by Parking Type

The average and peak weekday parking occupancy (%) of each type of available parking space is summarised in **Table 17** and detailed in **Appendix E**. The overall peak parking demand occurred on Thursday when 669 spaces were occupied (60% occupancy) between 11:00am and 1.00pm. A lower peak occupancy of 554 spaces was recorded on Saturday between 11.00am and 12.00pm.

An analysis of the occupancy survey indicates that:

- Restricted on-street spaces have higher utilisation on Thursday (~65%) than on Saturday (~49%);
- The small number of unrestricted on-street spaces were also more utilised on Thursday than Saturday;
- Spaces in Council's McKillop Lane short term car park experienced an average occupancy about 66% on Thursday less than on Saturday (~70%);
- The IGA supermarket's small car park was very busy most of the time.
- The Picton Mall car park was operating with occupancies of 55% and 57% percent on Thursday and Saturday respectively; this is lower than expected although utilisation of the parking immediately in front of the main public entrance is generally close to practical capacity.

Parking Space Description	Thursday				Saturday		
	Supply	Ave	Peak	Overall Peak	Ave	Peak	Overall Peak
On-Street Spaces							
Disabled	**5**	26%	60%	20%	27%	60%	40%
5 mins	**2**	5%	50%	0%	8%	50%	0%
30 mins	**3**	0%	0%	0%	0%	0%	0%
1 Hour	**104**	49%	60%	60%	46%	50%	49%
2 Hours	**39**	62%	87%	79%	47%	59%	56%

Parking Space Description	Thursday				Saturday		
	Supply	Ave	Peak	Overall Peak	Ave	Peak	Overall Peak
Sub-Total	**153**	**50%**	**65%**	**61%**	**44%**	**49%**	**49%**
Unrestricted Spaces	**65**	47%	66%	62%	44%	49%	49%
Loading Zones	**7**	26%	43%	29%	57%	71%	29%
Total On-street	**225**	**63%**	**73%**	**70%**	**45%**	**50%**	**48%**
Off-Street Parking							
Short Stay Spaces							
Council Car Parks							
McKillop Lane 15 mins	**2**	40%	100%	50%	83%	100%	50%
McKillop Lane 2 Hours	**23**	79%	100%	83%	87%	100%	87%
McKillop Lane 3 Hours	**46**	62%	78%	78%	61%	65%	61%
Sub-Total Council Short Stay Spaces	**71**	**66%**	**83%**	**79%**	**70%**	**77%**	**69%**
The Picton Mall							
Disabled	**5**	54%	100%	80%	77%	100%	100%
2 and 3 hours Surface Car Park	**82**	74%	93%	88%	86%	91%	91%
3 hours Basement Car Park	**111**	26%	41%	23%	34%	43%	43%
Sub-Total	**198**	**47%**	**61%**	**51%**	**56%**	**65%**	**65%**
Total Short Stay	**269**	**52%**	**65%**	**58%**	**60%**	**66%**	**66%**
Long Stay Spaces							
Council Car Parks							
Off Manolis Lane	**83**	86%	95%	95%	33%	47%	33%
Near St Mark's Church	**67**	47%	55%	55%	34%	39%	34%
Walton Lane	**50**	29%	36%	36%	19%	24%	24%
Sub-Total Council Long Stay	**200**	**59%**	**67%**	**67%**	**30%**	**33%**	**31%**
Public Spaces in Private Car Parks							
Khan's Supermarket	**18**	93%	100%	94%	69%	83%	83%
Other Private Spaces for Patrons and Staff	**166**	50%	58%	58%	29%	33%	33%
Sub-Total	**184**	**63%**	**72%**	**71%**	**36%**	**41%**	**40%**
Total Long Stay	**384**	**61%**	**69%**	**69%**	**33%**	**35%**	**35%**
Non-Public Spaces							
Council's Staff Parking Manolis Lane	**58**	78%	88%	86%	26%	36%	36%
The Picton Mall Staff	**34**	21%	26%	21%	13%	24%	15%
Picton Bowling Club	**144**	21%	28%	22%	35%	45%	40%

Parking Space Description	Thursday				Saturday		
	Supply	Ave	Peak	Overall Peak	Ave	Peak	Overall Peak
Sub-Total Non-Public	**236**	**35%**	**41%**	**38%**	**29%**	**39%**	**35%**
Total Off-Street	**889**	**53%**	**57%**	**57%**	**40%**	**45%**	**45%**
Total	**1114**	**56%**	**60%**	**60%**	**41%**	**45%**	**45%**

Table 17: Parking Occupancy by Type of Parking

* Between 11:00am and 1:00pm on Thursday11.00am and 12:00pm on Saturday

By way of a broad and overall summary:

- On-street parking is more highly utilised during the week than on a weekend, peaking at about 73% occupancy;
- Off-street parking is typically more highly utilised during the week that the weekend, peaking at about 57%;
- The Picton Mall parking was similarly demanded during the week and weekend, peaking at 65% occupancy on the Saturday;
- Council's short stay parking is most highly demanded at about 83% during the weekday;
- Overall, short-stay parking is similarly demanded on weekdays and the weekend, peaking at about 65%;
- Long stay demands are higher during the weekdays, peaking at 69% occupancy.

7.2.4 Effective Parking Occupancy

The Picton Town Centre was flooded in June 2016. As a result, a considerable number of businesses were affected and remained closed for a number of months. The parking surveys were therefore carried out in September 2016. On the day of survey, of the over 100 businesses and organisations some 21 were still closed.

The relatively low overall level of parking occupancy on the Thursday of about 60% and the lower peak occupancy of about 45% on the Saturday is in part a consequence of the substantial number of closed businesses. Under normal circumstance, these businesses may well have been operational and generating a corresponding parking demand.

In order to assess the parking conditions in such circumstances when all businesses are operational, the following approach was adopted:

- The existing floor area, prior to the floods, was obtained from The Economic Impact Assessment for the Stonequarry Commercial Planning Proposal of:
  - 11,000 m2 of retail; excluding the IGA supermarket (1,500 m^2) and Coles (3,300 m^2), the remaining retail establishments accounted for 6,200 m^2.
  - Commercial/office establishments had a total area of 4,000 m^2.

The average floor area of each shops or office was estimated to be 109 m^2 and 100 m^2 respectively as calculated below:

Activity	Total Floor Area m^2	Total N° of Businesses	m^2 per premise
Retail *	6,200	57	109
Office	4,000	40	100
Total	**10,200**	**97**	**105**

*Excludes Coles and IGA

Table 18: Mean Business Floor Area

The overall peak parking occupancy on the Thursday was recorded at 669 spaces. Excluding the parking occupancy in the IGA and Coles car parks, as well as the non-retail/office establishments such as the Club and the Public School, the parking demand for the remaining establishments within the Town Centre was 490 spaces out of 698 spaces.

This peak demand was generated by the 76 establishments opened on the day of survey. Thus on average, every establishment generates an average parking demand of about 6.1 spaces per $100m^2$ as noted below.

Activity	Opened Establishments Excluding Coles & IGA			Peak Parking	Parking
	No.	Average GFA m^2	Floor Area m^2	Occupancy (Spaces)	Demand Rate (Spaces/$100m^2$)
Retail	43	109	4,677		
Office	33	100	3,300		
Total	**76**	**105**	**7,977**	**490***	**6.1**

*Excludes Public School

Table 19: Mean Parking Demand Rate per Activity

Applying the parking demand rate of 6.1 spaces per 100 m^2 to the establishments closed on the day of survey, a further peak parking demand of 136 spaces has been estimated as calculated below:

Activity	Closed Establishments			Parking	Peak Parking
	N°	Average GFA m^2	Floor Area GFA m^2	Demand Rate (Spaces/$100m^2$)	Occupancy (Spaces)
Retail	14	109	1,526		93
Office	7	100	700		43
Total	21	**105**	2,226	**6.1**	**136**

Table 20: Peak Parking Occupancy for Unoccupied Activities

Thus, the most likely peak parking demand within the Picton Town Centre would have been for 626 spaces (490+136). This demand is about 10 percent below the available parking supply of 698 spaces.

7.3 Parking Turnover and Length of Stay

The following sections examine parking turnover and length of stay effects on parking.

7.3.1 Method of Survey

The length of stay of employees and visitors enables an assessment of the general demand of short stay and long stay parking in the Centre.

The number plates of vehicles parked in a sample of on-street short term parking spaces were recorded together with their approximate time of arrival and departure; a similar survey was carried out in the Picton Mall car park and nearby Council car park. The data collected was processed to obtain length of stay and parking turnover for each of on-street and off-street spaces available to the public. These surveys were carried out on Thursday 22 September 2016 between 9:00am and 5:00pm.

The frequency distributions of length of stay and average length of stay of parkers in a sample of on-street spaces and off-street spaces are detailed in **Appendix F** and summarised in **Table 21**.

Time Restriction	Surveyed Spaces	Total Cars (8 Hours Survey Period)	Average Length of Stay (mins)	85%ile Length of Stay (mins)	Turnover (veh/space/hr)
On-Street Spaces					
15 Minutes	2	10	54	105	0.63
1 Hour	28	215	41	56	0.96
2 Hours	13	51	97	158	0.49
3 Hours	43	176	82	135	0.51
Disabled	3	4	41	60	0.17
Loading Zones	3	13	40	45	0.54
Sub-Total	**92**	**469**	**63**	**103**	**0.64**
Off-Street Spaces					
3 hr Parking The Picton Mall	40	203	42	107	0.59
Unrestricted Council car park	22	58	314	480	0.18
Staff Only Spaces The Picton Mall	9	9	338	480	0.05
Sub-Total	**71**	**270**	**110**	**330**	**0.32**
Total	**163**	**739**	**80**	**124**	**0.47**

Table 21: Length of Stay of Vehicles in Picton*

7.3.2 Turnover of Parking Facilities

The average turnover rates over the period of the survey in vehicles/ space/hour have been calculated from the information collected and are noted by parking type in **Table 21**.

Parking turnover rates indicate the number of cars per hour, during a specified survey period, using a particular space. The shorter the designated length of stay for the space, the greater should be the turnover rate or utilisation of the space.

In theory, where parking is in great demand and is strictly controlled, "15 minutes" spaces would show turnover rates of about 4.0 cars per hour, "half-hour" of 2.0, "one hour" spaces of 1.0 or more, and "two hours" spaces of 0.5 or more. One and two hours spaces experienced expected turnover rates.

On-street parking spaces in 15 mins time restricted spaces recorded much lower turnover rates than expected; this is related to the fact that 60 percent of cars using these spaces exceeded the posted time limit (refer **Table 22**).

Off-street parking spaces with three hours limited spaces had a higher turnover rate of 0.59 cars/space/hour than expected (~0.33).

7.3.3 Length of Stay

The distribution of parking duration for each type of parking is summarised in **Table 22.**

Parking Space Description	0-15 mins	16-30 mins	31-45 mins	46-60 mins	1-2 hrs	2-3 hrs	3-4 hrs	4-6 hrs	6-8 hrs	Total	Total Cars Parked in 8 hrs
On-Street Parking											
5 mins	40%	40%	20%	0%	0%	0%	0%	0%	0%	**100%**	10
15 mins	30%	20%	10%	10%	20%	10%	0%	0%	0%	**100%**	10
1 hour	37%	32%	12%	7%	9%	3%	0%	1%	0%	**100%**	799
2 hours	6%	12%	16%	8%	31%	18%	8%	2%	0%	**100%**	243
3 hours	13%	15%	20%	11%	23%	10%	5%	3%	2%	**100%**	188
Unrestricted	10%	7%	0%	0%	7%	5%	3%	12%	55%	**100%**	94
Disabled	25%	25%	25%	0%	25%	0%	0%	0%	0%	**100%**	7
Total On-Street	**26%**	**24%**	**13%**	**7%**	**15%**	**7%**	**2%**	**2%**	**4%**	**100%**	**1,350**
Off-Street Parking											
Council Car Parks											
Near Picton Mall	10%	7%	0%	0%	7%	5%	3%	12%	55%	**100%**	120
Near St Mark's Church	10%	7%	0%	0%	7%	5%	3%	12%	55%	**100%**	96

Parking Space Description	0-15 mins	16-30 mins	31-45 mins	46-60 mins	1-2 hrs	2-3 hrs	3-4 hrs	4-6 hrs	6-8 hrs	Total	Total Cars Parked in 8 hrs
Sub-total	**10%**	**7%**	**0%**	**0%**	**7%**	**5%**	**3%**	**12%**	**55%**	**100%**	**216**
Picton Mall	41%	19%	15%	8%	13%	2%	0%	0%	0%	**100%**	1,095
Khan's Supermarket	10%	7%	0%	0%	7%	5%	3%	12%	55%	**100%**	85
Other Private Spaces	10%	7%	0%	0%	7%	5%	3%	12%	55%	**100%**	784
Sub-Total	**28%**	**13%**	**9%**	**4%**	**10%**	**4%**	**2%**	**6%**	**24%**	**100%**	**1,964**
Non-Public Spaces											
Council's Staff Parking	0%	11%	0%	0%	0%	0%	22%	11%	56%	**100%**	50
Picton Bowling Club	26%	24%	13%	7%	15%	7%	2%	2%	4%	**100%**	150
Sub-Total Non-Public	**20%**	**21%**	**10%**	**5%**	**11%**	**5%**	**7%**	**4%**	**17%**	**100%**	**200**
Total Off-Street	**25%**	**14%**	**8%**	**4%**	**10%**	**4%**	**2%**	**6%**	**27%**	**100%**	**2,380**
Total	**26%**	**17%**	**10%**	**5%**	**12%**	**5%**	**2%**	**5%**	**19%**	**100%**	**3,730**

Table 22: Parking Length of Stay Distribution

The result of the survey indicated that:

- The average and 85$^{\%ile}$ length of stay for vehicles parking in 15 minute controlled on-street spaces exceeded the posted time limit during the survey period of 9.00 am to 5.00 pm. This indicates a high incidence of cars exceeding the legally posted time limit;
- About 60% of the total on-street parking demand occurs within the spaces controlled to 1 hour or less;
- In comparison, the average and 85$^{\%ile}$ length of stay for vehicles parking in the other short-term spaces (1 to 3 hours limit) were lower than the posted time limit;
- About 85% of on-street parkers stayed for up to 2 hours; in comparison, about 61% of parkers in the off-street car parks did so;
- Long stay parking demands in the 6 to 8 hours range (representing all day parkers) represent about 19% to 24% of the total off-street demand. About 4% of the on-street parking is used in this way.

7.3.4 Incidence of Illegal Parking

The percentage of vehicles overstaying the posted time limit during the survey period are shown in detail in **Appendix G** and summarised in **Table 23**.

TIME RESTRICTION	TOTAL PARKED CARS	CARS EXCEEDING TIME LIMIT BY UP TO (in Minutes)						
		Up to 15	15-30	30-60	60-120	Over 120	Total	Percentage
On-Street								
15 Minutes	10	2	1	1	2	0	**6**	60%
1 Hour	799	26	19	26	22	11	**104**	13%
2 Hours	243	14	10	19	19	5	**67**	28%
3 Hours	188	2	0	7	4	4	**17**	9%
Total On-Street	**1,240**	**44**	**30**	**53**	**47**	**20**	**194**	**16%**
Off-Street								
Picton Mall (Up to 3 Hours)	1095	0	5	0	0	5	**10**	1%
Total	**2,335**	**44**	**35**	**52**	**47**	**25**	**203**	**9%**

Table 23: Number of Cars Exceeding Time Restrictions (Illegal Parking)

Based on the traffic survey results, it has been estimated that about 1,240 vehicles parked in on-street restricted spaces during the eight hours periods of survey, about 16% (~190) of which exceeded the time limits where they parked. A much lower proportion of parking in the 3 hours spaces of the Picton Mall exceeded the time limit; they accounted for less than 1% of all parked cars.

Over-stay demands were recorded in all categories. The highest incidence of overstaying occurred in the "15 minutes" (~60%) and in the "2 hours" (~28%) on-street spaces. This level of over-staying is quite high and an improved level of enforcement particularly for the shorter time limited spaces would improve this situation considering there are a number of vacant spaces in the area. Alternatively, it may be appropriate to investigate the supply of 15 minutes spaces and their location, and to give consideration to moving some of the supply to a 30 minutes restriction period. While over-staying is likely to occur within the 30 minutes period controlled areas, as it does in all categories, an enhanced level of service and potentially diminished overall degree of non-compliance may be achievable.

7.4 Future Parking Requirement

Council has advised that the only potential commercial growth of the Picton Town Centre would be the proposed Stonequarry Commercial development to the north of Argyle Street.

The proposed development would at ultimate completion comprise of 18,500 m^2 of retail and 4,400 m^2 of Commercial/office establishments. Off-street car parking is anticipated to be constructed on ground level of the development to provide adequate flood mitigation on the site, as well as to maximise the available parking space for the site.

Volume 5 of Council's 2016 Development Control Plan for Commercial and Community Uses specify the following parking requirements:

- Neighbourhood Shops: 2.5 car parking space per 100m² of GFA.
- Office and Business premises: 2.5 car parking space per 100m² of GFA.
- Shopping centres:
  - GFA ≤ 10,000 6.1 spaces per 100 m² of GLFA
  - 10,000 < GFA ≤ 20,000 5.6 spaces per 100 m² of GLFA
  - 20,000 < GFA ≤ 30,000 4.3 spaces per 100 m² of GLFA
  - GFA > 30,000 4.1 spaces per 100 m² of GLFA.

The proposed development is considered to be a Shopping Centre of 22,900 m^2 GFA. Thus, it would require some 985 spaces.

Based on a previous version of the DCP, it was established that 524 car parking spaces would be required to support the proposed development.

As the proposed development is still at a Planning Proposal stage, the exact number of parking spaces to be provided would be determined during the Development Application phase.

7.5 Loading Facilities

There are seven designated on-street loading spaces. Loading areas are also provided in the Picton Mall (for Coles), the IGA and at McDonalds.

Vehicles servicing about 62% of businesses park either on-site or in loading areas. Vehicles servicing about 40% of businesses parked in on-street spaces; about 55% of these actually park in short stay on-street spaces.

The results of the survey are in **Table 24**.

LAND USE	OFF-STREET		ON-STREET		TOTAL
	On-site	Loading Area	Restricted Spaces	No Limit	
Retail Grocery / Food	1			1	2
Retail Other	13	4		1	18
Office	11	1	9	1	22
Bank / Post Office	3		1	1	5
Hairdresser / Barber		1	2	2	5
Milk Bar / Coffee Lounge / Restaurant	1	4	1	1	7
Medical Services			1	3	4
Recreational Club / Hotels	1				1
Gymnasium	1				1
Family Day Care				1	1
Total	**31**	**10**	**14**	**11**	**66**
Total Percentages	**47%**	**15%**	**21%**	**17%**	**100%**

Table 24: Parking of Service Vehicles

The key loading and servicing observations are as follows:

- Retail and office activities generate the greatest demand for loading and servicing, and this predominantly occurs onsite;
- With the earlier identification of on-street parking vacancies, it is not unexpected that efficient utilisation is made of some of the on-street parking areas for servicing purposes, almost 40% of the total demand;
- Over time, as on-street parking demands increase these on-street loading and servicing demands may migrate back to on-site loading areas or within service lanes. There is assessed to be some spare capacity within the off-street facilities to accommodate these changing demands with time, noting the on-street availability of supply is some way from being fully demanded.
- It may be appropriate to give further consideration to peak summer holiday demand periods at a later stage, especially to determine the need for additional or perhaps temporary facilities for tourism and visitor generated demands. These may include vehicle type specific demands such as motorhome parking areas with appropriate manoeuvring and parking bay length;
- Furthermore, consideration should be given to definition of service vehicle loading areas and related back-of-house service lane provisions within the Town Centre Commercial area to ensure these areas are appropriately integrated and protected as development and uptake of the commercial lands advances.

8. Transport Modelling

A separate technical report detailing the development of the Picton Town Centre model has been prepared in accordance with the Brief. The report provides an overview of the model development process and the calibration and validation outcomes. It has been developed in accord with the Roads and Maritime Services (RMS) Traffic Modelling Guidelines[4] microsimulation category for the purposes of level of data comparison (calibration and validation).

Key matters addressed in the report are summarised as follows:

- The sourcing of Network Data, Traffic Demand Data, and Performance Data;
- Model Structure, Version, Parameters, Hierarchical Structure, and Route Choice settings;
- Demand Development addressing Demand Release profiles, Zone System and Origin/Destination Demand development;
- Model Calibration and Validation including turning count, queue length and travel time methods;
- Base Network scenarios for 2016 and 2026 (AM, PM, Saturday Midday);
- Findings, constraints and results analysis.

Overall, a suitable and appropriate Aimsun microsimulation model has been developed for the Study Area. The calibrated and validated base models provided a sound basis from which to develop, test and compare a range of traffic management options and potential effects, and this assessment has formed the basis of determination of the ultimate Transport Master Plan for Picton.

The following sections describe the assessments that have been made and how these have affected and contributed to development of the Transport Master Plan and corresponding Structure Plans.

8.1 Development of Model Tests

A range of scenarios have been developed to examine the potential performance of the network, its breakdown points (weakest links), and to incrementally develop the mitigations necessary to generate a future year network that performs at a desired Level of Service D (LOS D).

In broad terms, the modelling has focussed on resolving the critical network issues, drawing from the most challenging time period being the weekday PM peak 2026. While somewhat more complex, the 2026 model demonstrates similar yet exemplified constraints to those identified at 2016. It is therefore adopted as a reasonable and appropriate assessment base, recognising the necessity for cross referencing with the identified critical issues and patterns at other time periods. The aggregated data described at **Section 4.10** demonstrates relatively minor total network demand differences for the AM and Weekend

[4] http://www.rms.nsw.gov.au/business-industry/partners-suppliers/documents/technical-manuals/modellingguidelines.pdf

peak periods. Regard has been had for the differing traffic flow distributions between the various time periods.

While network testing and evaluation has been incremental, the overall broad assessment has been based around three core performance test:

- **Test Series 1:** The series of Tests 1i to 1v incrementally introduce network improvements;
- **Test 2:** Exchange of the Walton Lane extension to Barkers Lodge Road, to a Cliffe Road extension to Barkers Lodge Road; and
- **Test 3:** The overall network improvements with Prince Street bridge closed.

The network Tests include a range of sub-options that examine the need for and level of mitigation, for example priority intersection control compared with roundabout or signal control. These sub-options are then developed further to refine and develop a recommended network approach and to effectively inform the relationships between implementation staging.

The relative components of the various model tests are summarised in the following Table:

Description	Location	2026 Do Nothing	2026 Test 1 i.	2026 Test 1 ii.	2026 Test 1 iii.	2026 Test 1 iv.	2026 Test 1 v.	2026 Test 2	2026 Test 3
Base Network Configurations	Mushroom Tunnel	I.	I.	I.	I.	I.	I.	I.	I.
	Picton East	I.	I.	I.	I.	I.	I.	I.	I.
	Stonequarry Commercial	I.	I.	I.	I.	I.	I.	I.	I.
	Argyle/ Regreme	I.	I.	I.	I.	I.	I.	I.	I.
Street and Intersection Configurations	Argyle/ Cliffe/ Margaret	I.	II.a.	II.a.	II.a.	II.a.	II.a.	II.a.	II.a.
	Walton St		I.a.	I.a.	I.a.	I.a.	I.a.	I.	I.
	Argyle/ Barkers Lodge		I.	II.	II.	II.	II.	II.	II.
	Menangle/ Colden/ Margaret		I.	I.	I.	I.	I.	I.	I.
	Argyle/ Menangle			I.	I.		I.	I.	I.
	Prince Street		I.	I.	II.a.	II.a.	II.a.	II.a.	
	Stonequarry Bridge							I.	
	Barkers Lodge/ Colden Ring Road					I.	I.		

Table 25: Summary of Model Options (refer also to Table 26)

The "red" cells in the Table indicate where a form of control has changed, when read across the lines of the Table. While not listed in the Table, the Abbotsford development proposal is included in the modelling, however is connected to the network in a different way to the three other developments listed.

The corresponding form of connections and intersections adopted in the tests can be referenced from the following Table.

Base	Version	Addition	Base Name	Pre-requisites	Restrictions	Description
1	I		Enlarged Network			Old Hume Highway extended north past Jarvisfield Road
2	I		Mushroom Tunnel			Mushroom Tunnel in place
3	I		Picton East		3.II.	Picton East in place with 30 kmh max speed
3	II				3.I.	Picton East in place with 50 kmh max speed
4	I		Stonequarry Commercial			Stonequarry Commercial in place with Elizabeth St/Cliffe St connection
5	I		Argyle/ Regreme			Roundabout in place at Old Hume Highway/Regreme Rd
6	I		Argyle/ Cliffe/ Margaret		6.II.	Signals in place at Argyle St/Margaret St/Cliffe St
6	II				6.I.	Alternative layout of signals at Argyle St/Margaret St/Cliffe St
6	II	a		6.II.		Additional pedestrian crossings and 25 kmh max speed on Argyle St between Margaret St and Stonequarry Creek
7	I		Walton St			Walton St in place with roundabouts at Cliffe St and Menangle St W
7	I	a		7.I.		Walton St extended across Stonequarry Creek to Barkers Lodge Rd
8	I		Argyle/ Barkers Lodge		8.II.	Upgrade of priority layout at Argyle St/Barkers Lodge Rd
8	II				8.I.	Signals in place at Argyle St/Barkers Lodge Rd
9	I		Menangle/ Colden/ Margaret			Turn bays on Margaret St/Colden St, priority direction change at Margaret St/Colden St and signals in place at Menangle St/Colden St
10	I		Argyle/ Menangle			Signals in place at Argyle St/Menangle St
11	I		Prince Street		11.II., 11.III.	Extended turn bays entering Prince St from Menangle St and seagull in place exiting Prince St onto Menangle St
11	II				11.I., 11.III.	Roundabout in place at Argyle St/Prince St, signals in place at Menangle St/Prince St and Prince St fully four laned
11	II	a		11.II.		Roundabout in place at Argyle St/Prince St, signals in place at Menangle St/Prince St and Prince St bridge two laned
11	III				11.I., 11.II.	Prince St bridge eliminated
12	I		Stonequarry Bridge			Cliffe St extended across Stonequarry Creek to Barkers Lodge Rd
13	I		Barkers Lodge/ Colden Ring Road	8.II., 9.I.		Extensions of Barkers Lodge Road and Colden Street to meet, creating a ring road. This also closes Picton Ave and connects users of this to the new ring road.
13	II			8.II., 9.I.		Extensions of Barkers Lodge Road and Colden Street to meet, creating a ring road. This also closes Picton Ave and connects users of this to the new ring road as well as leaving Argyle/Menangle unsignalised.

Table 26: Summary of Link and Intersection Control (refer also to Table 25)

8.2 Modelling Test Results

The modelled Test results help to inform an understanding of the transport network performance. The key performance indicator adopted is the network Level of Service (LOS), i.e.: the ease with which movements can occur. By way of a broad definition the standard Austroads scale for assessment ranges from LOS A (free flowing and uninterrupted movement) to LOS F (highly congested, practical grid lock condition). The long term target design performance for the network, its links and intersections is LOS D in the future year.

8.2.1 Intersection Performance Results

Intersections typically control the overall network performance in an urban situation. The stopping and starting of movements and their corresponding giving way and priority conditions generally influence traffic distribution.

Provisional option testing was undertaken in the model to establish an appropriate, feasible and practical approach to network assessment and the potential for staged implementation of network improvements.

The summarised intersection performance for each of the modelled tests cases for the worst performing PM peak period are summarised in the following Table:

Location	2026 Do Nothing	2026 Test 1 i.	2026 Test 1 ii.	2026 Test 1 iii.	2026 Test 1 iv.	2026 Test 1 v.	2026 Test 2	2026 Test 3
Argyle Street/ Regreme Road	A (4)	B (22)	A (5)	A (4)	A (4)	A (4)	A (4)	F
Argyle Street/ Cliffe Street/ Margaret Street	E (64)	F (104)	E (66)	E (69)	E (63)	E (58)	D (57)	F
Argyle Street/ Barkers Lodge Road	F (769)	E (69)	C (35)	B (25)	C (30)	C (34)	C (32)	F
Menangle Street/ Colden Street	F (418)	B (28)	C (29)	B (20)	C (38)	C (37)	B (22)	F
Colden Street/ Margaret Street	F (166)	B (28)	A (5)	A (7)	A (5)	C (41)	C (41)	F
Argyle Street/ Menangle Street	F (727)	F (152)	D (50)	C (36)	C (36)	C (37)	C (34)	F
Argyle Street/ Prince Street	F (292)	D (51)	C (39)	A (6)	A (5)	A (5)	A (5)	F
Prince Street Bridge	C (40)	C (32)	C (35)	A (2)	A (2)	A (3)	A (3)	F
Menangle Street/ Prince Street	F (185)	F (96)	F (104)	C (31)	B (18)	B (20)	C (43)	F
Argyle Street/ Picton Avenue	F (358)	D (46)	E (61)	C (41)	A (4)	A (4)	D (44)	F
Argyle Street/ Lumsdaine Street	F (680)	C (43)	F (73)	C (34)	B (27)	C (29)	B (28)	F

Table 27: Summary of Intersection Performance Results – PM Peak Period

The key observations that can be made from these results are as follows:

- Not planning for any improvements to the network within the next 10 years is expected to result in widespread congestion and extended delays (2026 Do Nothing Test);
- Test scenario 1i introduces a Town Centre main street speed environment more conducive to pedestrian access and mobility. It also introduces a new connection from Walton Street south across Stonequarry Creek to Barkers Lodge Road. The result is an easing of main street demands but still unresolved congestion on Argyle Street and Barkers Lodge Road approach to Argyle Street. Prince Street intersection with Menangle Street has improved priority control, however this is inadequate to resolve the demands. The Prince Street bridge is modelled in its current configuration and shows an acceptable LOS. The consequence on not improving the bridge however is the increased demands and continued heavy vehicle movement through the Town Centre main street environment. Argyle Street / Menangle Street cannot be upgraded to signals until such time as the predominant heavy vehicle turning demands are removed from the intersection.
- Test scenario 1ii further introduces signal control at Argyle Street / Menangle Street and Argyle Street / Barkers Lodge Road intersections. These measures deliver local intersection improvements at the treated intersections. The result is also an increased use of the Walton Street link. The introduced delays due to the Argyle Street / Menangle Street signals encourages some through traffic to divert to the parallel Walton Street link. While the performance at Argyle Street / Menangle Street intersection is improved with signals, it is noted that these cannot physically be introduced without the removal of heavy vehicle turning demands from the intersection, this delivered by way of the Prince Street bridge upgrade. Congestion remains at the Prince Street / Menangle Street intersection;
- Test scenario 1iii changes the Prince Street intersections to signals at Menangle Street and a roundabout at Argyle Street. It also removes the current height and weight restrictions from the Prince Street bridge. The impact is a significant localised improvement in performance of the intersections despite the increased traffic demand on the Prince Street corridor. Additional traffic demands divert to the Prince Street crossing and the result is a material improvement in performance of the CBD main street environment. The Argyle Street intersection with Margaret Street exhibits a marginally unacceptable performance arising from redistributed traffic demands.

These are expected to be readily addressed through localised increase in lane lengths, a potential minor alteration to lane sharing and refinement of the signal phasing. It is not expected there will be a need for material further road widening at this location. The Argyle Street / Menangle Street intersection is shown signalised and operates effectively;

- Test scenario 1iv examines whether the Argyle Street / Menangle Street intersection warrants signalisation and also introduces a new link road from Menangle Street / Colden Street intersection to Barkers Lodge Road. The new link road diverts further traffic demand from the main street environment and alleviates the need for signalisation of the Argyle Street / Menangle Street intersection. Notwithstanding this, ultimately signalisation here would be to enhance pedestrian movement and accessibility within the Town Centre and not purely in response traffic flow demands;
- Test scenario 1v develops scenario 1iv by reintroducing signalisation at the Argyle Street / Menangle Street intersection. Additionally, a link Road from Colden Street / Menangle Street intersection through to Barkers Lodge Road / Argyle Street intersection is included. The result is a slight increase in delay at the Argyle Street / Menangle Street intersection, but still an acceptable level of performance. The merit for signalisation at the intersection however is primarily in the provision of a controlled pedestrian crossing environment and therefore the performance of vehicle movements is slightly impacted. It needs to be further noted here that the Argyle Street / Menangle Street intersection cannot practically be signalised until restrictions are lifted from the Prince Street bridge and heavy commercial traffic demands are diverted from turning at the main street intersection. The physical turning space requirements for long articulated vehicles is not able to be managed alongside the lane requirements for signalisation. An alternative solution would be to construct the new link road from Menangle Street / Colden Street intersection through to Argyle Street / Barkers Lodge Road intersection and establish the route as a defined heavy vehicle bypass of the Town Centre.
- Test scenario 2 relocates the Stonequarry Creek crossing from a Walton Street extension to an extension of Cliffe Street to Barkers Lodge Road. It also removes the link road from Menangle Road / Colden Street intersection through to Barkers Lodge Road intersection. The result is a local redistribution of traffic with little material impact elsewhere. There is evidence that it is a less efficient alternative to the Walton Street extension as most of the demand is to and from the north and south on Argyle Street. Some additional traffic demand returns to Argyle Street between Barkers Lodge Road and Menangle Street.
- Test scenario 3 assess the impact to the network of closure (temporary or permanent) to the Prince Street bridge. The impact is significant and adverse for the whole of the Town Centre as well as for the performance of Argyle Street and Menangle Street corridors. The result is significant congestion that impacts successive and adjacent intersections.

8.2.2 Intersection Performance Across Different Time Periods

Three key periods have been modelled in order to inform the assessment of and impact on network performance. These include the weekday AM, weekday PM and a weekend midday shopper demand period. The assessed network performance across each of these

periods at 2026 in the "Do Nothing" scenario, i.e.: growth without intervention is demonstrated in the following Table:

Period Time	2026 INTERSECTION LEVEL OF SERVICES (DELAY (s))		
	AM 8:30 - 9:30	PM 16:30 - 17:30	Weekend 11:30 - 12:30
Argyle Street/ Regreme Road	A (3)	F (151)	A (3)
Argyle Street/ Cliffe Street/ Margaret Street	B (28)	F (145)	B (26)
Argyle Street/ Barkers Lodge Road	F (611)	F (1266)	D (51)
Menangle Street/ Colden Street	D (55)	F (597)	A (15)
Colden Street/ Margaret Street	B (17)	F (438)	A (3)
Argyle Street/ Menangle Street	F (412)	F (2696)	F (105)
Argyle Street/ Prince Street	F (134)	F (410)	C (36)
Prince Street Bridge	D (55)	E (60)	B (23)
Menangle Street/ Prince Street	F (143)	F (150)	D (57)
Argyle Street/ Picton Avenue	F (201)	F (865)	C (31)
Argyle Street/ Lumsdaine Street	F (477)	F (1278)	C (41)

Table 28: 2026 Do Nothing Intersection Performance – AM, PM and Weekday

It can be readily seen that the weekday PM peak period is significantly affected is detailed earlier. Additionally, the weekday morning period also presents with an unacceptable performance outcome. The weekend mid-day period exhibits some deterioration of performance with pressure evident on the following intersections:

- Argyle Street/ Barkers Lodge Road;
- Argyle Street/ Menangle Street; and
- Menangle Street/ Prince Street.

These three intersections are critical to the overall network performance and therefore it's reasonable to conclude an overall unacceptable network performance is expected.

By way of a comparison, the following summary shows the corresponding network performance resulting at 2026 from Test scenario 1v – full network establishment:

Period Time	2026 INTERSECTION LEVEL OF SERVICES (DELAY (s))		
	AM 8:30 - 9:30	PM 16:30 - 17:30	Weekend 11:30 - 12:30
Argyle Street/ Regreme Road	A (3)	A (5)	A (3)
Argyle Street/ Cliffe Street/ Margaret Street	D (49)	E (67)	D (47)
Argyle Street/ Barkers Lodge Road	B (27)	C (33)	B (27)
Menangle Street/ Colden Street	C (33)	C (39)	C (31)
Colden Street/ Margaret Street	D (48)	C (40)	D (55)
Argyle Street/ Menangle Street	C (35)	C (38)	C (35)
Argyle Street/ Prince Street	A (5)	A (5)	A (4)
Prince Street Bridge	A (5)	A (3)	A (4)
Menangle Street/ Prince Street	B (18)	B (19)	B (15)
Argyle Street/ Picton Avenue	C (41)	A (4)	C (31)
Argyle Street/ Lumsdaine Street	A (8)	C (32)	A (6)
Barkers Lodge Road/ Walton Street	A (5)	A (3)	A (4)
Menangle Street/ Walton Street	A (6)	A (8)	A (7)
Cliffe Street/ Walton Street	A (3)	A (4)	A (3)

Table 29: 2026 Test Scenario 1v Intersection Performance – AM, PM and Weekday

It is evident that the range of improvement measures tested is able to demonstrate material improvement in performance across all three peak demand periods. In all assessments and option analyses undertaken, demand pressures continue to be evident at the Argyle Street/ Cliffe Street/ Margaret Street intersection recently signalised. There will be a need to establish increased capacity at this intersection as the network demands increase. These are expected to be readily addressed through localised increase in lane lengths, a potential minor alteration to lane sharing and refinement of the signal phasing. It is not expected there will be a need for material further road widening at this location. The timing of those improvements are subject to the eventual growth demand, however it is expected that improved capacity is expected to be warranted prior to or about 2026 based on current forecasts.

8.2.3 Network Performance Results

The overall network performance is also measured based on Level of Service outcomes. The LOS performance measure however is based assessed travel speed compared with the assigned link travel speed on the network and therefore differs from the intersection Table above. The network performance results are best viewed pictorially. Accordingly, network diagrams that show the corresponding LOS D, E and F are set out for each of the Test scenarios at **Appendix H**:

The key observations from the traffic demands and speed change measurements are captured within the performance analysis described at **Section 8.2.1** above. Overall, it can be seen that speeds reduce on controlled intersection approaches as would be expected.

8.2.4 Network Traffic Demands

With the development and refinement of each option, traffic redistributes across the transport network. The traffic demands for each of the Test options, with the exception of Option 3 which exhibits multiple inter-related network blocking and congestion, are set out at **Appendix I** for reference and information. Some notable observations can be summarised as follows:

- The establishment of the Walton Street extension across to Barkers Lodge Road is expected to be a well utilised connection with a direct improvement to the Argyle Street traffic environment;
- Two laning the Prince Street bridge delivers direct and further benefits to the Town Centre (Argyle Street) area, removing traffic demands from that environment;
- Good utilisation is made of the development of Margaret Street and Colden Street as an alternate route between Argyle Street and Menangle Street;
- The southern link road that ultimately completes the Town Centre network demonstrates the creation of an effective and well utilised Town Centre ring route, however the traffic demands are such that it I not expected to be demanded within the 2026 horizon assessed;
- Overall, there are very real and direct impact opportunities to deliver great outcomes for the Town Centre retail and commercial environment and to establish a long term efficient transport network for Picton.

8.3 Transport Modelling and Operational Summary and Conclusions

The following broad conclusions can be drawn from these results:

- Direct interventions will be necessary to ensure a satisfactory level of performance of the network to 2026;
- The Picton transport network is materially impacted by constraints on its connectedness. It is exposed to significant risk, lacks resilience, as a result of the constrained Prince Street bridge operation, and the remaining single Argyle Street Stonequarry Creek crossing south of the Town Centre;
- Physical turning movement demands due to large articulated vehicles at Argyle Street / Menangle Street intersection in Picton Town's community heart will prevent the introduction of safety and accessibility improvements for pedestrians until such time as strategic network connections are able to be established, i.e.: the Prince Street bridge improvements;
- There is significant opportunity to improve the functionality and accessibility of the Town Centre for people and vehicles, minimising the impacts of less-compatible Arterial through movements, many of these achievable in advance of the Prince Street bridge improvements;
- The defined local planned development activities are expected to contribute materially to the need for mitigation and intervention;

- Some of the identified network improvements have previously been identified in earlier studies and some are also currently provided for within the Draft Development Contributions Plan.

Overall it can be seen that Test Scenario 1iii, with appropriate localised improvement responses to Argyle Street / Margaret Street intersection will deliver an effective outcome for the Town Centre.

The performance of Prince Street as a corridor can be extended a few years in practical life through improvement to the form of intersections at each of its ends. Notwithstanding this, without improvements to the bridge, any benefit to the Town Centre environment will be limited, heavy commercial vehicle movements will continue to be routed through the Town and it will not be physically possible to signalise the Argyle Street / Menangle Street intersection to deliver pedestrian accessibility, safety and amenity at this location. On these bases, it is assessed that the need for removal of the restrictions on height and weight from the Prince Street bridge can be expected to arise within the 10 year horizon. That said, the network does not immediately collapse. Delaying the bridge replacement to post 2026 results in continued reductions in performance that will increasingly become evident over time. Peak spreading effects will become evident, and with the introduction of other local in-centre connections, localised traffic diversions (rat-running) will become more evident.

On the positive side, an upgrade to the Prince Street bridge will deliver increased network resilience for the Picton transport network. Without it, some improvement in amenity and performance in the Town Centre is unable to be realised due to the physical movement demands of larger vehicles. Additionally, an enhancement to the Prince Street bridge off-sets otherwise needed intersection capacity improvements in the Town Centre area, this is as a result of redistribution of traffic demands away from the current main street (Argyle Street).

The Test scenarios have identified that some works, which are ultimately recommended to deliver a wholly resilient and efficient transport network long term for Picton, are not expected to be demanded within the 10 years horizon window. This is in particular reference to the southern link road section connecting Menangle Street / Colden Street with Argyle Street / Barkers Lodge Road intersection.

On the northern side of the Town Centre, a strategic connection across Stonequarry Creek is identified as being of significant value in contribution to enhanced amenity in the main street (Argyle Street) precinct; its addition to network resilience, especially in the absence of an upgraded Prince Street bridge; enhanced local accessibility, convenience and safety for local trip making; and it has the potential to delay the need for signalisation of the Argyle Street / Barkers Lodge Road intersection. Ultimately Barkes Lodge Road will require signalisation, and especially once it is established as a cross road intersection with future connection to Menangle Street / Colden Street intersection. Signalisation is however, based on the demand assessments made, expected to arise within the horizon period assessed.

9. Access and Movement Structure Plans & Strategies

The following sections describe the developed Structure Plans and associated Strategies. The targeted strategies describe transport infrastructure related works necessary to deliver the Structure Plan outcome.

Structure Plans and Strategies are established for the following movement modes:

- Pedestrians;
- Cycling;
- Public Transport;
- Parking; and
- Traffic Management.

Land Use is relevant in the context that it is an inherent generator of traffic. Traffic planning is therefore directly connected with land use considerations, as it is with the transport systems that provide for its movement. The overall Land Use environment has been assessed in the course of the investigations and Study. There are no material matters of land use allocation, zoning or utilisation that require further and separate articulation in this Study. In undertaking the Study proper regard has been had for the potential and proposed future changes to land resulting from known use proposals where this departs from the current zoning provisions.

The key Strategies are set out in Tables that:

- Describe the overall outcomes to be expected;
- The alignment with and delivery of the Transport Master Planning Principles;
- The interdependency between the timing for implementation of the various Strategies; and
- The overall timeframe expectation for implementation.

Overall, the elements of the Access and Movement Structure Plans and Strategies contribute to the forming of the Town Centre Transport Master Plan, addressed in the following section. The Strategy Reference numbers are not intended to imply any order, preference or priority.

9.1 Pedestrians

Pedestrian connectivity and its integration with other modes, in particular cycling is a key issue for Picton. There are many gaps within the accessible network that will benefit from being addressed. The demographic assessment identifies that non-vehicular transport modes are materially under-represented in Picton and hence present and opportunity for significant improvement.

The local geographical terrain presents as a long-term barrier to some pedestrian movement, however significant opportunity exists to provide off-street connections that are shorter than by road, have a higher level of amenity and which could be linked to the Town's heritage and culture to build a well-connected pedestrian movement network. Cost

efficiencies will be achievable where pedestrian pathway development is integrated and shared with cycle facilities.

The Picton demographic is not dis-proportionately represented by elderly or persons with a movement challenge. Notwithstanding, there is substantial representation by sectors who would benefit from a high standard of surface quality and accessibility. The opportunity here is for ongoing development and enhancement of the walking environment for all users.

The Town Centre and Train Station are separated both geographically in elevation as well as distance (about 1.4km). The link is serviced by a public transport route, and the connectivity and service between these should be a constant focus of review and development to support access to the strategic transport system. Contributions made in the Stakeholder Workshop identified the potential to establish a new Train Station location on the loop area across Barkers Lodge Road from the Town Centre. This proposal does present the possibility of reducing that indicative separation to under 400m walking distance, while some, but much reduced, elevation difference would remain. The curvature of the loop is likely to be a significant and potentially insurmountable barrier to station and platform development there however. This matter was seen as a much longer term strategic project, beyond the period of this assessment, but nonetheless, a key outcome that presents significant long-term potential benefits to Picton Town if achievable. Accordingly, it is recommended that consideration be given to further investigation of this matter beyond the scope of this Study.

9.1.1 Pedestrian Structure Plan

The recommended Pedestrian Structure Plan to 2026 is shown as follows:

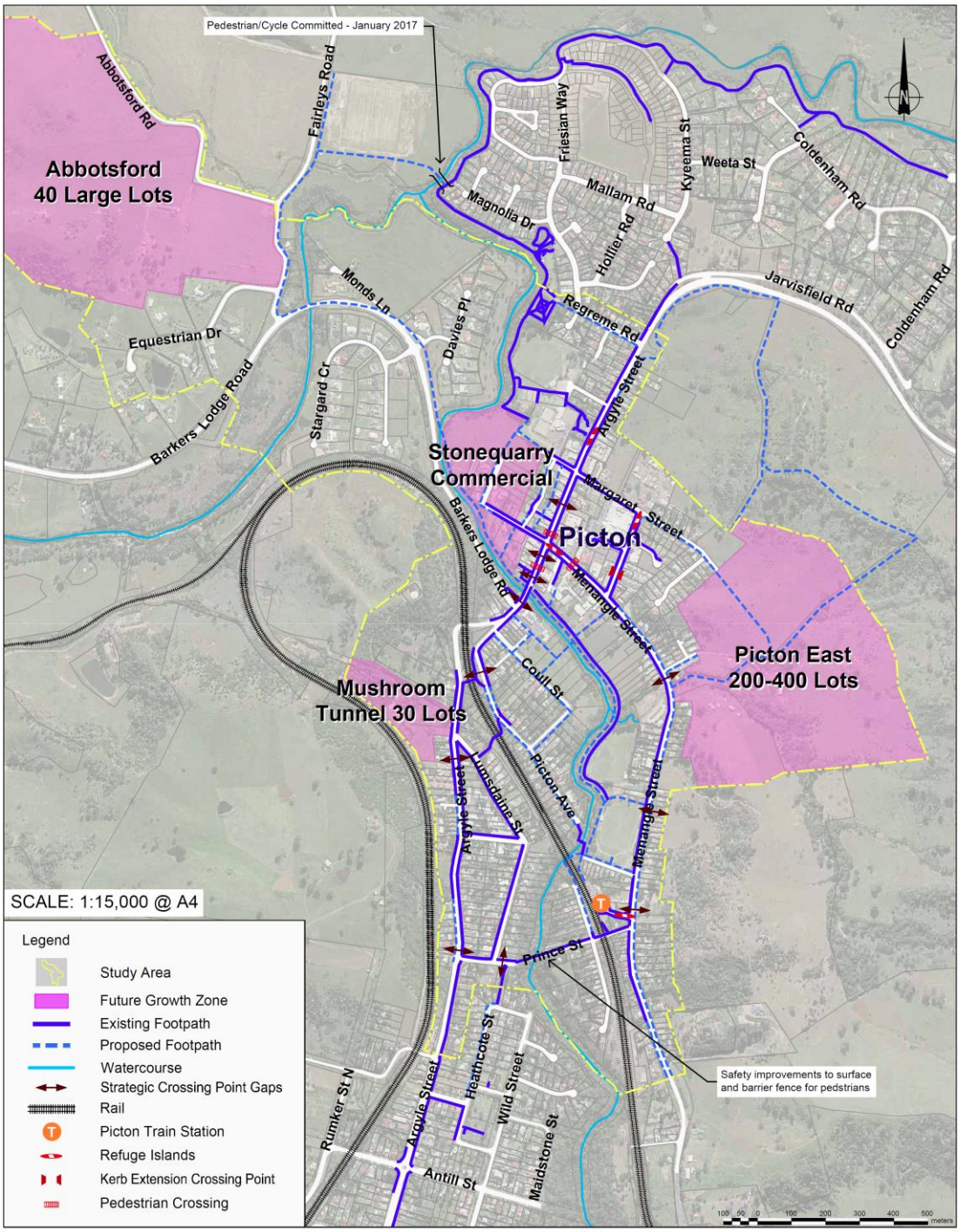


Figure 35: Pedestrian Structure Plan to 2026

9.1.2 Pedestrian Strategies

Key Strategies to deliver the Pedestrian Structure Plan are described in the following Table:

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
PS1	PS	State roading footpath	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3	RMS/WCC	N/A	N/A	0	Incrementally provided over the period
PS2	PS	Local roading footpaths	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period
PS3	PS	State roading crossing points	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3	RMS/WCC	N/A	N/A	0	Incrementally provided over the period
PS4	PS	Local roading crossing points	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period
PS5	PS	Surface safety and barrier improvements to Prince Street Bridge	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
PS6	PS	Enhance and upgrade Town Centre pedestrian surface and amenity environment to establish continuity of guidance, safe surfacing, good amenity and seating, and create a safe walking environment for all pedestrian sectors including disabled, injured, elderly, vision impaired and others.	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period
PS7	PS	Establish a Town Centre "Heritage Walking Trail to support and encourage tourism, and to build on walkability / accessibility of local Town Centre environment	To establish a comprehensive, connected walkable and accessible network.	P1, P2, P3, P5	WCC/Developer	N/A	N/A	0	Incrementally provided over the period

Table 30: Pedestrian Strategies

9.2 Cycling

The Wollondilly Bike Plan 2011 has set out the strategic context for on and off-street cycling in Picton. It considers at a higher order level the overall structure for a framework of cycle links that will form the core of a cycling network throughout the whole of the Wollondilly Shire.

The Cycling Structure Plan for Picton draws on this established skeleton network and further develops the connections and linkages that will deliver an integrated cycling network for Picton Town Centre.

Key issues for cycling in Picton in the current environment include:

- Exposure to movement along State arterial networks;
- Geographical movement challenges;
- Limited access to end of journey facilities; and
- Evidence of cycling as an under-utilised mode of transport.

The Structure Plan focusses on:

- Building cycle networks that are connected and continuous to provide assured accessibility;
- Integrating cycling and walking activities to optimise investment in these two transport modes;
- Providing for safe and efficient movement, principally off-street and in a way that presents cycling as a time efficient alternative to other modes of travel;
- Linking the cycle and pedestrian networks with the Town's culture, heritage and key destination points; and
- The provision of safe and appropriate end of journey facilities for security, protection and convenience;
- Requiring new development and redevelopment to establish site based end of journey facilities such as secure lock-up, storage, lockers and as appropriate shower and changing facilities.

9.2.1 Cycling Structure Plan

The recommended Cycling Structure Plan to 2026 is shown as follows:

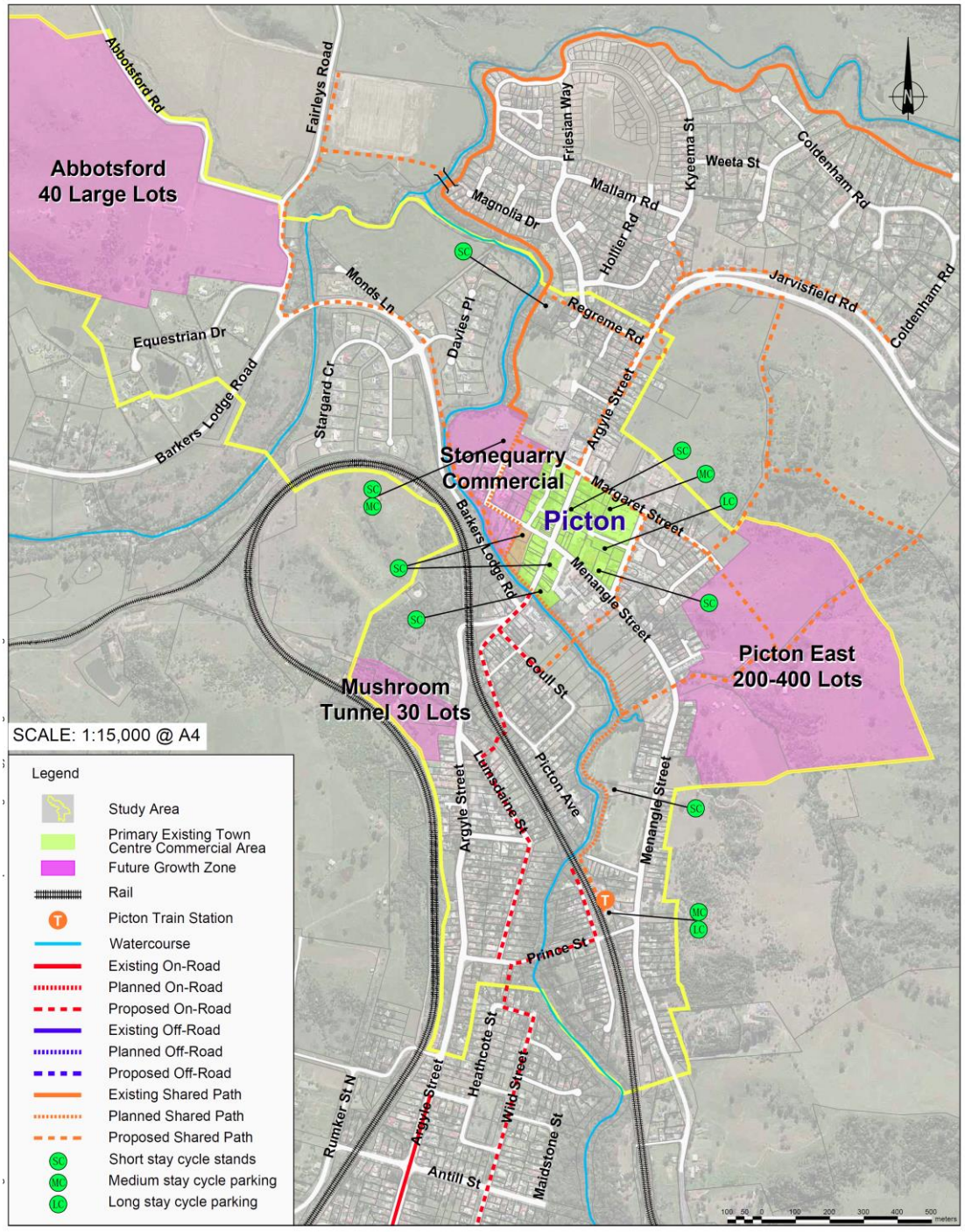


Figure 36: Cycling Structure Plan to 2026

9.2.2 Cycling Strategies

Key Strategies to deliver the Cycling Structure Plan are described in the following Table:

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
CS1	CS	State roading shared path	To establish a comprehensive, connected and accessible cycle network.	P1, P2, P3	RMS/WCC	N/A	N/A	0	Incrementally provided over the period
CS2	CS	local roading shared path	To establish a comprehensive, connected and accessible cycle network.	P1, P2, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period
CS3	CS	Require end of journey cycle facilities to be established with development thresholds in the LEP.	To establish a comprehensive, connected and accessible cycle network.	P1, P3	WCC	N/A	N/A	0	Incrementally provided over the period
CS4	CS	Short stay cycle stands	To establish a comprehensive, connected and accessible cycle network.	P1, P3	WCC/Developer	N/A	N/A	1	
CS5	CS	Medium stay covered cycle parking	To establish a comprehensive, connected and accessible cycle network.	P1, P3	WCC/Developer	N/A	N/A	5	
CS6	CS	Long stay cycle lock-up	To establish a comprehensive, connected and accessible cycle network.	P1, P3	WCC/Developer/RMS	N/A	N/A	10	

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
CS7	PS, CS	Prepare a Picton walking and cycle network map, market it and make available to the community	To establish a comprehensive, connected and accessible cycle network.	P1, P3	WCC	N/A	N/A	3	

Table 31: Cycling Strategies

9.3 Public Transport

Public transport services can generally be considered in the following three contexts:

- Train services – for long distance and higher speed connections;
- Bus services covering both long distance but predominantly focussed on domestic and local servicing; and
- Taxi or other individualised transport service providing a door to door and tailored transport service. This mode of transport also assists those without access to other personal transport options, and those without the capability to operate a personal form of transport, to readily move about and access local services and facilities.

Picton is currently service by Train and bus services, but is not readily supported by a locally established personalised/individualised transport service. Accessibility is therefore currently constrained by this gap.

The train service is currently well utilised by observation of the associated parking area utilisation, and restricted parking targeted at preventing overflow onto local streets around the Train Station. The demographic analysis identifies public transport by Train as more highly utilised in relation to bus services. The key link with the Train service is currently by personal motor vehicle and/or drop-off.

The bus service is relatively infrequent in the Study area, when it is considered in relation to corresponding in-Study-area walk and cycle times. It is also linked with the Train frequency and is competitive with the train service on longer service runs.

While most key destinations are accessible, a smaller, local Picton service presents as a potential local access opportunity connecting the key facilities of the Town such as the Train Station, Town Hall, Town Centre, Heritage areas, Tourism destinations, the Wollondilly Leisure Centre and access to essential services such as health, utilities, finance, government, library, information and food interests.

The total demand numbers, by observation appear relatively small indicating ample current capacity within the services provided and the Bus service provider confirms this. Taxi and other personalised services therefore present as feasible alternative movement options. Similarly, a local transport access service, potentially locally funded, would need to be tailored in size and frequency to effectively draw out the local demand. Such a service could be trialled to assess demand in the first instance.

Accordingly, the public transport Strategies are developed in such a way as to recognise the practicalities of providing related services to meet the demand expectations of a relatively small demographic. An integrated service approach that not only services basic transport needs of residents, but which also provides to accommodate local school access, tourism and recreational demand sectors may present as a suitable and tailored local solution.

Waiting and shelter facilities are limited and somewhat basic in their construction. An opportunity exists to encourage patronage and to provide additional facility that supports walking movement around the Study area. On higher volume routes an opportunity exists to work with suppliers and integrate advertising to off-set cost. The Bus service provider

confirmed an imminent funded project to upgrade bus stops and shelters and the overall accessibility of facilities in the CBD area, including the Menangle Street Terminus facility. This is integrated with the State driven accessibility targets for 100% accessible services by 2022. Currently, Picton is well placed in relation to accessibility with an assessed 89% of facilities meeting the future requirements.

Frequency of strategic, inter-city service demands will be subject to frequent review by the service providers and assessment and will be impacted by factors outside those influenced by Picton. Nonetheless, Picton has a role in advocating for these services and this should be advanced.

The predominant public transport focus for Picton therefore is recommended to be on local, personal safety and accessibility servicing, drawing on an integrated sector approach to deliver a viable local service outcome. Some efficiency may be derived further from varying existing transport routes to deliver greater accessibility to services, particularly following the release of subdivision development.

9.3.1 Public Transport Structure Plan

The recommended Public Transport Structure Plan to 2026 is shown as follows:

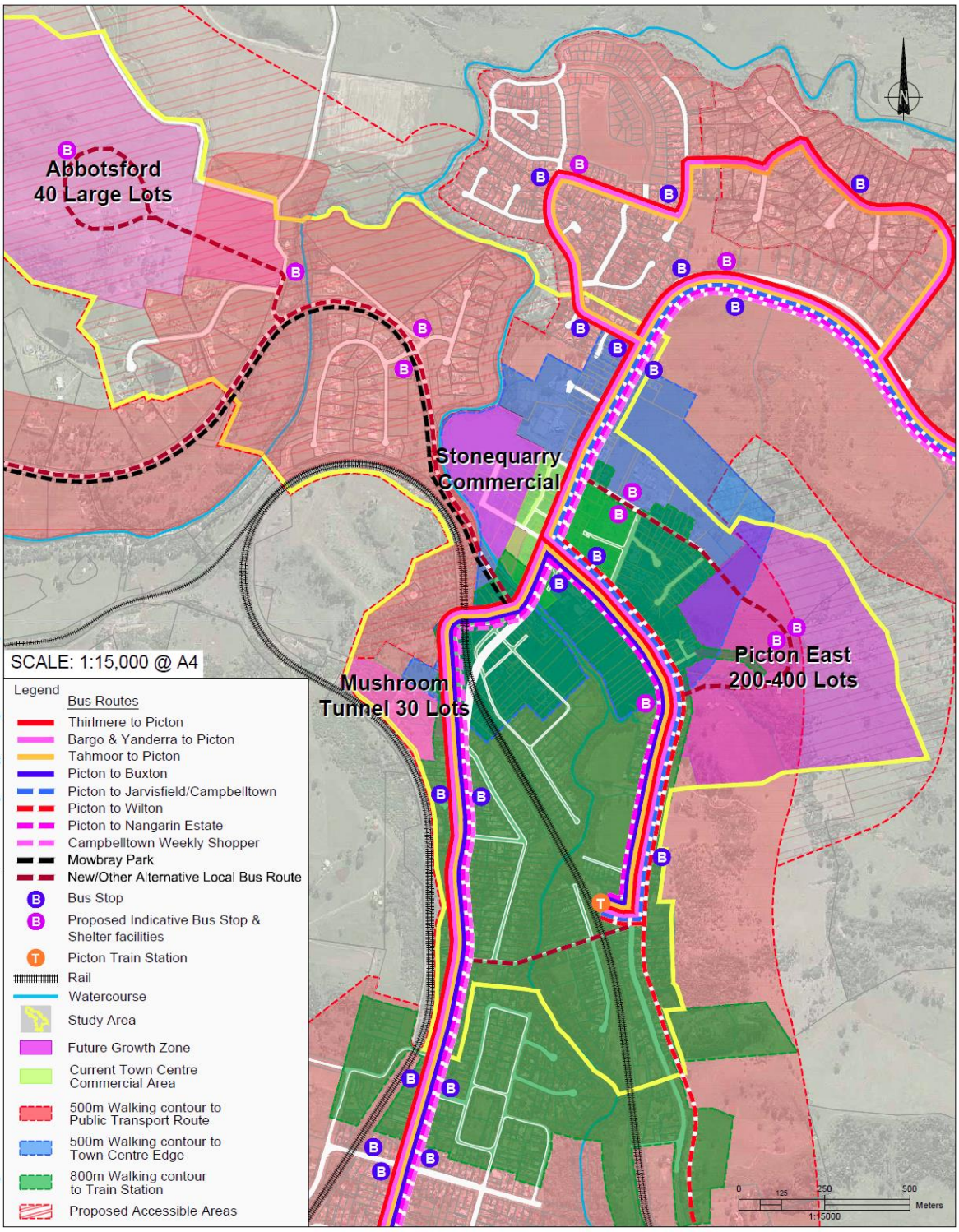


Figure 37: Public Transport Structure Plan to 2026

9.3.2 Public Transport Strategies

Key Strategies to deliver the Public Transport Structure Plan are described in the following Table:

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
PTS1	PTS	Bus stop, shelter and seating	To establish an integrated, connected, accessible public transport network	P1, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period
PTS2	PTS	New or varied bus route networks	To establish an integrated, connected, accessible public transport network	P1, P3	RMS/WCC	N/A	N/A	0	Coordinated with development timing
PTS3	PTS	Monitor and implement increased bus frequency on strategic routes to lead and encourage growth demand	To establish an integrated, connected, accessible public transport network	P1, P3	WCC/Developer	N/A	N/A	0	Incrementally provided over the period
PTS4	PTS	Bus access to the western side of the Train Station and bus turning area on Campbell Street	To establish an integrated, connected, accessible public transport network	P1, P3	WCC/Developer	N/A	N/A	4	

Table 32: Pedestrian Strategies

9.4 Parking

The overall position for parking supply is one of an ample resource servicing current demands. Localised high demand areas have been identified in the survey. These are typically high turn-over, short duration stay areas that come with consolidated peak demand periods.

Potentially resulting from the adequacy of supply, some areas showed evidence of significant duration overstay parking. This does not present as a current adverse effect on demands. It has the potential to develop as an issue in time as growth demands increase and a more broad-based demand for parking emerges within the commercial centre area.

Maintaining an efficient balance between future demand and supply will be a key issue for future development in the commercial centre. With development, an increased demand for long stay parking is to be expected. The larger Town Centre employers currently generate the highest concentrations of long stay parking demand resulting in some of these localised parking areas exhibiting high occupancy rates.

While parking supply is highly convenient at present, and space for at grade parking is readily available, a high degree of amenity is afforded in the parking system. There is an expectation that gradually, with emerging development demand and the increasing value of centrally located land in the Town Centre, some parking will necessarily relocate to peripheral areas. While this has the potential to be perceived as an inconvenience to some users, it is evident that long term, parking will continue to be well provided for in terms of location, convenience and amenity.

Opportunity exists to develop parking supply to add value to the commercial centre. The introduction of dedicated parking, potentially within existing established facilities, for tourist based recreational vehicles presents as an opportunity. Further developing the current Town Centre parking signage to create a well delineated parking circuit that manages traffic circulation and movement will assist in minimising recirculation congestion and associated disruption.

Currently high demand areas are in need of targeted design solutions. These will need to address directional circulation and movement, convenience through appropriate design standard adoption, the safe provision for and separation of pedestrian and cycle movements. These may include time managed drop-off and pick-up areas and the optimisation of parking supply through design of both on and off-street parking areas.

One-way circulation layouts should generally be avoided in the Picton Town Centre to avoid local concentrations of traffic movement at a few locations. Rather, the access and movement circulation should be developed to optimise two-way circulation and effective distribution of movements across the network. A parking system that remains connected off-street, as far as practical, will integrate well with the local transport network. Future potential parking network connections to adjacent parking facilities and to the street should be protected and assured.

Train Station parking demands appear to be at capacity for the most part of the day. Evidence of historical local street parking over-flow can be seen in signage that actively prevents all day parking on local streets. This would appear counter-productive. Over-

width streetscapes exist on Campbell Street to the west of the Train Station, with frontage to the Station lane and with a cross rail facility already in place. These could be relatively easily and effectively developed to support growing parking demands for the train service. Such development could also enhance the local streetscape, increase passive surveillance and add value to the local area, so long as adequate parking is retained for the use and convenience of the local residential properties.

Alternatively, a substantial investment would be required to make land available for Train Station parking. It is recommended that further parking supply and Train Station development options be investigated and advanced. These would benefit from including consideration of future road network connections to Webster Street and Prince Street directly. The current Menangle Street intersection is awkwardly located in relation to the more significant and long-term development of the Prince Street / Menangle Street intersection. At-grade parking is likely to continue to be a preferred solution here. The footprint of the current parking area does not efficiently lend itself to parking deck development. Additional and adjacent land may be required to facilitate this in time. Accordingly, advanced provision should be made to accommodate that future need.

Overall, monitoring and parking enforcement is not a current area of concern for the Town's parking supply. The need for future monitoring and enforcement could be minimised through the careful and considered planning and regular review of parking supply, distribution and especially in time limit control and its location. Time based management of parking is expected to change in geographic location over time as activities move within the commercial centre area, as new development establishes and as Shire-wide underlying growth emerges. The parking supply should be seen as a resource to be actively managed. Long stay parking demands may benefit from identification and protection of sites for this purpose now, although demand for its use is not expected to arise until post 2026.

Loading and servicing facilities, as observed, appear adequate to meet current demands. In the longer term the requirement for these facilities to be accommodated wholly on-site for larger developments will be necessary. The network of service lanes also establishes key local pedestrian and cycle connections within the Town Centre, it provides for some local through traffic movement and short stay drop-off/pick-up activity away from the main roan network. In respect of smaller footprint development and sites, these will rely predominantly on common facilities such as loading and service lane areas. These are variably evident at present, however long term the Town Centre will benefit from the protection of and requirement for publicly managed service lane and lay down areas. These will provide to accommodate service vehicle loading and manoeuvring off-street and preserve the road carriageway environment for movement based activities in the first instance.

9.4.1 Parking Structure Plan

The recommended Parking Structure Plan to 2026 is shown as follows:

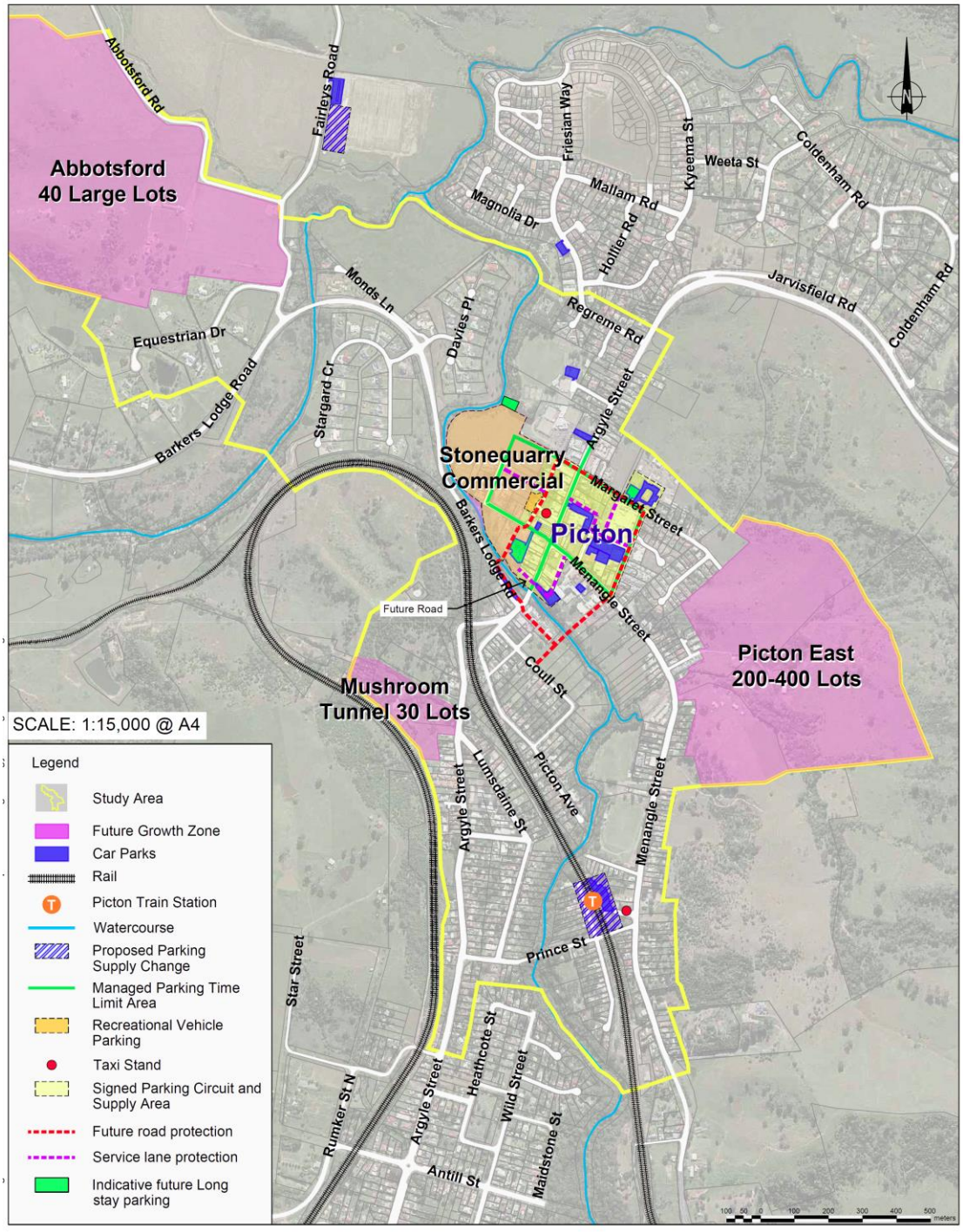


Figure 38: Parking Structure Plan to 2026

9.4.2 Parking Strategies

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
PAS1	PAS	Investigate demand and lobby for supply of additional parking around the Train Station	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P3, P4	WCC	N/A	N/A	7	
PAS2	PAS, PTS	Introduce a Taxi/Uber service to the Town and provide for a dedicated Taxi Stand area in the Town Centre and also at the Train Station	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC	N/A	N/A	2	
PAS3	PAS	Investigate, identify and provide for a centralised tourist recreational vehicle parking in the Town Centre area, preferably linked to the waste disposal facility	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC	N/A	N/A	2	
PAS4	PAS	Define the Town Centre commercial area, review the current signed network and establish a comprehensively signed parking circuit and system of guidance	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC/Developer	N/A	N/A	6	

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
PAS5	PAS	Actively monitor and manage the Town Centre's commercial and public parking time limits to optimise accessibility and convenience for higher turn-over demands and to direct and provide for long stay parking in areas less heavily demanded	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC	N/A	N/A	0	Incrementally provided over the period
PAS6	PAS	Within the Town Centre Traffic Management Area defined in TMS8, review the on and off-street parking layout and supply and redesign the parking provision to optimise parking supply and establish mode priority.	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC	TMS8	N/A	8	
PAS7	PAS	Investigate, identify and protect key land areas (indicatively shown on the Structure Plan) within and around the Town Centre Area for the future and efficient provision of long stay parking demands. Pre 2026 requires the identification/protection of land with future acquisition/construction costs assessed as post 2026 and not included in this Study	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC/Developer	N/A	N/A	3	

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
PAS8	PAS	Continue to ensure new development appropriately provides to meet the increased parking demands it generates	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC/Developer	N/A	N/A	4	
PAS9	PAS	Investigate, plan and protect loading and service lay-down areas and an integrated service lane network with the commercial Town Centre area. Pre 2026 requires the identification/protection of land with future acquisition/construction costs assessed as post 2026 and not included in this Study	To provide a parking supply and network that contributes positively to an efficient, accessible and prosperous Town Centre	P1, P3, P4	WCC/Developer	N/A	N/A	7	

Table 33: Parking Strategies

9.5 Traffic Management

The effective management of traffic demands on the transport network is a current and critical matter and one that, without intervention, will damage the viability of the Town Centre and adversely impact the economy of movement on the wider network.

The Picton transport network is constrained in terms of movement options by its current lack of connectedness, as well as limitations to heavy vehicle movement. This compounds demands in the Town Centre and especially at the Argyle Street / Menangle Street intersection. Large vehicle tracking is not adequately contained within the directional carriageway at this intersection. Overall movement demands conflict with the accessibility, convenience, amenity and safety in the Town Centre main street environment.

Network resilience is a critical issue for Picton. For significant periods of each year the Prince Street bridge is closed for maintenance. This generates further and compounded traffic effects in the Commercial Town Centre area. Temporary traffic diversion routes are established to manage these effects, although the overall outcome remains less than adequate. Further, were a significant incident or disruption occur to the sole remaining (Argyle Street) bridge crossing during this period all cross Creek transport movement would be prevented. The alternative routes for movement involve significant rerouting distances.

The Structure Plan develops a strategic transport network that enhances transport efficiency, connectedness and access. It removes unnecessary conflict between incompatible transport and land use activities. The network structure provides for the Town Centre to grow effectively and efficiently. It introduces local roading connections and Town Centre circulation to separates local movement activity from the strategic through function of the Arterial roads. Current and potential future congestion areas are addressed through an integrated approach that creates network capacity through effective redistribution thereby delaying as far as practicable capital investment and avoiding the potential for investment now that may become redundant in years to come due to other network connectedness improvements.

9.5.1 Traffic Management Structure Plans

The recommended Traffic Management Structure Plan to 2026 is shown as follows:

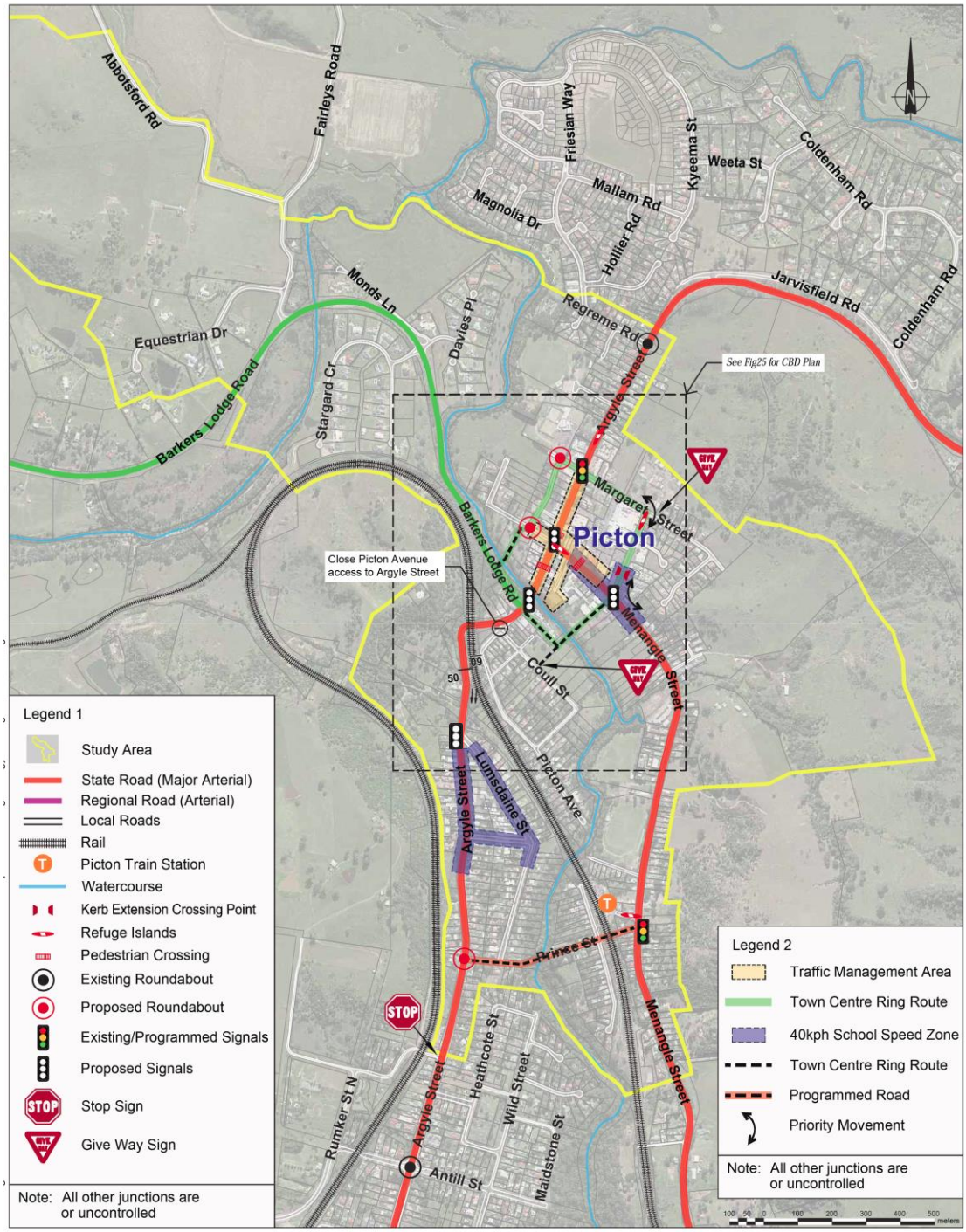


Figure 39: Traffic Management Structure Plan to 2026

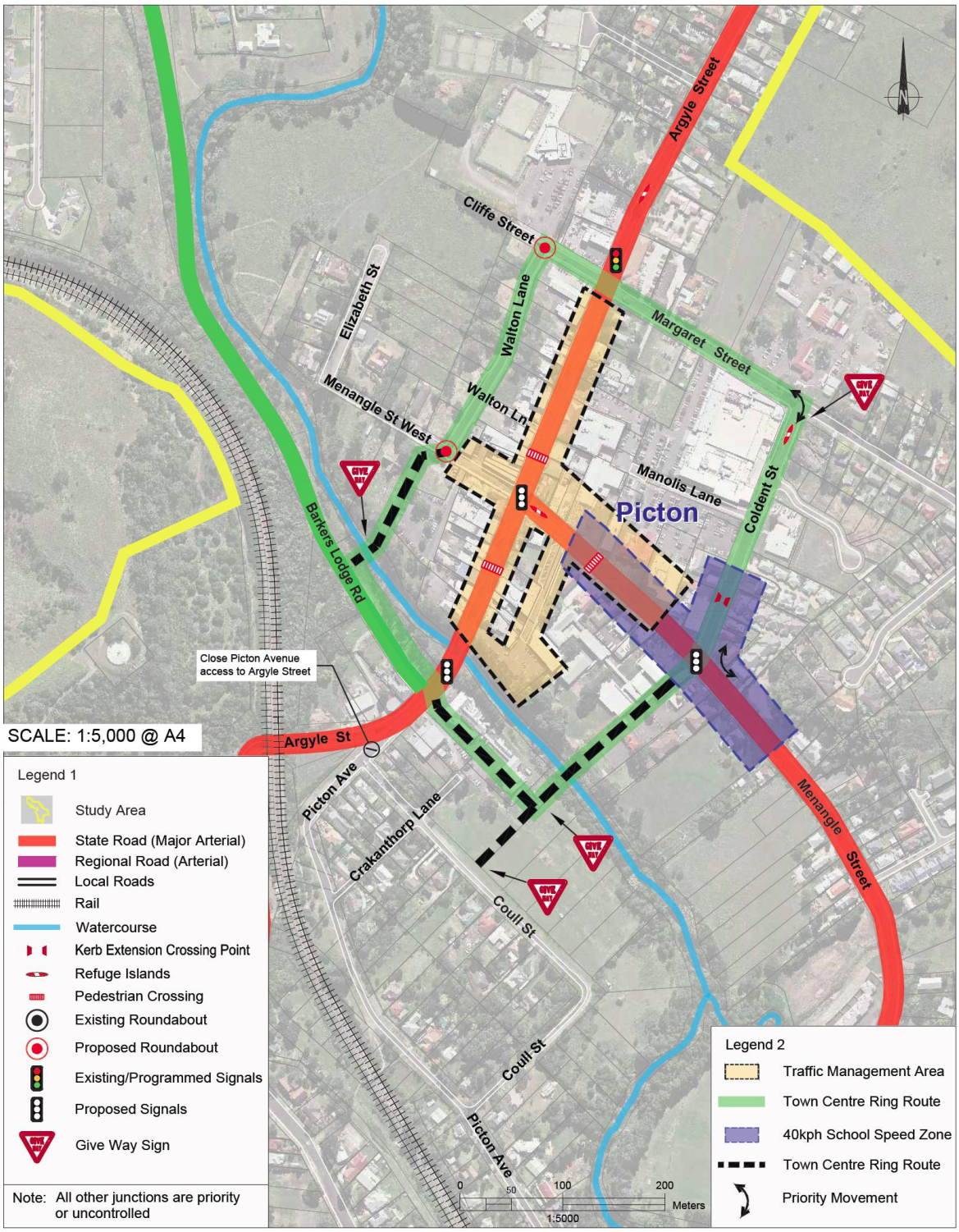


Figure 40: Traffic Management Structure Plan to 2026 - CBD

9.5.2 Traffic Management Strategies

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
TMS1	TMS	Investigate, identify and establish a core Town Centre Ring Route to efficiently and effectively distribute traffic movement to and from the Town Centre. **Stage 1:** Plan, design and establish the preferred Town Centre Bypass Route along Colden Street and Margaret Street	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P3	WCC/Developer	N/A	TMS2, 3, 7, 8	2	
TMS2	TMS	Intersection upgrade (signals) to Menangle Street / Colden Street	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	TMS1	TMS7, 8	1	
TMS3	TMS	Intersection phasing and capacity upgrade to Argyle Street / Margaret Street signals	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P3	WCC/Developer	TMS1	TMS7, 8	2	
TMS4	TMS	Investigate, identify and establish a core Town Centre Ring Route to efficiently and effectively distribute traffic movement to and from the Town Centre. **Stage 2:** Plan, design and establish the link from Walton Lane through to Barkers Lodge	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P3	WCC/Developer	N/A	N/A	2	Timing to coincide with shopping centre development

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
		Road, including a new bridge connection							
TMS5	TMS	Intersection upgrade (initially priority upgrade then signals) to Argyle Street / Barkers Lodge Road. Signals already in the Draft Development Contributions Plan 2017.	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	N/A	N/A	3	Timing to coincide with shopping centre development
TMS6	TMS	Investigate, identify and establish a core Town Centre Ring Route to efficiently and effectively distribute traffic movement to and from the Town Centre. **Stage 3:** Prince Street bridge, alignment and intersection upgrades as already provided for within the Draft Development Contributions Plan 2017	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	N/A	TMS7, 8	3, 7, 10	Incrementally provided over the period. Intersection upgrades initially, Menangle / Prince signals in Yr 3, Argyle / Prince

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
									roundabout Yr 7, bridge to follow
TMS7	TMS	Intersection upgrade (signals) to Argyle Street / Menangle Street (Already provided for in the Draft Development Contributions Plan 2017	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	TMS1, 2, 3	TMS8	10	Following Prince Street bridge improvements
TMS8	TMS	Identify and establish a core Town Centre Traffic Management and Pedestrian Frontage area, strengthening pedestrian accessibility, connections, traffic circulation and parking management outcomes on Argyle Street, Menangle Street, Mary McKillop Lane and Menangle Street North (as shown on the Structure Plan)	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	TMS1, 2, 3, 7	N/A	5	

Strategy Reference	Transport Mode / Use	Strategy (Work) Description	Outcomes and Notes	Principle(s) Delivered	Stakeholder / Accountability	Strategy Dependency		Staged Timing / Priority (by Year)	Note to Staging Priority
						Precedent Strategy	Subsequent Strategy		
TMS9	TMS	Investigate, identify and establish a core Town Centre Ring Route to efficiently and effectively distribute traffic movement to and from the Town Centre. **Stage 4:** Investigate, plan, and protect the southern Ring Route section of roading, including provision for a new bridge, between Colden Street, Barkers Lodge Road and Coull Street, and signals at Colden Street and Barkers Lodge Road (Barkers Lodge is in the current Draft Development Contributions Plan 2017). Capital costs post 2026 are not included in this Study	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	TMS1, 2, 3	TMS10	10	This can be staged to achieve closure of Picton Avenue and connection with Barkers Lodge in the first instance (Yr 5), followed by the link extending through to Menangle Street / Colden Street intersection post the 10 year horizon
TMS10	TMS	Close access from Picton Ave directly onto Argyle Street and connect Crankthorpe Lane to signalised Barkers Lodge Road / Argyle Street intersection	To enable the Town Centre and Main Street environment to be developed in a safe, efficient, integrated, and sustainable way	P1, P2, P3	WCC/Developer	TMS9	N/A	4	To coincide with shopping centre development
TMS11	TMS	Construct either a pedestrian signalised crossing of Argyle Street or a full signalisation of Lumisdaine Street intersection	To support safe crossing for pedestrians and safely support access/egress for the subdivision	P1, P2, P3	WCC/Developer	N/A	N/A	2	To coincide with the Mushroom Tunnel subdivision

Table 34: Traffic Management Strategies

10. Picton Town Centre Transport Master Plan

A recommended Picton Town Centre Transport Master Plan has been developed, drawing from the various mode based and elemental Structure Plans and Strategies. A balanced and considerate approach has been taken to the cost planning for investment. The approach seeks to make effective use of existing transport network capacity through redistribution and connectedness. This enables the establishment of an enduring, resilient network structure that will support and encourage Town Centre growth.

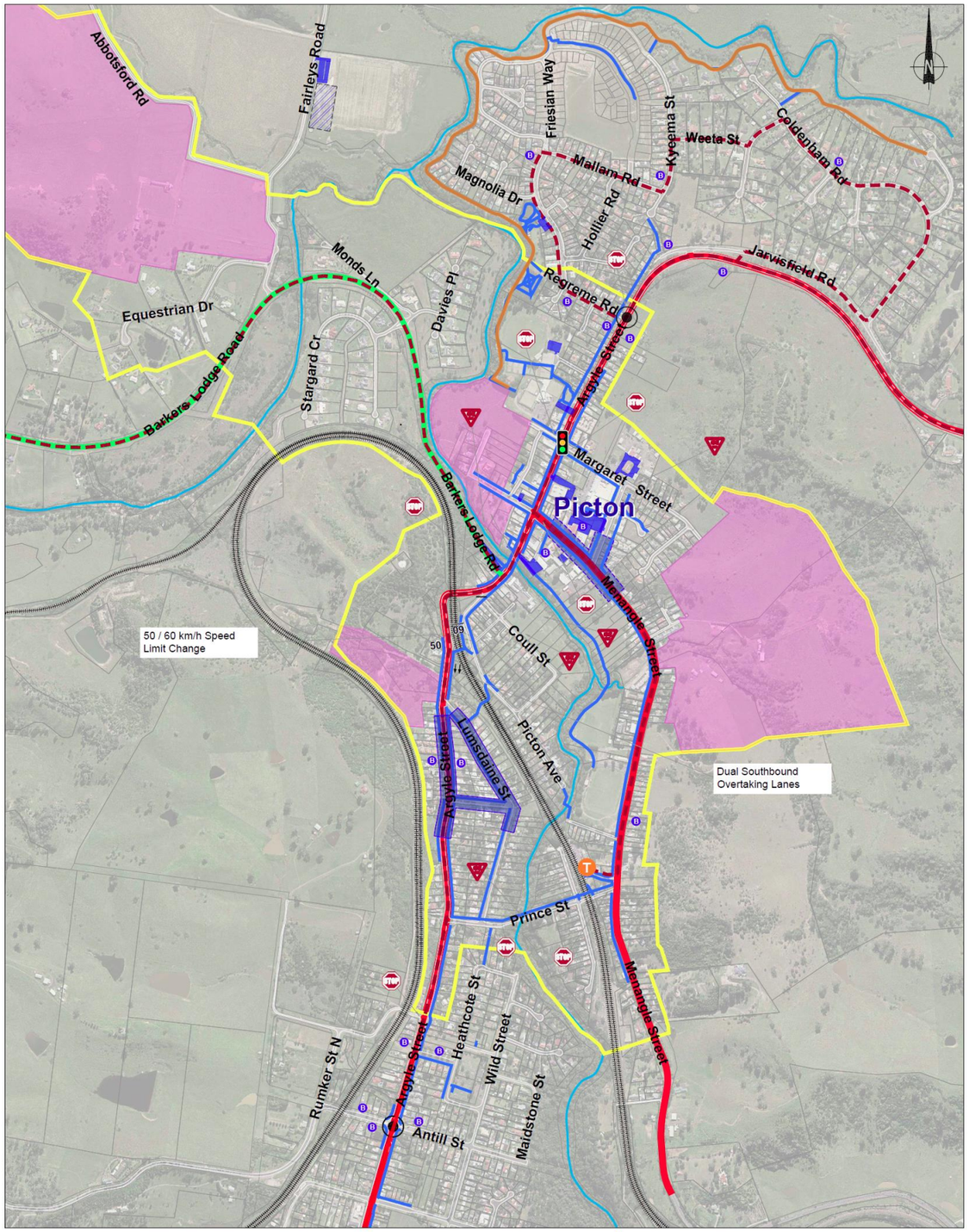
Capital works are able to be effectively staged to spread investment demand. Direct capital intervention is minimised through the creation of networks, avoiding potentially unnecessary site based future investment and re-investment.

The overall outcome will be a multi-modal integrated network that delivers enhanced accessibility and safety for local movements. Critical conflicts are permanently removed and the Town Centre is able to be returned to the community for its intended servicing purpose.

The Transport Master Plan is intended to communicate the overall intent and direction for Access and Movement planning in Picton. It should be read in conjunction with the more particular and specific Structure Plans and Strategies.

The overall Transport Master Plan is shown on the following Figures. The Figures show the following:

- Exiting Traffic Management Measures;
- Year “0”: This image shows the existing base network with the range of measures described in the Strategies, as those works that are to be incrementally developed over the 10 years horizon period;
- Year 2: This is the Year “0” network with the works described as occurring within the first 2 years of the Plan;
- Year 5: The Year 2 network with additional works through to Year 5 of the Plan; and
- Year 10: The full Structure Plan as described, to 2026.



SCALE: 1:15,000 @ A3

Legend

- Study Area
- Future Growth Zone
- Rail
- Watercourse
- Picton Train Station
- State Roads
- Regional Roads
- Town Centre Ring Route
- Service Lane Network
- Prince Street Upgrade
- Existing Roundabout
- Roundabout Upgrade
- 40km/h School Zone
- Existing Signalised Intersection
- Intersection Upgrades
- Stop Sign
- Give Way Sign

Parking

- Car Parks
- Long Stay Parking
- Taxi / Uber Stand
- Recreational Parking
- Commercial Parking Circuit
- Train Station Parking
- Parking Optimisation
- Proposed Parking Supply Change

Cycling

- Existing On-Road Cycleways
- Existing Shared Paths
- State Road Shared Path
- Local Road Shared Path
- On Road Cycle Network
- Short Stay Cycle Stands
- Medium Stay Cycle Stands
- Long Stay Cycle Stands

Pedestrian

- Existing Footpath
- State Footpaths
- Local Footpaths
- Refuge Islands
- Kerb Extension Crossing Point
- Pedestrian Crossing
- Pedestrian Frontage Area

Bus Facilities

- Existing Bus Stops
- Alternative Bus Route
- Proposed Bus Stops
- New / Varied Bus Routes
- Train Station Bus Facilities

SCALE: 1:7,500 @ A3

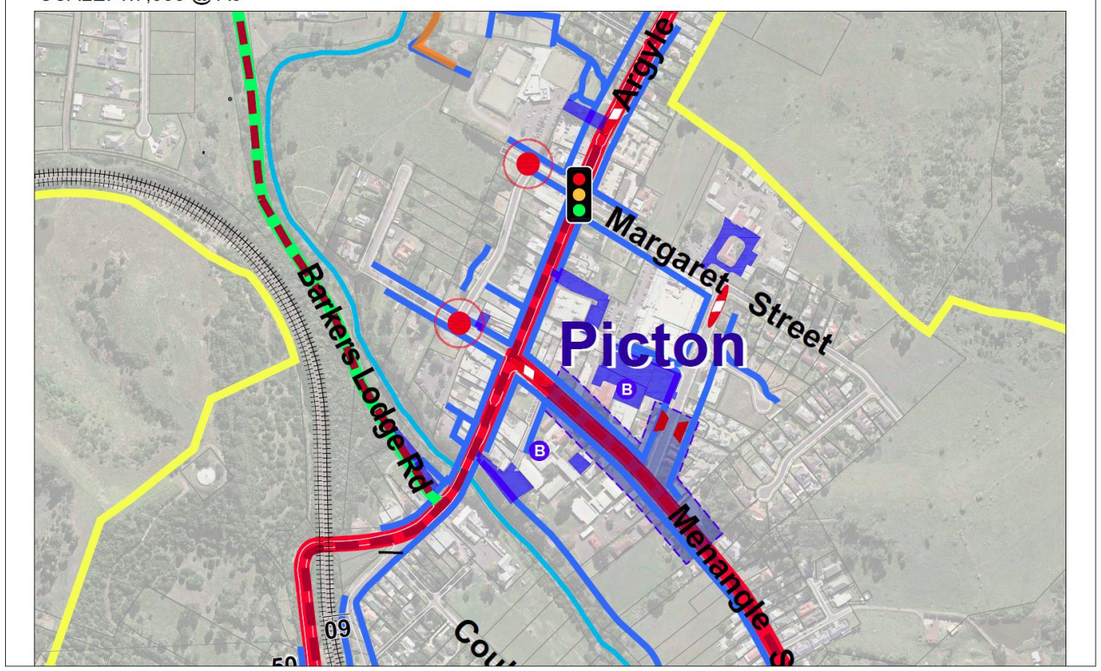


Figure 41: Picton Town Centre Transport Master Plan: Existing

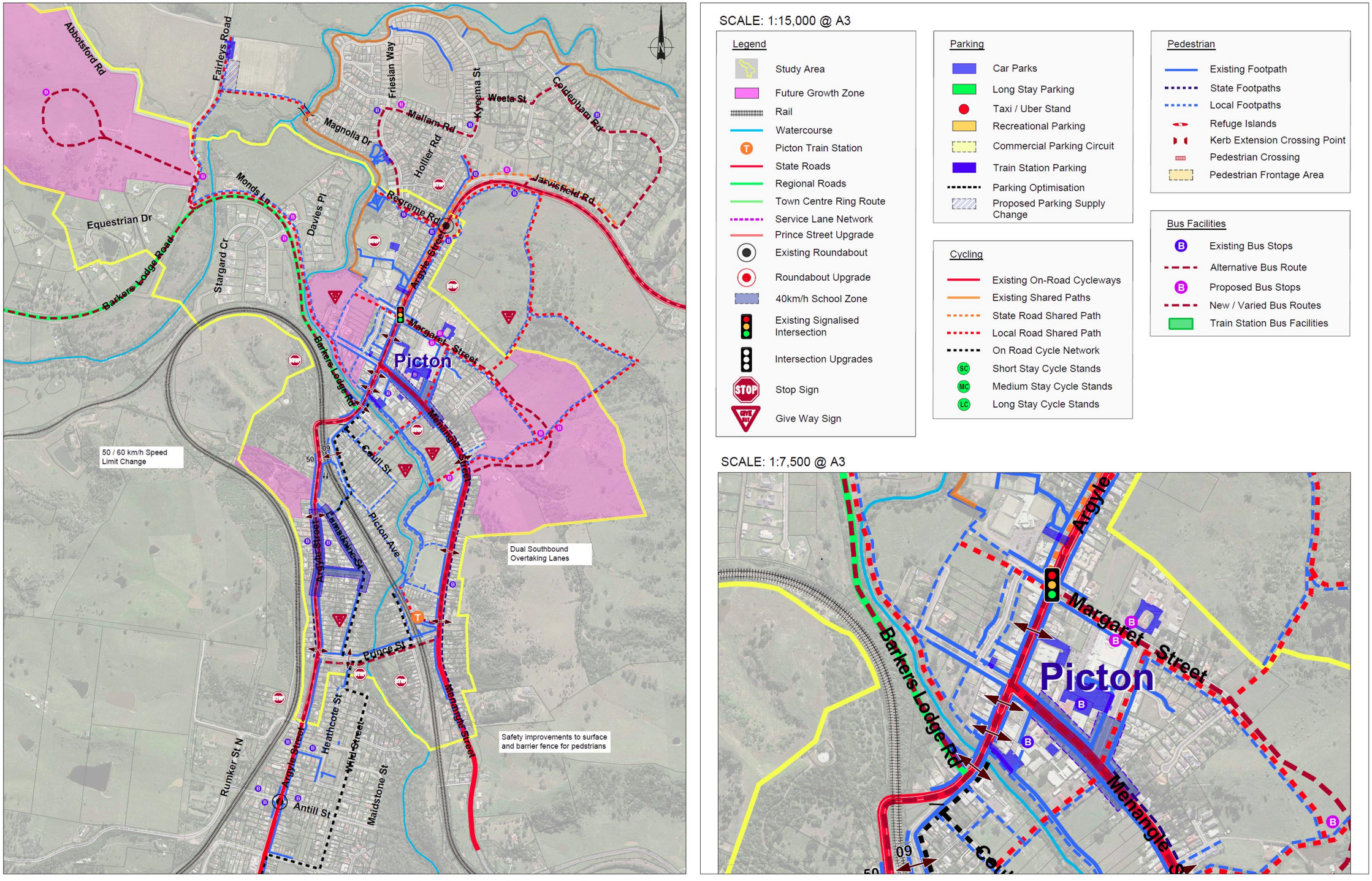


Figure 42: Picton Town Centre Transport Master Plan: Year "0" (Existing plus annual incremental measures)

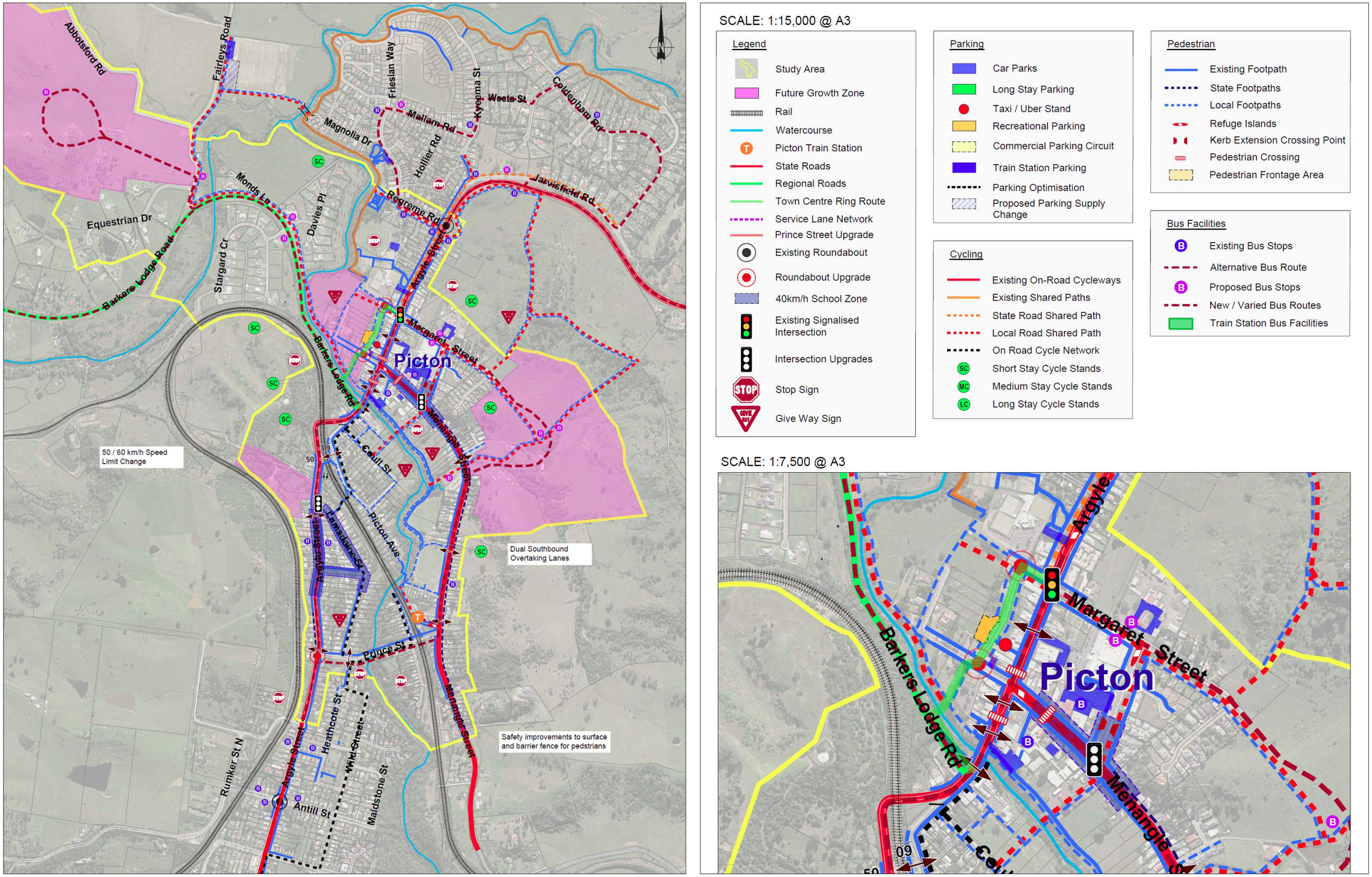


Figure 43: Picton Town Centre Transport Master Plan: Year 2

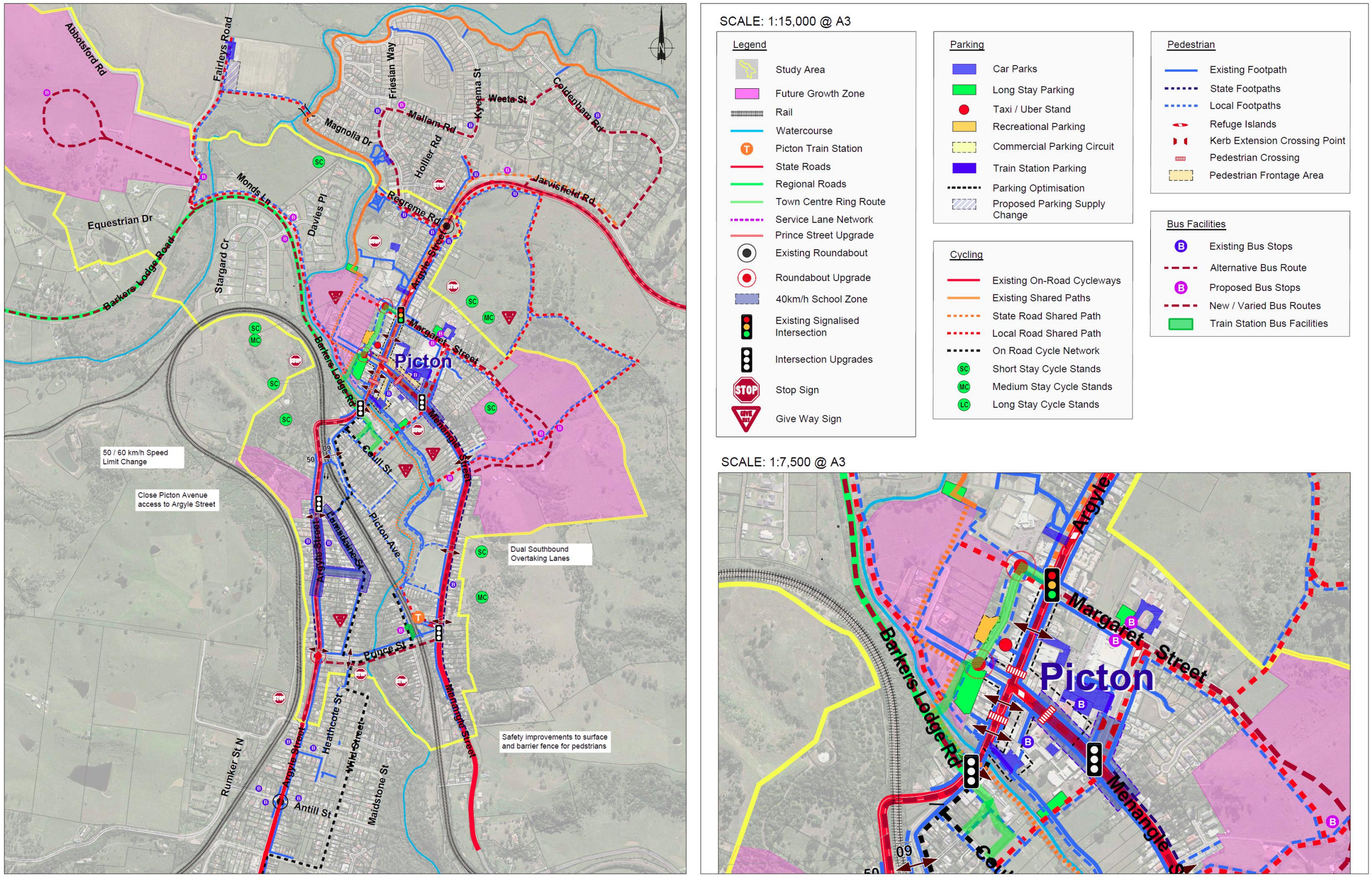


Figure 44: Picton Town Centre Transport Master Plan: Year 5

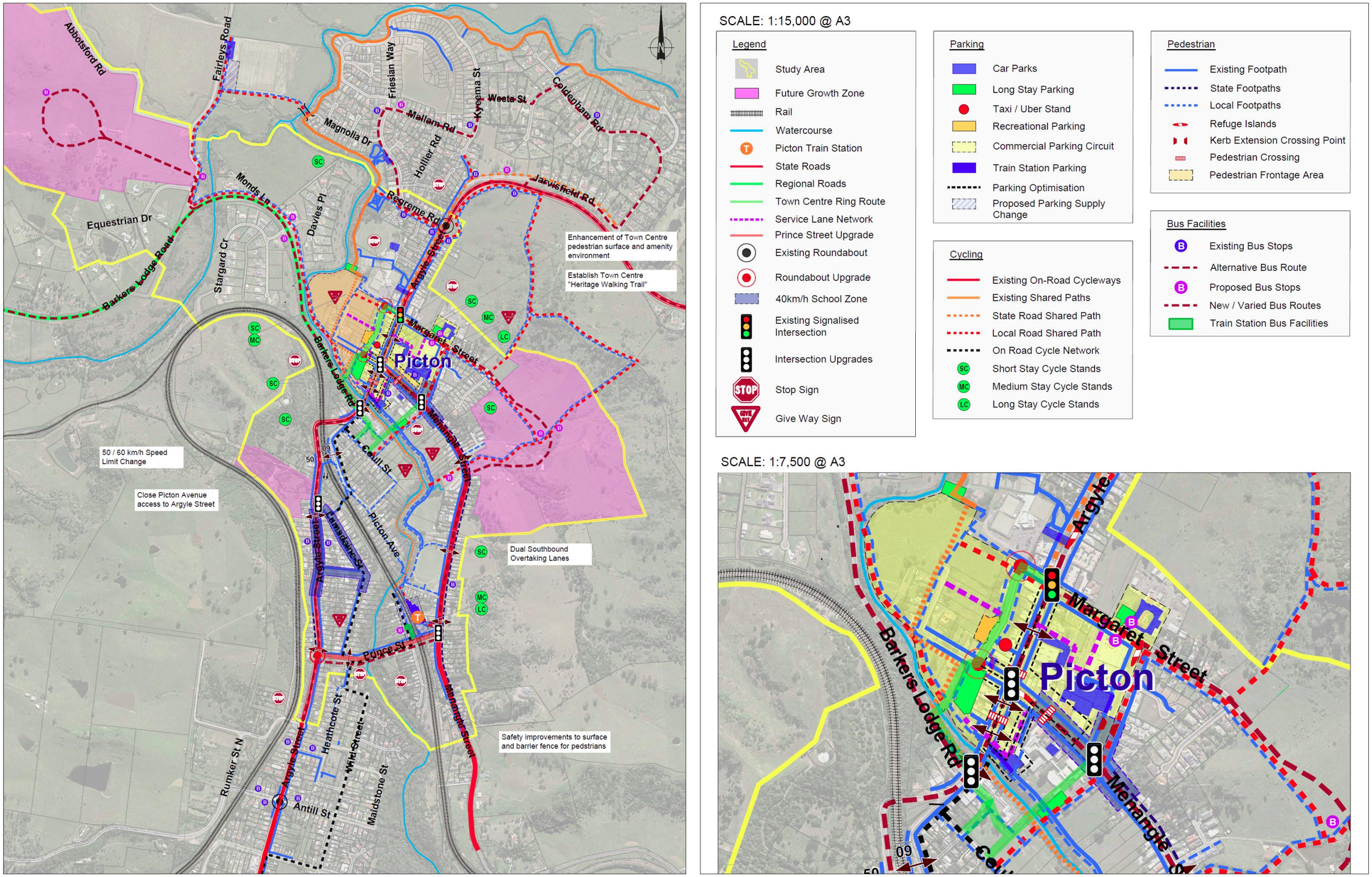


Figure 45: Picton Town Centre Transport Master Plan: Year 10 (2026)

11. Conclusions

The key conclusions from the Study are that:

- The transport network is at significant risk and lacks resilience for strategic, commercial through movements as well as local access;
- Accessibility and amenity in the Town Centre is eroded by the forced flow of heavy commercial vehicle movements through the main street environment;
- There is an overall poor connectedness to the network, in part due to geographic constraints, but also due to constraints to vehicle movement on some links, such as the Prince Street bridge but also arising from turning movement restrictions and the current hierarchical network approach;
- The future traffic demands on the Picton network, that arise from both local and region-wide growth forecasts are expected to have a significant impact on the local transport network.

The Study has developed the following:

- An overall Transport Master Plan that will deliver resilience; protect efficiency; and realise amenity, accessibility and a sound community outcome for Picton Town Centre;
- The Master Plan aggregates a range of interventions that have been determined for and which are set out as Structure Plans for each of the following transport modes:
  - Parking;
  - Walking;
  - Cycling;
  - Public Transport; and
  - Traffic movement.

For each Structure Plan and for the Transport Master Plan, key strategies have been detailed to describe how the Master Plan can be delivered.

The overall Master Plan initiatives have been costed and the proportional contributions due to the varying traffic demands and future land use activities have been evaluated. Care has been taken to optimise shared facility use to minimise the potential capital investment requirement. Similarly, incremental and a staged approach to implementation, based on actual demand will deliver the optimal investment outcome for Picton.

Appendix A

Summary Crash Report

Summary Crash Report

Transport for NSW
Centre for Road Safety

# Crash Type		
Car Crash	66	88.0%
Light Truck Crash	18	24.0%
Rigid Truck Crash	1	1.3%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	*(1)*	*(1.3%)*
Bus Crash	1	1.3%
"Heavy Vehicle Crash	*(2)*	*(2.7%)*
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	9	12.0%
Pedal Cycle Crash	1	1.3%
Pedestrian Crash	3	4.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	29	38.7%
Non intersection	46	61.3%

* Up to 10 metres from an intersection

Collision Type		
Single Vehicle	25	33.3%
Multi Vehicle	50	66.7%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	66	88.0%
Unclassified Road	9	12.0%

Contributing Factors		
Speeding	15	20.0%
Fatigue	8	10.7%
Alcohol	3	4.0%

Weather		
Fine	55	73.3%
Rain	13	17.3%
Overcast	4	5.3%
Fog or mist	3	4.0%
Other	0	0.0%

Road Surface Condition		
Wet	18	24.0%
Dry	57	76.0%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	3	4.0%
Daylight	47	62.7%
Dusk	6	8.0%
Darkness	19	25.3%

Crash Movement		
Intersection, adjacent approaches	9	12.0%
Head-on (not overtaking)	2	2.7%
Opposing vehicles; turning	4	5.3%
U-turn	1	1.3%
Rear-end	20	26.7%
Lane change	1	1.3%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	4	5.3%
Overtaking; same direction	1	1.3%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	3	4.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	8	10.7%
Out of control on straight	2	2.7%
Off road, on curve	2	2.7%
Off road on curve, hit object	13	17.3%
Out of control on curve	2	2.7%
Other crash type	3	4.0%

Speed Limit				
40 km/h or less	1	1.3%	80 km/h zone	6	8.0%
50 km/h zone	29	38.7%	90 km/h zone	0	0.0%
60 km/h zone	38	50.7%	100 km/h zone	1	1.3%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 07:30-09:30 or 14:30-17:00 on school days	~ 40km/h or less	0	0.0%	~ School Travel Time Involvement	19	25.3%

Day of the Week												
Monday	9	12.0%	Wednesday	11	14.7%	Friday	12	16.0%	Sunday	7	9.3%	WEEKEND	22	29.3%
Tuesday	9	12.0%	Thursday	12	16.0%	Saturday	15	20.0%	WEEKDAY	53	70.7%			

CRASHES	75	
Fatal	1	1.3%
Serious inj.	5	6.7%
Moderate inj.	12	16.0%
Minor/Other inj.	5	6.7%
Uncategorised inj.	10	13.3%
Non-casualty	42	56.0%

Self Reported Crash	4	5.33%

Time Group		% of Day	
00:01 - 02:59	3	4.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	3	4.0%	4.2%
06:00 - 06:59	2	2.7%	4.2%
07:00 - 07:59	3	4.0%	4.2%
08:00 - 08:59	3	4.0%	4.2%
09:00 - 09:59	4	5.3%	4.2%
10:00 - 10:59	5	6.7%	4.2%
11:00 - 11:59	4	5.3%	4.2%
12:00 - 12:59	1	1.3%	4.2%
13:00 - 13:59	2	2.7%	4.2%
14:00 - 14:59	6	8.0%	4.2%
15:00 - 15:59	7	9.3%	4.2%
16:00 - 16:59	3	4.0%	4.2%
17:00 - 17:59	9	12.0%	4.2%
18:00 - 18:59	10	13.3%	4.2%
19:00 - 19:59	1	1.3%	4.2%
20:00 - 21:59	6	8.0%	8.3%
22:00 - 24:00	3	4.0%	8.3%

Street Lighting Off/Nil		% of Dark
5 of	19	in Dark 26.3%

CASUALTIES	39	
Killed	1	2.6%
Seriously inj.	5	12.8%
Moderately inj.	17	43.6%
Minor/Other inj.	6	15.4%
Uncategorised inj.	10	25.6%
^ Unrestrained	1	2.6%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Crashes		Casualties
9	2015	5
12	2014	5
17	2013	10
21	2012	11
16	2011	8

McLean Periods		% Week	
A	9	12.0%	17.9%
B	2	2.7%	7.1%
C	13	17.3%	17.9%
D	5	6.7%	3.5%
E	4	5.3%	3.6%
F	16	21.3%	10.7%
G	11	14.7%	7.1%
H	7	9.3%	7.1%
I	0	0.0%	12.5%
J	8	10.7%	10.7%

#Holiday Periods																			
New Year	0	0.0%	Easter	2	2.7%	Queen's BD	0	0.0%	Christmas	1	1.3%	Easter SH	6	8.0%	Sept./Oct. SH	1	1.3%		
Aust. Day	0	0.0%	Anzac Day	0	0.0%	Labour Day	0	0.0%	January SH	6	8.0%	June/July SH	4	5.3%	December SH	1	1.3%		

Crashid dataset Picton Crashes

Note: Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data. Reporting yrs 1996-2004 and 2014 onwards contain uncategorised inj crashes.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Rep ID: REG01 **Office:** Southern **User ID:** marshja

Page 1 of 1

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Appendix B

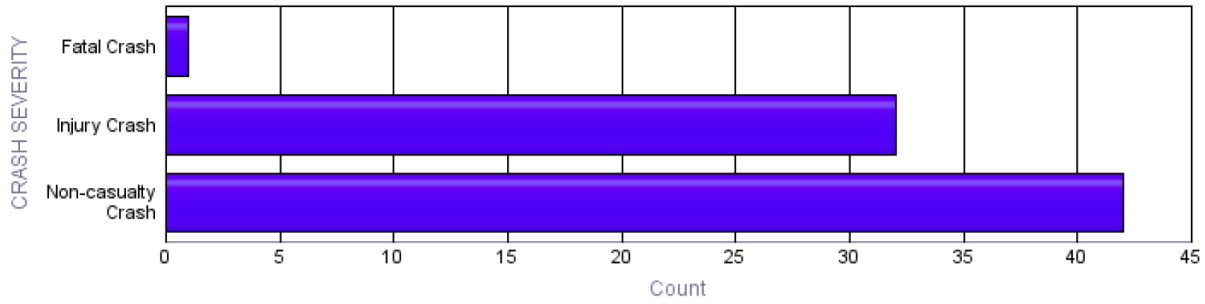
Crash Comparison Graphs

Crash Comparison Graph

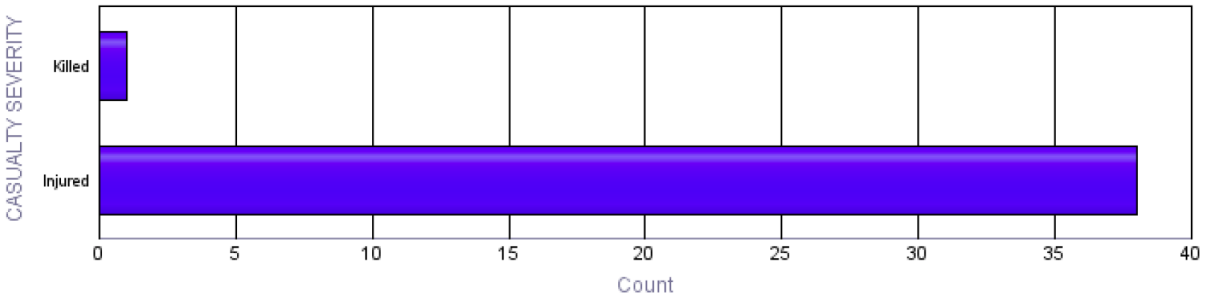
Subject: Crashid dataset Picton Crashes

Control:

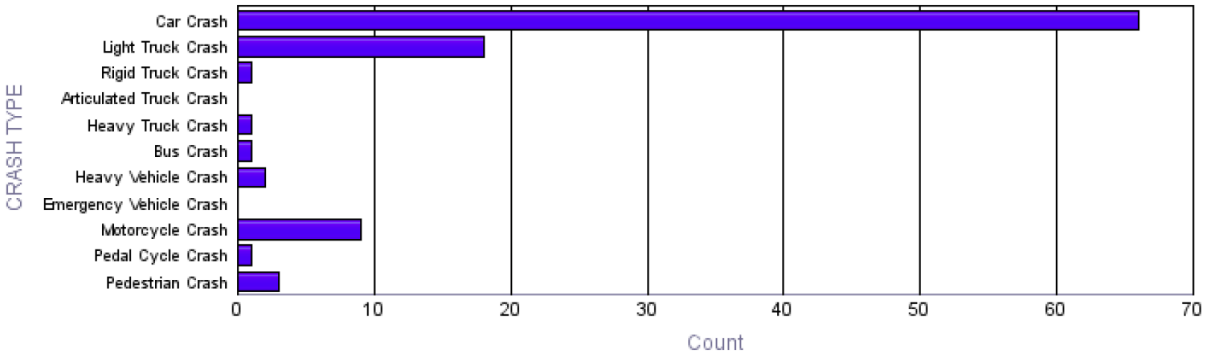
Graph 1: Crash Severity



Graph 2: Casualty Severity



Graph 3: Crash Type



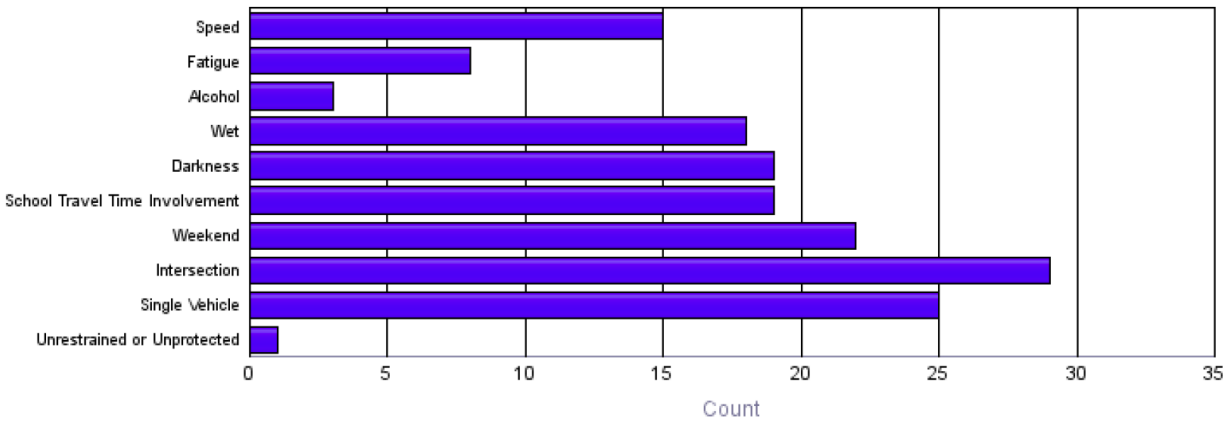
Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Crash Comparison Graph

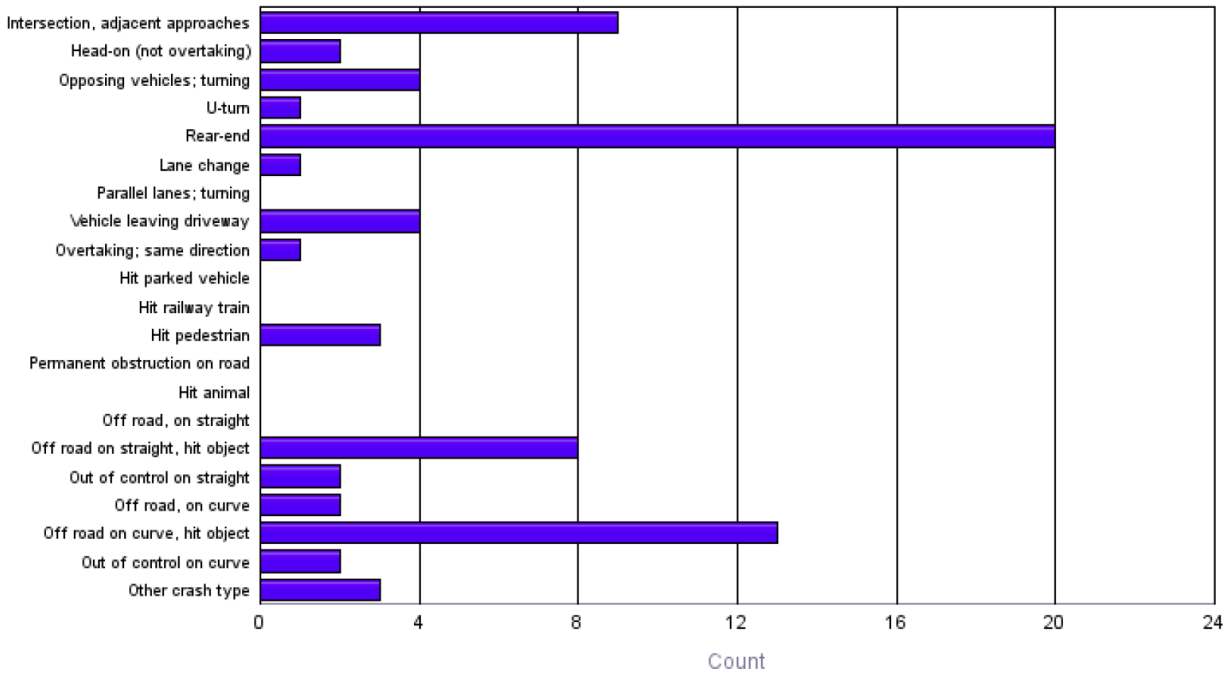
Subject: Crashid dataset Picton Crashes

Control:

Graph 4: Risk Factors



Graph 5: Crash Movement



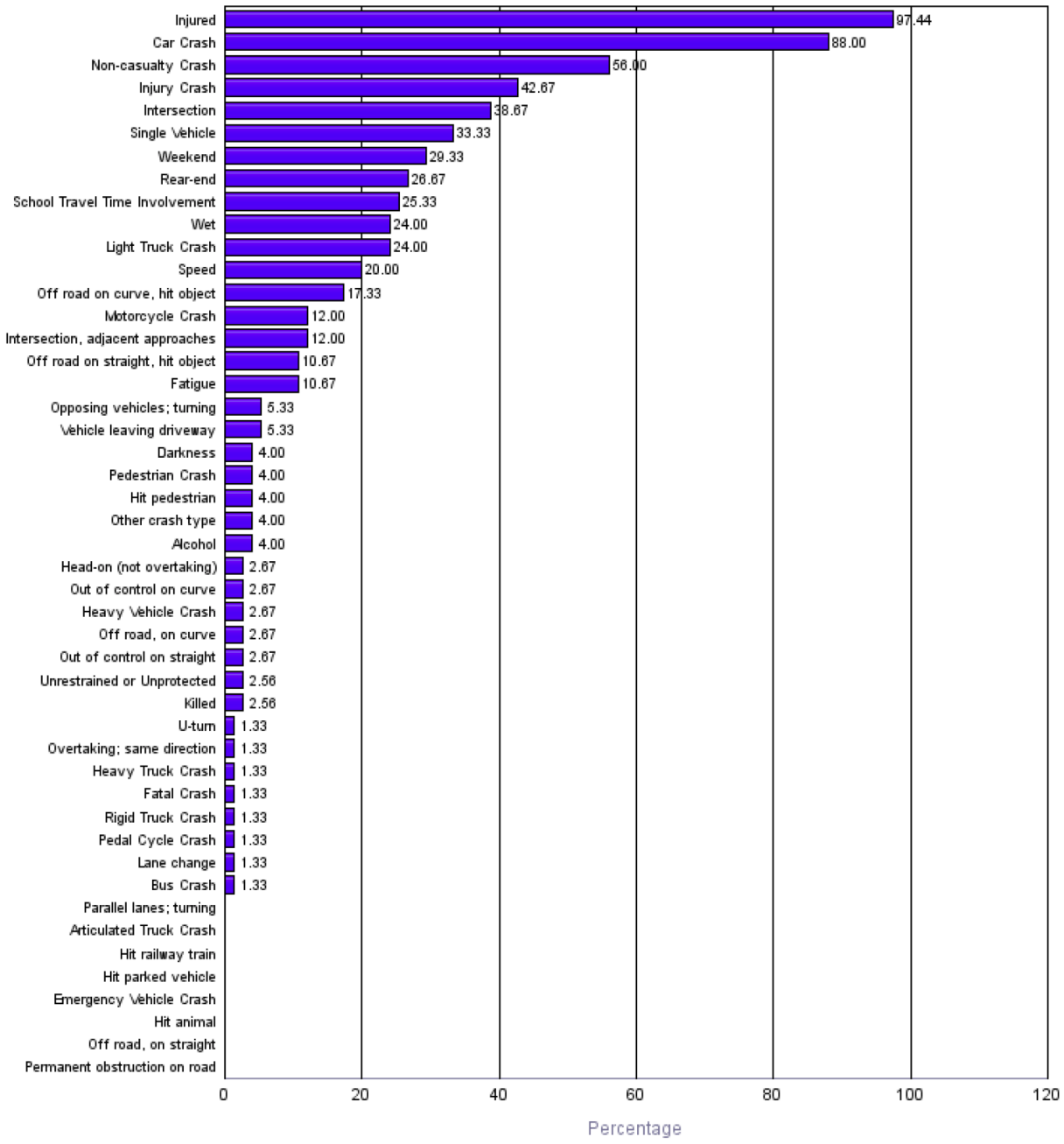
Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Crash Comparison Graph

Subject: Crashid dataset Picton Crashes

Control:

Graph 6: All Group Crash Characteristic graph



Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Appendix C

Sample Business Survey Questionnaire

PICTON TOWN CENTRE 2016 BUSINESS SURVEY

Wollondilly Council has commissioned a Town Centre Transport Master Plan for the Picton Town Centre. The aim of the study i identify existing traffic and parking deficiencies and formulate appropriate solutions.

Name of Establishment: _____

Address of Establishment: (If not visible, please ask) _____ ☐

A LAND USE TYPE

1	Retail Grocery/food	5	Hairdresser/Barber	☐
2	Retail Other	6	Milk Bar / Coffee Lounge/Restaurant	
3	Office	7	Medical Services	
4	Bank / Post Office	8	Other (specify) : _____	

B Number of Staff on Day of Survey ☐

C Please advise suburb or Towns where staff reside (insert number of staff by suburb in appropriate box)

1	Picton Township	☐	6	Pheasant Nest	☐
2	Cooridja	☐	7	Razorback	☐
3	Douglass Park	☐	8	Tahmoor	☐
4	Maldon	☐	9	Thirlmere	☐
5	Mowbray Park	☐	10	Other (Specify)	☐

D No of Parking Spaces On-site ☐

E Mode of Travel of Staff (please place appropriate number in each corresponding box)

1.	Car as Driver	☐	6	Bus	☐
2.	Car as Passenger	☐	7	Taxi	☐
3.	Motorcycle	☐	8	Bicycle	☐
4	Passenger (dropped off)	☐	9	Walk	☐
5	Train ☐		10	Other specify _____	

F Where did the staff who travelled by car (1 & 2 above) or motorcycle (3) park?
(please place appropriate number in each corresponding box)

		N°			
1	On-site	☐	4	ON-STREET - Time Restrictions	☐
2	Council car park	☐	5	ON-STREET - No restrictions	☐
3.	Other private Car park	☐	6	Other Specify _____	☐

G Where do you Receive Merchandise and Other Deliveries?

1.	On-site	3	ON-STREET - Time Restriction		☐
2	ON-Street Loading Zone	4	ON-STREET - No restriction	5 Other Specify _____	

H Hours of Operation

FROM (24 hour) ☐☐☐☐ TO (24 hour) ☐☐☐☐

THANK YOU FOR YOUR CO-OPERATION

Appendix D

Sample Visitors Questionnaire Survey

PICTON TOWN CENTRE 2016 SHOPPERS SURVEY

Wollondilly Council has commissioned a Town Centre Transport Master Plan for the Picton Town Centre. The aim of the study is to identify existing traffic and parking deficiencies and formulate appropriate solutions.

INTERVIEW NO. : ☐☐☐☐

A Please advise where did you start this trip.

1	Picton Township	6	Pheasant Nest	☐
2	Cooridja	7	Razorback	
3	Douglass Park	8	Tahmoor	
4	Maldon	9	Thirlmere	
5	Mowbray Park	10	Other (Specify) _____	

B How did you travel to Picton today ? ☐

1.	Car (Driver or passenger)	4	Bus	7	Bicycle
2.	Passenger (dropped off /picked up)	5	Train	8	Walk
3.	Motorcycle	6	Taxi	9	Other (specify) _____

C How many people, INCLUDING YOURSELF, travelled with you today ? ☐

If not travelling by car or motorcycle then go to "G" below

D Which approach road did you take to access the Town Centre?

1	Menangle St, south of Colden St	3	Barkers Lodge Rd, north of Argyle St	☐
2	Argyle St, west of Barkers Lodge Rd	4	Argyle St, north of Downing St	

E Where did you park ? (Refer to Town Centre map)

1	Council car park (I)	7	ON-STREET - 15 mns	CODE
2	Picton Mall (Y)	8	ON-STREET - 30 mns	
3	Khan's Super IGA (V)	9	ON-STREET - 1 hr spaces	☐
4	Picton Bowling Club (A)	10	ON-STREET - 2 hr spaces	
5	Private Off Street car park (Note Zone from attached map) _____	11	ON-STREET - 3 hr spaces	
		12	ON-STREET - No restriction	
6	ON-STREET - 5 mins	13	OTHER (specify where) _____	

F How did you find parking in Picton ? CODE ☐

1	Very easy	3	Somewhat difficult
2	Easy	4	Very difficult

G What was the main purpose of your trip to the centre today ? ☐

1	Work (retail/shops)	6	Personal Services (eg Hairdressing,)
2	Work (Office)	7	Bank / Post Office /
3	Shopping (food/groceries)	8	Professional Services (eg solicitors)
4	Shopping (Other)	9	Recreational (coffee shop/restaurant)
5	Medical	10	Other (specify) : _____

H If work (1 or 2) was your main purpose, do you permanently work in the centre ? ☐

1. Yes 2. No

I What was your time of arrival to and your expected time of departure from the Centre ?

ARRIVAL (24 hour) ☐☐☐☐ DEPARTURE (24 hour) ☐☐☐☐ DURATION OF VISIT (mins.) ☐☐☐

THANK YOU FOR YOUR CO-OPERATION

Appendix E

Overall Parking Space Occupancy Summarised by Parking Type

Thursday 22 September 2016		Starting Time										Summary					
	Supply	9.00am	10.am	11.00am	12.00pm	1.00pm	2.00pm	3.00pm	4.00pm	5.00am	6.00pm	Average	Peak	Overall Peak	Supply	Average	Peak
On-Street Spaces																	
Disabled	**5**	3	3	1	1	2	2	0	0	1	0	26%	60%	20%	0.45%	1	3
5 mns	**2**	1	0	0	0	0	0	0	0	0	0	5%	50%	0%	0.18%	0	1
30 mns	**3**	0	0	0	0	0	0	0	0	0	0	0%	0%	0%	0.27%	0	0
1 Hour	**104**	56	62	60	62	61	53	50	42	32	30	49%	60%	60%	9.34%	51	62
2 Hours	**39**	29	34	34	31	29	22	19	15	17	12	62%	87%	79%	3.50%	24	34
Sub-Total	**153**	**89**	**99**	**95**	**94**	**92**	**77**	**69**	**57**	**50**	**42**	**50%**	**65%**	**61%**	13.73%	76	99
Unrestricted Spaces	**65**	36	43	43	40	38	32	29	24	13	8	47%	66%	62%	5.83%	31	43
Loading Zones	**7**	1	3	3	2	1	1	2	2	2	1	26%	43%	29%	0.63%	2	3
No Parking		1	0	0	1	2	0	0	0	0	0					0	2
No Stopping		0	0	0	0	0	0	0	0	0	0					0	0
Total On-street	**225**	**146**	**160**	**164**	**158**	**140**	**132**	**132**	**132**	**132**	**132**	**63%**	**73%**	70%	20.20%	143	164
Off Street Spaces For Public																	
Short Stay Spaces																	
Council Car Parks																	
McKillop Ln 15 mns	**2**	2	1	1	1	0	1	1	0	0	1	40%	100%	50%	0.18%	1	2
McKillop Ln 2 Hours	**23**	22	23	23	19	19	18	20	16	11	10	79%	100%	83%	2.06%	18	23
McKillop Lane 3 Hourss	**46**	35	34	35	36	34	28	24	22	18	17	62%	78%	78%	4.13%	28	36
Sub-Total Council Short Stay Spaces	**71**	**59**	**58**	**59**	**56**	**53**	**47**	**45**	**38**	**29**	**28**	66%	83%	79%	6.37%	47	59
The Picton Mall																	
Disabled	**5**	4	5	5	4	4	2	2	0	1	0	54%	100%	80%	0.45%	3	5
2 & 3 Hours Surface Car Park	**82**	56	65	70	72	76	68	58	51	45	43	74%	93%	88%	7.36%	60	76
3 Hours Basement Car Park	**111**	21	32	29	25	41	46	29	26	20	22	26%	41%	23%	9.96%	29	46
Sub-Total	**198**	**81**	**102**	**104**	**101**	**121**	**116**	**89**	**77**	**66**	**65**	**47%**	**61%**	**51%**	**17.77%**	**92**	**121**
Total Short Stay	**269**	**140**	**160**	**163**	**157**	**174**	**163**	**134**	**115**	**95**	**93**	52%	65%	58%	24.15%	139	174
Long Stay Spaces																	
Council Car Parks																	
Off Manolis Lane	**83**	59	65	77	79	75	72	68	62	54	51	86%	95%	95%	7.45%	71	79
Near St Mark's Church	**67**	21	30	33	37	35	32	27	19	21	21	47%	55%	55%	6.01%	31	37
Walton Lane	**50**	9	12	15	18	18	16	14	11	12	12	29%	36%	36%	4.49%	15	18
Sub-Total Council Long Stay	**200**	**89**	**107**	**125**	**134**	**128**	**120**	**109**	**92**	**87**	**84**	59%	67%	**67%**	17.95%	117	134
Public Spaces in Private Car parks																	
Khan's Supermarket	**18**	15	18	18	17	18	14	12	9	10	10	93%	100%	94%	1.62%	17	18
Other Private Spaces for Patrons & Staff	**166**	78	87	95	97	78	62	51	49	27	30	50%	58%	58%	14.90%	83	97
Vacant Land Near Margaret St		11	17	19	17	16	16	16	16	12	9						
Sub-Total	**184**	**104**	**122**	**132**	**131**	**112**	**92**	**79**	**74**	**49**	**49**	**63%**	**72%**	**71%**	16.52%	**116**	**132**
Total Long Stay	**384**	**193**	**229**	**257**	**265**	**240**	**212**	**188**	**166**	**136**	**133**	**61%**	**69%**	**69%**	34.47%	**233**	**265**
Non Public Spaces																	
Council's Staff Parking Manolis Lane	**58**	36	41	45	50	51	49	40	29	21	16	78%	88%	86%	5.21%	45	51
The Picton Mall Staff	**34**	6	8	9	7	6	7	10	8	7	5	21%	26%	21%	3.05%	7	9
Picton Bowling Club	**144**	18	28	31	32	36	40	37	31	27	28	21%	28%	22%	12.93%	31	40
Sub-Total Non Public	**236**	**60**	**77**	**85**	**89**	**93**	**96**	**87**	**68**	**55**	**49**	**35%**	**41%**	**38%**	**21.18%**	**83**	**96**
Total Off-Street	**889**	**393**	**466**	**505**	**511**	**507**	**471**	**409**	**349**	**286**	**275**	**53%**	**57%**	**57%**	79.80%	**476**	**511**
Total	**1114**	**539**	**626**	**669**	**669**	**647**	**603**	**541**	**481**	**418**	**407**	**56%**	**60%**	**60%**	100.00%	**626**	**669**

Saturday 17 September 2016		Starting Time						Summary					
	Supply	9.00am	10.am	11.00am	12.00pm	1.00pm	2.00pm	Average	Peak	Overall Peak	Supply	Average	Peak
Disabled	5	2	1	3	2	0	0	27%	60%	40%	0.45%	1	3
5 mns	2	0	1	0	0	0	0	8%	50%	0%	0.18%	0	1
30 mns	3	0	0	0	0	0	0	0%	0%	0%	0.27%	0	0
1 Hour	104	37	50	49	51	52	47	46%	50%	49%	9.34%	48	52
2 Hours	39	20	22	23	22	14	10	47%	59%	56%	3.50%	19	23
Sub-Total	**153**	**59**	**74**	**75**	**75**	**66**	**57**	**44%**	**49%**	**49%**	13.73%	**68**	**75**
Unrestricted Spaces	65	28	26	32	32	26	27	44%	49%	49%	5.83%	29	32
Loading Zones	7	5	5	5	2	4	3	57%	71%	29%	0.63%	4	5
No Parking													
No Stopping		0	0	0	0	0	0						
Total On-street	**225**	**92**	**105**	**112**	**109**	**96**	**87**	**45%**	**50%**	**48%**	**20.20%**	**100**	**112**
Off Street Spaces For Public													
Short Stay Spaces													
Council Car Parks													
McKillop Ln 15 mns	2	2	2	2	1	2	1	83%	100%	50%	0.18%	2	2
McKillop Ln 2 Hours	23	22	23	20	20	18	17	87%	100%	87%	2.06%	20	23
McKillop Lane 3 Hours	46	30	30	30	28	24	27	61%	65%	61%	4.13%	28	30
Sub-Total Council Short Stay Spaces	**71**	**54**	**55**	**52**	**49**	**44**	**45**	**70%**	**77%**	**69%**	**6.37%**	**50**	**55**
The Picton Mall													
Disabled	5	4	3	4	5	3	4	**77%**	**100%**	**100%**	**0.45%**	**4**	**5**
2 & 3 Hours Surface Car park	82	69	64	70	75	70	75	**86%**	**91%**	**91%**	**7.36%**	**71**	**75**
3 Hours Basement Car Park	111	27	32	43	48	41	33	**34%**	**43%**	**43%**	**9.96%**	**37**	**48**
Sub-Total	**198**	**100**	**99**	**117**	**128**	**114**	**112**	**56%**	**65%**	**65%**	**17.77%**	**112**	**128**
Total Short Stay	**269**	**154**	**154**	**169**	**177**	**158**	**157**	**60%**	**66%**	**66%**	**24.15%**	**162**	**177**
Long Stay Spaces													
Council Car Parks													
Off Manolis Lane	83	39	32	30	27	19	17	33%	47%	33%	7.45%	27	39
Near St Mark's Church	67	21	21	20	23	26	24	34%	39%	34%	6.01%	23	26
Walton Lane	50	5	8	10	12	12	11	19%	24%	24%	4.49%	10	12
Sub_Total Council Long Stay	**200**	**65**	**61**	**60**	**62**	**57**	**52**	**30%**	**33%**	31%	**17.95%**	**60**	**65**
Public Spaces in Private Car parks													
Khan's Supermarket	18	13	10	14	15	12	11	69%	83%	83%	1.62%	13	15
Other Private Spaces for Patrons & Staff	166	43	54	55	54	42	40	29%	33%	33%	14.90%	48	55
Vacant Land Near Margaret St		4	7	6	5	4	4						
Sub-Total Private	**184**	**60**	**71**	**75**	**74**	**58**	**55**	**36%**	**41%**	**40%**	16.52%	**66**	**75**
Total Long Stay	**384**	**125**	**132**	**135**	**136**	**115**	**107**	**33%**	**35%**	**35%**	34.47%	**125**	**136**
Non Public Spaces													
Council's Staff Parking	58	11	9	15	21	19	14	26%	36%	36%	5.21%	15	21
The Picton Mall Staff	34	2	4	3	5	8	5	13%	24%	15%	3.05%	5	8
Picton Bowling Club	144	29	36	51	57	65	62	35%	45%	40%	12.93%	50	65
Sub-Total Non Public	**236**	**42**	**49**	**69**	**83**	**92**	**81**	**29%**	**39%**	**35%**	**21.18%**	**69**	**92**
Total Off-Street	**889**	**321**	**335**	**373**	**396**	**365**	**345**	**40%**	**45%**	**45%**	79.80%	**356**	**396**
Total	**1114**	**413**	**440**	**485**	**505**	**461**	**432**	**41%**	**45%**	**45%**	100.00%	**456**	**505**

Appendix F

Frequency Distribution of Length of Stay for Parking

LENGTH OF STAY DISTRIBUTION OF PARKERS AT PICTON TOWN CENTRE												
SURVEYED SPACES	Surveyed Spaces	Length of Stay										Turnover
		0-15mns	16-30mns	31-45mns	46-60mns	1 to 2hr	2 to 3hr	3 to 4hr	4 to 6 hr	6 to 8hrs	Total	car/space/hr
On Street Parking												
15 Minutes	2	3	2	1	1	2	1	0	0	0	**10**	0.63
1 Hour	28	79	68	26	14	19	6	0	2	1	**215**	0.96
2 Hours	13	3	6	8	4	16	9	4	1	0	**51**	0.49
3 Hours	43	23	26	35	19	40	17	8	5	3	**176**	0.51
Disabled	3	1	1	1	0	1	0	0	0	0	**4**	0.17
Sub-Total	89	109	103	71	38	78	33	12	8	4	**456**	**0.64**
Off Street Parking												
3 Hours Parking	43	84	38	31	16	27	5	1	1	0	**203**	0.59
Unrestricted	40	6	4	0	0	4	3	2	7	32	**58**	0.18
Staff Only	22	0	1	0	0	0	0	2	1	5	**9**	0.05
Sub-Total	105	90	43	31	16	31	8	5	9	37	**270**	**0.32**
Total	**194**	**199**	**146**	**102**	**54**	**109**	**41**	**17**	**17**	**41**	**726**	**0.47**
Loading Zones	3	5	3	3	0	2	0	0	0	0	**13**	**0.54**

ALL SPACES IN CENTRE	Actual Spaces	Length of Stay									
		0-15mns	16-30mns	31-45mns	46-60mns	1 to 2hr	2 to 3hr	3 to 4hr	4 to 6 hr	6 to 8hrs	Total
On Street Parking											
5 Minutes	**2**	4	4	2							**10**
15 Minutes	**2**	3	2	1	1	2	1	0	0	0	**10**
1 Hour	**104**	293	253	97	52	71	22	0	7	4	**799**
2 Hours	**62**	14	29	38	19	76	43	19	5	0	**243**
3 Hours	**46**	25	28	37	20	43	18	9	5	3	**188**
Unrestricted	**65**	10	6	0	0	6	5	3	11	52	**94**
Disabled	**5**	2	2	2	0	2	0	0	0	0	**7**
Sub-Total	**286**	**351**	**323**	**177**	**92**	**200**	**89**	**31**	**29**	**59**	**1350**
Off Street Parking											
Council Car Parks Unrestricted											**0**
Near Picton Mall	**83**	12	8	0	0	8	6	4	14	66	**120**
Near St Mark's Church	**67**	10	7	0	0	7	5	3	12	53	**96**
Sub_Total Council Car Parks	**150**	**22**	**15**	**0**	**0**	**15**	**11**	**7**	**26**	**119**	**216**
Picton Mall (Up to 3 hours)	**232**	453	205	167	86	146	27	5	5	0	**1095**
Khan's Supermarket	**18**	9	6	0	0	6	4	3	10	47	**85**
Other Private Spaces	**166**	81	54	0	0	54	41	27	95	432	**784**
Sub-Total Private	**416**	**543**	**265**	**167**	**86**	**206**	**72**	**35**	**110**	**479**	**1964**
Non Public Spaces											**0**
Council's Staff Parking	**58**	0	6	0	0	0	0	11	6	28	**50**
Picton Bowling Club	**144**	39	36	20	10	22	10	3	3	7	**150**
Sub-Total Non Public	**202**	39	42	20	10	22	10	15	9	34	**200**
Total Off-Street	**768**	**604**	**321**	**187**	**97**	**243**	**93**	**57**	**145**	**633**	**2380**
Total	**1054**	**955**	**644**	**364**	**189**	**442**	**182**	**88**	**174**	**691**	**3729**
Loading Zones	7	12	7	7	0	5	0	0	0	0	**30**

Appendix G

Proportion of Over-stay Parking Demand

TIME RESTRICTION	Total Parked Cars	Cars Exceeding Time Limit by Up To (in Minutes)						
		Up to 15	15-30	30-60	60-120	Over 120	Total	Percentage
On-Street								
15 Minutes	10	2	1	1	2	0	**6**	60%
1 hour	799	26	19	26	22	11	**104**	13%
2 hours	243	14	10	19	19	5	**67**	28%
3 hours	188	2	0	7	4	4	**17**	9%
Total On Street	**1,240**	**44**	**30**	**53**	**47**	**20**	**194**	16%
Off Street								
Picton Mall (Up to 3 hours)	1095	0	5	0	0	5	**10**	1%
Total	**2,335**	**44**	**35**	**52**	**47**	**25**	**203**	9%

Appendix H

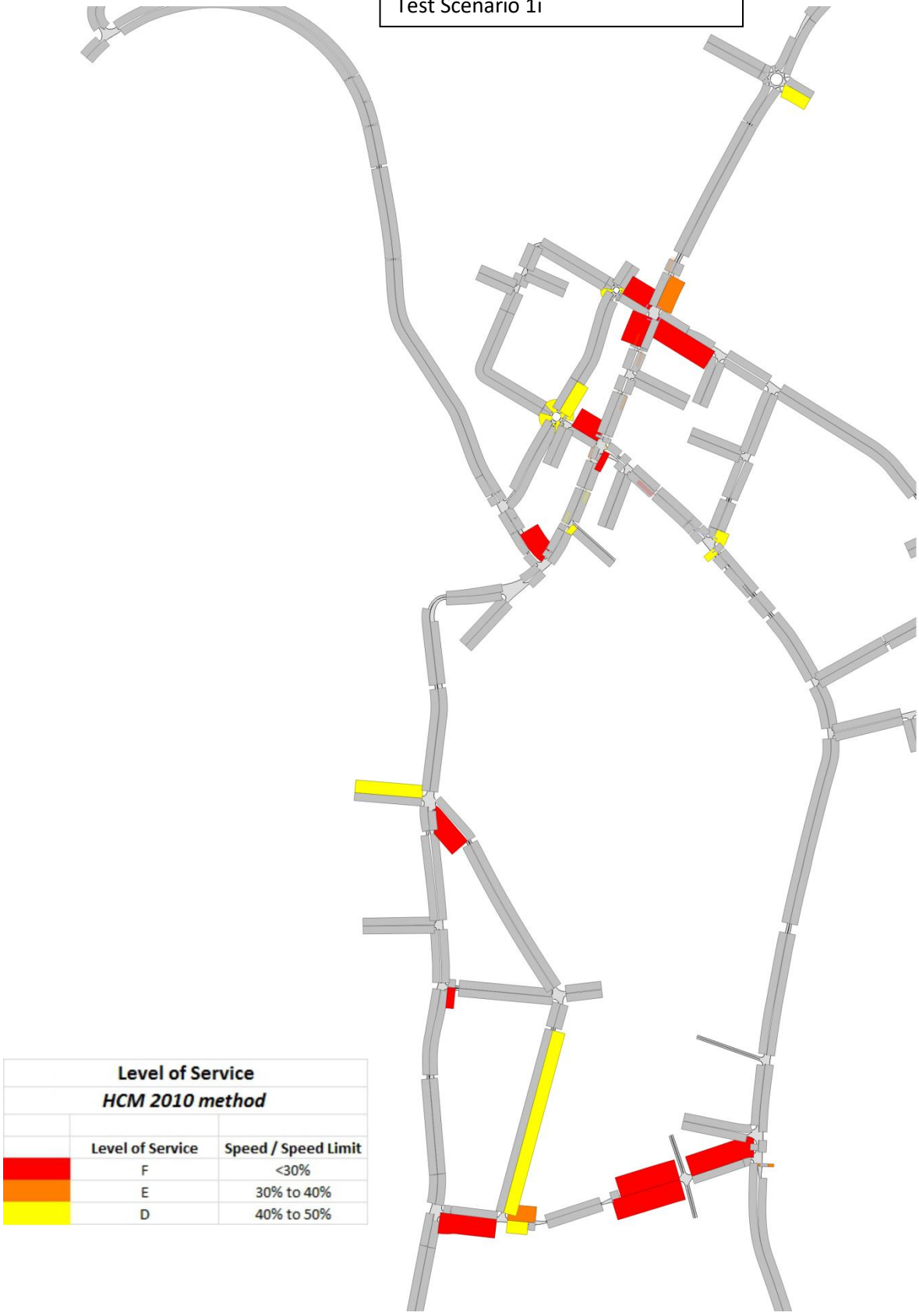
2026 PM Peak LOS Plots

- Test Scenario Do Nothing
- Test Scenario 1i
- Test Scenario 1ii
- Test Scenario 1iii
- Test Scenario 1iv
- Test Scenario 1v
- Test Scenario 2
- Test Scenario 3

Test Scenario Do Nothing

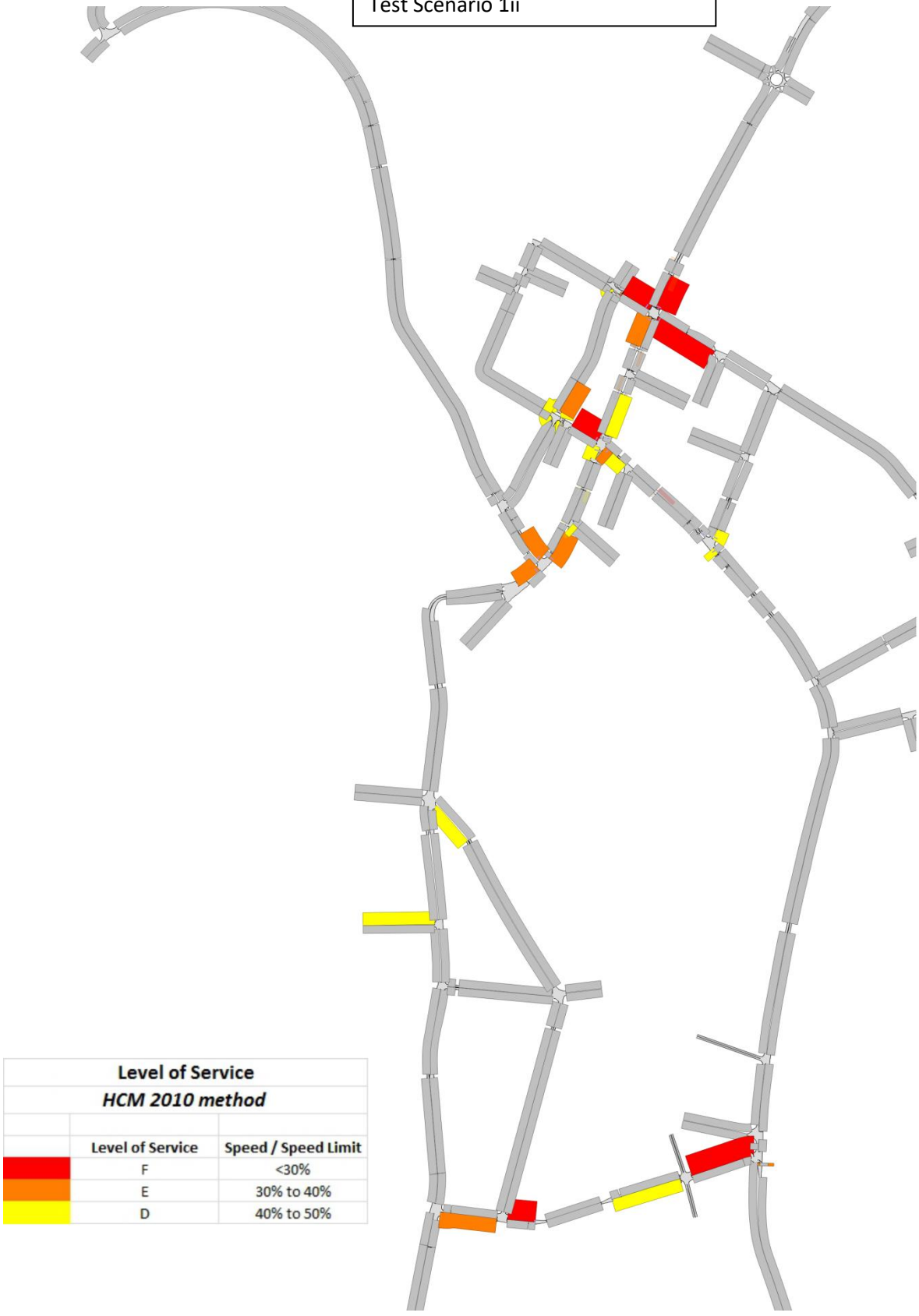
Level of Service	
HCM 2010 method	
Level of Service	Speed / Speed Limit
F	<30%
E	30% to 40%
D	40% to 50%

Test Scenario 1i



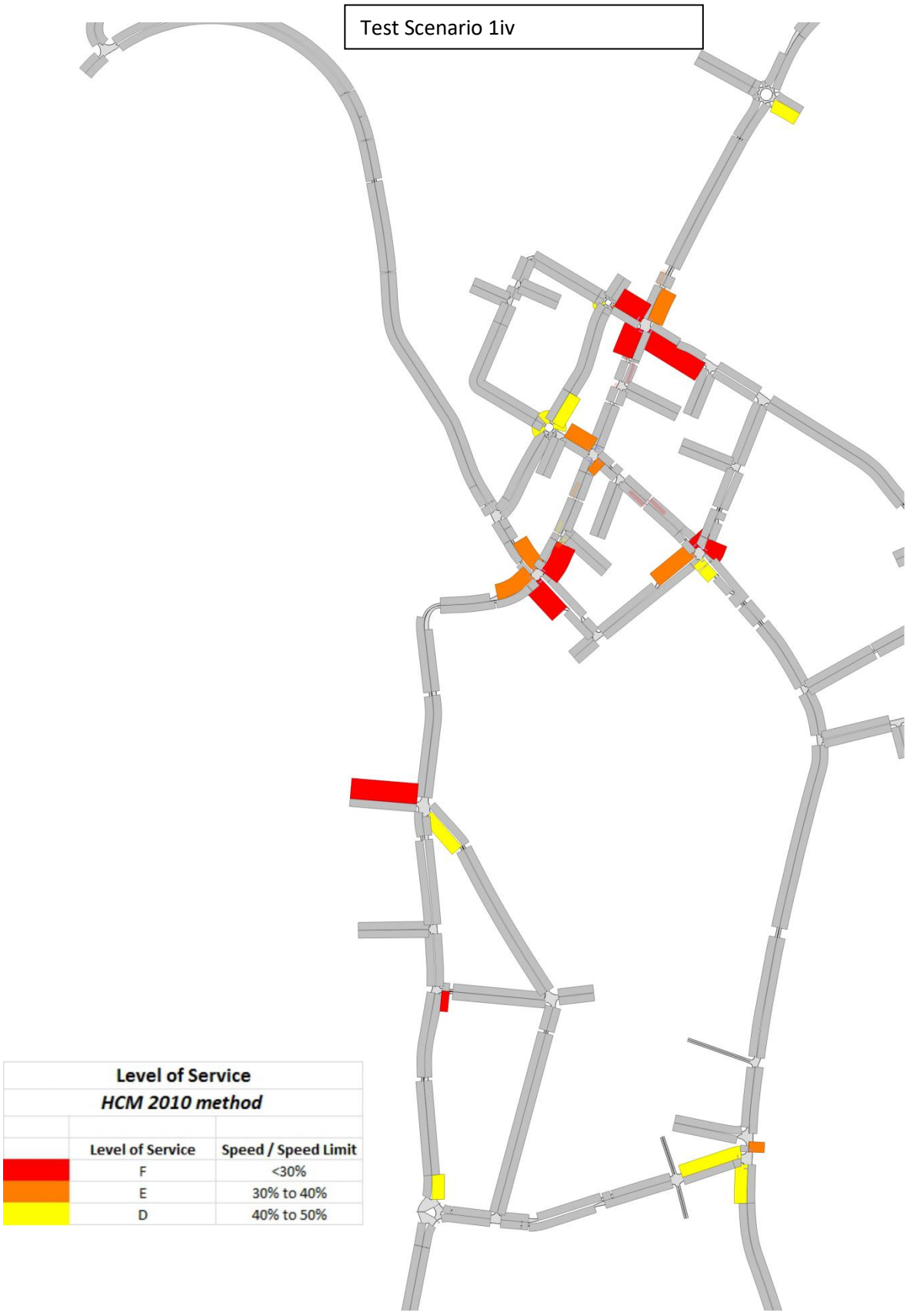
Level of Service	
HCM 2010 method	
Level of Service	Speed / Speed Limit
F	<30%
E	30% to 40%
D	40% to 50%

Test Scenario 1ii

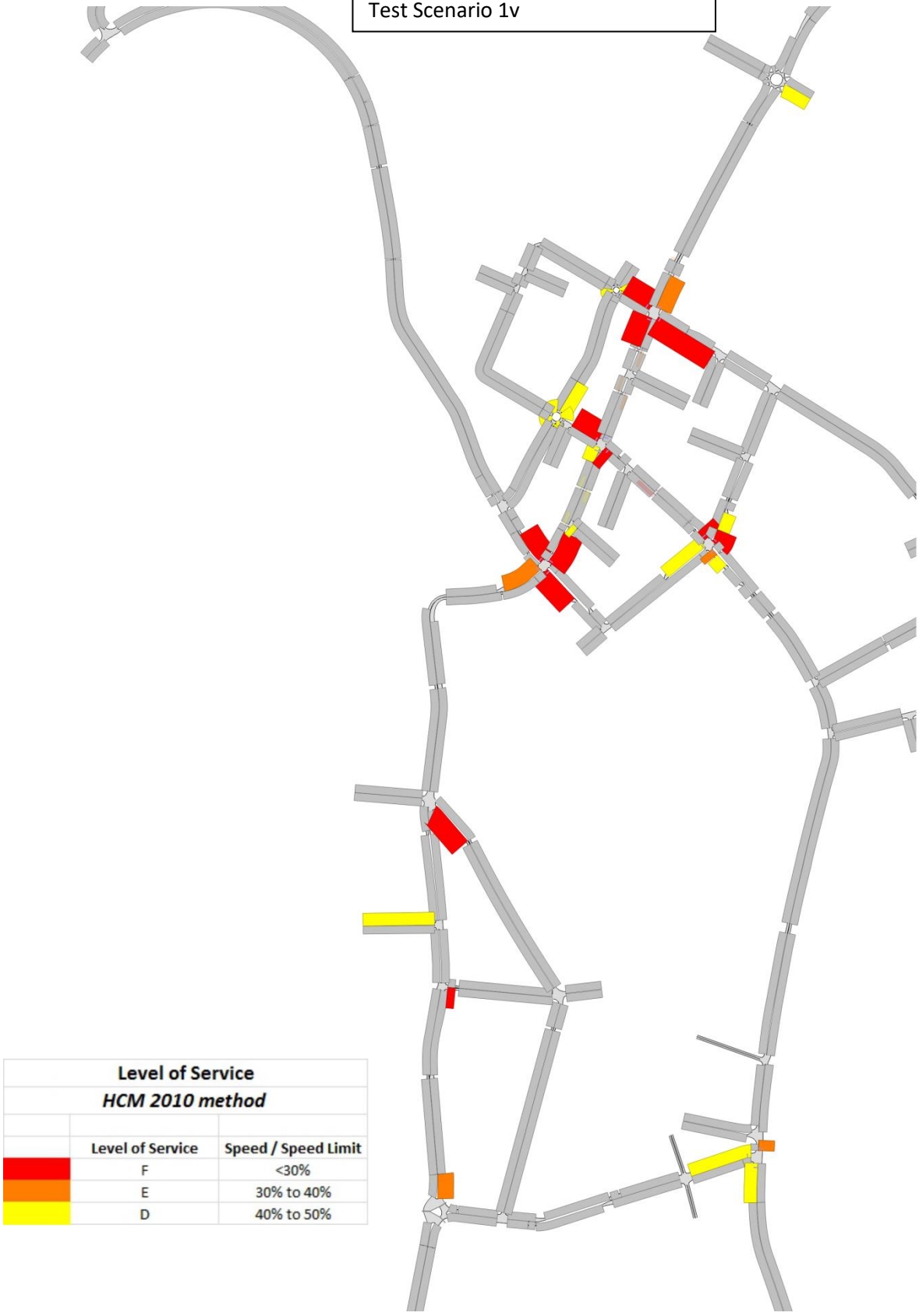


Level of Service	
HCM 2010 method	
Level of Service	Speed / Speed Limit
F	<30%
E	30% to 40%
D	40% to 50%


Test Scenario 1iii
Level of Service
HCM 2010 method
Level of Service
Speed / Speed Limit
F
<30%
E
30% to 40%
D
40% to 50%


Test Scenario 1iv
Level of Service
HCM 2010 method
Level of Service
Speed / Speed Limit
F
<30%
E
30% to 40%
D
40% to 50%

Test Scenario 1v



Level of Service	
HCM 2010 method	
Level of Service	Speed / Speed Limit
F	<30%
E	30% to 40%
D	40% to 50%

Test Scenario 2

Level of Service	
HCM 2010 method	
Level of Service	**Speed / Speed Limit**
F	<30%
E	30% to 40%
D	40% to 50%


Test Scenario 3
Level of Service
HCM 2010 method
Level of Service
Speed / Speed Limit
F
<30%
E
30% to 40%
D
40% to 50%

Appendix I

2020 PM Peak Link Volume Plots

- 2016 Base year Model
- 2026 Do Nothing
- Test Scenario 1i
- Test Scenario 1ii
- Test Scenario 1iii
- Test Scenario 1iv
- Test Scenario 1v
- Test Scenario 2


2016 Base year Model
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


2026 Do Nothing
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


Test Scenario 1i
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


Test Scenario 1ii
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


Test Scenario 1iii
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


Test Scenario 1iv
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


Test Scenario 1v
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000


Test Scenario 2
Simulated Flow (Colour)
0 to 100
100 to 300
300 to 700
700 to 1300
1300 to 4000