



Wingecarribee Shire Bicycle Strategy
Stage 2
Towns and Villages of the Southern Highlands

transportation planning, design and delivery

Wingecarribee Shire Bicycle Strategy

Stage 2

Towns and Villages of the Southern Highlands

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1. Introduction

1.1 Background

In 2008 Wingecarribee Shire Council adopted a Bicycle Strategy for the Shire's main centres of Mittagong, Bowral and Moss Vale which was prepared by GTA Consultants. The Strategy aimed to make cycling safer, easier and more attractive in the main centres and to provide a comprehensive plan to support physical activity, active living, active ageing and active tourism.

Funding has been secured to expand on the existing Bicycle Strategy and provide a strategy for the remainder of the Shire. This strategy, Wingecarribee Bicycle Strategy – Stage 2, focuses on the smaller towns and villages of the Shire (outside of the main centres) such as Berrima, Robertson, Bundanoon and Yerrinbool and in particular the connections between the smaller towns and villages and the main centres of Mittagong, Bowral and Moss Vale.

The Southern Highlands is an attractive place to cycle and there is great potential to increase commuter and recreational cycling rates among residents. The region is a popular tourist destination and given the proximity to Sydney there is real potential to increase cycling related tourism.

GTA Consultants was commissioned by Wingecarribee Shire Council in October 2013 to build on the previous 2008 Bike Plan and develop the Stage 2 Bicycle Strategy for the towns and villages of the Shire.

1.2 Strategy Objectives

The primary objective of the Stage 2 Bicycle Strategy is to make cycling safer, easier and more attractive and to provide a comprehensive plan to support physical activity, active living, active ageing and active tourism.

The Stage 2 Bicycle Strategy aims to provide Wingecarribee Shire Council with current best practice and contemporary bicycle planning guidance for its towns and villages. The strategy focuses on delivering maximum effectiveness for increasing cycling across the Local Government Area (LGA) and to attract community wide benefits for cyclists (such as health and safety while riding) and also for non-cyclists (such as reducing traffic congestion in the main centres).

This Stage 2 Bicycle Strategy key aims are to:

- i provide a broad level assessment of the existing cycling conditions in and around the Shire's towns and villages
- ii establish a network of commuter and recreational bicycle routes and facilities for the Shire's towns and villages focussing on the connections between these locations and the main centres of Mittagong, Bowral and Moss Vale
- iii summarise the stakeholder and community consultation undertaken as part of the project and detail the key outcomes of this consultation
- iv outline encouragement, training, promotional and monitoring programs
- v identify potential funding sources and partnership opportunities.

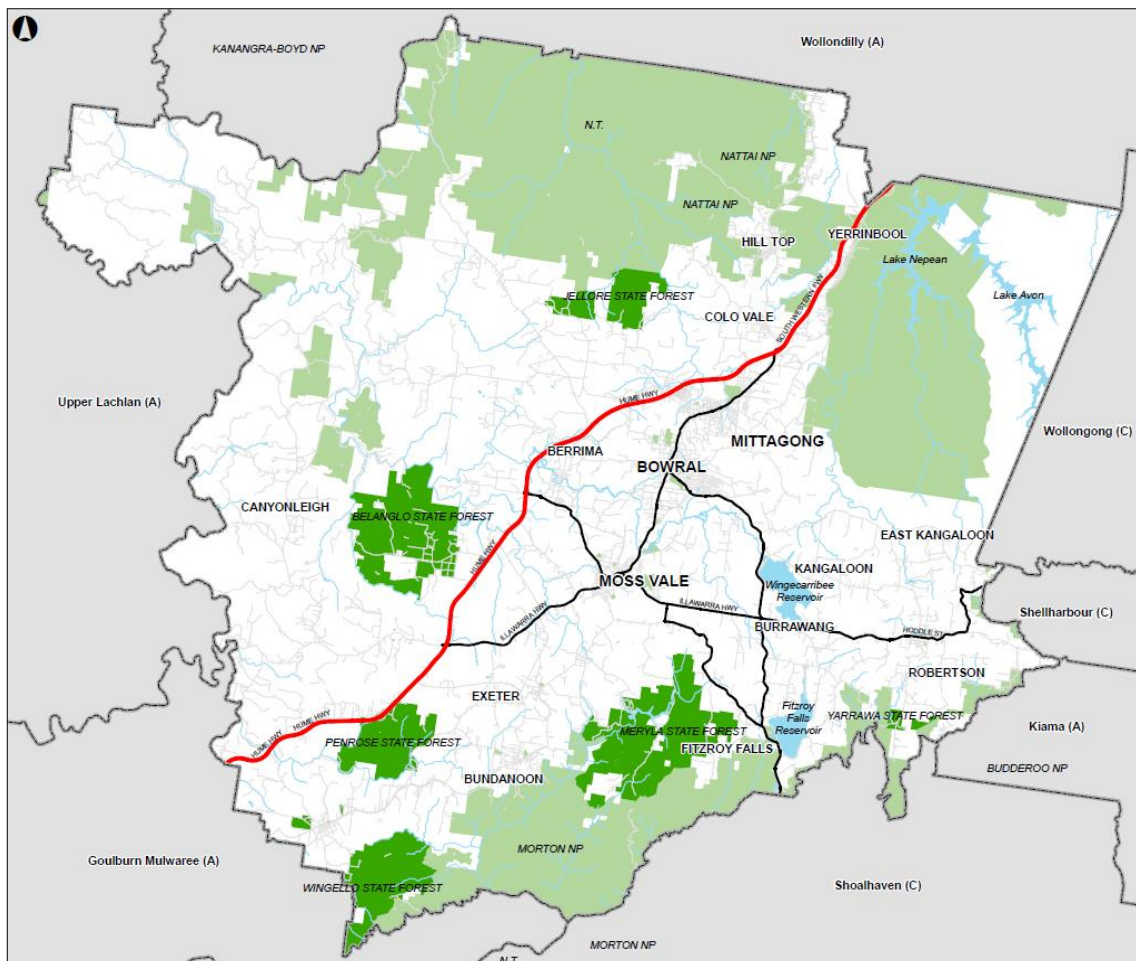
2. Existing Conditions

2.1 Existing Road Network

Wingecarribee Shire covers an area of over 2,700 square kilometres and has a road network of extending over 2,700 kilometres including 63 kilometres of motorway. Wingecarribee Shire Council is responsible partially or completely for the maintenance of the majority of roads across the Shire (excluding the Hume Motorway), with funding assistance provided by Roads and Maritime Services (RMS).

The road network connecting the towns and villages with the Shire's main centres of Bowral, Mittagong and Moss Vale is generally rural in nature, often with significant distances between the towns/ villages themselves and also the main centres. The location of the main centres and key towns and villages of Wingecarribee Shire is shown in Figure 2.1 with a detailed map contained in Appendix A.

Figure 2.1: Wingecarribee Shire Locality Map



2.1.1 Road Hierarchy

There are three main systems used for classifying roads in New South Wales:

- Legal Classification
- Functional Classification
- Administrative Classification.

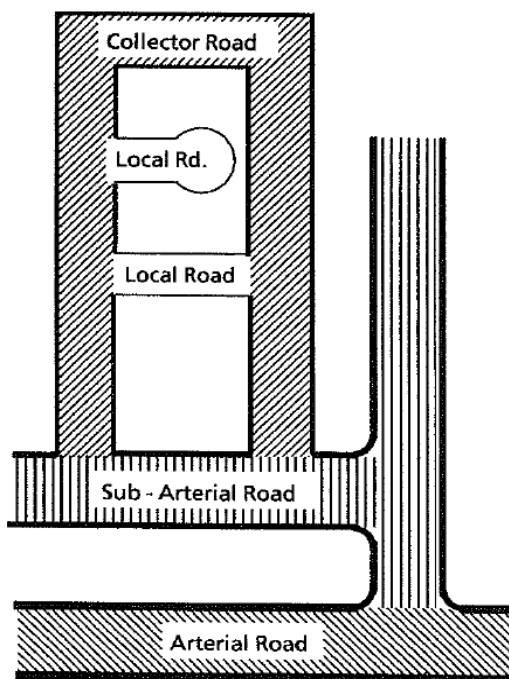
Functional classification is the process by which roads are grouped into classes or systems according to their function or the character of the service they are intended to provide.

The functional system uses a four tier classification system as follows:

- **Arterial Roads** – Predominantly carry through traffic and serve as a major inter-regional link
- **Sub-Arterial Roads** – Connect the arterial road network to areas of development carrying traffic within the same region
- **Collector Roads** – Connects sub-arterial roads with the local roads in developed areas
- **Local Roads** – Provides access to individual allotments.

A graphical representation of the functional classification system is shown in Figure 2.2.

Figure 2.2: Functional Classification Schematic Representation



Source: Roads and Maritime Services Guide to Road Design, 1991 (Figure 1.2.1)

Table 2.1 summarises the road network lengths across Wingecarribee Shire based on a functional road classification.

Table 2.1: Wingecarribee Shire Road Network Summary

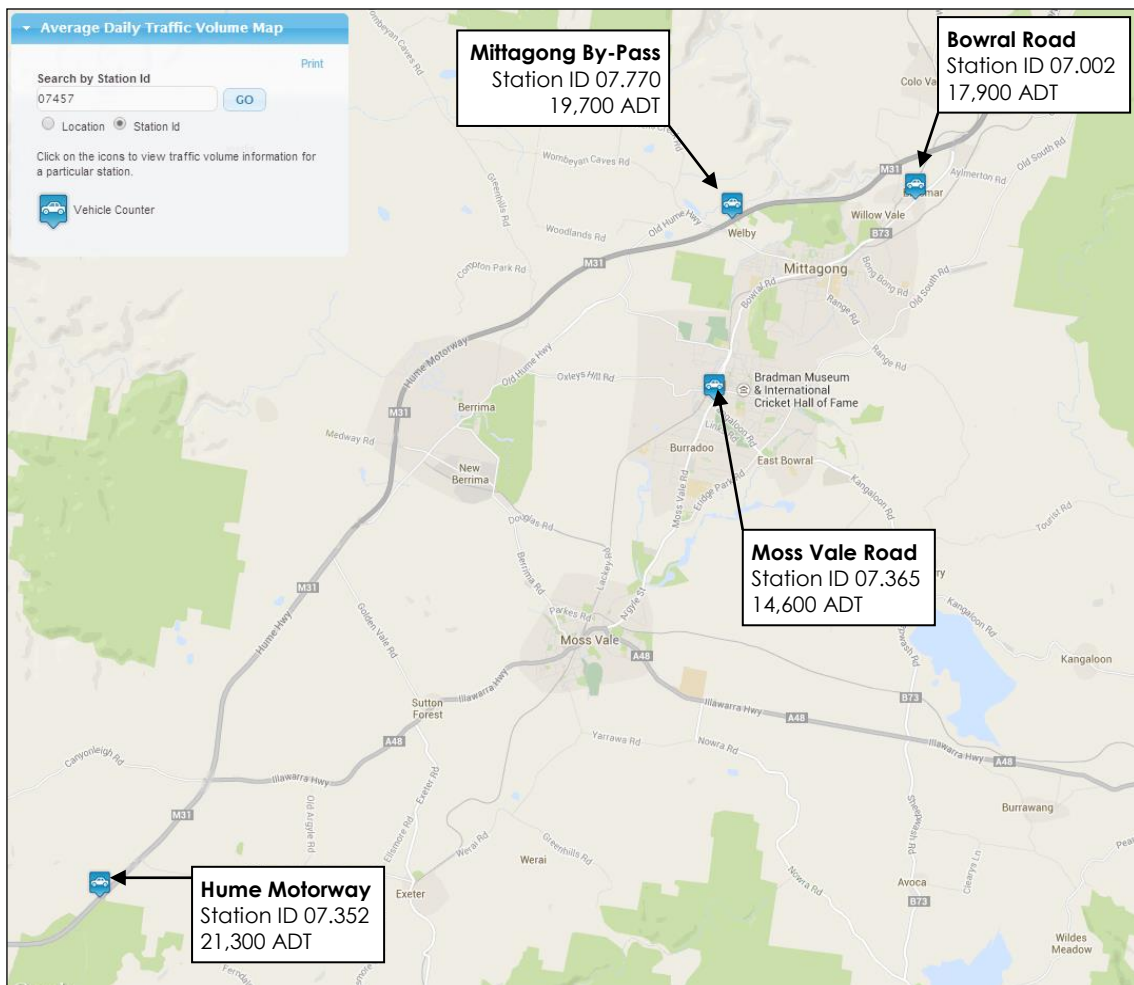
Functional Road Classification	Description	Length (km)
Arterial	Motorway (Hume Highway/Motorway)	63
	Other (Illawarra Highway, Old Hume Highway etc.)	45
Sub-Arterial, Collector and Local		2,596
Total		2,704

As shown in Table 2.1, the road network within Wingecarribee Shire including the Hume Highway has a total length of over 2,700 kilometres. In addition to this there is a network of approximately 900 kilometres of unsealed fire trails across the Shire, including those in National Parks and State Forests.

2.1.2 Traffic Volumes

The volume of traffic travelling on roads across the Shire is an important consideration in planning bicycle facilities and routes. Roads and Maritime Services (RMS) maintains a series of permanent traffic volume recording stations across the state. Figure 2.3 shows the Average Daily Traffic (ADT) volume of roads across Wingecarribee Shire based on the available data from RMS permanent count stations.

Figure 2.3: 2012 Average Daily Traffic volumes (RMS permanent count stations)



Map and Data Source: [RMS Interactive Average Daily Traffic Map](#)

2.1.3 Wingecarribee Shire Road Characteristics

Outside of the Shire's main centres there are three key road types (excluding the Hume Motorway) that can be characterised based on a number of features as summarised in Table 2.2.

2.1.4 Road Shoulders

Narrow road shoulders or the absence of road shoulders on the majority of collector, sub-arterial and arterial roads makes the provision of on-road bicycle facilities within the existing road reserve difficult. On many arterial and sub-arterial roads, the road shoulder is less than 0.5 metres wide. This is too narrow to accommodate on-road treatments such as bicycle lanes or shared road shoulders. Examples of such narrow road shoulders are shown in Figure 2.4 and Figure 2.5. The continuity of road shoulders is also a key issue. Narrow bridges (Figure 2.4), culverts and safety barriers act as squeeze points forcing cyclists to ride in the traffic lane with vehicles travelling at high speeds.

Figure 2.4: Sheepwash Bridge, Sheepwash Road, Glenquarry



Figure 2.5: Illawarra Highway, Burrawang



At other locations road shoulders are unsealed or may only be partially sealed which is unsuitable for on-road infrastructure treatments. Examples of a partially sealed shoulder with a level difference between pavement surfaces are shown in Figure 2.6 and Figure 2.7. Such level differences and variation in surface material is a safety hazard to cyclists. Carriageway re-sheeting is required at these locations to provide a smooth pavement surface.

Figure 2.6: Illawarra Highway at Sheepwash Road, Avoca







Figure 2.7: Road shoulder pavement level difference - Illawarra Highway at Sheepwash Road, Avoca



Table 2.2: Wingecarribee Shire Key Road Type Characteristics (outside of main centres)

Functional Road Classification	Speed Limit	Width	Street Lighting	Footpaths	Kerb and Gutter	Hard Shoulder	Examples
Local within town/village centre	50km/h	12m	Yes	No	Yes	No	 Erith Street, Bundanoon  Ellsmore Road, Bundanoon
Local outside town/village centre	50km/h	6-7m	No	No	No	No	 Wilson Drive, Colo Vale

Functional Road Classification	Speed Limit	Width	Street Lighting	Footpaths	Kerb and Gutter	Hard Shoulder	Examples	
Collector	70-90km/h	6-7m	No	No	No	No		
Sub-Arterial							<p>Ringwood Road, Exeter</p>	<p>Oldbury Road, Moss Vale</p>
Arterial	80-100km/h	7-20m [1]	No	No	No	No [2]		
							<p>Illawarra Highway, Avoca (at Kellys Creek)</p>	<p>Old Hume Highway, Woodlands</p>

[1] Varies based on lane configuration.

[2] Hard shoulders are generally not present on Arterial Roads such as the Illawarra Highway and Old Hume Highway, however there are some locations such as at major intersections where these are present.

As shown in Table 2.2, there is commonality amongst the key features of roads outside of the towns and villages of the shire. These roads can be characterised as being rural in nature whereby there is no street lighting, footpaths, hard shoulder or kerb and gutter. The roads that connect the towns and villages with each other as well as with the main centres consist of collector, sub-arterial and arterial roads with speed limits ranging from 70 to 100km/h.

2.2 Existing Bicycle Network

Outside of the main centres of the Shire, there is little dedicated on-road bicycle infrastructure. Some examples of existing bicycle infrastructure include on-road bicycle lanes on the Illawarra Highway, Robertson as shown in Figure 2.8. Bicycle warning signage can also be found sporadically on roads around the Shire to alert drivers to the potential presence of cyclists on certain roads. An example of such signage is shown in Figure 2.9.

Figure 2.8: On-road bicycle lane – Illawarra Highway, Robertson



While there is relatively little dedicated on-road bicycle infrastructure between the towns and villages of the Shire, the Southern Highlands is a very popular location for on-road cycling. It's beautiful scenery, challenging topography and relatively low traffic volumes on many roads make it an attractive destination for training and group cyclists, particularly on weekends and early mornings. These groups are known anecdotally to consist primarily of experienced and confident riders, with some "pelotons" consisting of 20-30 riders. In the absence of hard shoulders on the majority of roads between towns and villages, these cyclists often ride two abreast, occupying the travel lane.

Figure 2.9: Bicycle warning sign – Golden Vale Road, Sutton Forest



The speed limit of roads between the towns and villages of the Shire ranges from 70 to 100km/h. The high vehicle speeds of these roads as well as the lack of hard shoulder forces cyclists to ride in the vehicle travel lane. This road environment is not conducive to encouraging less confident or inexperienced cyclists to ride nor inspiring new cyclists to ride.

Bong Bong Track

The Bong Bong Track provides a 26 kilometre long continuous facility in and around Bowral as well as providing a key connection to Moss Vale. The track consists primarily of a 3.0 metre wide, off-road, shared pedestrian and bicycle path as can be seen in Figure 2.10 and Figure 2.11.

Figure 2.10: Bong Bong Track, Bowral – off-road shared path



Figure 2.11: Bong Bong Track, Bowral – off-road shared path



2.3 Mountain Biking

Mountain biking is rapidly increasing in popularity in NSW and Wingecarribee Shire. Given the easy access to a wide range of terrain and the close proximity to Canberra, Sydney and Wollongong, the Southern Highlands popularity as a major mountain biking destination is growing.

Mountain biking is currently permitted in Morton National Park in the south of the Shire, but is not permitted in Nattai National Park. Mountain biking is permitted on all formed roads and fire trails within the six State Forests in the shire: Belanglo, Meryla, Penrose, Jellore, Wingello and Yarrowa.

The State Forests of the Southern Highlands are working forests with pine trees grown for commercial purposes. There is approximately 3,500 hectares of commercial pine plantations in the Southern Highlands which are managed by Forestry Corporation NSW. These forests are also native eucalypt forests which are not available for logging.

Wingello State Forest is located in the south of the shire and provides 37 kilometres of signed mountain bike trails including almost 10 kilometres of purpose built trails (single track) of varying degrees of difficulty. The three separate mountain bike trails in Wingello State Forest are shown on Figure 2.14 and include:

- **Blue Trail** – 6 kilometres in length consisting of formed roads and fire trails through pine plantation.
- **Yellow Trail** – 9 kilometres in length consisting of formed roads and fire trails through pine plantation and native forest.
- **Red Trail** – 22 kilometres in length consisting of a combination of formed roads, fire trails and single track.

The mountain bike trails are on occasion temporarily closed due to timber harvesting operations. A formed road used for mountain biking in Wingello State Forest is shown in Figure 2.12 with an example of wayfinding/ route signage used shown in Figure 2.13

Figure 2.12: Wingello State Forest



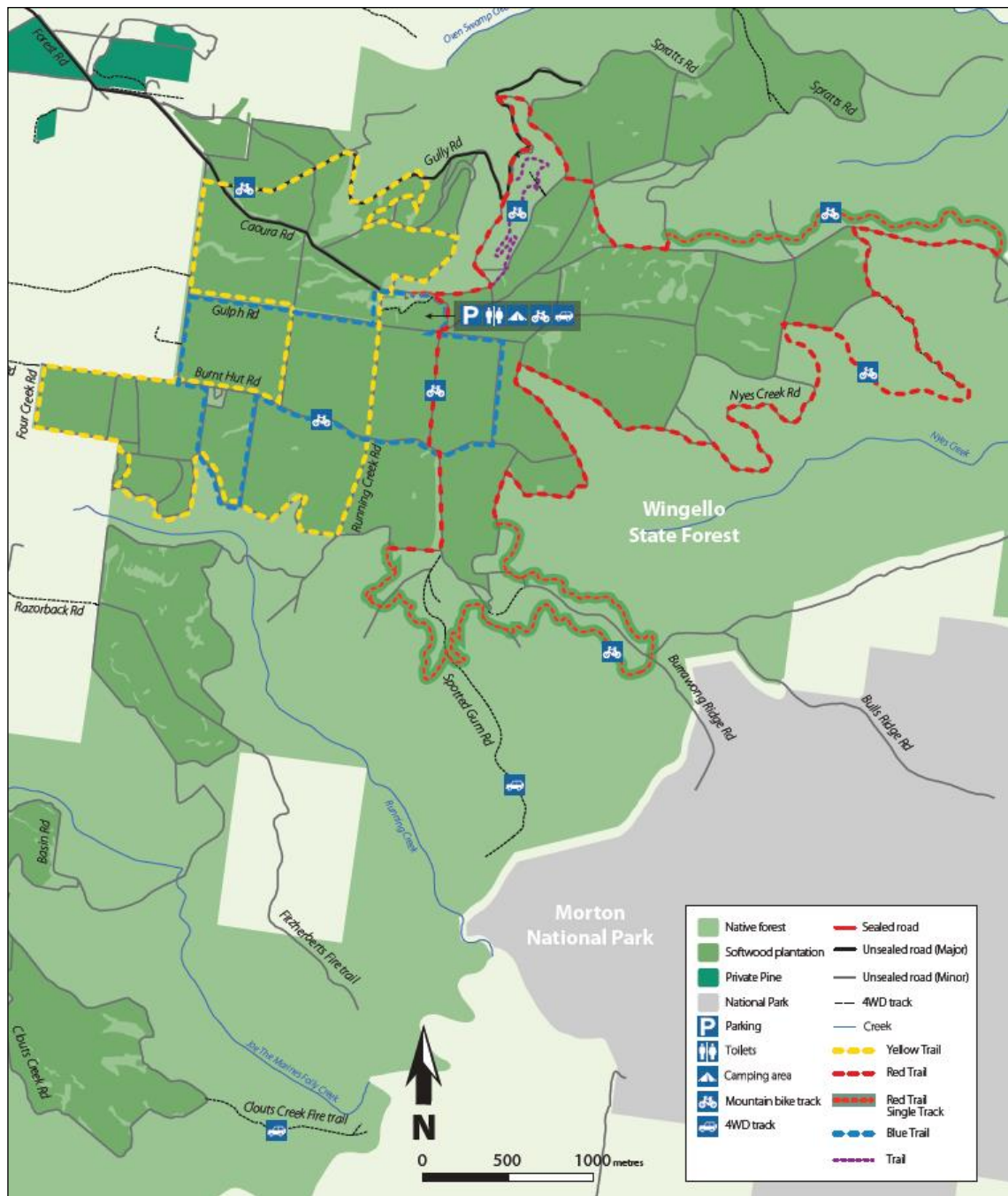
Photo Source: [Trail Flix website](#)

Figure 2.13: Wingello State Forest – mountain bike trail wayfinding/ route signage



Wild Horizons have prepared the 'Mountain Bike Trails of the Southern Highlands' map which is available for purchase on the [Wild Horizons website](#).

Figure 2.14: Wingello State Forest Mountain Bike Trails



Source: Forestry Corporation

2.4 Cycling Events

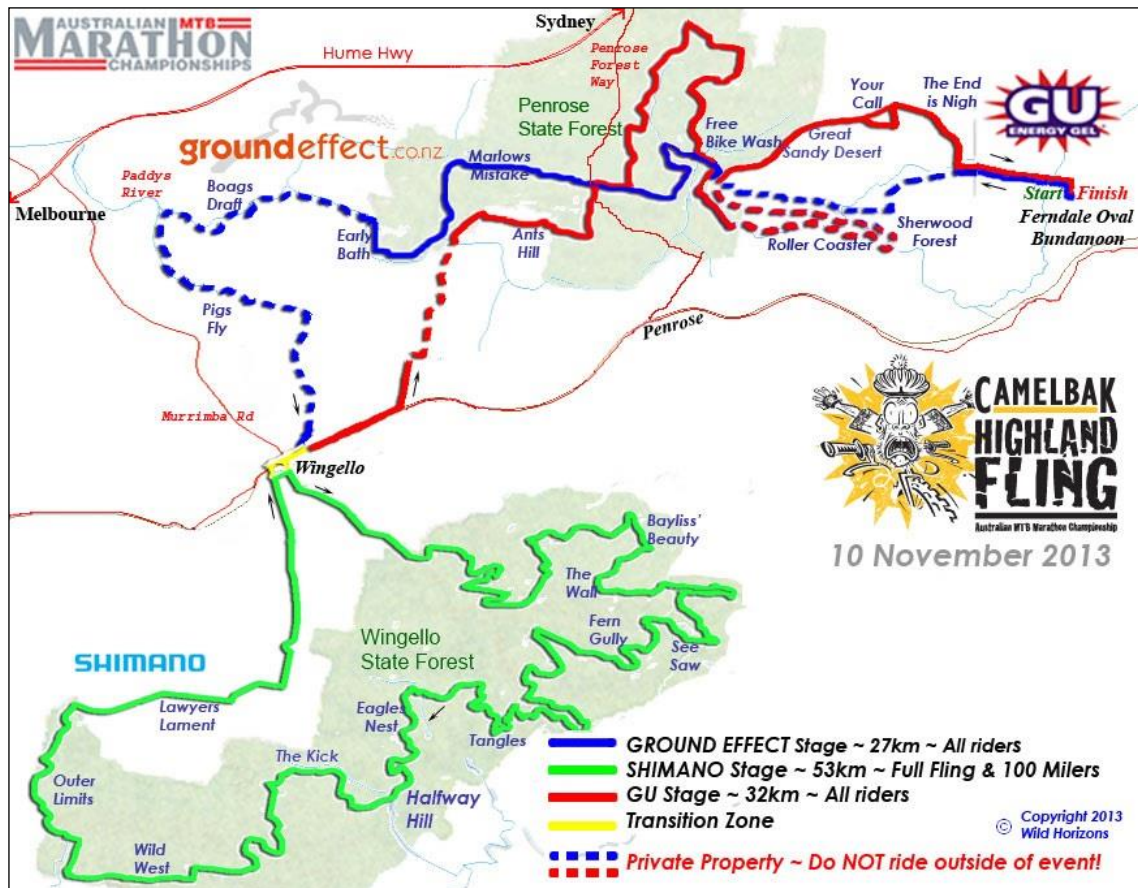
There are three mountain bike events held annually in the shire: the Highland Fling, the Three Ring Circus and the James Williamson Enduro Challenge.

Highland Fling

Wild Horizons Highland Fling is Australia's largest mountain bike marathon event and is based in Bundanoon in the south of the shire. The event is held each November and consists of four

separate mountain bike marathon events of varying distances (14km, 55km, 110km and 165km) to cater for riders of different abilities. The event courses utilise trails in Wingello and Penrose State Forests as well as travelling through private property. The route map from the 2013 event is shown in Figure 2.15.

Figure 2.15: Highland Fling Route Map



Source: [Wild Horizons website](#)

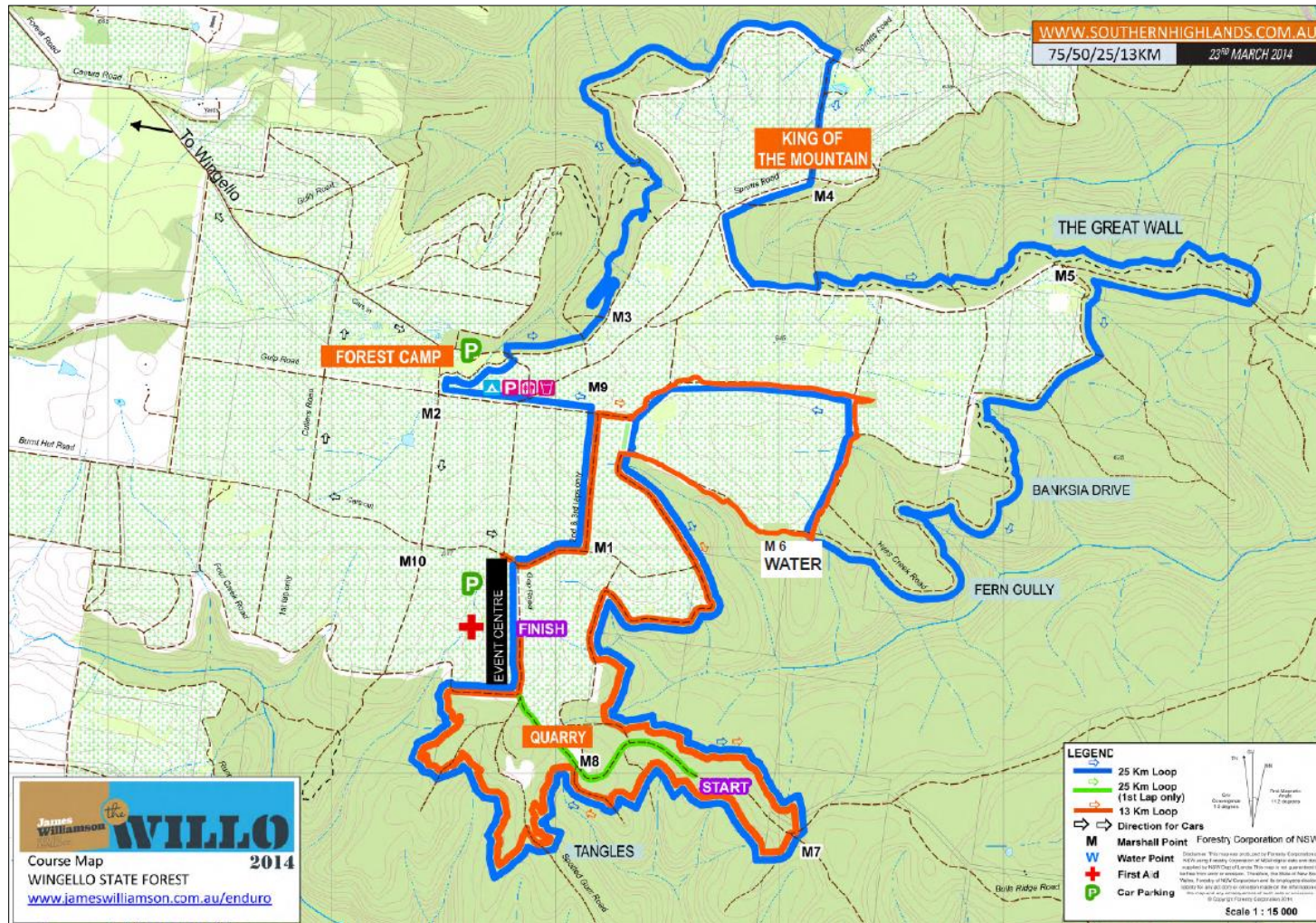
Three Ring Circus

Wild Horizons Three Ring Circus is an annual mountain bike and circus event held in Wingello State Forest. The event offers 20 kilometre night time event as well as a 50 kilometre team endurance event. A free children's event is also held as part of the three ring circus.

James Williamson Enduro Challenge

The James Williamson Enduro Challenge is an annual mountain bike endurance event also held in Wingello State Forest. The event is held in March each year and includes individual and team events over a variety of distances (13km, 25km, 50km and 75km) as shown in Figure 2.16. The event caters for all age groups including children.

Figure 2.16: James Williamson Enduro Challenge Map



Source: James Williamson Enduro Challenge website

2.5 Crash Analysis

Crashes reported to Police in NSW are compiled in the RMS CrashLink data base. Analysis was undertaken of crashes within the Shire using CrashLink data for the most recent five year period that complete data was available from 2008 to 2012.

A total of 1,583 crashes were recorded within Wingecarribee Shire over the five year period up to and including 2012.

Crash Severity

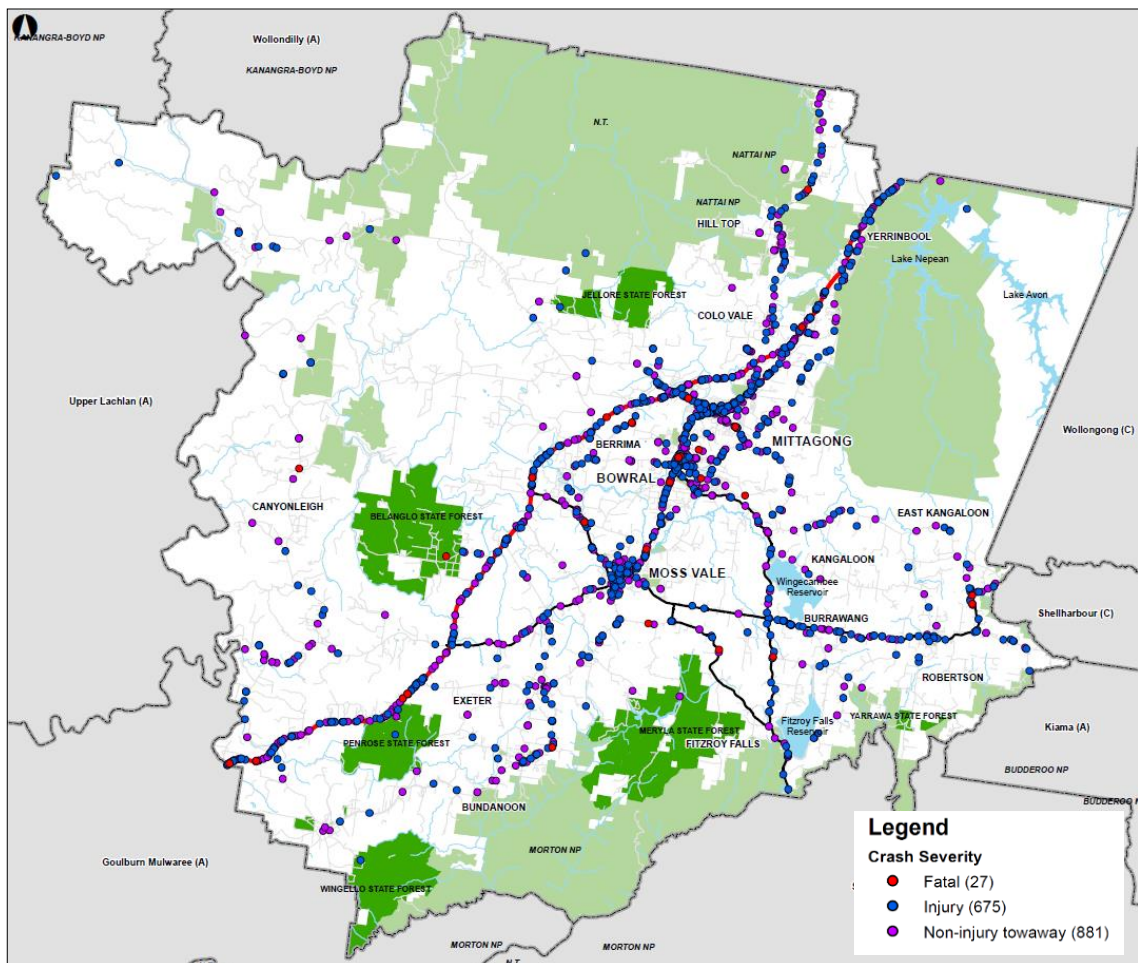
The RMS CrashLink system uses three severity categories for reporting crashes: fatal, injury and non-injury (tow away).

The breakdown of severity of the 1,583 recorded crashes in the Shire is as follows:

- 27 – fatal
- 675 – injury
- 881 – non-injury (tow away).

The location of recorded crashes by severity is shown in Figure 2.17 with a full size map contained in Appendix B.

Figure 2.17: Wingecarribee Shire – All Crashes, 2008-2012



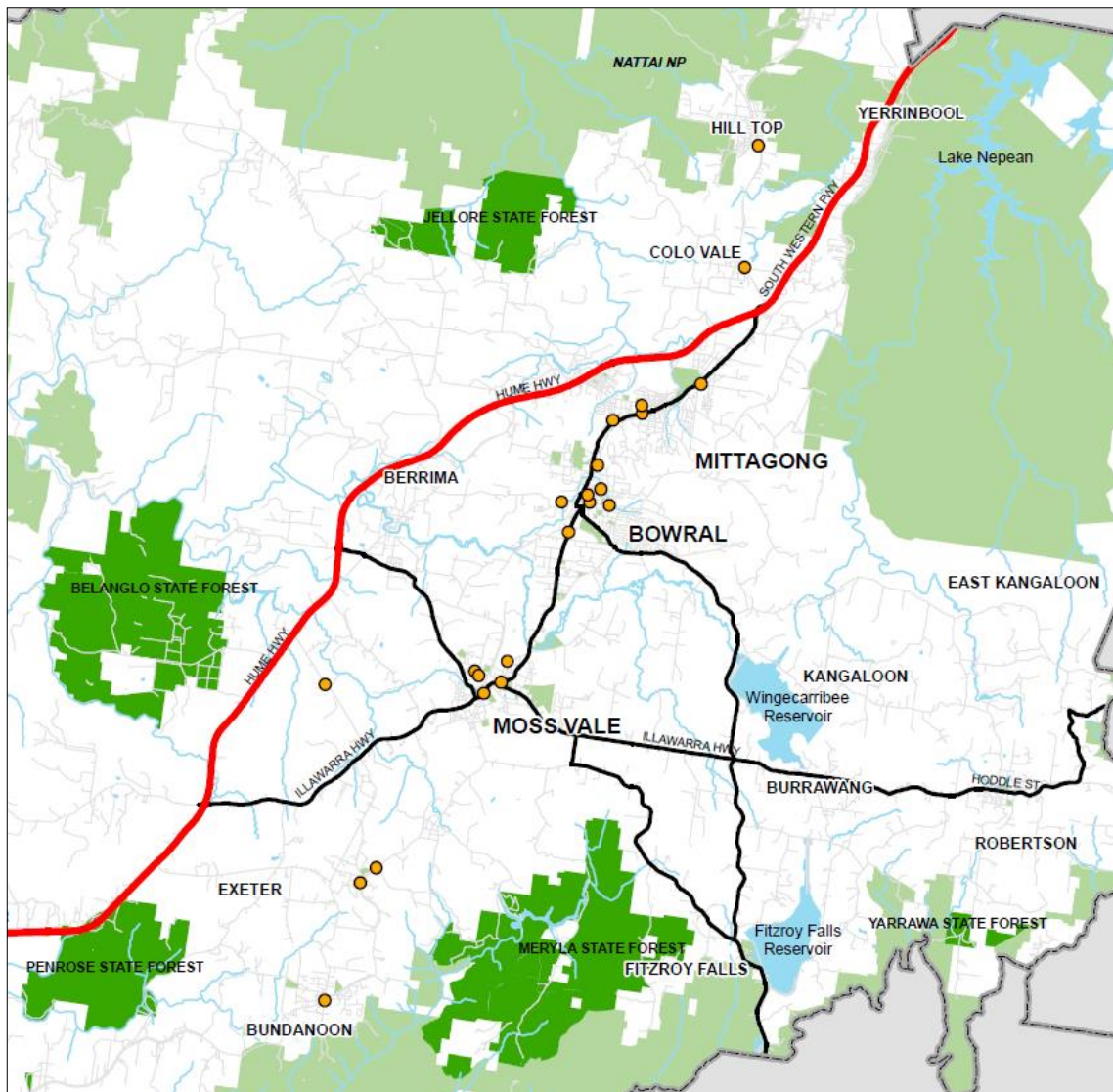
7 (26%) of the 27 recorded fatal crashes over the five year period occurred on the Hume Motorway. A detailed map showing the location of all recorded fatal crashes is contained in Appendix B.

Cyclist Crashes

Of the 1,583 crashes recorded over the five year period 22 (1.4%) involved cyclists. All of the crashes involving cyclists were recorded with the same degree of severity; 'injury'. No fatal cyclist crashes were recorded over the five year period examined.

The location of crashes involving cyclists is shown in Figure 2.18 with a full size map contained in Appendix B.

Figure 2.18: Wingecarribee Shire – Cyclist Crashes, 2008-2012



As shown in Figure 2.18, cyclist crash clusters can be observed in the three main centres of Moss Vale, Bowral and Mittagong. 16 of the 22 recorded cyclist crashes occurred in the three main centres. Detailed maps showing the location of cyclist crashes in the main centres are contained in Appendix B.

Crashes recorded in the CrashLink database are attributed with a Road User Movement (RUM) code. The RUM code describes the first impact that occurred during the crash. Table 2.3 summarises the RUM codes attributed to crashes involving cyclists across the shire for the five year period examined.

Six of the 22 recorded cyclist crashes occurred outside of the shire's three main centres. Of these crashes the following RUM codes were recorded: 13 (right near), 30 (rear end), 48 (from footpath), 53 (overtake turning), 63 (vehicle turning) and 74 (on-road out of control).

Table 2.3: Wingecarribee Shire – Cyclist Crashes RUM Code Summary, 2008-2012

RUM Code	RUM Code Description	No. of Crashes
10	Cross traffic	3
13	Right near	1
16	Left near	1
20	Head on	1
21	Right through	2
30	Rear end	1
37	Left turn sideswipe	2
47	Emerging from drive	1
48	From footpath	3
53	Overtake turning	1
63	Vehicle door	1
71	Off rd left => obj	1
74	On road-out of control	4
TOTAL		22

It is widely recognised that a substantial proportion of non-fatal cyclist crashes are not reported to police. As the NSW Police Force is the only source of crash notification used in CrashLink data, statistics relating to cyclist crashes may not accurately reflect the situation. It is likely that numerous other crashes have occurred in the Shire that have not been reported to police.

Pedestrian Crashes

Of the 1,583 crashes recorded over the five year period, 30 (1.9%) involved pedestrians. The severity of these crashes is as follows:

- Fatal – 3
- Injury – 26
- Non-injury 1.

A map showing the location of pedestrian crashes is contained in Appendix B. Similar to cyclist crashes, pedestrian crash clusters can be observed in the Shire's three main centres.

Detailed maps showing the location of cyclist crashes in the main centres are contained in Appendix B.

2.6 Public Transport

Rail Services

Wingecarribee Shire is served by the Southern Highlands line of the Sydney Trains Intercity network. The Southern Highlands line connects Sydney Central with Goulburn via Campbelltown. Within the Shire, intercity trains serve the three main centres (Mittagong, Bowral and Moss Vale) as well as six of the Shire's towns and villages: Yerrinbool, Burradoo, Exeter, Bundanoon, Penrose and

Wingello. An extract of the Sydney Trains network map showing the Southern Highlands line is shown in Figure 2.19.

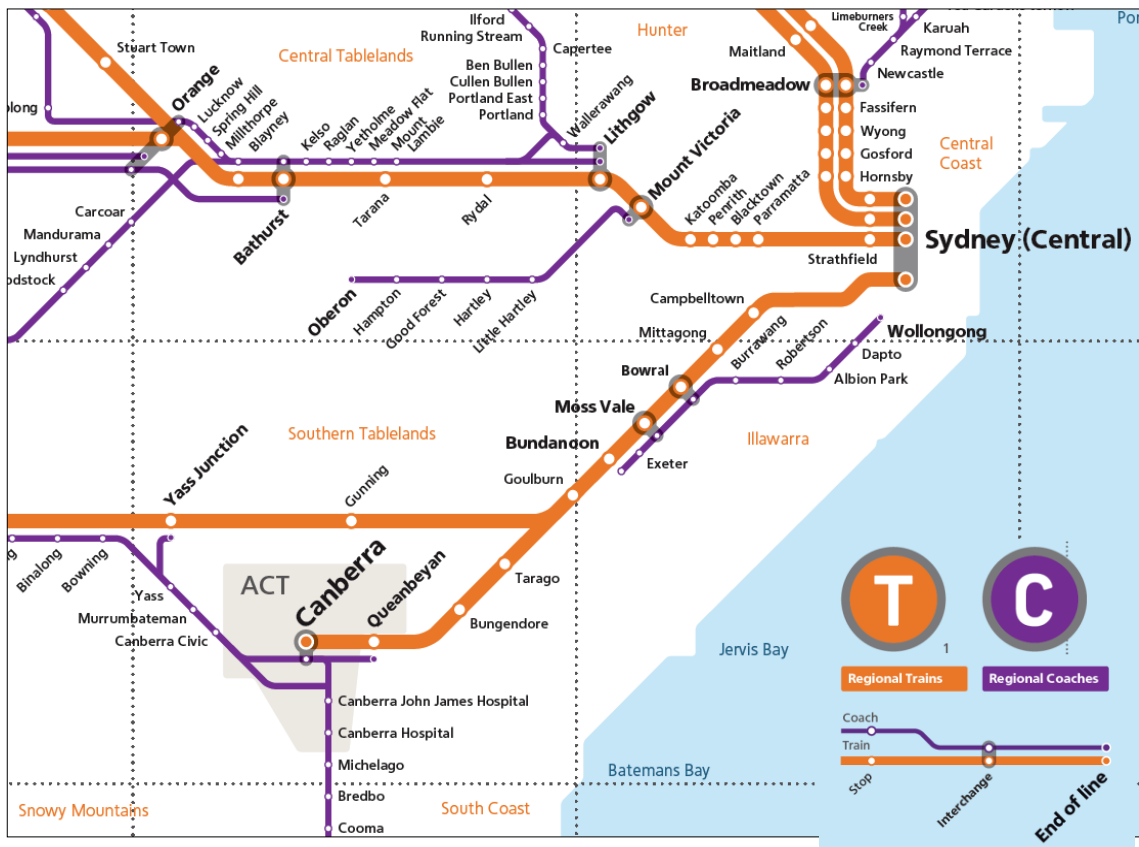
Figure 2.19: Sydney Trains network map



Source: SydneyTrains website

The Southern Highlands line also forms part of the NSW TrainLink Sydney to Canberra rail service. An extract of the NSW TrainLink regional network map is shown in Figure 2.20.

Figure 2.20: NSW Train Link regional network map



Source: NSW TrainLink website

3. Strategic Context

3.1 Federal

Australian National Cycling Strategy 2011-16 (2010)

The National Cycling Strategy was released by Austroads and The Australian Bicycle Council in 2010. The overarching vision for the strategy is to realise a 'step-change' in attitudes to cycling and in the numbers of riders in Australia. In the short term, the strategy sets the goal to double the number of people cycling across the nation over the next five years. The strategy sets out a coordinated framework for the development of cycling in Australia to 2016 under the following priorities and objectives:

- **Cycling Promotion** – Promote cycling as both a viable and safe mode of transport and an enjoyable recreational activity.
- **Infrastructure and Facilities** – Create a comprehensive network of safe and attractive routes to cycle and end of trip facilities.
- **Integrated Planning** – Consider and address cycling needs in all relevant transport and land use planning activities.
- **Safety** – Enable people to cycle safely.
- **Monitoring and Evaluation** – Improve monitoring and evaluation of cycling programs and develop a national decision making process for investment in cycling.
- **Guidance and Best Practice** – Develop nationally consistent technical guidance for stakeholders to use and share best practice across jurisdictions.

3.2 State

NSW Long Term Transport Master Plan (2012)

The NSW Long Term Transport Master Plan sets the framework for the NSW Government to deliver an integrated, modern transport system. The final version of the NSW Long Term Transport Master Plan was released in December 2012 and sets out 220 short, medium and long term actions to integrate, grow, modernise and manage the transport network across NSW.

The Master Plan sets out five key measures related to cycling:

- i Improved access to user-friendly bike trip information.
- ii A long term NSW Cycling Investment Program to improve the planning, management and delivery of cycleway capital programs, supported by design solutions and standards to reflect customer needs.
- iii A program to increase and improve bike parking at public transport interchanges.
- iv A Connected Cycling Network that targets investment in clearly defined cycleways within a five kilometre radius of major urban centres in the short-term and 10 kilometre radius of centres in the longer term.
- v Enhanced cycling routes in regional centres to increase the number of people who cycle.

NSW Bike Plan (2010)

Prior to the release of the NSW Long Term Transport Master Plan, the NSW Bike Plan was the primary bicycle planning document used in NSW and outlined state government plans to deliver a safe and practical bicycle network.

The Plan set out a whole-of-government agenda to promote active transport, with infrastructure and encouragement initiatives coming under five broad headings:

- Create connected cycling networks
- Make bike-riding safe for all
- Plan cycling-friendly neighbourhoods
- Grow jobs in cycling
- Get organisations working together to support bike-riding.

NSW National Parks and Wildlife Service (NPWS) Sustainable Mountain Biking Strategy (2011)

The Office of Environment and Heritage published the NSW National Parks Sustainable Mountain Biking Strategy in September 2011. Mountain biking is rapidly growing in NSW and riders are seeking 'single-track' mountain biking experiences in the national parks. The Sustainable Mountain Biking Strategy sets guidelines for providing high quality mountain biking experiences in NSW National Parks.

The guidelines key elements set out in the strategy include:

- **Quality mountain biking experiences** - Designing tracks to incorporate topography, points of interest, vegetation and wildlife, providing track features which can accommodate novice and experienced riders and providing tracks for mountain biking use only, to avoid conflicts with visitors seeking different experiences within the national parks.
- **Minimal environmental impacts** – Choosing appropriate locations and track designs that will have minimal effects on the surrounding environment, closing tracks during wet weather to prevent environmental impacts, particularly in areas where soil types can be easily eroded.
- **Safety of visitors** – Designing tracks which are safe for all riders, ensuring tracks are well maintained and informing visitors of the safety gear required for mountain bike riding.
- **Communication** – Informing visitors of track location and lengths, and providing maps so riders can choose the mountain bike riding experience they prefer, providing signage throughout tracks to warn riders of upcoming safety hazards and unexpected changes to the tracks.

3.3 Local Plans and Policies

2008 Bicycle Strategy

In 2008 Wingecarribee Shire Council adopted a Bicycle Strategy for the Shire's main centres of Mittagong, Bowral and Moss Vale. This Strategy aimed to make cycling safer, easier and more attractive in the main centres and to provide a comprehensive plan to support physical activity, active living, active ageing and active tourism.

The strategy aims to provide safe cycle routes through and between the Shire's main centres by incorporating a substantial amount of new infrastructure with existing networks. The strategy aims

to cater for all cyclist types and trip types including school students, commuter and recreational cyclists as well as other users who may wish to use cycling infrastructure such as walkers and joggers.

The five key elements of the proposed bicycle network outlined in the 2008 Bicycle Strategy consisted of:

- **Linking Mittagong, Bowral and Moss Vale** – there is a clear need for a continuous shared path from Mittagong to Moss Vale to form the spine for pedestrian and bicycle access between the three towns.
- **Main Feeder Routes** – connecting routes branching off from the demonstration project to link Welby, Willow Vale, Renwick, East Bowral and Burradoo.
- **Local Access Connections** – to link key places of interest such as the schools, pools, playing fields, main shopping areas and main employment areas.
- **Urban Recreational Routes** – to enhance and extend sections of the Bong Bong Track.
- **Regional Links and Tourism Routes** – including the development of the Mittagong to Picton Rail Trail and a series of routes to Berrima.

The Strategy included a 10 year infrastructure implementation plan which categorised works based on a three-tier priority system. Over 29 kilometres of Priority 1 (highest priority) works were identified which included the upgrade of existing routes and the construction of new infrastructure. The total cost of Priority 1 works was estimated to be \$8.2 million on the basis of 50-50 funding with RMS and an allocated Council budget of \$410,000 per annum.

Community consultation undertaken as part of the project identified strong support for the consideration of the needs of other cyclist types, including mountain bikers, BMX riders, road cyclists and track cyclists. The Strategy also identified a range of programs to support increased bicycle usage and participation across the LGA.

A key recommendation was to expand the bicycle strategy to include the whole of the LGA, including other towns, links between towns as well as regional and tourism rides and routes.

Wingecarribee 2031+: Community Strategic Plan (2010)

Wingecarribee 2031+ is the Shire's Community Strategic Plan and presents a blueprint for the future of the Southern Highlands. It represents the vision, aspirations, goals, priorities and challenges for the community.

Goal 3.1 of Wingecarribee 2031+ outlines Council's goals in relation to providing an integrated and efficient transport network across the LGA. The cycling related goals of this plan are summarised in Table 3.1.

Table 3.1: Wingecarribee 2031+ Community Strategic Plan – Cycling Related Goals

Goal #	Goal	Council's Role
3.1.4	Provide safe and efficient road, cycle, and where appropriate, walking paths between and within towns and villages, and conveniently located parking areas for cars and bicycles. Ideally, all road reserves to include provision for safe walking and cycling	Leader
3.1.5	Encourage cycling and walking	Leader
3.1.6	Encourage development that will increase the viability of public transport, cycling and walking infrastructure	Leader and advocate

The plan states that progress in meeting the above goals will be measured by the distance (kilometres) of walking, cycling and shared paths across the LGA.

2013-17 Delivery Program and 2013-14 Operational Plan (2013)

The 2013-17 Delivery Program and 2013-14 Operational Plan were adopted by Council in June 2013.

The Delivery Program sets out the principal activities that Council will undertake across the full range of Council operations over a four year period to 2017. The activities outlined in the Delivery Program directly address the goals and strategies outlined in Wingecarribee 2031+: Community Strategic Plan. Delivery Program Objective 18 (DP18) contains the following objective:

"Provide efficient and safe roads, shared cycle and foot pathways and drainage networks".

The Operational Plan supports the implementation of the Delivery Program and outlines in more detail the individual actions and activities that Council will undertake in the 2013-14 financial year. Operational Plan Program/ Project 113 (OP113) is linked with DP18 and is stated as follows:

"Undertake footpaths, shared paths and cycle ways construction capital works program".

The Operational Plan identifies the following funding sources for OP113:

- Infrastructure Renewal Strategy (IRS)
- Section 94
- Grant funding.

2013-17 Capital Works Schedule

The 2013-17 Capital Works Schedule identifies a total of over \$800,000 for cycleway and walkway works over the five years to 2018 as summarised in Table 3.2. A breakdown of cycleway/walkway works for the 2013-14 financial year is provided in Table 3.3.

Table 3.2: 2013-17 Capital Works Schedule – Cycleway/Walkways

2013-14	2014-15	2015-16	2016-17	2017-18	Total 2013-18
\$52,000	\$187,000	\$187,000	\$187,000	\$191,675	\$804,675

Source: 2013-17 Delivery Program and 2013-14 Operational Plan, pg. 71, [Wingecarribee Shire Council website](#)

Table 3.3: 2013-14 Capital Works Items – Cycleway/Walkway Renewal

Cycleway/Walkway Project	Total Project Cost
Boardman Road Cycleway Renewal	\$15,000
Cycleway Renewal – Funded for Project 3.6.3 [1]	\$32,000
Design Bowral Cycleway Drainage and Lighting Upgrade	\$5,000
Total	\$52,000

[1] No further details for 'Project 3.6.3' are provided in the Delivery Program, Operational Plan or Community Strategic Plan

Source: 2013-17 Delivery Program and 2013-14 Operational Plan, pg. 76, [Wingecarribee Shire Council website](#)

4. Stakeholder Engagement

4.1 Bicycle Strategy Working Group

A working group was established to provide a forum for Councillors, Council officers and Bicycle User Group (BUG) members to discuss issues related to the development of the Stage 2 Bicycle Strategy. The following Wingecarribee Shire Council officers participated in the working group:

- Recreation Planner
- Roads and Traffic Officer
- Sport and Recreation Coordinator.

The key aims of the working group were as follows:

- assist in extending the bicycle strategy to include all towns and villages in the shire
- identify and provide advice on the needs of all bicycle user groups
- provide feedback on proposed routes, designs and constructions methods
- provide feedback on the prioritisation of works for cycleway construction
- provide advice on all matters referred to the working group by Council
- refer any issue with budgetary implications to Council's Finance Committee for a decision.

4.1.1 Key Issues

The key issues arising from the working group in relation to the strategic direction of cycling in the shire are summarised below:

Road Riding

- i **Road shoulder width** – Provision for adequate shoulder width should be incorporated into all council road works and planning. If 80% of a section of road provides sufficient width to accommodate a shoulder lane treatment, then this should be provided.
- ii **Signage strategy** – investigate ways for cycling related signage to become part of a broader vision for the Southern Highlands. Such signage is intended to enhance the bicycle friendly nature of the shire and improve driver awareness of the presence of cyclists on roads across the Southern Highlands.

Mountain Biking

- i Develop off-road riding/ mountain biking options focussing on the needs of three key groups:
 - families
 - juniors
 - adult recreation.
- ii Explore options for utilising existing fire trails.
- iii Mapping and promotion of existing mountain biking facilities.
- iv Define plans for existing mountain bike areas such as Welby and Wingello, and provide support to trail developers.
- v Encourage plans for the development of mountain biking in other areas of the shire such as in Belanglo, Penrose, Meryla and Jellore State Forests.

4.1.2 Secondary Strategies

In addition the key issues identified above, the following were identified by the working group as lower priority strategies for developing cycling across the network:

- **Commuter links** – it is understood that these are generally not feasible at present but will develop along main roads as road shoulder upgrades are implemented. Prioritising cycling along off-road facilities and low traffic speed and volume roads is considered to be a higher priority.
- **Support non-government organisations (NGOs)** who are negotiating with land holders/managers to improve cycling. Where a NGO has a plan which is consistent with a Council policy or strategy, Council could provide written support to other land holders/managers on behalf of the NGO. Private landowners could become part of this planning.
- **Rail Trails** – explore options for developing a bicycle rail trail between Picton and Mittagong using the Loop Line which links with Train Works museum at Thirlmere.

4.2 Shire Tour

A tour of the shire was also undertaken in March 2014 to identify opportunities for developing the bicycle network outside of the main centres. The tour participants included:

- Council's Recreation Planner
- The bicycle strategy consultant team
- Representatives of local cycling groups and local cycling shops.

The tour covered a large proportion of the shire and investigated options for on-road and off-road routes across the shire. Some of the key issues identified through the tour included:

- **Fitzroy Reservoir** – there is a real opportunity to provide a recreational route around Fitzroy Reservoir. Bicycle access around the reservoir is currently restricted, however the reservoir itself is open to the public and is used for water based recreation activities such as sailing and fishing. Liaison with Sydney Catchment Authority is required to explore options for permitting bicycle access.
- **Financial cost of continuous treatments** – due to the significant distances that exist between the towns and villages of the shire, the cost of implementing new infrastructure such as unsealed paths and/ or clearing vegetation can be high.

5. Bicycle Infrastructure Toolkit

This section provides guidance on the different bicycle infrastructure treatments available and when these should be provided. This section aims to assist Council and the public in selecting the infrastructure requirements for cyclists.

5.1 Urban Infrastructure Types

There are a variety of infrastructure types available to planners and designers. Table 5.1 outlines some of the key infrastructure types, which are generally used in urban environments in NSW.

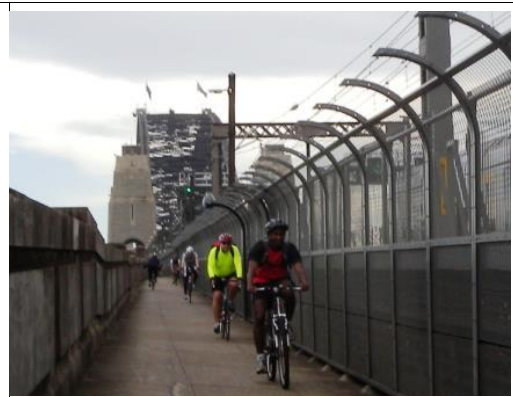
Table 5.1: Urban Bicycle Infrastructure Typology

Two-Way Separated Bicycle Paths (not in the road reserve)

Two-way cycleways are exclusive bicycle paths that are completely separate from parked cars, vehicle traffic and pedestrians. They provide bi-directional travel on one side of the street off-road and in the road reserve. They can also be located in parks and reserves.

This type of facility is highly desirable as it separates cyclists from pedestrians and vehicle traffic and is located outside of the road.

Example: Sydney Harbour Bridge



Two-Way Separated Bicycle Paths (in the road reserve)

Two-way cycleways are exclusive bicycle paths that are completely separate from parked cars, vehicle traffic and pedestrians. These facilities provide bi-directional travel along one side of the road and provide physical separation between cyclists, pedestrians and vehicle traffic.

These facilities often require substantial engineering works to implement which needs to be balanced relative to competing demands for space within the road reserve and construction costs.

*Examples: College Street, Sydney (top)
Epping Road, Lane Cove (bottom)*



Bicycle Lanes

Bicycle lanes are on-road, one-way facilities which designate road space exclusively for cycling which must be legally signposted with bicycle lane signs. In built-up areas, bike-lanes often run adjacent to parked cars and a buffer zone is incorporated to reduce the hazard of drivers opening their car doors. To increase driver awareness, bicycle pavement stencils are often used and green coloured surfacing at intersections.

As bicycle lanes are an on-road facility, they are more likely to encourage more confident cyclists, depending on the speed and volume of traffic in the adjacent traffic lanes.

Bicycle lanes are a low cost facility to implement and maintain. In Wingecarribee Shire there is great opportunity to implement bicycle lanes along local roads and some collector roads within the towns and villages where there is sufficient width to accommodate these.

On many of the sub-arterial and arterial roads in Wingecarribee Shire there is often insufficient road width to implement bicycle lanes and no hard shoulder.

*Examples: Illawarra Highway, Robertson (top)
Longueville Road, Lane Cove (bottom)*



Shared Road Shoulders

Road shoulders are one-way facilities which are shared between parked cars and cyclists. To encourage good parking discipline, it is recommended to add a supplementary broken line, but there is no formal buffer zone to guard from potential hazards such as opening car doors. To increase driver awareness, bicycle pavement stencils are often used and occasionally green coloured surfacing.

*Example: West Street, Crows Nest (top)
Greenwich Road, Greenwich (bottom)*



Mixed-Traffic

Mixed-traffic roads are roads which are linemarked and/or signed for mixed use by motor vehicles and bicycles. Mixed-traffic facilities are suitable for roads with low traffic volumes and speeds, such as quiet residential streets. The main purpose of these facilities is for route guidance and driver awareness of key bicycle routes.

Example: St. Giles Avenue, Greenwich



Shared Paths (in or not in the road reserve)

Shared paths can be located adjacent to a road or through a park or reserve. They are used by both cyclists and pedestrians with linemarking and/or signage designating their legal status as a shared path and helping to encourage safe use by both user groups.

Pedestrians have the right of way on shared paths. There is the potential for conflict between user types when volumes of pedestrians and cyclists are high or when the path width is narrow.

This type of facility attracts cyclists of all abilities and can generally be implemented wherever there is sufficient width to accommodate a 3.0m wide path. Wider paths may be required depending on the volume of cyclists and pedestrians.

There is great opportunity to implement shared paths across Wingecarribee Shire.

*Examples: Bong Bong Track, Bowral (top)
Railway Parade, Burradoo (bottom)*



General Traffic

No specific provisions are made for cyclists. Although most residential streets are suitable for cycling, others are unsafe due to high traffic volumes and speeds.

Example: Kangaloon Road, Glenquarry



5.1.1 Infrastructure to meet user needs

Different infrastructure types are suited to cyclists differing range of abilities. Figure 5.1 summarises cyclists preference for different infrastructure types and provides guidance on what proportion of cyclists are comfortable using these different types.

Figure 5.1: Bicycle Infrastructure to match customer needs



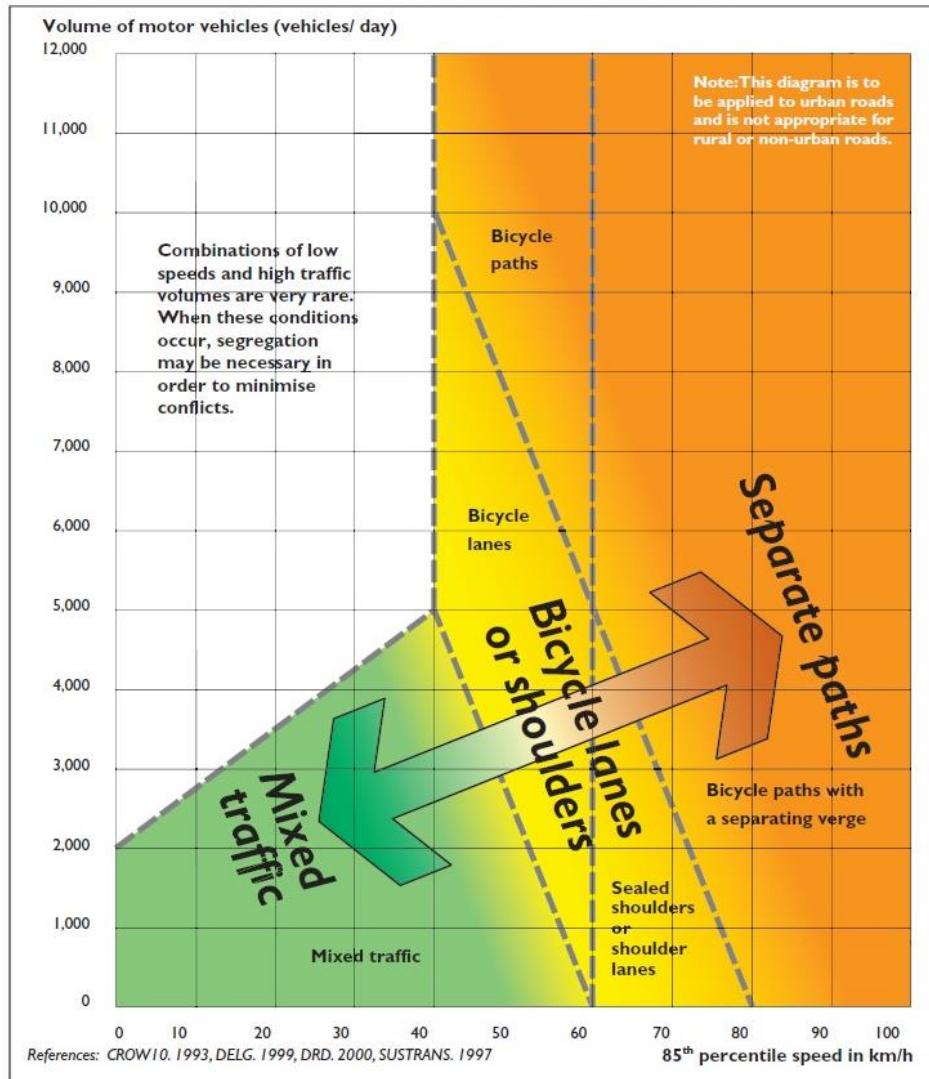
Source: [Sydney's Cycling Future](#), Figure 5, pg. 12 (Transport for NSW, 2013)

5.1.2 When is separation from vehicles recommended?

For on-road, urban bicycle facilities, selection of the appropriate infrastructure treatment is primarily determined by the speed and volume of vehicles on the road. Figure 5.2 provides guidance on the selection of infrastructure types for urban roads based on traffic speed and volumes. This graph should be referred to when planning future urban bicycle routes in Wingecarribee Shire. For rural roads, such as those outside of the main centres, application of this graph is not entirely appropriate and it is provided for reference purposes only.

RMS guidance (Figure 5.2), and guidance from other jurisdictions in Australia and internationally, almost universally recommend a bicycle path physically separated from vehicles where traffic speeds are 80km/h and above.

Figure 5.2: Separation of bicycles and vehicles according to traffic speed and volume on urban roads



Source: NSW Bicycle Guidelines, Figure 3.2, pg. 13 (RMS, 2003)

5.2 High Speed Rural Road Treatments

Providing bicycle facilities on rural roads is challenging due to the high vehicle speeds (generally with speed limits of 70km/h or above) and often physical constraints of the road reserve. International guidelines and practice in 'cycling' countries such as the Netherlands and the UK provide cyclists with paths separated from high speed traffic. A summary of international practice is provided in Table 5.2.

Table 5.2: International practice in providing for cyclists on high speed roads

Country	Practice	Reference
UK	Where the 85 th percentile speed is greater than 40 mph (64.4 km/h), segregated bicycle facilities (tracks/paths) should generally be provided. For high speed roads with low traffic volumes (less than 3,000 vehicles per day/less than 300 vehicles in the typical AM peak hour), on-road bicycle lanes may also be considered.	TfL (2005)
Germany and Denmark	Provision of fully integrated off-road paths and bicycle lanes along roads and at intersections in cities and surrounding areas.	Pucher and Buehler (2008)
The Netherlands	Cyclists should always be separated from high speed traffic by providing a separate path or alternative (cycling) route. Consideration should also be given to lowering traffic speeds.	CROW (2007)
New Zealand	On urban roads with a speed limit of 80 km/h or more, cycle paths should be provided. Where speed limits are 70 km/h, sealed shoulders may be acceptable where there are fewer than 2,000 vehicles per day.	LTSA (2004)

Source: Austroads Research Report – Cycling on Higher Speed Roads (AP-R410-12), Table 2.1, pg. 7 (Austroads, 2012)

In Australia and New Zealand guidelines and practices for higher speed roads vary between jurisdictions. However, the majority of jurisdictions are providing more off-road paths along urban motorways and generally sealed shoulders along high speed rural roads. The NSW Bicycle Guidelines (RMS, 2003) are focused primarily on providing guidance for the design of cycling facilities in urban environments.

High speed roads present an increased safety risk to all road users including cyclists. There are inherent risks where cyclists and high speed vehicles share road space, primarily due to:

- the high differential in operating speeds between cyclists and vehicles
- increase in crash severity
- often large amount of heavy vehicle traffic.

Providing off-road paths as an alternative to on-road facilities on higher speed rural roads as is done in the Netherlands and the UK is often not feasible in NSW due to the high financial cost, long distances of facilities required and land ownership issues.

As cycling is a legitimate transport mode and cyclists are legally permitted to use roads, there is a need to improve facilities and conditions for cyclists riding on-road in higher speed rural roads, such as those outside the main centres of Wingecarribee Shire. Techniques for improving space and conditions for cyclists on high speed rural roads can be infrastructure related as well as non-infrastructure related and can include:

- **Providing an alternative route** – such as using a lower speed route
- **Reducing the speed limit**
- **Technology** – such as providing bicycle activated signs to alert drivers to the presence of cyclists
- **Using non-infrastructure solutions** – such as education (advertising campaigns), enforcement (policing) and encouragement programs (behaviour change).

On-road treatments for cyclists on higher speed rural roads include:

- **Exclusive bicycle lanes** – these should be a minimum of 2 metres wide
- **Sealed road shoulders (Figure 5.3)** – similar to bicycle lanes, sealed shoulders should be a minimum of 2 metres wide with additional width provided where there is a large number of heavy vehicles.

Figure 5.3: Typical motorway sealed shoulder treatment (Princes Motorway)



5.3 Road Shoulders

Road shoulders are provided to carry out two key functions; traffic and structural. Structurally road shoulders provide lateral support to the road pavement. In terms of traffic, road shoulders serve several key functions by providing:

- operating space for cyclists outside of the vehicle travel lanes
- a refuge for stopped vehicles on a firm surface, a safe distance from the adjacent traffic lanes
- an initial recovery area for an errant vehicle
- clearance to lateral obstructions.

The minimum sealed width requirements for road shoulders are outlined in *Austrroads Guide to Road Design, Part 3 – Geometric Design*. The width requirements vary depending on the intended function and road type as summarised in Table 5.3 and Table 5.4 respectively.

Table 5.3: Minimum Sealed Shoulder Widths (Austroads Guide to Road Design, 2010)

Function of shoulder	Minimum sealed width (m)
Lateral support of pavement	0.5
Control of moisture or on outside of curves	1.0
Initial recovery area	0.5
Discretionary stopping	
Cars	2.5
Trucks	3.0
Bicycle demand	2.0/3.0

Source: Austroads Guide to Road Design, Part 3 – Geometric Design, Table 4.7, pg. 38 (Austroads, 2010)

Table 5.4: Minimum Sealed Shoulder Widths (based on information contained in Austroads Guide to Road Design, 2010)

Road type	Minimum sealed shoulder width
Urban freeway	Between 2.0 and 3.0 m (3.0 m allows enough room for a truck to pull off clear of the traffic lane) 3.0 m adjacent to a safety barrier or on a freeway with 3 or more lanes
Rural road - single carriageway	Between 0 and 1.5 m, increasing with increasing traffic volumes
Rural road - divided carriageway	1.5 m where design AADT < 20,000, or 2.5 m if it is beside safety barriers and on the high side of superelevation 3.0 m where design AADT > 20,000, or 3.0 m if it is beside safety barriers and on the high side of superelevation
General	A minimum of 0.5 m where AADT < 1,000 Consideration should be given to sealing the full width of the shoulder under certain conditions (see p. 38 of Austroads AGRD03 2009a for a more extensive list) A minimum of 2.0 to 3.0 m to cater for bicycles

Source: Austroads Research Report – Cycling on Higher Speed Roads (AP-R410-12), Table 3.5, pg. 17 (Austroads, 2012)

As shown in Table 5.4, for single carriageway, rural roads, *Austroads Guide to Road Design* recommends a minimum sealed shoulder between of 0 and 1.5 metres, increasing with traffic volumes.

As shown in Table 5.4, *Austroads Guide to Road Design* recommends a minimum sealed shoulder width of 2.0 – 3.0 metres, depending on bicycle demand. The Austroads guide also notes that a shoulder width of 2.5 metres is needed for a passenger vehicle to stop clear of the traffic lanes. An example of a typical road shoulder arrangement is shown in Figure 5.4.

Where sealed road shoulders are of sufficient width to permit cycling (i.e. wider than 2.0 metres), signage and PS-2 bicycle logos can be used to designate the shoulder's shared use for motor traffic and cycling, and to increase driver awareness. An example of such a treatment is shown in Figure 5.3.

While for the purposes of cycling it is desirable to seal road shoulders where a width of 2.0 metres can be achieved, such treatments have high financial cost as all road shoulders need to be constructed to cater for heavy vehicle usage.

Figure 5.4: Typical motorway with sealed road (Hume Highway)



Source: RMS website

Edge Lines

Where sealed road shoulders are provided edge lines are used at the edge of the traffic lane to distinguish the traffic lane from the shoulder. These markings reduce the likelihood of moving traffic travelling in the road shoulder. The requirements for providing edge lines are contained in the *Australian Standard – Manual of uniform traffic control devices, Part 9: Bicycle Facilities (2009)* and vary depending on the road type as summarised in Table 5.5.

Table 5.5: Requirements for marking edge lines on rural roads (based on information contained in AS1742.9 2009)

Road type	Divided?	Further description	Requirements regarding edge lines
Rural	No	Sealed pavements less than 5.5m wide	Edge lines shall not be used
		Sealed pavements between 5.5m and 6.8m wide	Edge lines are generally not used unless the conditions are poor (e.g. poor alignment, frequent fog, etc). Edge lines shall not be used unless: a dividing line is also marked and the lane widths within the edge lines are at least 3.0m or if there is a high proportion of heavy vehicle traffic, 3.2m There are some exceptions, for example at localised pavement narrowing.
		Sealed pavements 6.8m wide or greater	Edge lines are normally required
	Yes	Including rural expressways	Edge lines shall be marked

Source: Austroads Research Report – Cycling on Higher Speed Roads (AP-R410-12), Table 3.4, pg. 16 (Austroads, 2012)

5.4 Advisory Bicycle Lanes

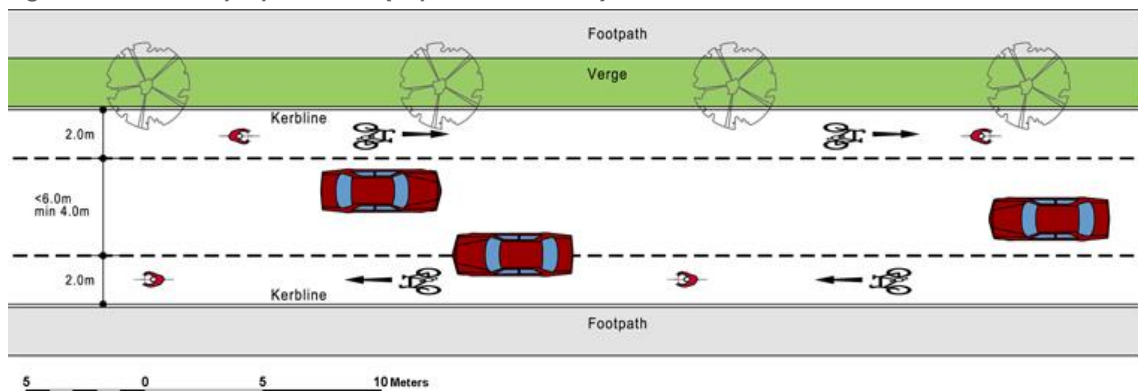
Advisory bicycle lanes (also known as suggestion lanes) are semi-formal facilities which indicate an area of the carriageway that is intended for the use by cyclists and is delineated from the adjacent traffic lane by a 'broken' longitudinal line with gaps. Motorists are advised, but not required to keep out of advisory cycle lanes, unlike formal bicycle lanes. Contrasting coloured pavement is often used on bicycle advisory lanes to improve delineation. Parking is not permitted in advisory cycle lanes.

Advisory cycle lanes are used where there is insufficient road width to provide formal bicycle lanes (which are delineated from the adjacent traffic lane by a continuous line with no gaps.) On roads with advisory cycle lanes, no centre line is provided, resulting in vehicles generally travelling in the centre of the carriageway. When vehicles from opposing directions pass one another, they can enter the bicycle lane where it is safe to do so. As such advisory cycle lanes are shared by cyclists with vehicles.

Advisory cycle lanes also give the perception that the carriageway is narrower than it is which in turn functions as method of traffic calming by reducing vehicle speeds.

Advisory cycle lanes are used widely on urban and rural roads in the US and Europe, and in particular in the UK, Netherlands, Denmark and the Republic of Ireland. The Netherlands mainly utilise shared bicycle lanes on narrow urban and rural collector roads with low to moderate traffic to allow roads to remain two-way and still provide bicycles with a safe lane of travel. An example layout of advisory cycle lanes contained in the National Cycle Manual of Ireland is shown in Figure 5.5.

Figure 5.5: Advisory Cycle Lanes (Republic of Ireland)



Source: National Cycle Manual – Ireland, Section 4.3.2.2, pg. 56 (National Transport Authority, 2011)

There is little formal guidance on the use of advisory cycle lanes in Australian jurisdictions. In NSW, bicycle shoulder lanes would be the most similar facility with the shared use status being indicated by bicycle logos (PS-2) and solid edgelines rather than unbroken lines.

Examples of advisory cycle lanes from The Netherlands are shown in Figure 5.6 to Figure 5.8.

Figure 5.6: Advisory cycle lanes (S. V. D. Oyeweg, Pijnacker, Delft, The Netherlands)



Source: Ellison and Gray (2011), [google maps link](#)

Figure 5.7: Advisory cycle lanes (Adriaan Pauwstraat, Delft, The Netherlands)



Figure 5.8: Advisory cycle lanes (Westplantsoen, Delft, The Netherlands)



Source: Ellison and Gray (2011), Figure 5.7 - [google maps link](#), Figure 5.8 - [google maps link](#)

In many respects vehicle movements on roads with advisory cycle lanes are similar to historical rural road environments in NSW whereby a 3.7 metre wide sealed road width was provided and drivers would use unsealed shoulders to pass oncoming traffic.

On many roads in rural areas of NSW (including Wingecarribee), traffic volumes do not exceed 150 vehicles per day (Average Annual Daily Traffic, AADT). In such environments, current Australian guidance permits the use of single lane carriageways with a minimum width of 3.7 metres. A carriageway width of less than 3.7 metres can result in excessive shoulder wear. A carriageway width greater than 4.5 metres but less than 6.0 metres may lead to two vehicles attempting to pass while remaining on the seal, potentially resulting in head-on accidents. The

width requirements for single carriageway rural roads are contained in *Austrroads Guide to Road Design Part 3: Geometric Design* and are summarised in Table 5.6.

Table 5.6: Single carriageway rural road widths (metres)

Element	Design AADT				
	1 – 150	150 – 500	500 – 1,000	1,000 – 3,000	> 3,000
Traffic lanes ⁽¹⁾	3.7 (1 x 3.7)	6.2 (2 x 3.1)	6.2 – 7.0 (2 x 3.1/3.5)	7.0 (2 x 3.5)	7.0 (2 x 3.5)
Total shoulder	2.5	1.5	1.5	2.0	2.5
Minimum shoulder seal ^{(2),(3),(4),(5),(6)}	0	0.5	0.5	1.0	1.5
Total carriageway	8.7	9.2	9.2 – 10.0	11.0	12.0

1. Traffic lane widths include centre-lines but are exclusive of edge-lines.
2. Where significant numbers of cyclists use the roadway, consideration should be given to fully sealing the shoulders. Suggest use of a maximum size 10mm seal within a 20 km radius of towns.
3. Wider shoulder seals may be appropriate depending on requirements for maintenance costs, soil and climatic conditions or to accommodate the tracked width requirements for Large Combination Vehicles.
4. Short lengths of wider shoulder seal or lay-bys to be provided at suitable locations to provide for discretionary stops.
5. Full width shoulder seals may be appropriate adjacent to safety barriers and on the high side of superelevation.
6. A minimum 7.0 m seal should be provided on designated heavy vehicle routes (or where the AADT contains more than 15% heavy vehicles).

Source: *Austrroads Guide to Road Design Part 3: Geometric Design*, Table 4.5, pg. 35 (Austrroads, 2010)

5.4.1 Conformance with the Australian Road Rules

A review of the current version of the *NSW Road Rules 2008* (21 March 2014) indicates there are no road rules that would prevent the implementation of advisory cycle lanes. The following road rules are of particular importance with respect to advisory cycle lanes:

- **150 Driving on or across a continuous white edge line**
(1A) A driver may drive on or over a continuous white edge line on a road if the driver is:
 - (e) avoiding an obstruction.*
- **129 Keeping to the far left side of a road**
 - (1) A driver on a road (except a multi-lane road) must drive as near as practicable to the far left side of the road.*
 - (2) This rule does not apply to the rider of a motor bike.*
 - (3) In this rule –*
road does not include a road-related area.
Note: Road related area includes the shoulder of a road

Schedule 4 of the *NSW Road Rules* provides the following definition of an obstruction:

“obstruction includes a traffic hazard, but does not include a vehicle only because the vehicle is stopped in traffic or is travelling more slowly than other vehicles.”

In developing the Stage 2 Bike Plan for Wingecarribee Shire, consultation with the Queensland Department of Transport and Main Roads (TMR, the equivalent of NSW RMS), was undertaken in relation to the legality of advisory cycle lanes. A preliminary assessment by the Transport Regulation Branch of TMR indicates that under the Queensland Road Rules (*Transport Operations (Road Use Management-Road Rules) Regulation 2009*), advisory cycle lanes are permissible. Both road rule 150 (1A) and the definition of obstruction are identical in the respective road rule legislation in both jurisdictions.

5.4.2 International Guidance

International guidance on advisory cycle lanes varies between countries. The below section summarises key international guidance on the use of advisory bicycle lanes.

United Kingdom

The primary guidance document for bicycle facilities design in the UK is *Local Transport Note 2/08 (LTN 2/08) Cycle Infrastructure Design* (Department for Transport, 2008). LTN 2/08 provides the following guidance on the use of advisory cycle lanes:

- used to signify that vehicles other than cyclists should not enter the lane unless it is safe to do so
- not recommended where they are likely to be blocked by parked vehicles
- are useful treatments across intersections to help raise driver awareness of the likely presence of cyclists.

Table 5.7 summarises the guidance for advisory cycle lanes prepared by Transport for London (TfL) based on half-carriageway width. It is important to note that cycling is not permitted on motorways in the UK.

Table 5.7: Options for advisory cycle lanes on two-way roads based on half-carriageway width (TfL)

	Half-road width (m)	Minimum cycle lane width (m)	General traffic lane width (m)	Notes	Drawing number
No parking/loading	3.5-4.4	1.5	2.0-2.9	2-way motor vehicle flows<5000vpd 30mph max speed limit	CCE/B6
	3.5-4.0	1.5	2.0-2.5	2-way motor vehicle flows<5000vpd 30mph max speed limit with central refuge/islands Diag 1010 marking alongside refuge/islands	CCE/B7
	≥4.0	1.5	≥2.5		CCE/B7
	4.5-5.0	1.5-2.0	≥3.0	All cases (mandatory lanes preferred)	-
With parking/ loading bay 1.8m wide	5.3-6.3	1.5-2.0	2.0-2.5	2-way motor vehicle flows<5000vpd 30mph max speed limit Coloured surface lane only with no road markings – minimum width of 1.5m	CCE/B9
	≥6.3	1.5 plus 0.5m gap to parking bay	≥2.5	2-way motor vehicle flows<10000vpd 30mph max speed limit	CCE/B9

Notes:

1. Lane widths are measured from kerb face to centreline of markings
2. Cycle lanes on roads with 40mph or higher speed limit should preferably be wider than 1.5m

Source: London Cycling Design Standard, Chapter 4, Figure 4.6, pg. 67 (TfL, 2005)

Republic of Ireland

The *National Cycle Manual* (2011) provides the following guidance on the use of advisory cycle lanes in the Republic of Ireland:

- advisory cycle lanes are to be a minimum of 2.0 metres wide
- the adjacent carriageway is to be a minimum of 4.0 metres wide and less than 6.0 metres wide where traffic flow is two-way
- road centrelines shall not be provided
- the maximum speed limit shall be 50 km/h or less
- most effective where there is no demand for kerbside parking

- coloured surfacing is only required at conflict points or where an area may be confused with on-street parking
- only to be used in exceptional circumstances where formal bicycle lanes are inappropriate.

The Netherlands

The CROW *Design Manual for Bicycle Traffic* is the comprehensive guide for the planning and design of bicycle facilities the Netherlands. The most recent English language version of the manual was published in 2007. Section 5 of the CROW manual outlines that advisory cycle lanes are an appropriate treatment where:

- the speed limit is 60 km/h or less
- the road has less than 3,000 vehicles per day and less than 300 vehicles per hour
- edge lines should be marked along the edge of the sealed road pavement no more than 0.3 metres from the road edge.

It is noted that the Dutch guidance related to maximum vehicle volumes for roads where advisory cycle lanes are appropriate is 3,000 vehicles per day. This volume is higher than that provided in Austroads for single carriageway roads (Table 5.6) of 150 vehicles per day where no sealed shoulder is provided.

5.4.3 International Research

The majority of research related to the planning, design and implementation of advisory cycle lanes in rural road environments originates from Europe. The below section summarises the implementation of advisory cycle lanes on rural roads in The Netherlands and Sweden.

Apeldoorn, The Netherlands¹

The research from Apeldoorn noted that the crux of advisory cycle lanes was the method of how to mix bicycles and vehicles in a safe manner which directly related to three key parameters:

- vehicle speed
- vehicle volumes
- physical size differential (i.e. difference in size between cyclists and heavy vehicles).

Reducing the speed of the motorised traffic should not be done radically. The low profile speed humps used in Apeldoorn, The Netherlands (Figure 5.9) on roads with a speed limit of 60 km/h can be negotiated comfortably by vehicles travelling at or below the speed limit. These speed humps are typical in height (100mm above the pavement) but the ramps extend up to 5.0 metres in length. Such low profile speed humps with extended ramp lengths enable good rideability for cyclists.

Reducing vehicular traffic volumes is difficult and often requires considerable effort to persuade drivers to choose alternate routes. When the volumes are too high, it is necessary to consider segregated cycle paths with a physical segregation from motorised traffic. Sometimes there is a need to consider both speed and volume reductions.

No formal evaluation was carried out, but private communications with the project manager are summarised in Table 5.8.

¹ Mulder, W., 2012, Private email correspondence to D van den Dool, 26 May 2012.

Figure 5.9: 60km/h speed hump - Engelandersholt, Apeldoorn, The Netherlands



Table 5.8: Advisory rural cycle lanes - before and after traffic patterns, Apeldoorn, The Netherlands

Parameter	Before	After
Hoog Buurloseweg		
Traffic Calming and Cycling	-	Stage 1) 60km/h speed humps Stage 2) two-way shared path, separated from the road
Traffic Volume	2,500 vehicles per day	2,500 vehicles per day
Bicycle Volumes	not provided, mainly recreational/ weekend cyclists	
Speed Limit	80 km/h	60 km/h
Speed Travelled	100 km/h	65 – 70 km/h
Engelandersholt (Figure 5.9)		
Traffic Calming and Cycling	-	60km/h speed humps spaced at 300-500m, red bicycle (suggestion) lanes , single car lane for two way traffic [1]
Traffic Volume	3,000 vehicles per day	3,000 vehicles per day
Bicycle Volumes	150 cyclists per day (commuters)	150 cyclists per day (commuters)
Speed Limit	80 km/h	60 km/h
Speed Travelled	80 – 100 km/h	65 – 70 km/h

[1] Research by Fietsberaad indicates bicycle lanes could be considered for rural roads that are 5.80 - 7.90 metres wide, with bicycle lanes to be a minimum of 1.70 metres wide. Where there are no bicycle lanes, edge lines should be less than 0.25 metres from the pavement edge, so that cyclists do not erroneously use the shoulder.

Skåne, Sweden

The Swedish Transport Administration (Trafikverket) conducted trials of advisory bicycle lanes on two rural roads, including before and after traffic surveys and user interviews. Similar to NSW, advisory lanes in Sweden are classified as road shoulders (i.e. "vägren"), the key parameters of which include:

- Pavement width – 6 metres
- Bicycle lane width - 1.25 metres
- Vehicle travel lane width (two-way) - 3.5 metres
- Speed limit – 70 km/h
- Vehicle volumes – 1,500 vehicles per day.

The travel lane is designed to carry traffic in both directions, i.e. one lane for two way traffic, with vehicles using both shoulders to pass. This is akin to historical rural road environments in NSW with very low volumes, where the main carriageway is sealed and the shoulders are gravel. Two sites were investigated as shown in Figure 5.10 and Figure 5.11.

The results of the formal before and after evaluation are summarised in Table 5.9.

Figure 5.10: Road #1145, Asmundtorp to Häljarp, Sweden - after traffic calming



Figure 5.11: Road #959, Södra Sandby to Flyinge, Sweden - after traffic calming

Table 5.9: Advisory rural cycle lanes - before and after traffic patterns, Skåne, Sweden

Parameter	Before	After
Road #1145, Asmundtorp to Häljarp (Figure 5.10)		
Traffic Calming and Cycling	-	bicycle suggestion lanes (road shoulders)
Traffic Volume	864 [1]	848 [1]
Bicycle Volumes	56 [1]	56 [1]
Speed Limit	70 km/h	
Speed Travelled – 85 th %ile		
- cars	80.0 km/h	80.0 km/h
- trucks	73.2 km/h	71.1 km/h
Lateral Clearance		
- car to bike	-	-
- bike to berm	-	-
Crashes	5 (5 years to 2010)	4 (22 months to August 2013)
Road #959, Södra Sandby to Flyinge (Figure 5.11)		
Traffic Calming and Cycling	-	bicycle suggestion lanes (road shoulders)
Traffic Volume	1,745 vehicles per 16 hours	1,426 vehicles per 16 hours
Bicycle Volumes	49 bicycles per 16 hours	56 vehicles per 16 hours
Speed Limit	70 km/h	70 km/h
Speed Travelled – 85 th %ile		
- cars	75.5 km/h	75.0 km/h
- trucks	70.7 km/h	62.8 km/h
Lateral Clearance		
- car to bike	2.3 metres	2.9 metres
- bike to berm	0.45 metres	0.86 metres
Crashes	4 (5 years to 2010)	0 (22 months to August 2013)

[1] Calculated from average hourly flows

5.5 One Metre Matters

5.5.1 Queensland Minimum Passing Distance Laws (2014)

A recent Queensland parliamentary inquiry by the Transport, Housing and Local Government Committee investigated ways to improve the interaction between cyclists and other road users. The Committee's report ([Report No. 39 'A new direction for cycling'](#), November 2013) made 68 recommendations to improve interactions between motorists and cyclists, and also the safety of cyclists on the road.

Following the parliamentary inquiry, new legislation was introduced in Queensland related to the minimum passing distance for cyclists riding on-road. On 7 April 2014 the new legislation came into force where, by law, motorists must stay wider of a cyclist riding on-road by giving:

- a minimum of 1.0 metre when passing cyclists in a speed zone of 60km/h or less; and
- 1.5 metres where the speed limit is over 60km/h.

Under the law motorists can cross centre lines (including double unbroken centre lines), straddle lane-lines and drive on painted islands to pass cyclists, provided the driver has a clear view of any approaching traffic and it is safe to do so. Motorists who break the rule will receive three demerit points and a fine of \$330. A maximum fine of \$4,400 can apply if the matter goes to court.

The law applies to all vehicles on the road including motorcycles, heavy vehicles and public transport vehicles.

These new road rules will initially be trialled over two years. This law is the first of its kind in Australia and will road-test the impact the rules have on saving lives.

Many cyclist fatalities on the road are caused by cyclists being hit from behind by vehicles travelling in the same direction. Introducing a minimum distance for passing cyclists is intended to reduce confusion about how much space is safe when passing a cyclist and to raise awareness of the vulnerability of cyclists on the road.

5.5.2 Amy Gillett Foundation

The [Amy Gillett Foundation](#) is a charity with one purpose – to reduce the incidence of death and injury amongst bike riders. The foundation is a strong supporter of the [metre matters](#) campaign and the introduction of minimum passing distance laws across all jurisdictions in Australia. The foundation is calling on the same minimum passing distances that are now in force in Queensland:

- a minimum of 1.0 metre when passing cyclists in a speed zone of 60km/h or less; and
- 1.5 metres where the speed limit is over 60km/h.

5.5.3 Summary

Educational campaigns such as one metre matters are important tools in encouraging behavioural change amongst motorists. The one metre matters campaign is particularly pertinent on the roads outside of the shire's main centres.

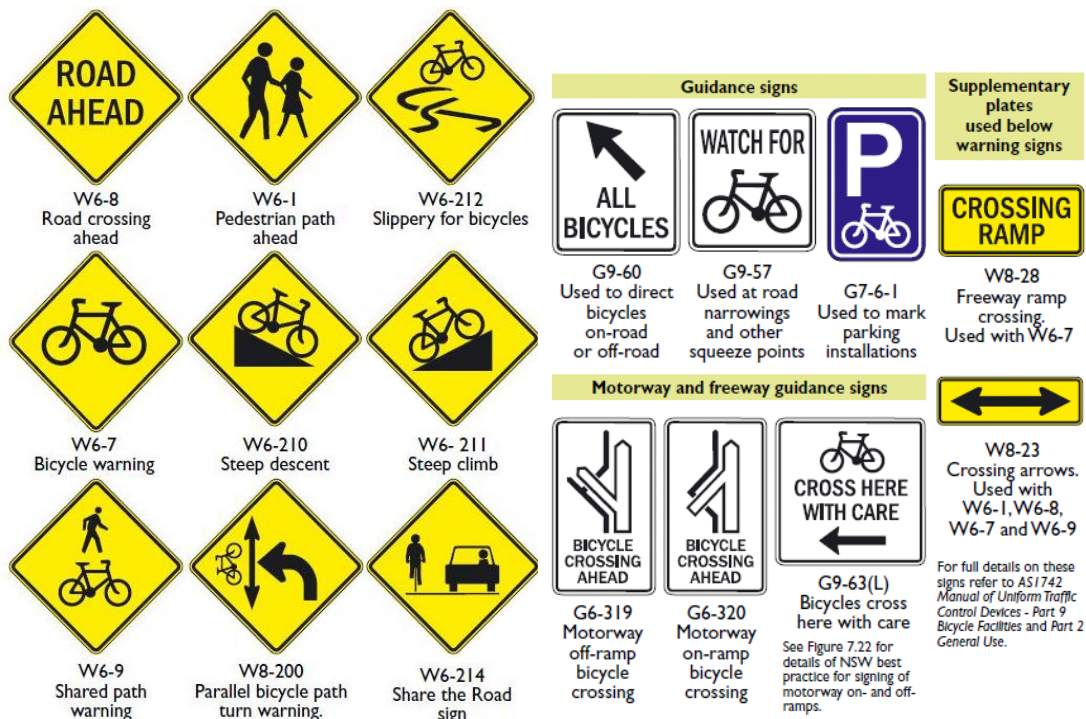
5.6 Increasing Driver Awareness

Increasing driver awareness of the presence of cyclists is important for improving the safety of on-road cyclists. There is currently few bicycle warning signs (W6-7, Figure 2.9) or share the road signs (W6-214) in place across the shire. This factor, coupled with the lack of dedicated on-road bicycle infrastructure results in a road environment whereby many motorists are not anticipating encountering cyclists, let alone groups of training cyclists which can be found across the shire.

5.6.1 Static Signage

Providing bicycle warning signage on key on-road routes and in particular those popular with bunch riders/ training cyclists will increase driver awareness of the presence of cyclists. Such signage also assists to legitimise cyclists riding on-road. Bicycle facility warning and guidance signage used in NSW are shown in Figure 5.12.

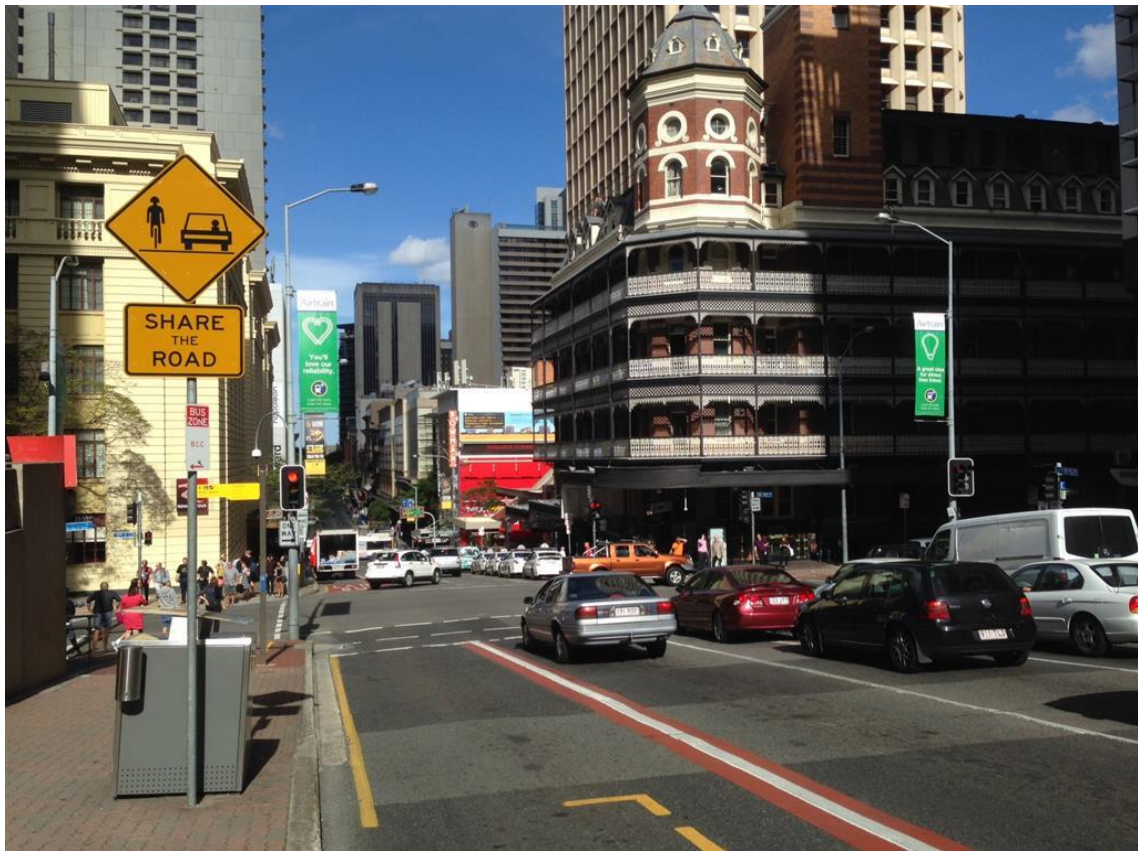
Figure 5.12: Warning and Guidance Signage for Bicycle Facilities



Source: NSW Bicycle Guidelines, Figure 9.2, pg. 71 (RMS, 2003)

Of the warning signs shown in Figure 5.12, the bicycle warning sign (W6-7) and the share the road sign (W6-214) are the appropriate signs for use on the roads outside the shire's main centres. Such signs are used extensively across Australia. An example of the share the road sign (W6-214) is shown in Figure 5.13.

Figure 5.13: Share the road warning signage (Edward Street, Brisbane)



5.6.2 Electronic Bicycle Activated Warning Signs

Electronic bicycle activated warning signs have recently been installed at several locations in Australia and New Zealand to increase driver awareness of the presence of cyclists. The sign illuminates the LED warning sign once activated by a cyclist, generally using induction loops under the carriageway.

Such signs have been used at physically constrained locations such as on bridges, where bicycle lanes are present on approach but due to the limited road width it is not possible to provide formal bicycle lanes across the bridge. An example of electronic bicycle activated warning sign from Noosa in Queensland is shown in Figure 5.14 to Figure 5.17, with an example from Appleby, New Zealand shown in Figure 5.18.

The Noosa example features:

- solar power (Figure 5.14 and Figure 5.15)
- bicycle induction loops located under the carriageway (Figure 5.16) which detect bicycle movements, activating the sign
- push button for manual call-up (Figure 5.17).

There is significant opportunity for the implementation of such signs on roads which connect the towns and villages of the shire. Solar powered versions offer a cost-effective solution where cabling to supply mains power is unnecessary.

Figure 5.14: Bicycle activated warning sign – Noosa Parade, Noosa, Queensland



Figure 5.15: Bicycle activated warning sign – Noosa Parade, Noosa, Queensland



Figure 5.16: Bicycle activated warning sign induction loops – Noosa Parade, Noosa, Queensland

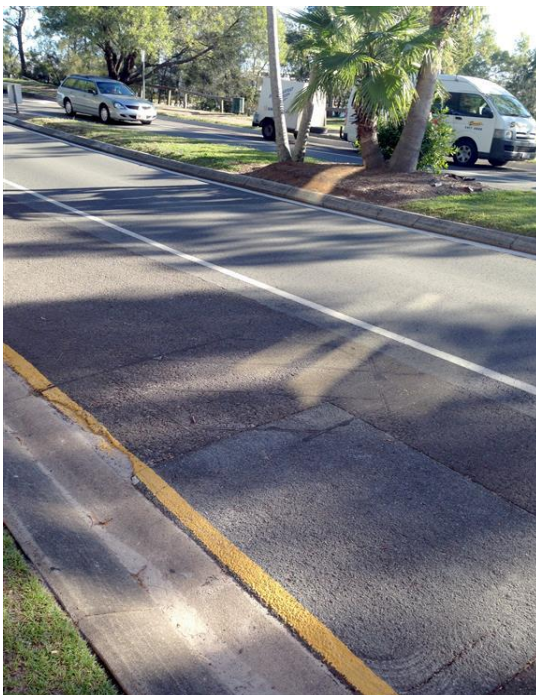


Figure 5.17: Bicycle activated warning sign push button – Noosa Parade, Noosa, Queensland



Photo Source: Noosa Council. [Google maps link](#)

Figure 5.18: Bicycle Activated Warning Sign - Waimea River Bridge, Appleby (Tasman District Council)



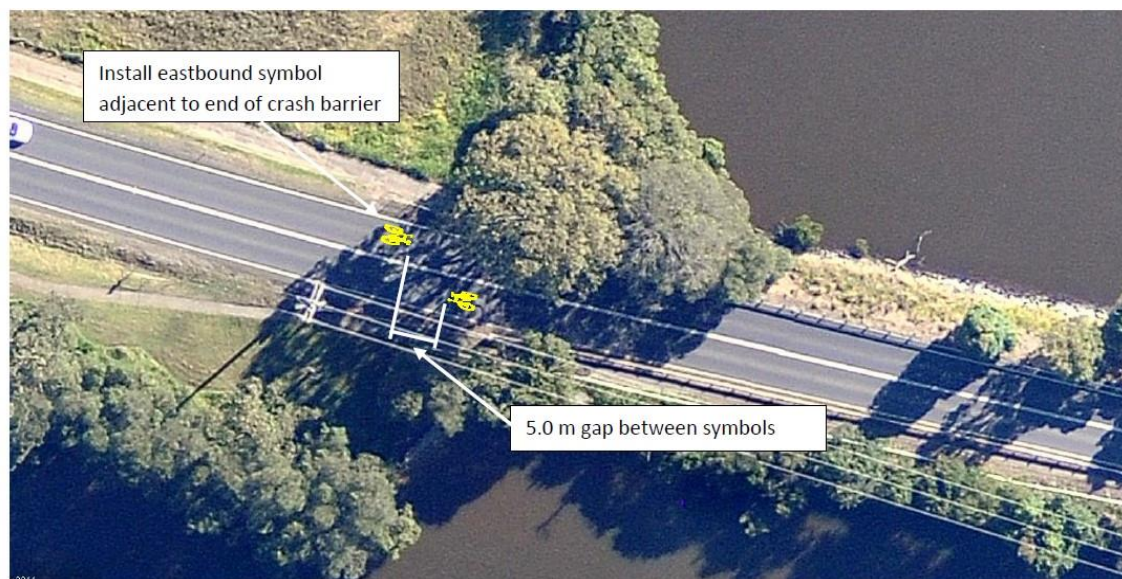
Source: Australian Bicycle Council

5.7 Bicycle Awareness Zone Pavement Symbols

Bicycle awareness zones are treatments used to highlight the presence of cyclists at locations where cyclists transition from road shoulders to the vehicle travel lane. Such treatments generally use linemarking and signage to highlight the presence of cyclists at specific locations and are used in both urban and rural road environments.

There is real opportunity to implement bicycle awareness zone treatments across Wingecarribee Shire at locations where road shoulders terminate, such as at bridges, culverts and adjacent to safety barriers. At these squeeze point locations, there is generally not a viable alternative route and cyclists are forced to merge into the vehicle travel lane. Bicycle awareness zones are used specifically to increase driver awareness of the transition of cyclists from the road shoulder to the vehicle travel lane. An example of bicycle awareness zones used at the Eudlo Creek Bridge, David Low Way near Bli Bli on Queensland's Sunshine Coast is shown in Figure 5.19. Further details of the treatment are contained in Appendix C.

Figure 5.19: Bicycle Awareness Zone example – Eudlo Creek Bridge, David Low Way, Sunshine Coast, Queensland



Source: SKM 2011

5.8 Sharrow Road Markings

Previously used in the US, sharrow road markings have been used in several jurisdictions in Australia, including NSW, to raise awareness of cyclists on the road where the road narrows and cyclists must ride in traffic lanes. Sharrows are used in similar scenarios to bicycle awareness zones.

An example sharrow road marking treatment on approach to a single lane roundabout in Preston in Melbourne is shown in Figure 5.20 and Figure 5.21.

A study by CDM Research for VicRoads indicates that use of sharrows at other Melbourne locations has improved safety and comfort of cyclists and enabled cyclists to 'claim the lane'. This allows cyclists to comfortably ride in the middle of the lane which removes cyclists from the 'door-opening' zone adjacent to parked cars.

While Figure 5.20 and Figure 5.21 show the application of sharrows in an urban environment, there is opportunity to utilise sharrow road markings in rural roads in Wingecarribee. Sharrows could be used where sealed road shoulders terminate such as at bridges, culverts and guard rails to highlight locations where cyclists are merging to travel in the vehicle lane.

Figure 5.20: Sharrow Road Markings – Raglan Street, Preston, Victoria



Figure 5.21: Sharrow Road Markings – Raglan Street, Preston, Victoria



5.9 Wayfinding and Directional Signage

Signed messages are an important part of any transport network. Signs should be concise, especially where cyclists are likely to be travelling at speed, and should have a high degree of conspicuousness as well as legibility. At critical locations, signs should be placed to identify the route as well as key destinations.

It is important that directional signage be consistent throughout the bicycle network, and be located at all relevant intersections to direct cyclists. Care should be taken during signage placement to avoid bicycle directional signage becoming lost in the clutter of other signs, or confusing motorised traffic.

The principal forms of wayfinding and directional signage are shown in Figure 5.22 and include:

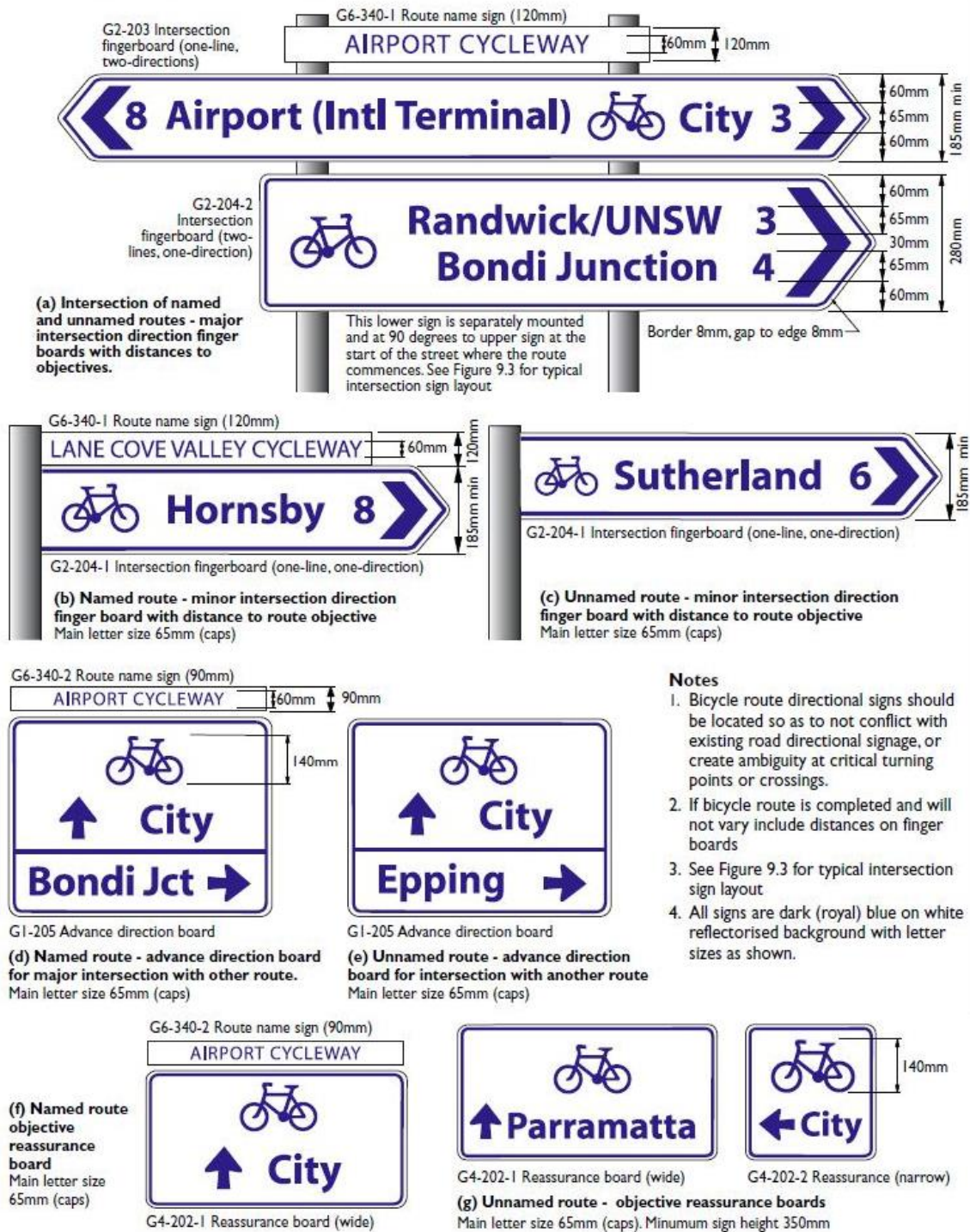
- **Intersection Fingerboards** – the primary means of indicating the route direction at key decision points.
- **Advanced Direction Boards** – placed before an intersection to indicate the route being followed and the route choices available at the following intersection. Destinations and are used on advanced direction boards but distances are not shown.
- **Reassurance Boards** – used between key decision points and on longer straight sections to reassure cyclists they are travelling towards their intended destination.

It is recommended that Council provide wayfinding and directional signage as per the following:

- i Install signage in association with all key cycle routes with intersection fingerboards installed at all key decision points.
- ii Mount signs on existing sign posts where possible to reduce street clutter.

The signs shown in Figure 5.22 can be customised for use in Wingecarribee Shire. Other LGAs in NSW have included the council logo on wayfinding and directional signage for cyclists.

Figure 5.22: Bicycle Network Route Directional Signage



Source: NSW Bicycle Guidelines, Figure 94, pg. 73 (RMS, 2003)

6. Developing the Bicycle Network

6.1 Challenges

Developing the bicycle network in the towns and villages of the shire presents significant challenges.

Narrow road shoulders or the absence of road shoulders on many of the arterial and sub-arterial roads which link the towns and villages with the main centres forces cyclists to ride in the vehicle travel lane. The speed limit of these arterial and sub-arterial roads is generally in excess of 80km/h. Sharing the travel lane with vehicles travelling at such high speeds is a barrier to increased cycling participation and is not conducive to encouraging less confident cyclists to ride, or inspiring new cyclists. As such, currently it is generally only experienced and confident cyclists who ride on the key roads outside the shire's main centres.

The distance between the main centres and the towns and villages of the shire is also a significant barrier for the provision of bicycle infrastructure. The provision of any continuous bicycle facility such as a sealed shoulder or off-road path is likely to have a significant financial cost associated with its implementation and outside Council's budget for bicycle infrastructure.

When creating links in a rural bicycle network in an effort to make riding an attractive and desirable transport option, it is sometimes more economical to build off-road shared pedestrian and cyclist paths rather than sealed shoulders which have to be constructed to bear the load of heavy vehicles. However, there are often land ownership issues which make the provision of off-road paths difficult.

Given the above challenges, the bicycle network proposed as part of the stage 2 bicycle strategy predominantly consists of on-road routes to link the towns and villages of Wingecarribee Shire. The feasibility of off-road opportunities has been investigated and two specific routes are proposed, as outlined below.

6.2 Proposed Infrastructure Treatments

Based on the treatments outlined in Section 5, five key infrastructure types have been identified for developing the bicycle network outside of the shire's main centres. These infrastructure types have been given an alphabetic code and are summarised in Table 6.1.

Where possible Council will consider and implement Crime Prevention through Environmental Design Principles.

Table 6.1: Proposed infrastructure treatment type summary

Treatment Type	Description	Application
A	<ul style="list-style-type: none"> • Sealed road shoulder treatment using signage and linemarking where existing sealed shoulders are a minimum of 2.0 metres wide. • Repair existing sealed road shoulders where necessary and ensure adjacent vegetation does not encroach into the shoulder area. • Construct short sections of new shoulder where possible and affordable. • Highlight locations where sealed road shoulders terminate and cyclists merge into the traffic lane (such as at bridges, culverts and safety barriers) to increase driver awareness using one of, or a combination of: <ul style="list-style-type: none"> ○ warning signage ○ sharrow road markings ○ bicycle advisory zones ○ cyclist activated warning signs. 	<p>Appropriate for roads with a speed limit of 80km/h or higher, e.g. Illawarra Highway (Robertson to Moss Vale).</p> <p>Consider removal of ancillary lanes and remark road with bike lanes/sealed shoulders, e.g. Old Hume Highway south of Oxleys Hill Road.</p>
B	<ul style="list-style-type: none"> • Formal on-road bicycle lanes where there is sufficient width for these to be provided. • Mixed traffic treatments using signage and linemarking where formal bicycle lanes are unable to be provided. • Highlight locations such as at bridges, culverts and safety barriers to increase driver awareness using one of, or a combination of: <ul style="list-style-type: none"> ○ warning signage ○ sharrow road markings ○ bicycle advisory zones ○ cyclist activated warning signs. 	<p>Appropriate for roads with a speed limit of 60km/h or below, mainly the linkages within the villages and low volumes "back road" routes.</p>
C	<ul style="list-style-type: none"> • Trial the use of advisory bicycle lanes on straight sections of road where it is appropriate to do so (where there is insufficient width to provide formal bicycle lanes). • Advisory cycle lanes should not be provided on bends and crests or where visibility is poor. • Highlight locations such as at crests and bends to increase driver awareness using one of, or a combination of: <ul style="list-style-type: none"> ○ warning signage ○ sharrow road markings ○ bicycle advisory zones ○ cyclist activated warning signs. 	<p>Appropriate for roads with a speed limit of 60km/h or below. Possible roads include:</p> <ul style="list-style-type: none"> • Tourist Road • Kangaloon Road (Kangaloon to Glenquarry) • Aylmerton Road. <p>There may be a need for speed reduction devices, such as used in The Netherlands. Consideration could be given to 70km/h as in Sweden, but 60km/h is preferred.</p>
D	<ul style="list-style-type: none"> • Provide short sections of new path or widen existing paths. 	<p>New Path - Illawarra Highway (Sutton Forest to Moss Vale)</p> <p>Widen Existing Path – Kangaloon Road, Bowral west of Old South Road with a section of new path to connect to Hordens Road and sign post for shared use for cyclists and pedestrians.</p>

It is important to consider site specific, local parameters such as:

- vehicle speed and volume
- road geometry and grade
- sight lines
- road pavement condition (including sealed road shoulder where provided)
- driver behaviour
- surrounding land uses.

6.3 Network Development Methodology

A radial network methodology has been applied in developing the bicycle network as part of the stage 2 bicycle strategy. This method seeks to connect the towns and villages with their nearest major centre, similar to the spokes of a wheel.

The development of the network outside of the shire’s main centres has been developed with consideration of the following parameters:

- road hierarchy
- road geometry
- speed and volume of vehicular traffic
- proportion of heavy vehicles using the road
- surrounding land uses
- road network and the possibility of using alternative roads.

In many instances, due to the configuration of the road network, there may only be one road connecting a town or village with the nearest main centre. While it is desirable to promote cycling on roads with low traffic speeds and volumes, in some cases no alternative route to the arterial or sub-arterial road exists.

6.4 Proposed Bicycle Network

The nearest main centre to each of the towns and villages of the shire, the proposed route and the distances between these locations are outlined in Table 6.2 with a network map shown in Figure 6.1. Figure 6.2, Figure 6.3 and Figure 6.4 provide more detailed maps for the links to each of three major towns, including allocation of infrastructure treatment type as per Table 6.1.

Key Strategies

In association with the proposed on-road routes identified below the following general strategies are recommended:

- **Increase driver awareness** of on-road cyclists using signage and linemarking to highlight the presence of cyclists to drivers using those treatments outlined in Section 5. This will also assist in legitimising cyclists riding on-road.
- **Trial advisory cycle lanes** on roads where formal bicycle lanes are not able to be provided and where it is appropriate to do so.
- **Provide wayfinding and directional signage** to assist cyclists to navigate the bicycle network.

Table 6.2: Towns/ villages, nearest main centres and proposed route

Town / Village	Nearest Main Centre	Route	Distance (km)
Berrima	Bowral	Old Hume Highway, Oxley Hills Road, Kirkham Road	8.5
East Kangaloon		Tourist Road, Kangaloon Road	21.2
Kangaloon		Kangaloon Road	16.1
Bundanoon (via Exeter)	Moss Vale	<ul style="list-style-type: none"> Ellsmore Road, Middle Road (to Exeter) Badgerys Way, Werai Road, Mount Broughton Road, Yarrowa Road, Throsby Street 	16.6
Burrawang		Church Street, Church Road, Illawarra Highway	14.9
Exeter		Ellsmore Road, Middle Road	6.6
Medway		Medway Road, Taylor Avenue, Berrima Road	13.4
New Berrima		Berrima Road, Waite Street	7.0
Robertson		Illawarra Highway	21.3
Sutton Forest		Illawarra Highway	5.6
Aylmerton		<ul style="list-style-type: none"> Aylmerton Road Old South Road, Bong Bong Road, Mary Street, Colo Street, Regent Street 	5.5
Balmoral (via Hill Top and Colo Vale)	Mittagong	<ul style="list-style-type: none"> Wilson Drive (to Hill Top and Colo Vale) Wattle Street, Ivy Street, Azalea Street, Drapers Road, Orient Street, Willow Street, Railway Terrace, Swan Street, Old Hume Highway (Colo Vale to Mittagong) 	21.5
Buxton (via Balmoral, Hill Top, Colo Vale and Willow Vale)		<ul style="list-style-type: none"> Wilson Drive (to Balmoral, Hill Top and Colo Vale) Wattle Street, Ivy Street, Azalea Street, Drapers Road, Orient Street, Willow Street, Railway Terrace, Swan Street, Old Hume Highway (Colo Vale to Mittagong) 	27.9
Colo Vale		Wattle Street, Ivy Street, Azalea Street, Drapers Road, Orient Street, Willow Street, Railway Terrace, Swan Street, Old Hume Highway (Colo Vale to Mittagong)	9.2
Hill Top (via Colo Vale)		<ul style="list-style-type: none"> Wilson Drive (to Colo Vale) Wattle Street, Ivy Street, Azalea Street, Drapers Road, Orient Street, Willow Street, Railway Terrace, Swan Street, Old Hume Highway (Colo Vale to Mittagong) 	14.7
Willow Vale		Willow Street, Railway Terrace, Swan Street, Old Hume Highway	5.5
Yerrinbool		Old South Road, Bong Bong Road, Mary Street, Colo Street, Regent Street	18.6
Total			234.1

Proposed Bicycle Network

On-Road Routes

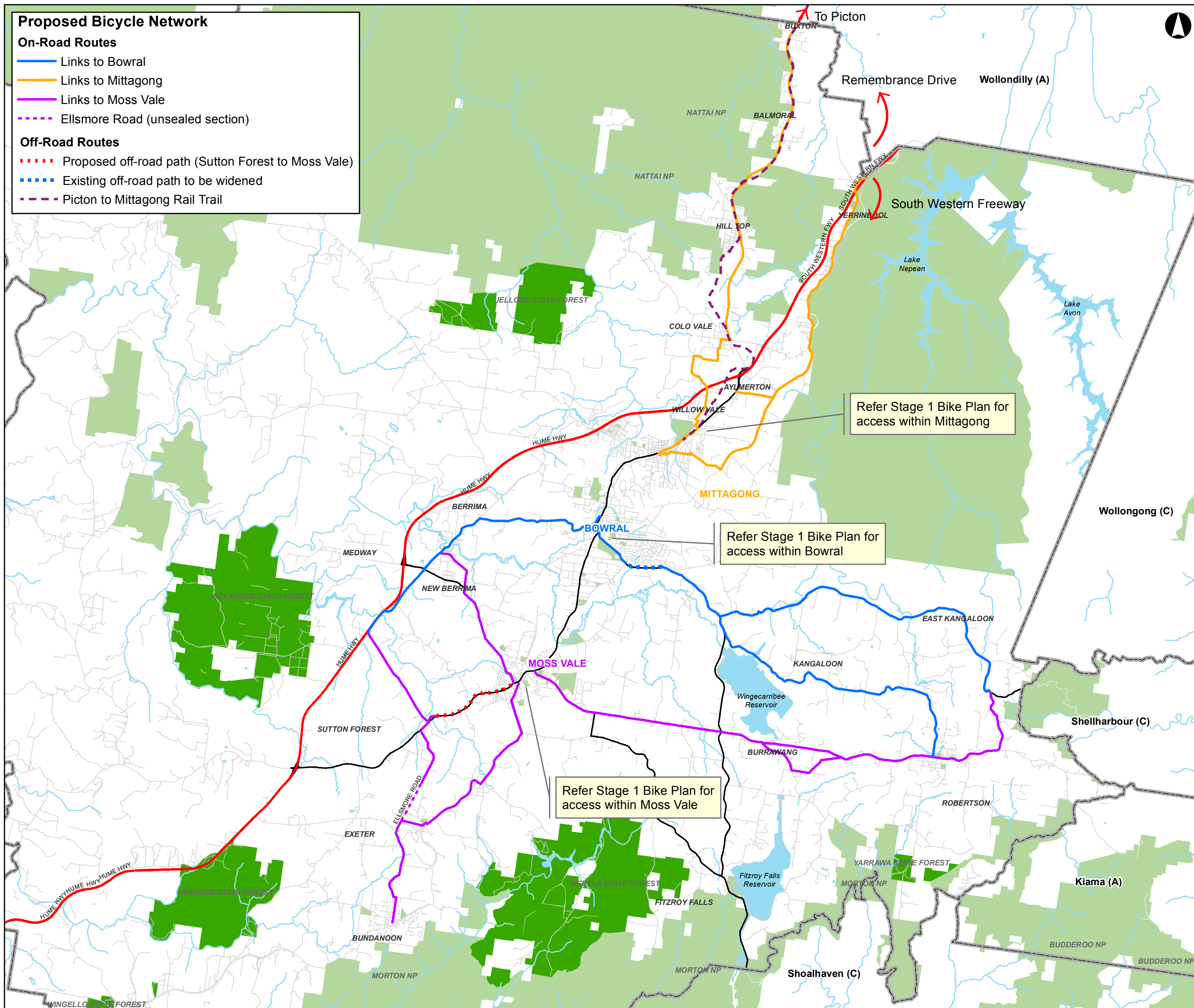
- Links to Bowral
- Links to Mittagong
- Links to Moss Vale
- Ellsmore Road (unsealed section)

Off-Road Routes

- Proposed off-road path (Sutton Forest to Moss Vale)
- Existing off-road path to be widened
- Picton to Mittagong Rail Trail

Legend

- National Parks and Reserves
- State Forest
- Motorway / Freeway
- Regional Road
- Local Road



P1	09-10-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd

Kilometers
0 2.5 5 10

GTA consultants
www.gta.com.au

Client
Wingecarribee Shire Council

Job Title

**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
Network Map

Scale at A3
1:175,000

Drawing Status
Final

Job No 14S1049000	Drawing No 010	Issue P1
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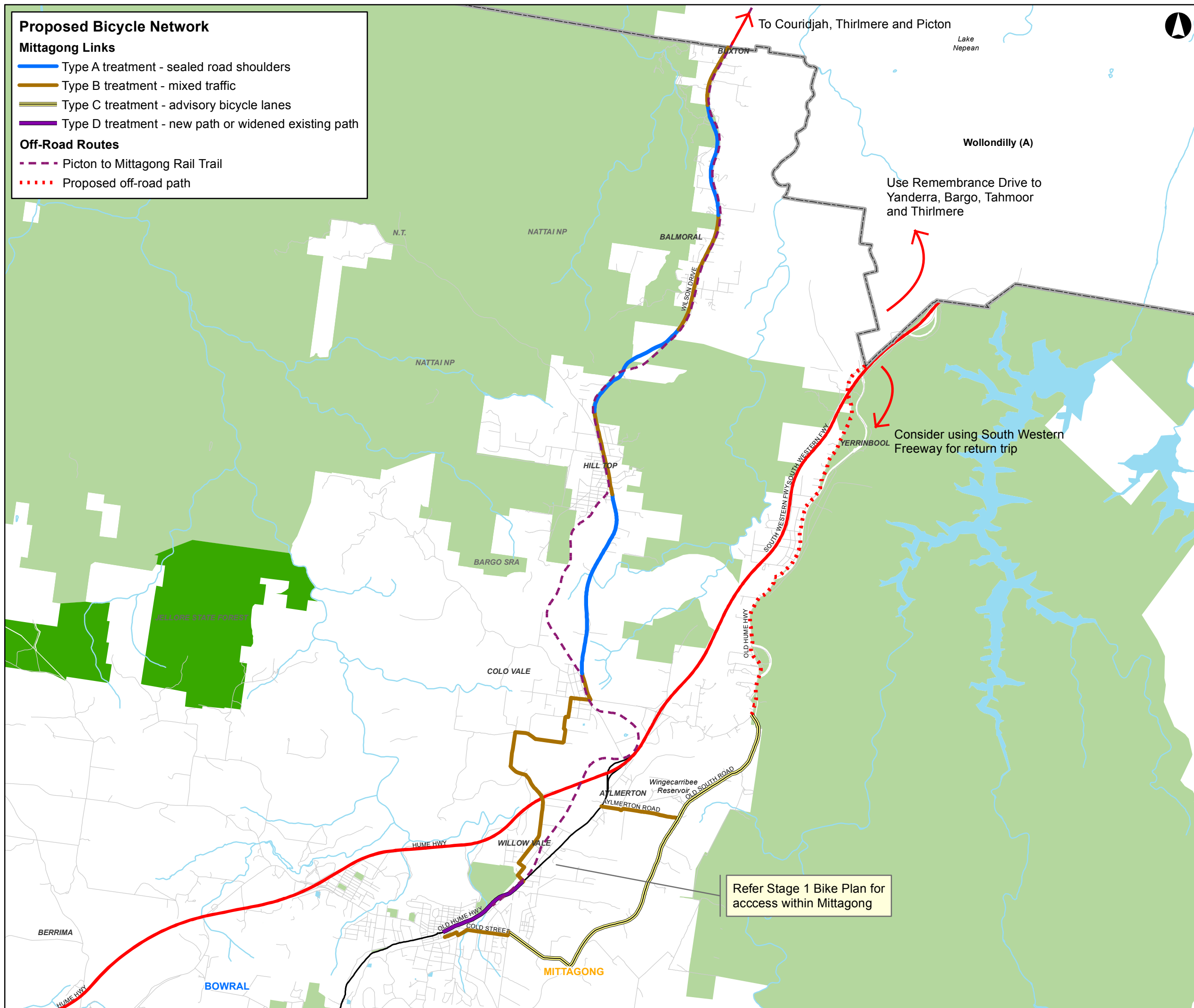
Proposed Bicycle Network

Mittagong Links

- Type A treatment - sealed road shoulders
- Type B treatment - mixed traffic
- Type C treatment - advisory bicycle lanes
- Type D treatment - new path or widened existing path

Off-Road Routes

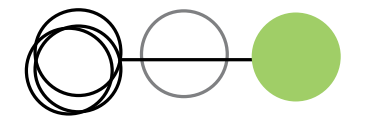
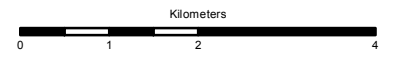
- Picton to Mittagong Rail Trail
- Proposed off-road path



Legend

- National Parks and Reserves
- State Forest
- Motorway / Freeway
- Regional Road
- Local Road

P1	09-10-14	BLL	DVD	DVD
Issue	Date	By	Chkd	Appd



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Job Title
**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Network Map
Mittagong Links**

Scale at A3
1:85,000

Drawing Status
Final

Job No 14S1049000	Drawing No 013	Issue P1
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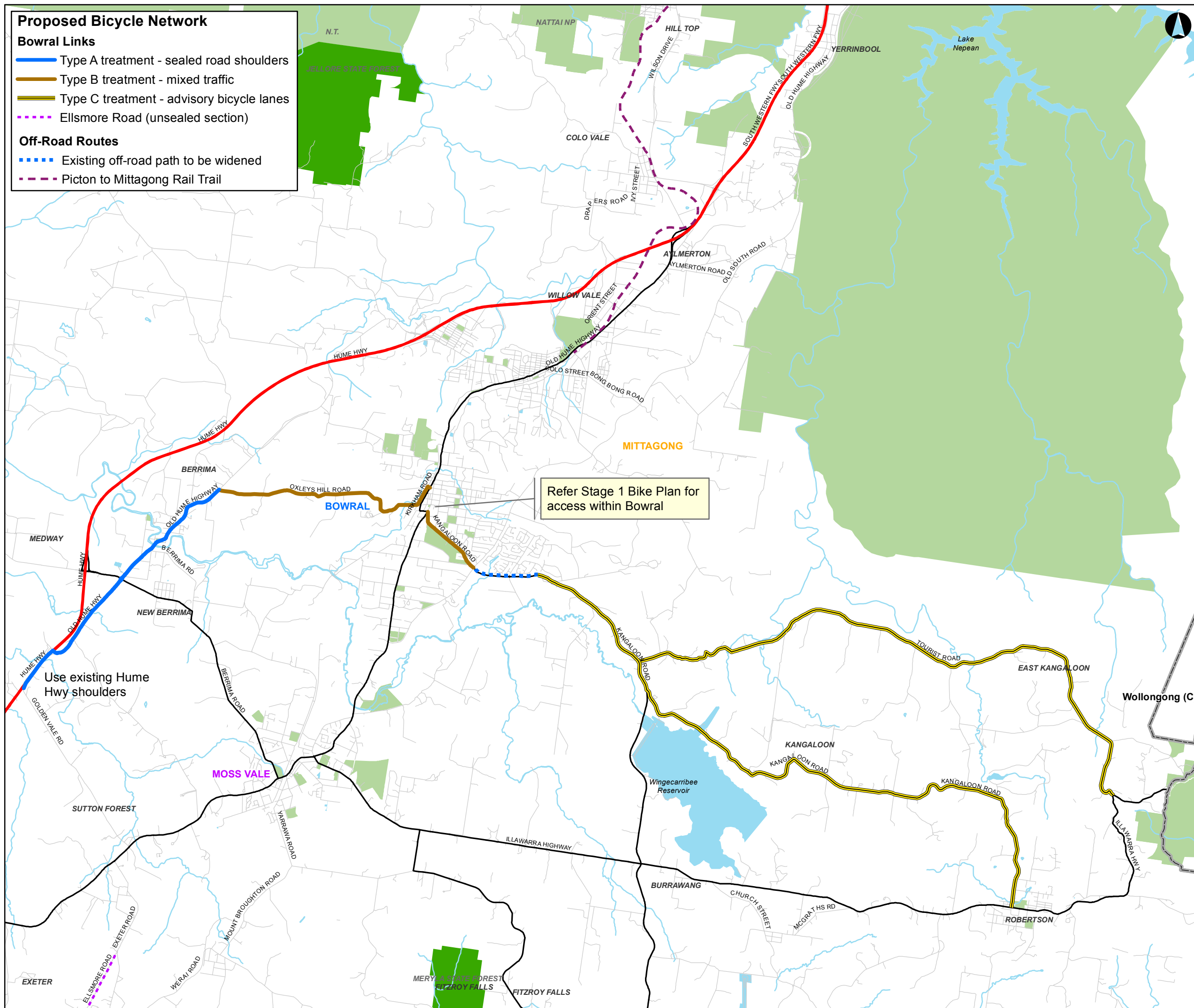
Proposed Bicycle Network

Bowral Links

- Type A treatment - sealed road shoulders
- Type B treatment - mixed traffic
- Type C treatment - advisory bicycle lanes
- - - Ellsmore Road (unsealed section)

Off-Road Routes

- - - Existing off-road path to be widened
- - - Picton to Mittagong Rail Trail



Legend

- National Parks and Reserves
- State Forest
- Motorway / Freeway
- Regional Road
- Local Road

P1	09-10-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd

Kilometers

0 1.25 2.5 5



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Job Title

Bicycle Strategy Stage 2 Towns and Villages of the Southern Highlands

Network Map Bowral Links

Scale at A3
1:100,000

Drawing Status
Final

Job No 14S1049000	Drawing No 012	Issue P1
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Proposed Bicycle Network

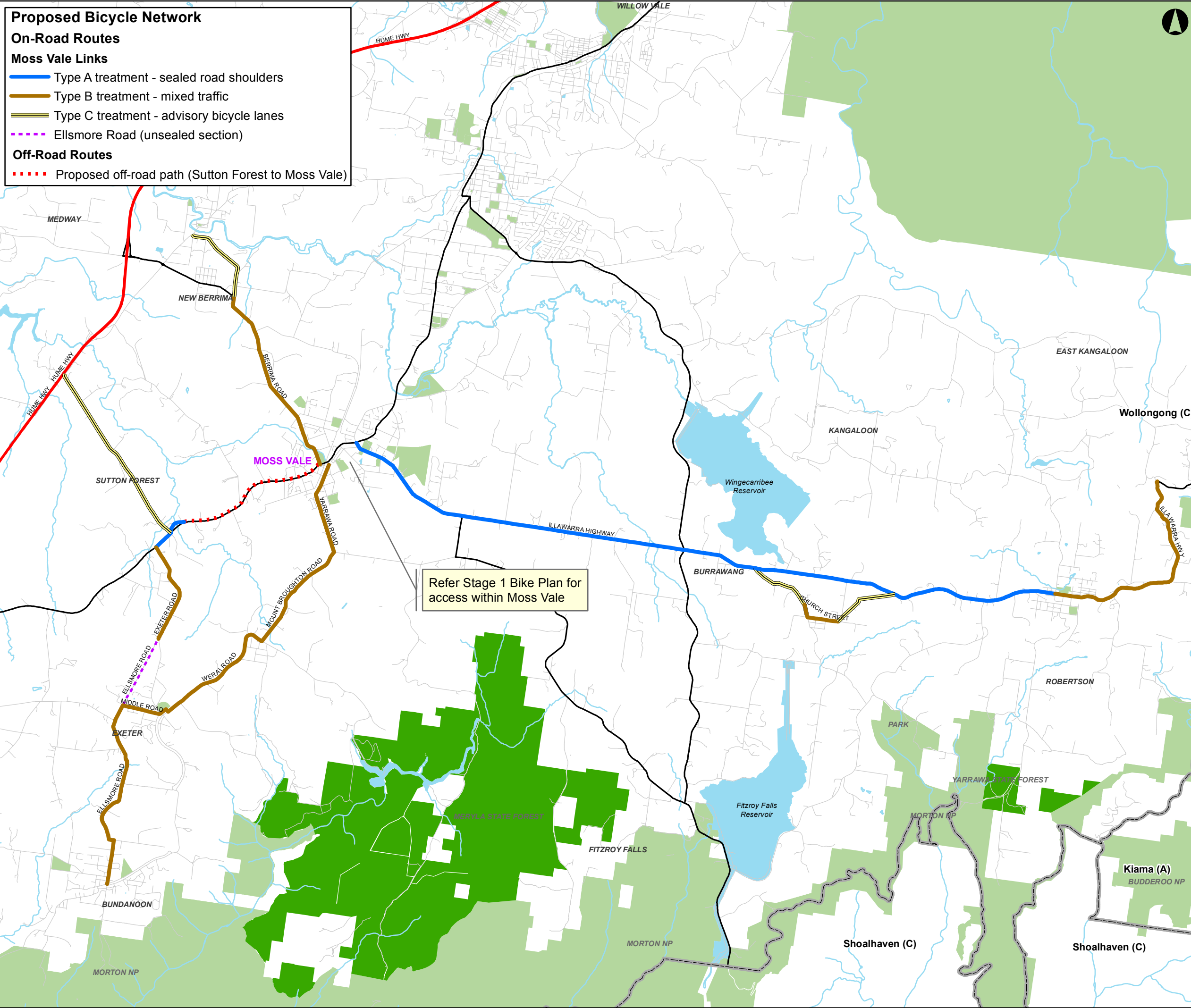
On-Road Routes

Moss Vale Links

- Type A treatment - sealed road shoulders
- Type B treatment - mixed traffic
- Type C treatment - advisory bicycle lanes
- Ellsmore Road (unsealed section)

Off-Road Routes

- Proposed off-road path (Sutton Forest to Moss Vale)



Refer Stage 1 Bike Plan for access within Moss Vale

Legend

- National Parks and Reserves
- State Forest
- Motorway / Freeway
- Regional Road
- Local Road

P1	09-10-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd

Kilometers
0 1.25 2.5 5

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Client
Wingecarribee Shire Council

Job Title
**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Network Map
Moss Vale Links**

Scale at A3
1:100,000

Drawing Status
Final

Job No 14S1049000	Drawing No 011	Issue P1
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6.5 Fitzroy Falls Reservoir Trail

Fitzroy Falls Reservoir is located 20 kilometres south-east of Bowral and is managed by the Sydney Catchment Authority. The 5.2 square kilometre reservoir forms part of the Shoalhaven Scheme and along with Wingecarribee Reservoir and Tallowa Dam are used to supply local communities and supplement water supplies for Sydney and the Illawarra. The location of Fitzroy Reservoir is shown in Figure 6..

Fitzroy Falls Reservoir is a popular recreational destination with toilet and picnic facilities located on the south-western shoreline which are accessible from Nowra Road. The reservoir itself is used for public use water based recreation activities such as sailing and fishing, with respective club facilities also located on the south-western shoreline.

Walking and bicycle access around the reservoir is currently prohibited with fences in place as shown in Figure 6.6 and Figure 6.7.

There is opportunity to provide an off-road, unsealed recreational bicycle route on sections around Fitzroy Reservoir. The distance around the reservoir is approximately 11 kilometres and the route could utilise existing service roads along the southern and western shoreline (shown as thin black lines on Figure 6.5 and as shown on Figure 6.6). The route could potentially utilise the unsealed formed public roads surrounding the reservoir such as Blencowes Lane, Clearys Lane and Bodycotts Lane to form a continuous route. Such a facility would be a significant tourist route suitable for cyclists of all abilities.

A feasibility study, as well as liaison with Sydney Catchment Authority is required to explore options for permitting bicycle access around the reservoir.

Figure 6.5: Fitzroy Falls Reservoir



Background Image Source: Six Maps

Figure 6.6: Fitzroy Falls Reservoir service road (looking north from car park)



Figure 6.7: Fitzroy Falls Reservoir (looking south from car park)



6.6 Mittagong to Picton Rail Trail

The 2008 Bicycle Strategy noted that the development of the Mittagong to Picton Rail Trail represented a strategic tourism and recreational opportunity for the entire Southern Highlands region. Rail Trails Australia defines a rail trail as:

"a trail that closely follows (preferably on) the formation of a former railway line or runs beside an active railway for the majority of its length."

Rail trails are markedly different from other off-road trails due to their favourable topography and their links with history. Depending on the specific trail conditions, topography and environment, rail trails can be suitable facilities for walkers, mountain bikers as well as hybrid bikes, prams and wheelchairs and in some cases, horses.

Rail trails are found extensively in the UK, US, New Zealand and Victoria, however they have not been widely implemented in NSW, noting Rail Trails NSW recently relaunched the initiative with significant support from Local Government and State politicians. Rail trails are popular facilities because they:

- are free to use
- are facilities which are far removed from vehicular traffic
- offer a pleasant, scenic experience
- have gentle grades, enabling cyclists with a broader range of abilities to enjoy them
- provide a continuous natural heritage corridor
- enable users to visit areas which are not accessible by vehicle
- provide a link to the cultural heritage of an area
- serve as a lasting monument to the engineering history of the rail line
- are a significant financial benefit to local communities due to bicycle tourism.

A 2007 Report by the Australian Cycling Sector identified a 3.0 metre wide gravel pathway, separated by a fence from the active rail section. The Australian Cycling Sector report, which is contained in Appendix D, estimated that construction of the rail trail would cost \$5 million.

The 30 kilometre long route would link Picton, the Trainworks rail museum in Thirlmere and Mittagong and be a major tourist drawcard for the region. It is understood that the rail museum is proposing that steam trains to reuse a short section the railway near Thirlmere, however no plans exist to extend reuse of the railway along its full length.

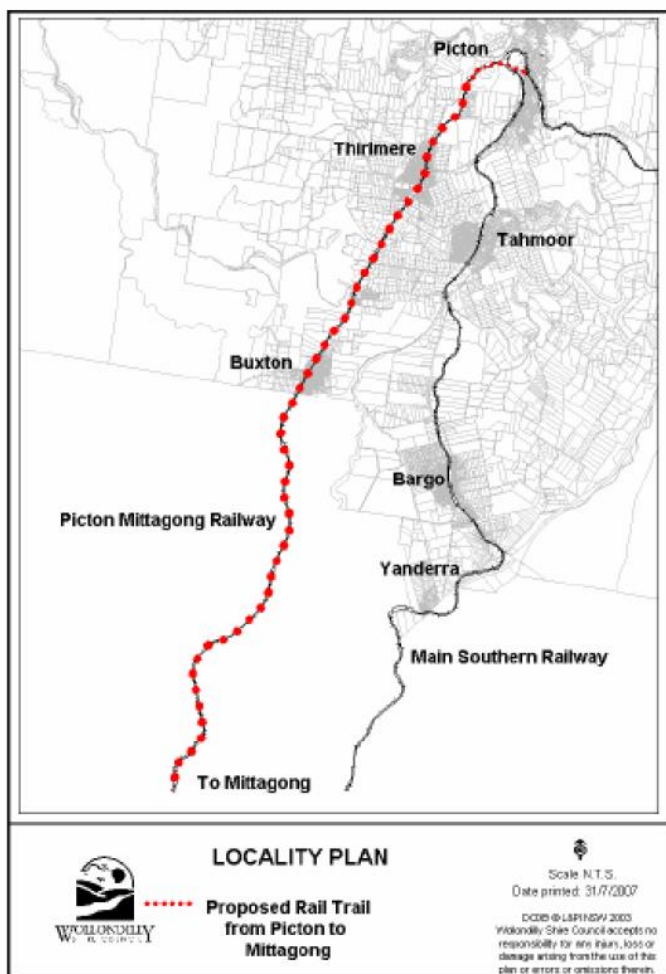
The Picton to Mittagong rail trail route is shown in Figure 6.8.

The Rail Trails Australia website provides information of existing cycling, walking and equestrian rail trails as well as guidance and advice for the development of Rail Trails:

<http://www.railtrails.org.au/>

It is recommended that Wingecarribee Council partner with Wollondilly Shire Council, Rail Trails Australia and the former owner of the rail line, Australian Track Rail Corporation (ATRC) to undertake a detailed feasibility study to investigate the future use of the disused Picton to Mittagong rail corridor. The recently re-launched initiative of Rail Trails NSW would be a strong business partner.

Figure 6.8: Mittagong to Picton Rail Trail



6.7 Mountain Biking

Given the easy access to a wide variety of terrain, the Southern Highlands is a major mountain biking destination. The continued growth in mountain biking and off-road cycling experiences across the shire should be supported by Council. Given the regions close proximity to Canberra, Sydney and Wollongong, there is real potential future growth of mountain biking and bicycle tourism in the shire which would have economic benefits for the region.

Council has limited capacity to directly facilitate mountain biking across the shire as many areas which are desirable for riding are located in State Forests and National Parks, which is outside council's jurisdiction.

Notwithstanding this, it is recommended that Council support the development of mountain bike facilities by other government agencies such as the Forestry Corporation or private enterprise.

National Parks

In NSW national parks and reserves, cycling, including mountain biking is permitted on all public access roads managed by the National Parks and Wildlife Service (NPWS) and on most management trails, subject to specific requirements in the park/reserve's plan of management (POM) or as shown on signage.

There are two National Parks located within the Shire: Morton National Park located in the south of the Shire and Nattai National Park located in the north. Mountain biking is permitted in the Morton National Park, but is restricted in Nattai National Park as outlined through its POM.

State Forests

There are six State Forests located in Wingecarribee Shire: Belanglo, Meryla, Penrose, Jellore, Wingello and Yarrawa. State Forests are managed by the Forestry Corporation of NSW.

In 2012 the Forestry Corporation recently sought expressions of interest to canvas opportunities for the establishment of an iconic mountain bike experience in the Southern Highlands. Broad proposals were requested on how trails in the forests could be managed and developed for commercial use as well as ensuring ongoing free public use of the facilities. Proposals were sought for Meryla, Wingello, Belanglo and Jellore State Forests. It is understood that these proposals have not progressed and the Forestry Corporation is currently working with local mountain bike groups to improve facilities and the overall rider experience in the forests.

7. Funding Opportunities

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

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

- Capital project cost
- Maintenance and other ongoing costs
- Vehicle operating cost (VOC) savings
- Time cost savings per vehicle hour
- Accident cost savings
- Environmental externalities (costs or benefits).

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

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

Three websites that provide further detail are:

- [Cycling Resource Centre](#)
- [Bicycle Info NSW - funding for cycleway projects](#)
- [Bicycle NSW - funding.](#)

A summary of potential funding sources is provided below.

7.1 State Government

7.1.1 TfNSW - Long Term Transport Master Plan

A key action of the Long Term Transport Master Plan is to boost cycling and support its integration with public transport. \$27.5 million has been allocated to cycling in the 2012-13 budget, \$8.86 million of which will be allocated to match Council funding to deliver approximately 100 local cycleway projects in over 70 different locations as well as support local cycling initiatives such as NSW Bike Week.

7.1.2 Roads and Maritime Services

The RMS's Bicycle Program allocates \$5 million annually to bicycle projects in NSW council areas. This 50/50 funding program is designed to assist councils with the development and implementation of their local bicycle networks. Full details are available in the Memorandum of Understanding available on the [RMS website](#).

Programs for potential funding include:

- Regional Roads REPAIR Program (22602) – the objective of this program is to provide additional assistance to councils to undertake larger works of rehabilitation, and development on Regional Roads to minimise the long-term maintenance costs of these roads commensurate with their function and usage. Walking and cycling infrastructure could potentially be included within this cost.
- Accident Blackspot Treatments (26301) – the objective of this program is to reduce the occurrence and severity of crashes at known crash locations by installing cost effective treatments, ensuring a road safety return.
- Cycleways (27304) – this program is aimed specifically at designing and constructing new on-road and off-road cycleways that increase the level of network availability in NSW. Funding arrangements fall into two broad categories:
 - State bicycle routes identified in the BikePlan 2010 – 100% funded by the RMS but under the care and control of the Council following completion.
 - Local bicycle routes identified in a Council's Bike Plan – 50/50 funded and to be maintained by Council following completion.
- Bicycle Facilities (27305) – this program is aimed at improving the operation of existing cycleways. Typical projects include upgrades of existing cycleways, retrofitting at existing traffic control signals, installation of kerb ramps and replacement of unsafe drainage grates.
- Bicycle User Support (27306) – this program aims to support cycling through research, training and promotion. Typical projects include bicycle promotion, bicycle use surveys, development and production of cycleway maps and cycling related guidelines.
- Local Government Pedestrian Facilities (27401) – this program helps to provide facilities on local and regional roads to improve pedestrian safety, mobility and access. Shared zones are eligible for funding under this program.

7.1.3 Bike Week Funding

NSW Bike Week is a state-wide NSW Government funded initiative held in September that aims to raise the profile of cycling as a healthy, easy, low cost and environmentally friendly transport alternative for driving short trips. Funding is available to promote local community NSW Bike Week events, which should be designed to encourage cycling in the local community.

7.2 NSW Department of Planning and Infrastructure (DoPI)

7.2.1 Metropolitan Greenspace Program

The Metropolitan Greenspace Program is administered by the Department of Planning and provides matching funding for improvements which could be made to access regionally-significant metropolitan open space in NSW. Since 1990, up to \$2.5 million has been awarded annually, on a matched funding basis.

The objective of the program is to assist local government in the development and planning of regionally significant open space and to enable more effective use of these areas by the public. The program aims to promote partnerships between State and Local Government. Successful projects in the last round of funding included the Withers Road Cycleway (Hills Shire Council), a feasibility study into the extension of the Cooks River Cycleway (Rockdale City Council) and planning and design of an off-road mountain bike facility (Ku-ring-gai Council).

NSW Environment Trust

The Department of Environment and Heritage (DEH) manages a number of grant programs under the banner of NSW Environment Trust. Each grant program funds projects which rehabilitate or regenerate the environment, or promote environmental education and sustainability. Cycling infrastructure can be incorporated into projects as a way to reduce greenhouse gas emissions by reducing car dependency and increasing cycling. Details of past and present programs are provided on the [DEH website](#).

Office of Communities, Sport and Recreation

The NSW Office of Communities, Sport and Recreation (OCSR) has a number of funding programs available to local governments. Further details on all grant programs are available on the [OCSR website](#), including:

Sport and Recreation Facility Grant Program

This program provides funding to build and upgrade sporting and recreation facilities with the aim of increasing the availability, standard and quality of facilities in NSW. This could include cycling tracks and training facilities. Levels of funding available range from \$500 - \$200,000, with the amount requested being 50% or less of the total project cost.

Sport and Recreation Participation Program

This program provides funding for projects designed to increase regular and on-going participation in sport, recreation or structure physical activity. Objectives include increasing participation, addressing barriers to participation and providing training programs. The funding could be appropriate for a cycling encouragement program.

ClubGRANTS

Clubs that earn over \$1 million annually in gaming machine revenue provide funding for community projects and services, and in turn receive dollar-for-dollar gaming tax deductions. The new ClubGRANTS scheme, announced in 2012 by the State Government, will provide a minimum of \$264 million of funding over the next four years, including approximately \$10 per year for large scale sport, health and community infrastructure projects. This funding can also be used to implement cycling encouragement initiatives like cycling programs, workshops and distributing maps. Further details are available on the [ClubsNSW website](#).

NSW Health and Area Health Services

The Local Health Area incorporating Wingecarribee is the South Western Sydney Local Health District. The health district annual budget typically allocates funding for health promotion, in areas which promote health-inducing physical activity. Previously, this funding has been used to pilot work place travel planning and promote cycling for short trips.

7.3 Federal Government

7.3.1 Department of Infrastructure and Transport

The Department of Infrastructure and Transport (DIT) offers a range of funding opportunities under the banner of the Nation Building Program. Details of all programs are provided via the [DIT website](#), including the following:

Roads to Recovery Program

In November 2000, this program was introduced as a single intervention by the Commonwealth to address the specific problem of local roads reaching the end of their economic life, and their replacement being beyond the capacity of local government. Over four years from 1 July 2009, the Australian Government, will provide additional funding of \$1.75 billion. This is in addition to its untied Financial Assistance Grants to councils for roads and other purposes. This program has been used by councils throughout Australia to fund bicycle infrastructure development and upgrades.

Black Spot Program

The Black Spot program began in 1996-97 and is part of the government's commitment to reduce crashes on all roads in Australia – it has approval to run to 2013-14. The program, which provides \$59.5 million per annum, targets road locations where crashes are occurring. Typical projects include upgrading traffic signals and improving roundabouts at dangerous locations. This program has been used by councils throughout Australia to fund bicycle infrastructure development and upgrades.

Liveable Cities Program

The Liveable Cities Program, new in 2011, will provide \$20 million over two years. The program was developed to support state, territory and local governments in meeting the challenges of improving the quality of life in capital and regional cities. The programs encourages government partnerships and foster innovative solutions to promote high quality urban design, improve the quality of open space, and address high levels of car dependency and traffic congestion, among other things. Applications for the program are closed - 2012 application dates have not yet been announced.

7.4 Other Funding Opportunities

Reinstatement Works

Following significant corridor upgrades for water, sewer or power, the local road network must be reinstated. These works may be undertaken by the contractor or by council. During the reinstatement works it is an opportune time to deliver bicycle facilities within the existing kerbs.

Private Development

Property developers and property managers levy new buildings to fund local walking and cycling infrastructure nearby. If a development is occurring (such as a shopping centre), bicycle parking facilities and safe bicycle routes around the site can be integrated into the plans encourage cycling for short trips.

Business Improvement Districts

Local business districts may levy members to deliver bicycle infrastructure, including cycleways and bicycle parking. This investment may become a platform for encouragement programs to increase short neighbourhood trips to the centre and can be integrated into the plans to encourage cycling for short trips.

Advertising

Revenue from business and clubs in the local area can provide funding for advertising within the LGA. These advertisements could be cycling related by providing bicycle maps and information and encouragement advertisements.

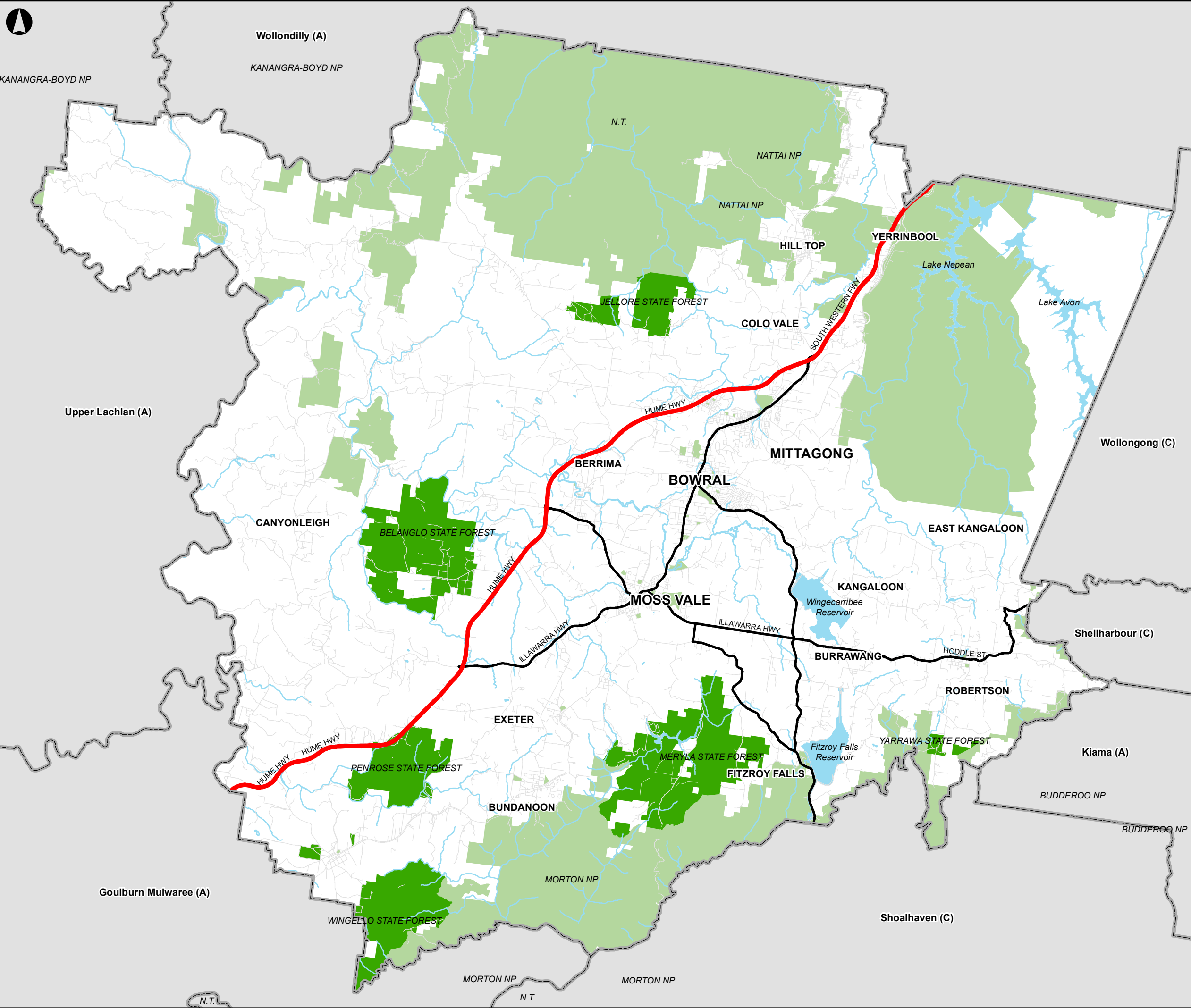
Cycling Promotion Fund

In the past the Cycling Promotion Fund (CPF) has funded a number of innovative projects that promote and encourage cycling to assist in developing the evidence base that such projects are effective. Although the grants program is inactive, the CPF assists by listing potential funding sources and programs, and continues to offer advice and guidance on the development of effective cycling programs and initiatives.

Appendix A

Locality Map

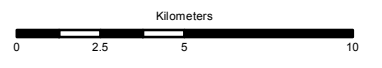




Legend

- LGA Boundary
- National Parks and Reserves
- State Forest
- Arterial Road (motorway)
- Arterial Road (non-motorway)
- Other Roads

P1	23-04-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd



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Job Title
**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Wingecarribee Shire
Locality Map**

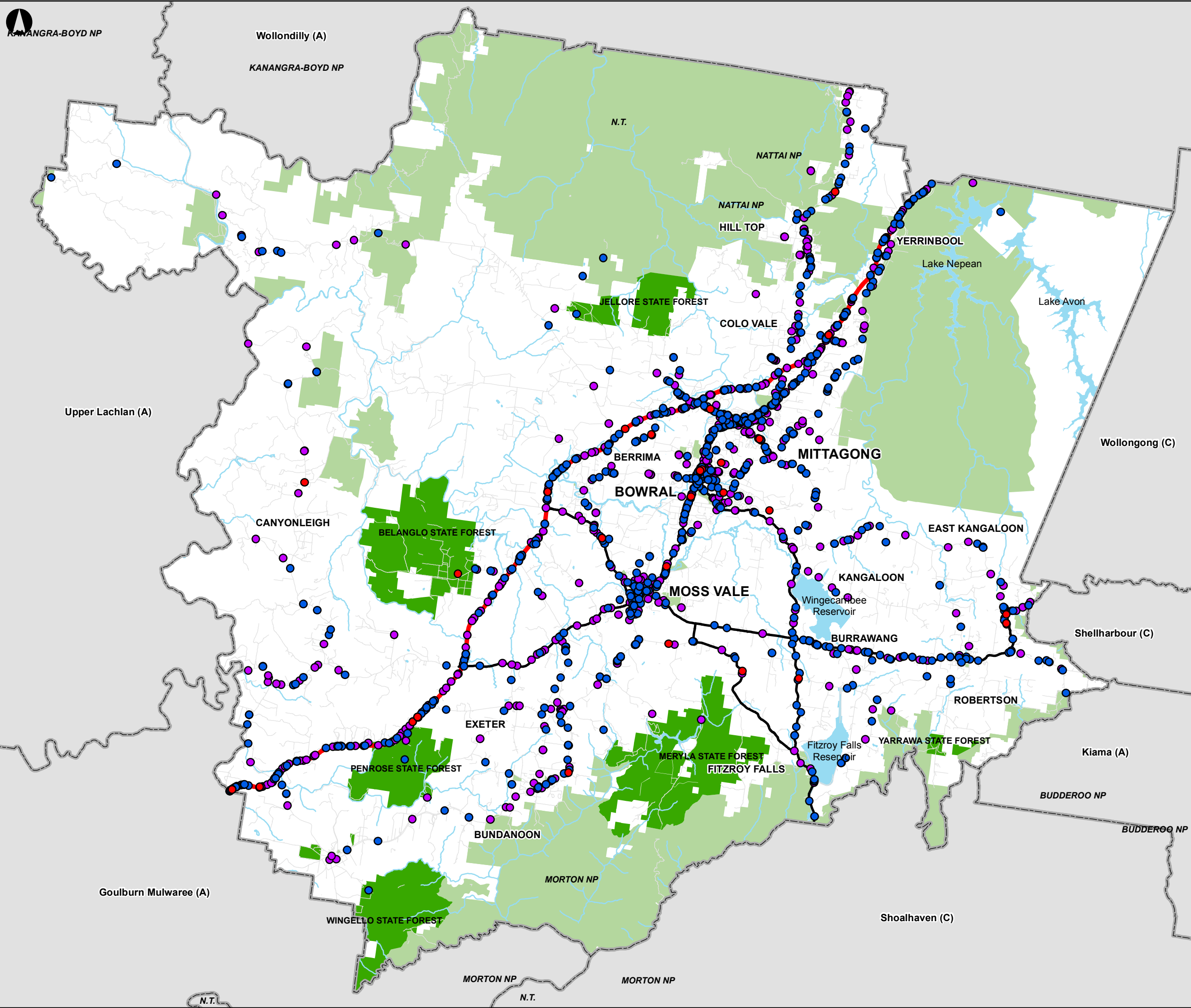
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Drawing Status
Final

Job No	Drawing No	Issue
14S1049000	002	P1

Appendix B

Crash Maps

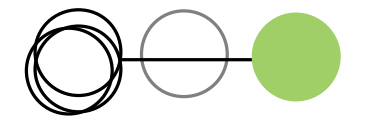
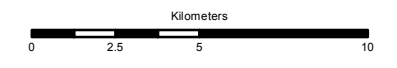


Legend

Crash Severity

- Fatal (27)
- Injury (675)
- Non-injury towaway (881)

P1	28-04-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd



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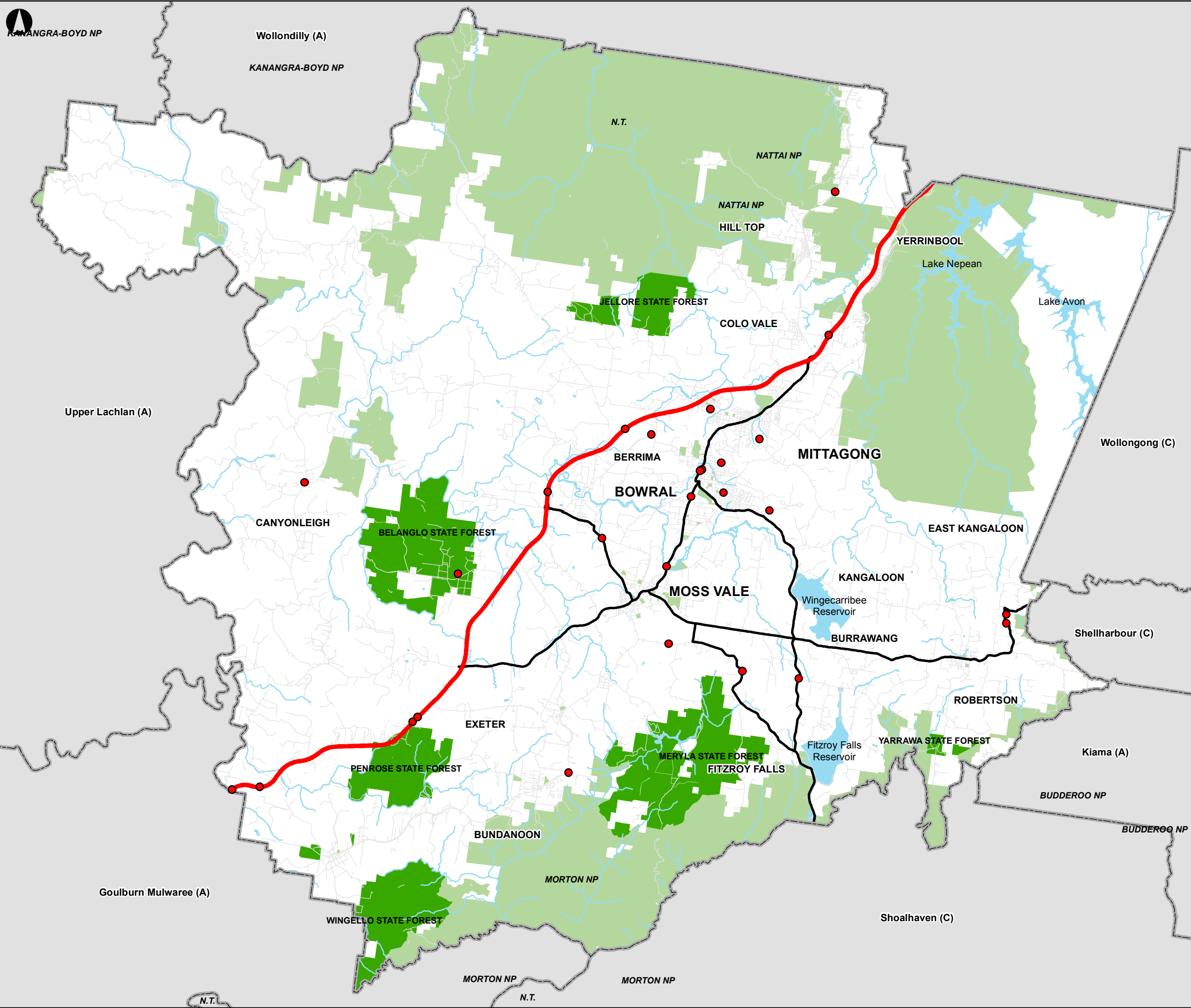
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**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Recorded Crashes by Severity
2008 - 2012**

Scale at A3
1:225,000

Drawing Status
Final

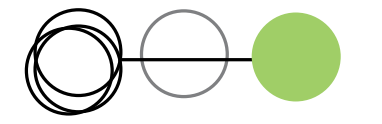
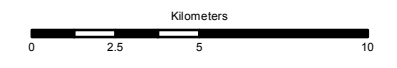
Job No 14S1049000	Drawing No 003	Issue P1
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Legend

- Crash Severity**
- Fatal (27)

P1	28-04-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd



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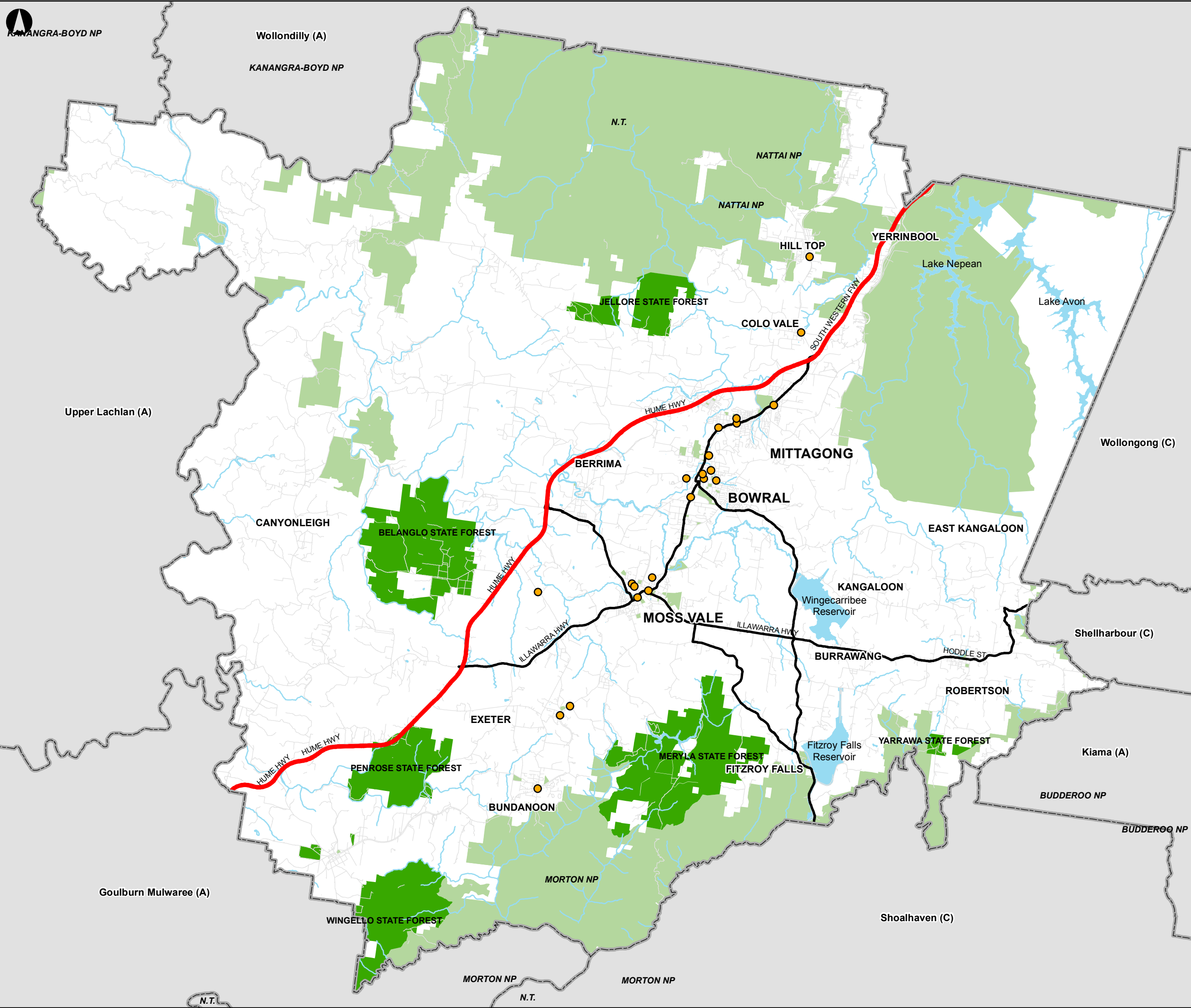
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Towns and Villages of the
Southern Highlands**

Drawing Title
**Recorded Fatal Crashes
2008 - 2012**

Scale at A3
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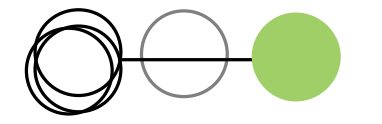
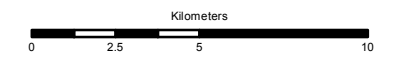
Drawing Status
Final

Job No 14S1049000	Drawing No 004	Issue P1
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Legend
 ● Cyclist Crashes (22)

P1	28-04-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd



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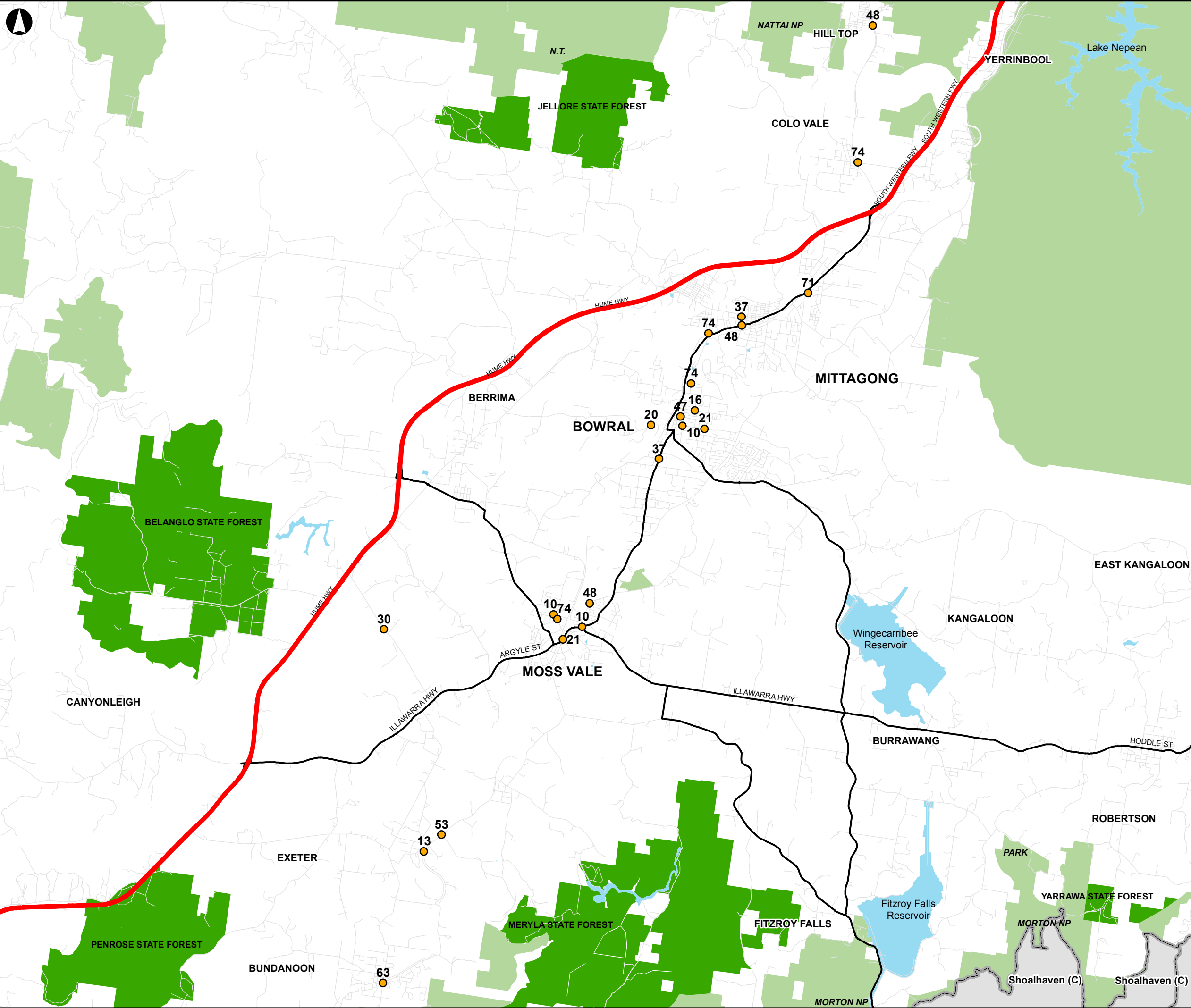
Job Title
**Bicycle Strategy Stage 2
 Towns and Villages of the
 Southern Highlands**

Drawing Title
**Recorded crashes involving cyclists
 2008 - 2012**

Scale at A3
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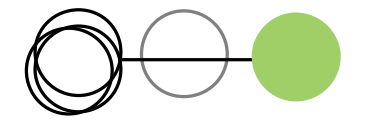
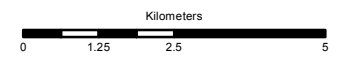
Drawing Status
Final

Job No	Drawing No	Issue
14S1049000	005	P1



- Legend**
- Cyclist Crashes (22)
- RUM Code and Description**
- 10 Cross traffic (3)
 - 13 Right near
 - 16 Left near
 - 20 Head on
 - 21 Right through (2)
 - 30 Rear end
 - 37 Left turn sideswipe (2)
 - 47 Emerging from drive
 - 48 From footpath (3)
 - 53 Overtake turning
 - 63 Vehicle door
 - 71 Off rd left => obj
 - 74 On road-out of cont.(4)

P1	02-05-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd



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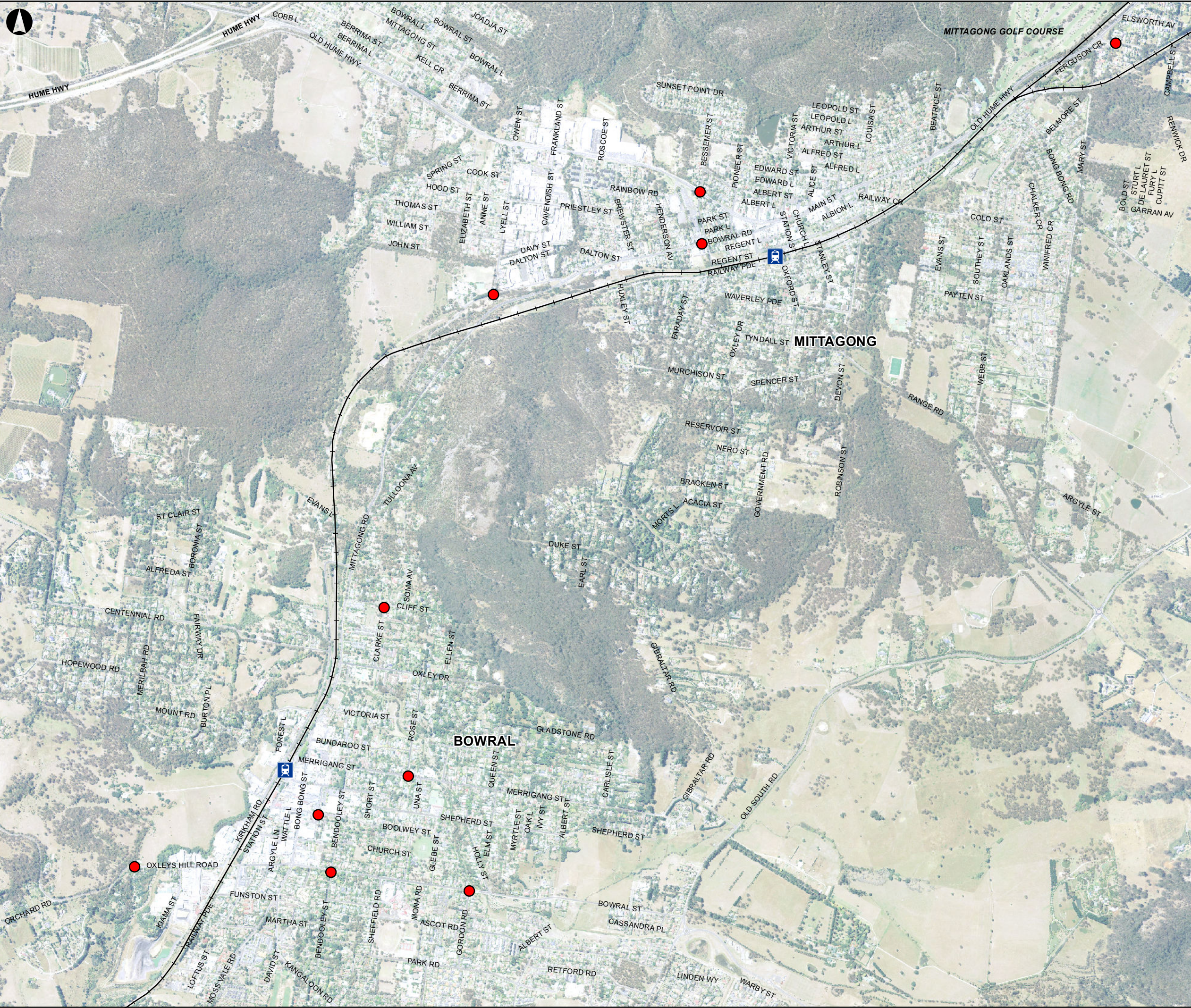
Job Title
**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Recorded crashes involving cyclists
by Road User Movement Code (RUM)
2008 - 2012**

Scale at A3
1:125,000

Drawing Status
Final

Job No	Drawing No	Issue
14S1049000	007	P1



Legend

- Cyclist Crashes

P1	28-04-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd

Meters
0 250 500 1,000

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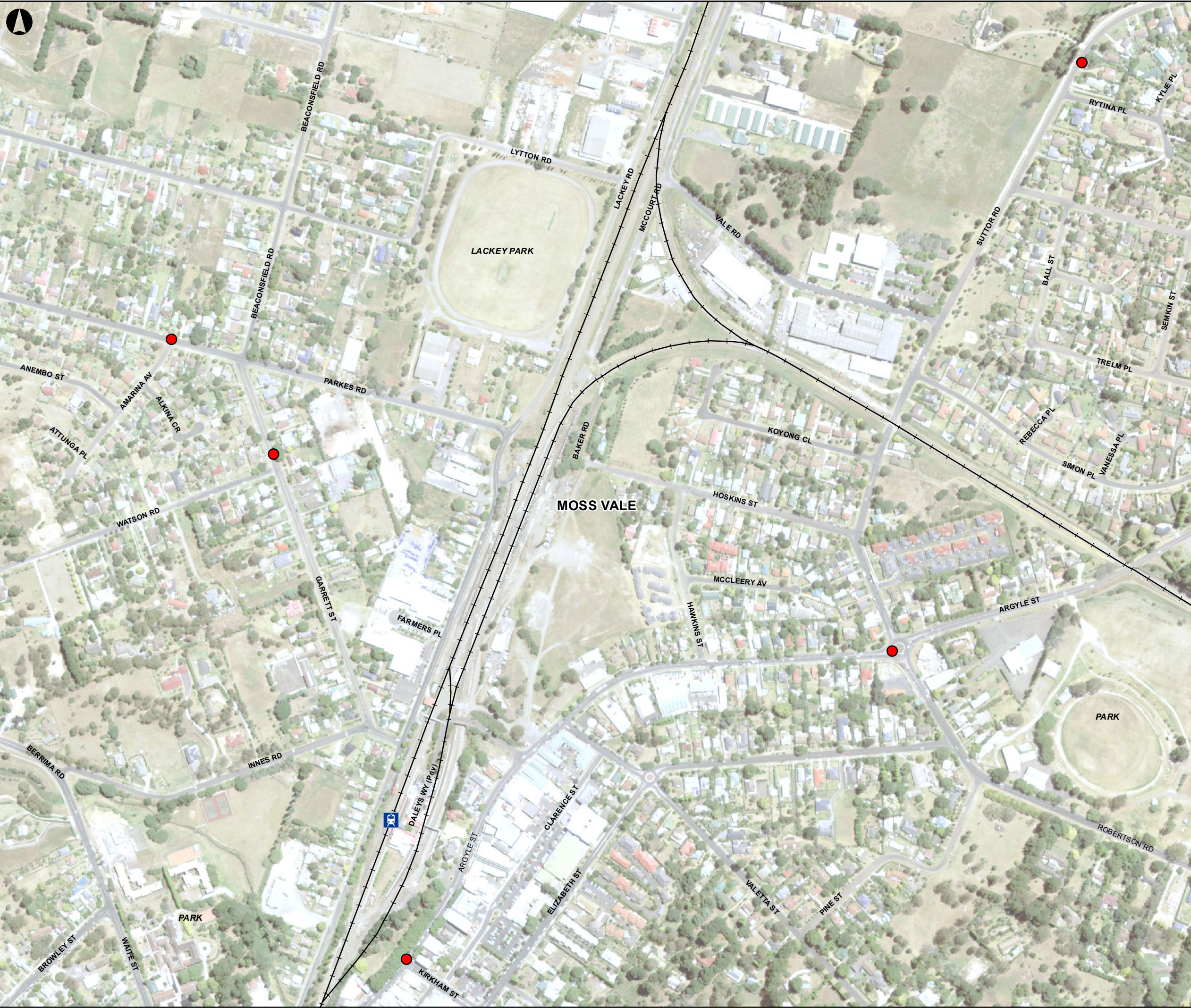
Job Title
**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Recorded crashes involving cyclists
Bowral and Mittagong
2008 - 2012**

Scale at A3
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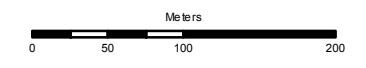
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Job No 14S1049000	Drawing No 006	Issue P1
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Legend
 ● Cyclist Crashes

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Issue	Date	By	Chkd	Appd



Client
Wingecarribee Shire Council

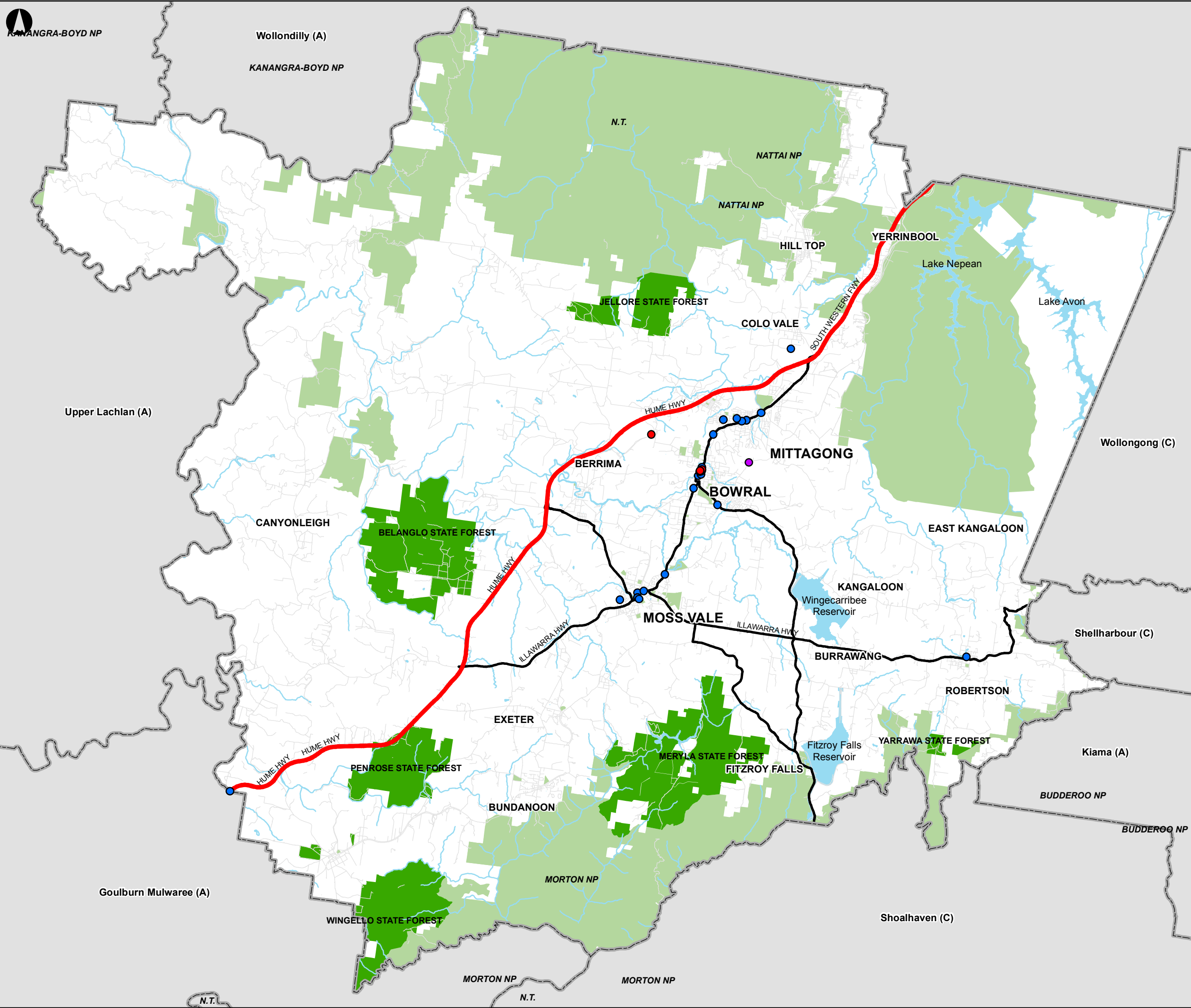
Job Title
**Bicycle Strategy Stage 2
 Towns and Villages of the
 Southern Highlands**

Drawing Title
**Recorded crashes involving cyclists
 Moss Vale
 2008 - 2012**

Scale at A3
1:5,000

Drawing Status
Final

Job No	Drawing No	Issue
14S1049000	006	P1

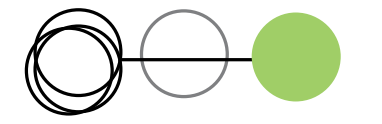
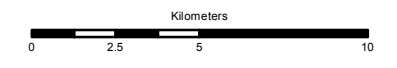


Legend

Pedestrian Crashes

- Fatal (3)
- Injury (26)
- Non-injury towaway (1)

P1	28-04-14	JCM	DVD	DVD
Issue	Date	By	Chkd	Appd



GTA consultants
www.gta.com.au

Client
Wingecarribee Shire Council

Job Title
**Bicycle Strategy Stage 2
Towns and Villages of the
Southern Highlands**

Drawing Title
**Recorded crashes involving
pedestrians by severity
2008 - 2012**

Scale at A3
1:225,000

Drawing Status
Final

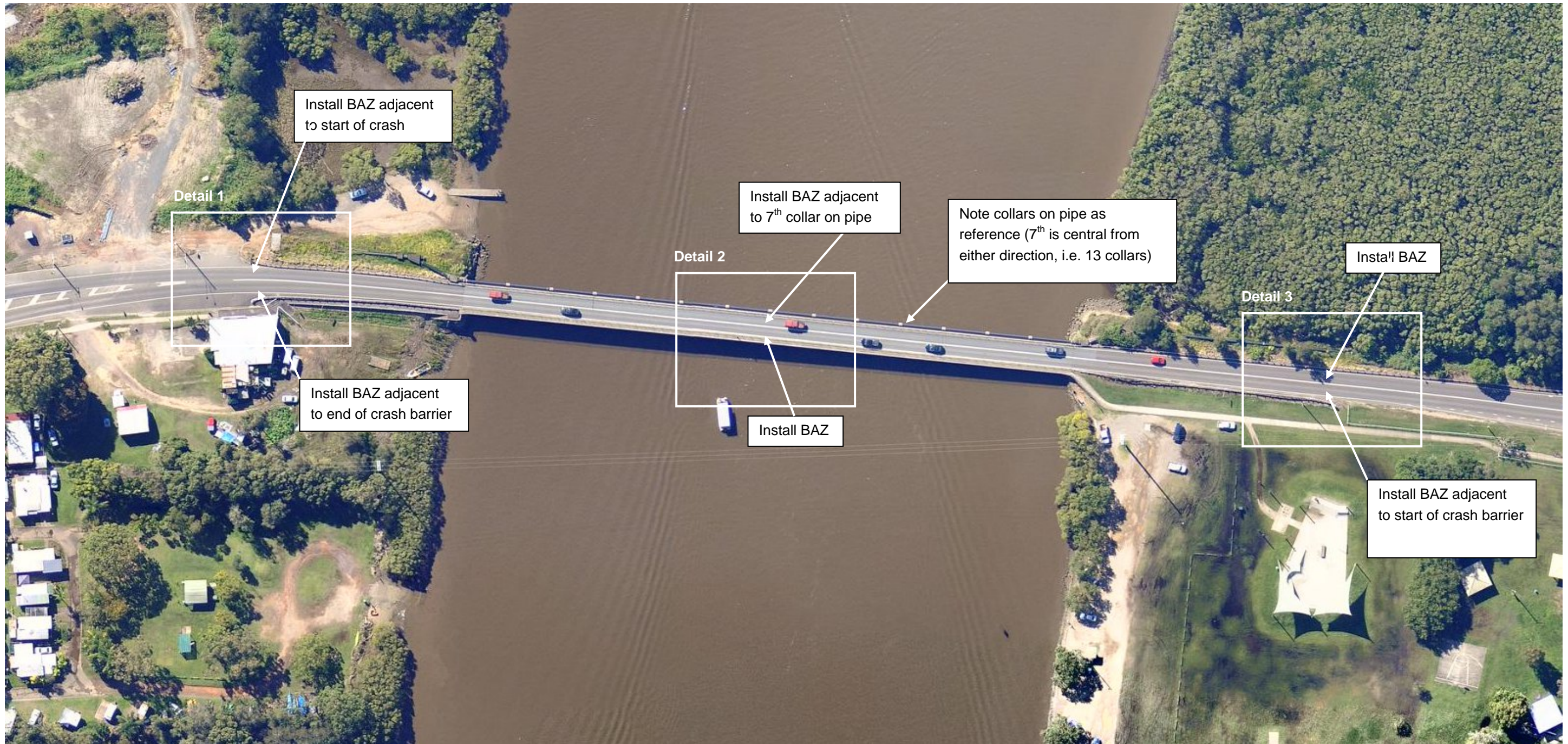
Job No	Drawing No	Issue
14S1049000	005	P1

Appendix C

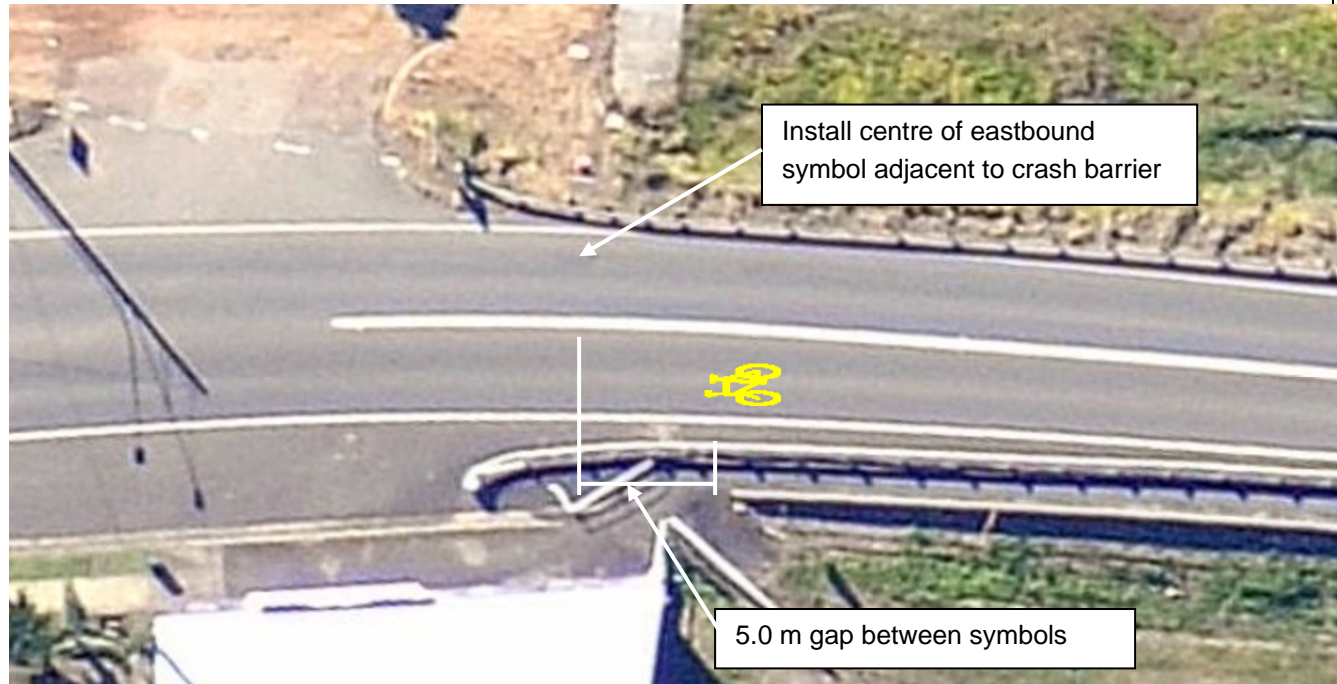
Bicycle Awareness Zone Details

Appendix A: Bicycle Awareness Zones

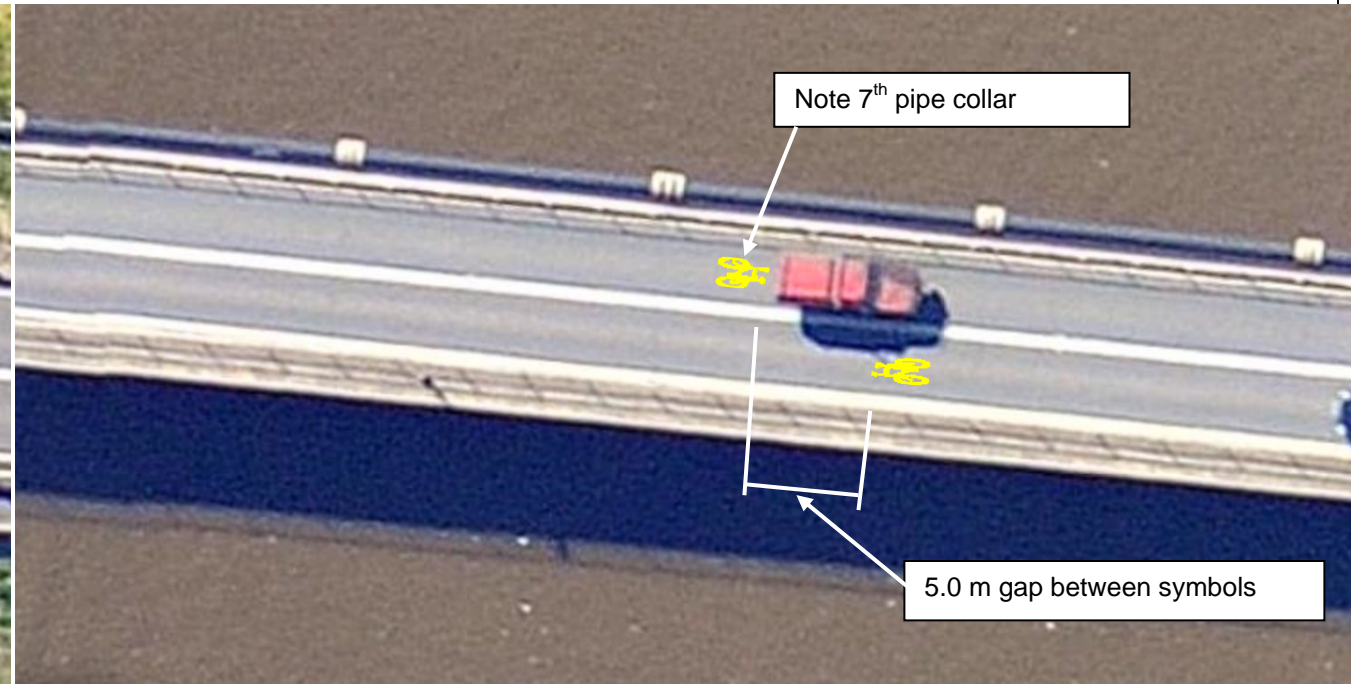
Bli Bli Bridge



DETAIL 1



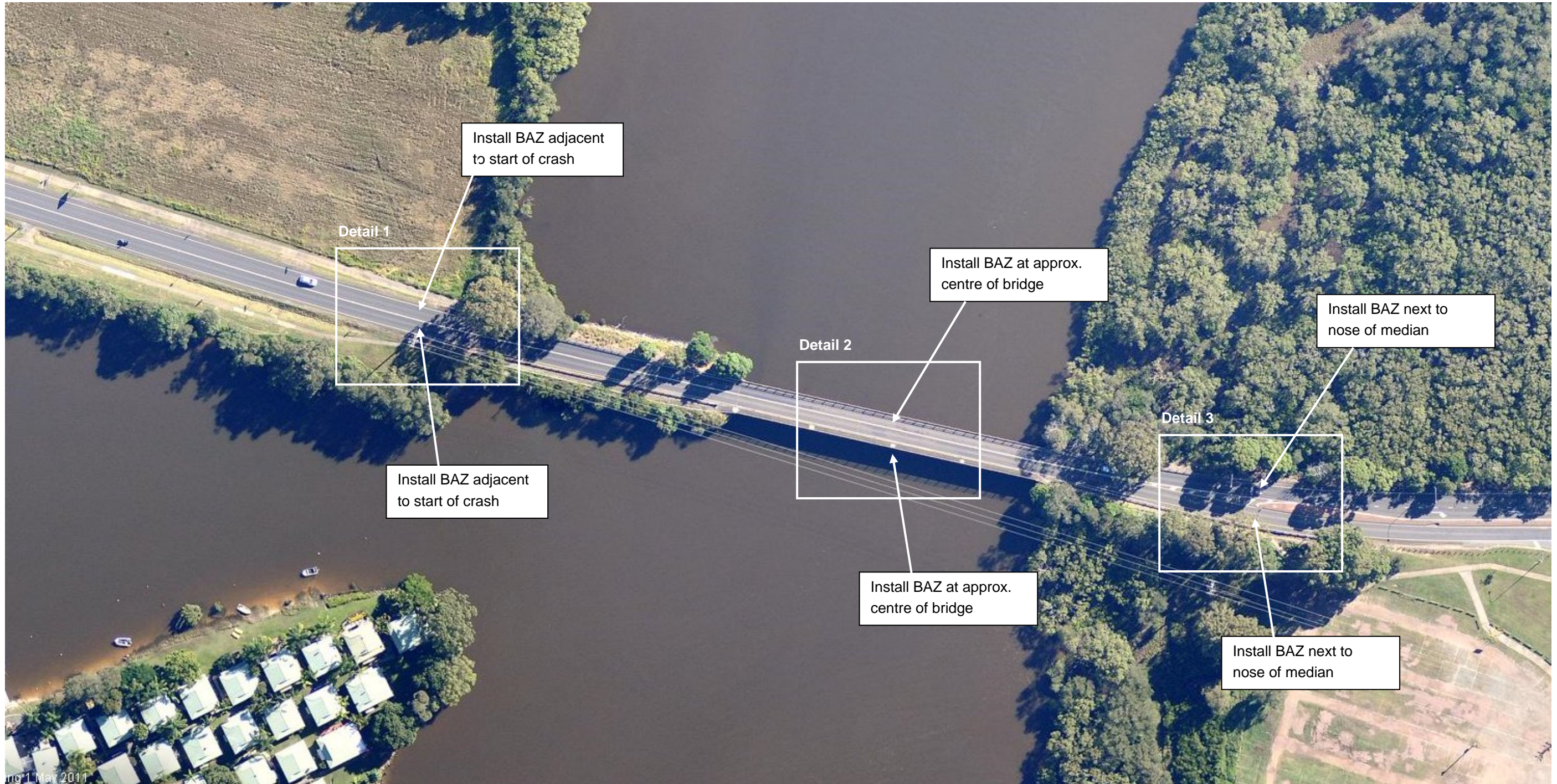
DETAIL 2



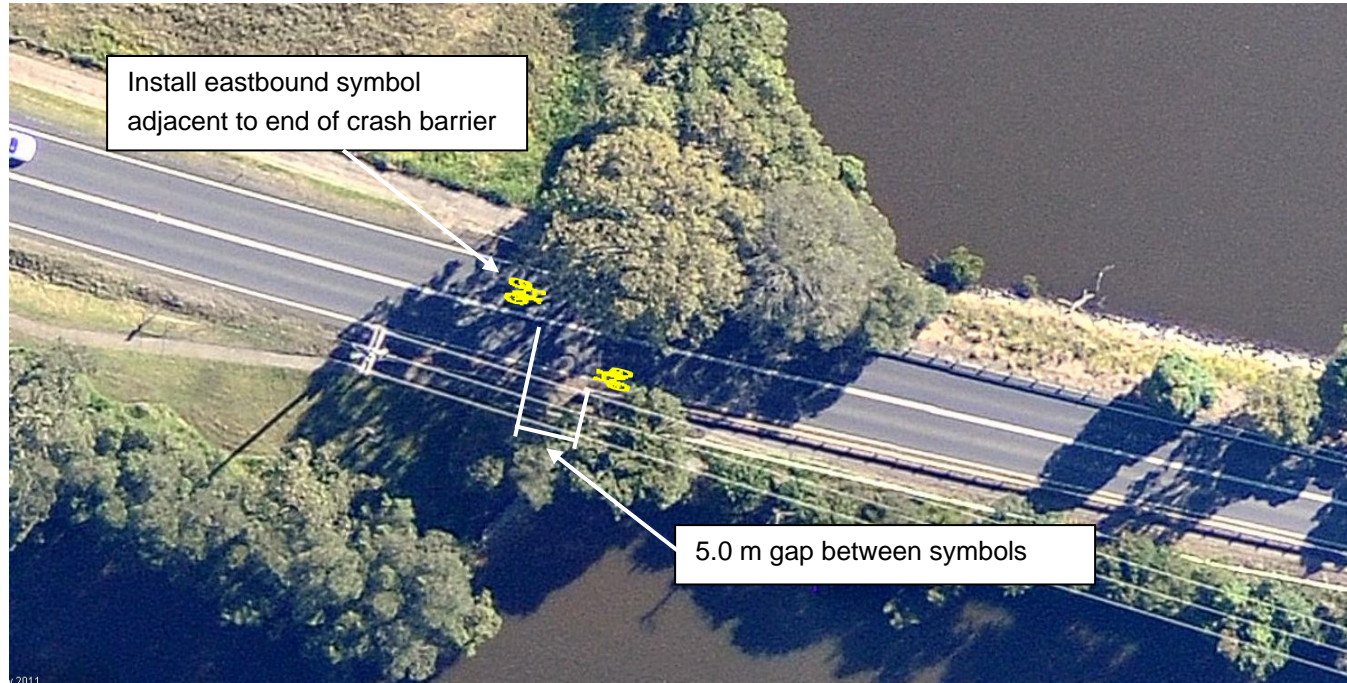
DETAIL 3



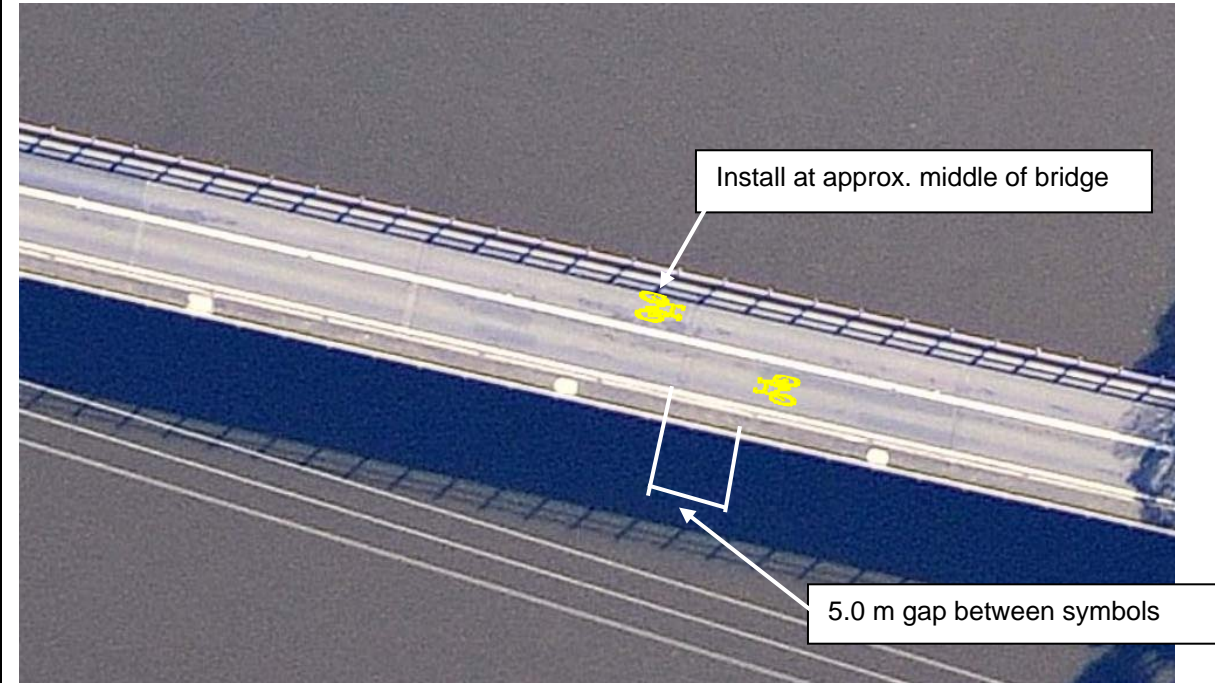
Eudlo Creek



DETAIL 1



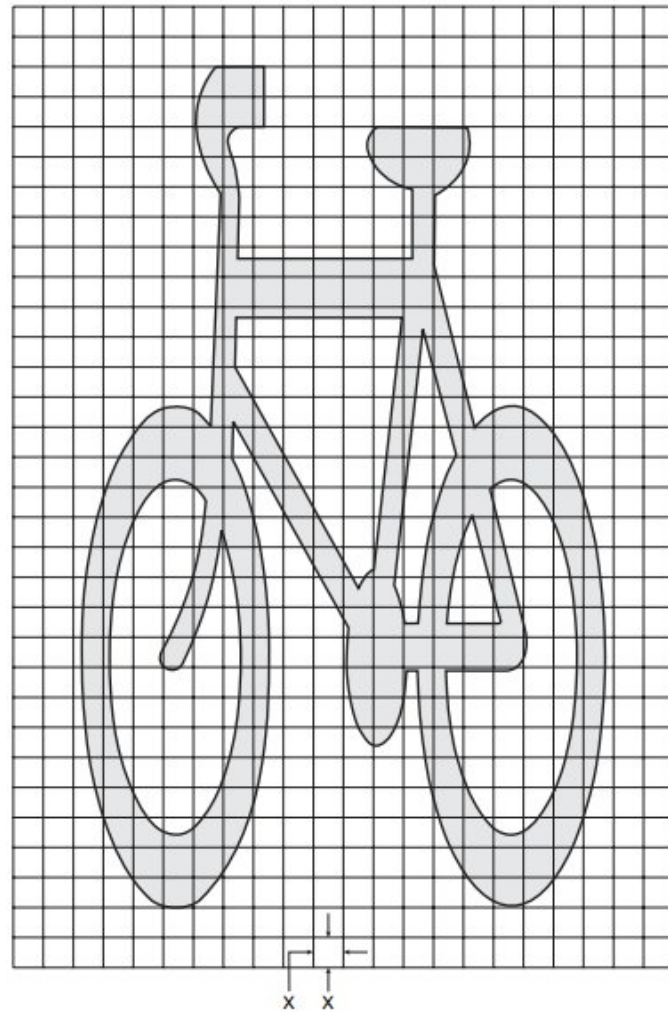
DETAIL 2



DETAIL 3



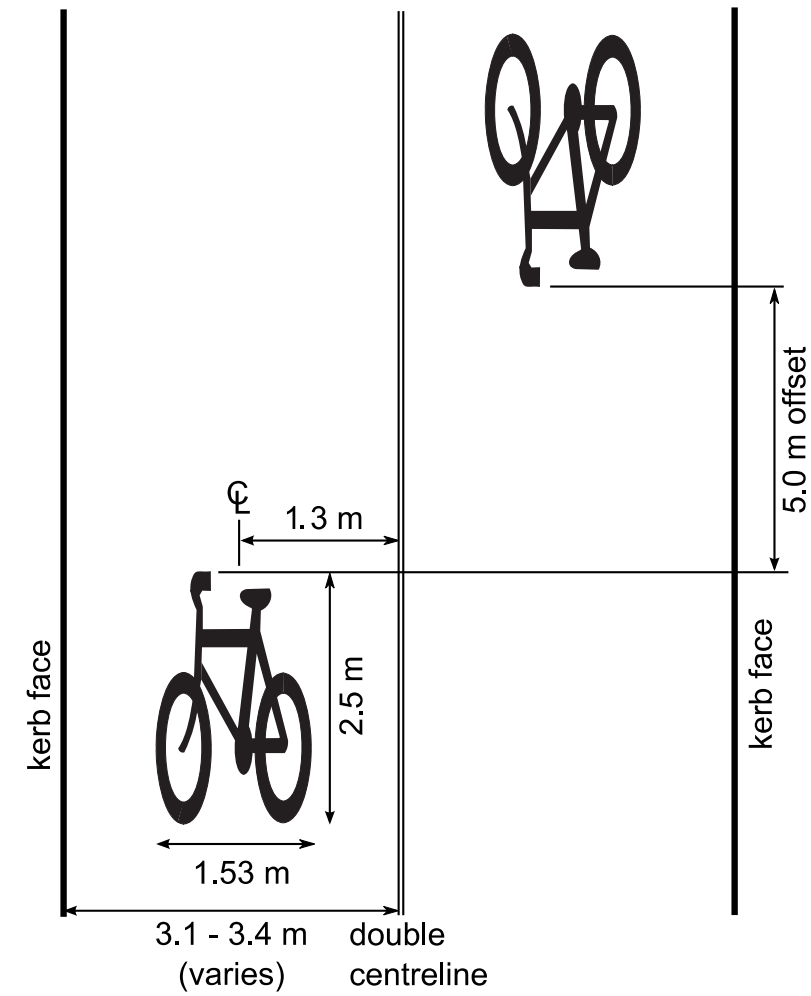
All BAZ symbols should be bicycle symbols 1530 mm x 2500 mm as per MUTCD Part 9 Fig 2.2 (see below).



X = 87 mm: 1530W x 2500H

The symbol should be positioned such that the symbol centreline is 1.3 m from the roadway centreline (see below). This will leave 1.0 – 1.3 m between the kerb face and symbol outer edge.

Symbols in adjacent lanes where there is no median should be offset with a 5.0 m gap.



Appendix D

Picton to Mittagong Rail Trail

Picton to Mittagong Rail Trail, NSW - Sample Project

**Wollondilly Shire Council and Wingecarribee Shire Council
Federal Electorate: Hume**

The project

From Picton to Mittagong there exists a section of what used to be the main southern railway. This section has been by-passed by a newer straighter section of railway. The section from Picton to Thirlmere is still used by the Thirlmere Rail Museum to run Tourist Train excursions on an irregular basis. A short section of rail extends to Buxton. From there it continues on to Mittagong. Most of this section is still in good condition and without rail being in place. In this section is located what is believed to be the deepest railway cutting in Australia.



Recently the NSW Government allocated \$14.6 million to the museum to upgrade the facilities to enable the heritage rolling stock, including locomotive 3801, which is presently housed at Everleigh to be relocated to Thirlmere.

Wollondilly Shire Council has recently initiated a Cycle Tourism project and the Rail Trail will be a cornerstone of the initiative. Wingecarribee Shire Council has expressed interest in participating in the project.

The benefits

This Rail Trail will contribute to increased tourism numbers. Picton is in close proximity to Sydney - a short drive or train trip. Trains service both Picton and Mittagong. In addition the Rail Museum plans to increase the number of tourist trips to and from Sydney. Cycle tourism is a growing market, attracting local, national and overseas tourists. This project would form a critical section of a Sydney to Melbourne Cycling Route, and link into planned Tourist Rides within Wollondilly Shire.

The value to local communities of cycle tourism is well documented, and the Southern Highlands has much to offer. This project will provide the impetus to drive a healthy, non-polluting and enjoyable recreational activity that will enhance the local communities.

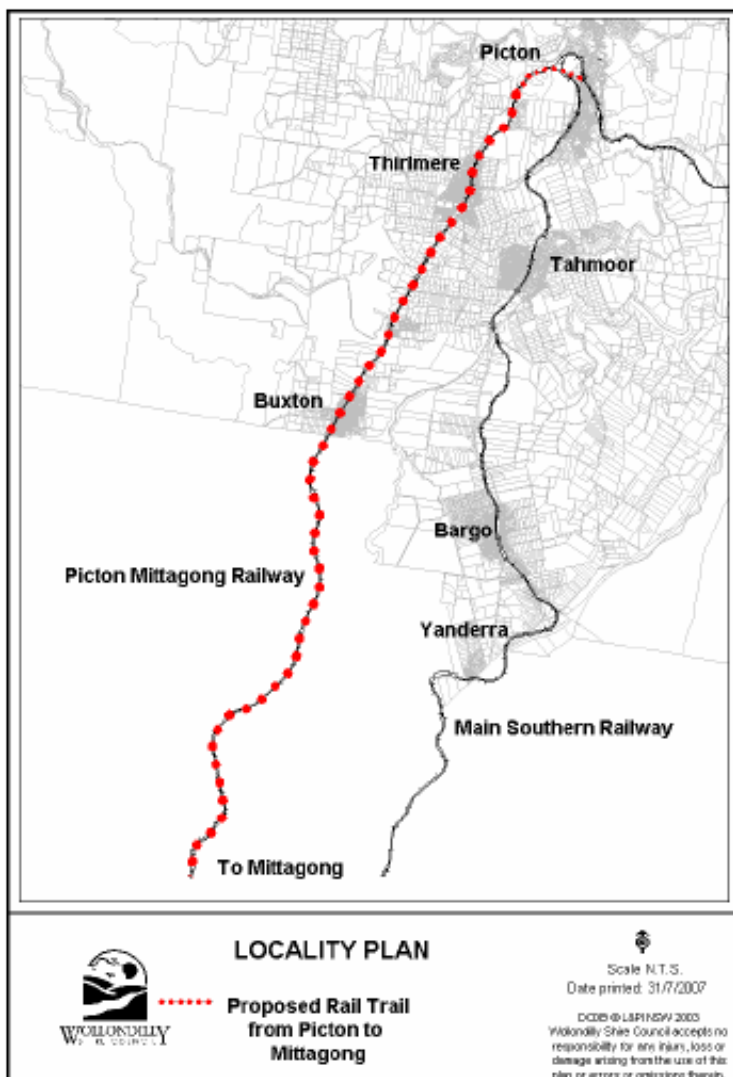
This project would provide incentive and momentum for the expansion of the cycle tourism network in both local government areas, creating a much needed boost to their economies.

Consultation and support

A local committee has been formed consisting of members of the local Chambers of Commerce, the Wollondilly Tourism Association, local cycling clubs, interested community members and a council representative. Discussions have commenced with the Thirlmere Rail Museum. Local Newspapers have publicised the initiative and community support is evident.

Costing

The proposal is for a 3m gravel pathway, separated by an appropriate fence from the active rail section, commencing at Picton and following the existing railway corridor. The length of the trail would be approximately 30km. The estimated cost of the project is \$5 million. This could be covered by a \$2million grant to each Council, with the communities to raise the additional funds.



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