



PO Box 215 Bondi NSW 2026
Phone (02) 9332 2024
Fax (02) 9332 2022
Mobile 0414 978 067
e-mail o.s@tefconsult.com.au
www <http://www.tefconsult.com.au>

HORNSBY BIKE PLAN REVIEW

FOR

HORNSBY SHIRE COUNCIL

DRAFT BICYCLE STRATEGY FOR CONSULTATION

Prepared for

Hornsby Shire Council

7 August 2018

**17115 Hornsby Bike Plan Review
Consultation Report.docx**

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Date	7/08/2018
Author(s)	L. Hawley, A Tan and O. Sannikov
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1. INTRODUCTION

The 2018 bicycle network takes into consideration:

- The National and State policies and funding which presently address cycling access to the Sydney CBD. On the North Shore, the plans only extend as far north as Roseville for the next ten years. The State policy for Hornsby Shire is to progress local, not long distance cycling links.
- Previous Bike Plans and Updates which placed a priority on regional routes, many of which are on RMS roads which require RMS co-operation in development and funding.
- Hornsby Shire growth and land use distribution, specifically the higher density residential developments and the industrial/business zones, some of which are in construction phase.

This 2018 Bike Plan has an emphasis on local cycling facilities and links between suburbs. The longest distances are proposed for commuter links to the Hornsby Town Centre/Hornsby Station, Pennant Hills Shopping Centre and Cherrybrook Station.

The basis of this Bike Plan, are the three Planning Districts in the settled urban areas of the Shire. These are further divided into ten Planning Sub Districts which contain suburb groupings as illustrated in Table 2.1 below.

Table 1.1 Planning Districts and Suburbs

Sub District	Suburbs
North 1	Mount Colah & Mount Ku-ring-gai
North 2	Hornsby Heights
North 3	Berowra, Berowra Heights
Central 1	Asquith
Central 2	Hornsby
Central 3	Waitara, Wahroonga
South 1	Westleigh, Thornleigh, Normanhurst
South 2	Pennant Hills West Pennant Hills
South 3	Cherrybrook, Castle Hill
South 4	Becroft, Cheltenham, Epping North

The Planning District maps have been used as a basis for developing the local networks. These maps have used Council's GIS data as well as generated data by TEF to present the road hierarchy as well as cycling generators and attractors.

Bicycle routes both on street and off street have been developed taking into consideration the following acceptable user risk exposure levels:

- Vulnerable cyclists (inexperienced, elderly, children);
- Experienced cyclists (adult, able bodied);
- Very experienced (adult commuters, fit and agile).

The trip purpose also has input into the appropriate facility type which have varying catchment areas and levels-of-service requirements. Specific engineering works are required to establish a bicycle network.

Essentially the 2018 bicycle network consists of a hierarchy of routes in the following four categories:

1. Local school routes to public primary schools which constitute shared paths of 2.5m immediately around the school and continuous footpaths for up to 500m radius around each school. Where necessary, traffic management is recommended to address crossing streets. 20 public primary schools are addressed.
2. Model cycling routes which are evenly dispersed throughout the Shire and serve the purpose of introducing higher level facilities for a range of cycling proficiencies as examples of contemporary cycling facility provision. Seven such routes are identified.
3. Local routes to attractors such as neighbourhood centres, recreation areas and ovals, as well as local railway stations.
4. Commuter routes to the Hornsby Town Centre and Hornsby railway station, which would be used by experienced cyclists. The routes are continuous and have consistent signage and pavement markings as well as motor vehicle traffic speed management and bicycle facility accommodation though devices and intersections where necessary.

In this Bike Plan, the emphasis on 'bike/parking lanes' is reduced. From experience, it is clear that in many cases this does not constitute a usable facility, due to the rider exposure to doors being opened by car drivers into the space designated as the cycling area.

Recently the law in NSW has been changed to address the following:

- Drivers must allow at least one metre in distance when passing a cyclist. For roads with a speed limit of more than 60 kilometres per hour, 1.5 metres is needed when passing. If it is safe to pass a cyclist, drivers are allowed to move across a centre dividing line, broken or unbroken, into the other lane. They can also drive on a flat dividing strip and a painted island.
- Children up to the age of 16 years old are legally permitted to cycle on footpaths.

Council's traffic volume and speed data has been examined, and in those cases where an unseparated bike facility is proposed to share with cars, traffic calming devices are also proposed where speeds reflect substantial non-compliance. It is highly recommended that these are implemented at the time of bicycle facility implementation with the appropriate community consultation. It is stressed that unless existing speeds on some roads in the Shire are lowered there will be community resistance to exposing themselves and their families to the unsafe road environment.

The principal bicycle facilities recommended to create a local network are illustrated in Figure 1.1 and constitute:

- On road separated cycle lanes'
- Off-road shared paths
- Mixed traffic on local residential streets.

Figure 1.1 Bicycle Facilities Proposed in the 2018 Bike Plan

On road separated two-way or one way bike lanes are for the exclusive use of cyclists. This facility offers the highest level of service for cyclists and are the safest on road facility.



Off road shared bicycle/pedestrian path which requires sharing by pedestrians and cyclists. This facility is suitable in areas where the pedestrian and cyclist numbers are low.



Mixed traffic lanes with logos are appropriate on residential streets with low traffic volumes and speeds. Speed can be controlled with traffic calming devices where there is significant non-compliance with the speed limit.



2. NORTHERN DISTRICT ROUTES

2.1 MT KURING-GAI AND MT COLAH

Mt Kuring-gai is a very small settlement spanning west and east of the Pacific Highway. There are three distinct areas – the eastern side has a primary school, community centre and access to the railway station while west of the Pacific Highway there are two settlements. The Beaumont Road industrial area is isolated on a ridge one kilometre north of the railway station area. The local primary school (Kuring-gai PS) has an estimated 10 cyclists per day. This school is the main cycling generator in the suburb. There were 178 children enrolled in the school in 2017, and the school is expected to grow modestly to 190 enrolments in the next five years. The new Aldi supermarket and associated shops lie on the western side, this is a potential cycling attractor due to the level of service in the centre.

The traffic environment is as follows:

- Beaumont Road in the industrial area is classified as a collector, all other streets are classified as local.
- Brisbane Avenue is a local road with volumes of 426vpd and 85th percentile speeds of 55km/h in a 50km/h speed limit.
- Bicycle crashes have occurred only on the Pacific Highway.
- The 1998 Bike Plan proposed no facilities in this area.
- The principal constraint is the Pacific Highway which dissects the suburb and isolates half the catchment from the school and the shops, however this is spanned by a pedestrian/cyclist bridge over the Highway. The connection to the road bridge on the eastern side is not safe for child pedestrians/cyclists.

The main opportunities are:

- To ensure that as many children as possible are able to cycle to school, from both sides of the Highway.
- That shoppers are encouraged to cycle to the shops.

Mt Colah is an expanding settlement spanning west and east of the Pacific Highway. There are three distinct ridge areas on the western side of the Highway and a small settlement on the eastern side eastern side which has a primary school, community centre and access to the railway station. The new development is five storey residential bounded by the Pacific Highway and the railway line north of Yirra Road which will yield 477 dwellings. The local primary school (Mt Colah PS) has an estimated 10-15 cyclists per day. This is the main cycling generator in the suburb. There were 460 children enrolled in the school in 2017, and the school is expected to grow to 500 enrolments in the next five years. The principal constraint is the topography which constrains development to isolated ridges west of the Highway.

The traffic environment is as follows:

- There is signalised access to the railway station and Yirra Road.
- All the entry ridge roads from the Highway are classified as collectors; most of the other streets are local.
- There are no speed/volume counts in the area.
- Bicycle crashes have occurred only on the Pacific Highway and Kuring-gai Chase Road – a State Road.

- The 1998 Bike Plan proposed no bicycle facilities in this area.
- The Pacific Highway which dissects the suburb and isolates most of the school catchment from the school is a major constraint.

The main opportunity is to ensure that as many children as possible are able to cycle to school, from both sides of the Highway, and especially from the new high rise residential developments.

Table 2.1 Mt Kuring-gai and Mt Colah Bicycle Routes

Route	Location	Facility Type
Mt Kuring-gai PS shared paths	Church St southern side from Low St to Leeming St (school side)	2.5m shared path
	Leeming St (school side) from Church St to King St	2.5m shared path
	King St (school side) to Brisbane Avenue	2.5m shared path
	Church St west from Leeming St to narrowing of footpath on overbridge	2.5m shared path
	Access roads from Pacific Highway to railway overbridge	a foot crossing (zebra) to access pedestrian bridge over Pacific Highway
Mt Kuring-gai Local Connector Routes	Pacific Highway western side from Glenview St to Excelsior Road	2.5m shared path
	Pacific Highway on eastern side from Glenview St to Kuring-gai station	2.5m shared path
	Glenview St from Pacific Highway to Crawford Road	Mixed traffic lanes with logos
Mt Kuring-gai commuter routes	Pacific Highway on eastern side from Glenview St to Kuring-gai station	2.5m shared path
	Mt Kuring-gai Industrial area from Beaumont Road intersection on Pacific Highway to Mt Kuring-gai Station.	Road shoulder travelling north and south – crossing over at Glenview St signals to travel north
Mt Colah PS shared paths	Pierre Close from Community Centre on school side to Cowan Road	2.5m shared path
	Cowan Road (south side) to Gray St	2.5m shared path
	Pierre Close from Cowan Rd east side (school side) to Berowra Road	2.5m shared path
	Cross over new pedestrian refuge on Pierre Close north of Berowra Road to west side then to Yirra Road bridge	2.5m shared path Pedestrian refuge
	Yirra Road bridge (north side) onto Pacific Highway east side along the frontage of the new high rise	2.5m shared path
	Pacific Highway on western side from signals at Mt Colah railway station north to Northumberland Road	2.5m shared path
	Pacific Highway western side from signals at Mt Colah railway station south to Rupert Street	2.5m shared path
Mt Colah Local Connector Routes	Excelsior Road from Pacific Highway to Galahad Close	Mixed traffic lanes with logos
	Lancelot St from Excelsior Road to Foxglove Oval	Mixed traffic lanes with logos
	Beryl Avenue from Pacific Highway to Oxley Drive	Mixed traffic lanes with logos
	Chestnut Road	Mixed traffic lanes with logos



Route	Location	Facility Type
	Northumberland Road from Pacific Highway to Landra Avenue Landra Avenue to Sprigg Place	Mixed traffic lanes with logos Mixed traffic lanes with logos
Mt Colah commuter route	Pacific Highway western side from Excelsior Road to Parklands Road signals then across to Mt Colah station	2.5m shared path

2.2 HORNSBY HEIGHTS

Hornsby Heights is a ridge settlement focussed on Sommerville Road with an entry to Galson Road. The local primary school (Hornsby Heights PS) has an estimated 20 cyclists per day. This is the main cycling generator in the suburb. There were 432 children enrolled in the school in 2017. The closest small shopping centre with a supermarket and associated shops is on the northern side of Galston Road.

The traffic environment is as follows:

- Galston Road a State road.
- Sommerville Road is a collector with volumes of 5-6,000vpd and 85th percentile speeds of 58km/h in a 50km/h speed limit, indicating a measure of speeding.
- A bicycle/ parking lane is the bicycle facility on Galson Road, however the width of this facility is constrained with cyclists subject to parked car door collisions. Local cyclists tend to use the footpath.
- A bicycle crash has occurred at the intersection of Galson Road with Sommerville Road in the last five years.
- The 1998 Bike Plan proposed on road facilities on Sommerville Road in this area.
- The principal constraint is Galston Road which dissects the suburb and isolates the southern catchment from the school and the shops, however the intersection with Sommerville Road is signalised.

The main opportunities are:

- To ensure that as many children as possible are able to cycle to school, especially down Sommerville Road which is essentially flat.
- That shoppers are encouraged to cycle to the local shops on Galston Road.
- That the open space/oval complex at Rofe Park is easily accessible to children and their parents by cycling.

Table 2.2 Hornsby Heights Bicycle Routes

Route	Location	Facility Type
Hornsby Heights PS shared paths	Sommerville Road from Galston Road to Altona Street on eastern side	2.5m shared path
	Galson Road eastern side from Sommerville Road to Evans St	2.5m shared path
Local Connector Routes	Galson Road eastern side from Evans St to Rofe Park	2.5m shared path
	Galson Road eastern side from Sommerville Road to Montview Parade	2.5m shared path
	Montview Parade from Galson Road along frontage of Montview Park & Oval	2.5m shared path
Local Connector/ Recreation/Commuter / Model Route	Sommerville Road from Galston Road to entry to Berowra Valley Regional Park	Mixed traffic lanes with logos
	Sommerville Road from Galston Road to entry to Berowra Valley Regional Park – - at 40km road pavement marking - midpoint Camiri St/Armen Way - south of Retford Way -entry/exit from Berowra Valley Regional Park	4 raised thresholds
	Sommerville Road from Galston Road to entry to Berowra Valley Regional Park close to bus stops – - north of Koala Close - south of Armen Way - south of Altona St - north of Plateau Close	4 pedestrian refuges

2.3 BEROWRA AND BEROWRA HEIGHTS

These two suburbs merge west of the Pacific Highway. There is one continuous area which is bisected by Berowra Waters Road. The railway station is east of the Highway accessed by signals. It is the northernmost substantial village settlement before the Hawkesbury River. There are two public primary schools in the area. Wideview PS has 390 students, with a prediction of only 10 or so student increase in the next 5 years. Berowra PS did not respond to the survey. Additionally there are two private schools in the area. There are two supermarkets with associated shops on the western side of Turner Road in Berowra Heights.

The traffic environment is as follows:

- Berowra Waters Road is a Regional Road with speed/volume counts at two separate locations.
- At 27 Berowra Waters Road there were volumes of approximately 12,600vpd and 85th percentile speeds of 52km/h in a 50km/h speed limit zone.
- At 1 Kita Road there were volumes of approximately 1404vpd and 85th percentile speeds of 49km/h in a 50km/h speed limit zone.
- Alan Road is also a Regional Road with volumes of approximately 4,300vpd and 85th percentile speeds of 56km/h with a speed limit of 50km/h.
- All other streets are classified as collectors or local streets.
- Bicycle crashes have occurred only on Berowra Waters Road and at the intersection of the Pacific Highway. One crash on Turner Road has occurred in the last five years.
- The 1998 Bike Plan proposed access to local facilities and bike parking at the railway station. A cycling loop incorporating Galston Road and Berowra Waters Road for cycling clubs and distance cyclists was also proposed, with no specific infrastructure for this, except signage.
- Presently there is a bike/parking lane on Berowra Waters Road, used on weekends by club cyclists, while local families and children tend to use the footpath.

The principal constraint is Berowra Waters Road which dissects the suburb and is a regional road. There are no signals but pedestrian refuges and crossing facilities to accommodate schools and shops.

The main opportunities are

- To ensure that as many children as possible are able to cycle to school, from both sides of Berowra Waters Road.
- Shoppers are encouraged to cycle to the local supermarkets and shops.
- Children are able to access the parks and ovals by bicycle where the gradient is not prohibitive.
- Commuters can access the railway station the full length of Berowra Waters Road.

Table 2.3 Berowra and Berowra Heights Bicycle Routes

Route	Location	Facility Type
Wideview PS shared paths	Wideview Road from school gates to Alan Road on western side	2.5m shared path
	Alan Road from Berowra Waters Road to Wideview Road on northern side	2.5m shared path
	Woodcourt Road northern intersection with Alan Road	Centre median with gap to accommodate cyclists
	Berowra Waters Road from Alan Road to Warrina St on north-eastern side	2.5m shared path
Berowra PS shared paths	Hillcrest Road from Koorong St to Berowra Waters Road on eastern side	2.5m shared path
	Berowra Waters Road from Warrina St to Hillcrest Drive on north-eastern side	2.5m shared path
	Berowra Waters Road from Hillcrest Drive to Crowley Road on eastern side	2.5m shared path
Local Connector Routes	Turner Road from Alan Road to Gooraway Place	Mixed traffic lanes with logos
	Turner Road from Mangaloo St to Gooraway Place	4 Speed humps
Local connector / Commuter Route	Berowra Waters Road from Crowley Road to Pacific Highway on northern side	2.5m shared path

3. CENTRAL DISTRICT ROUTES

3.1 ASQUITH

Asquith is a growth area spanning west and east of the Pacific Highway. There are two distinct areas – the eastern side has a primary school, while west of the Pacific Highway is the commercial centre - a Coles supermarket and various strip shops. The Asquith residential growth area is on the Pacific Highway from Mt Colah to Hornsby either side of the Highway in the following precincts:

- Lord Avenue - five storey residential – 715 dwelling units yield.
- Baldwin Avenue – town houses - 118 dwelling units yield.
- Stokes Avenue - town houses - 47 dwelling units yield.
- Jersey Street North - five storey residential – 353 dwelling units yield.
- Hyacinth Street - five storey residential – 332 dwelling units yield.
- Bouvardia Street - five storey residential – 363 dwelling units yield.
- Citrus Avenue/Pacific Highway - five storey residential – 162 dwelling units yield.
- Asquith Commercial Centre - ten storey mixed use – 265 dwelling units and 8,000 m² retail/commercial.

The local primary school (Asquith PS) has an estimated 5-6 cyclists per day. There were 410 children enrolled in the school in 2017, and the school is expected to grow to 550 enrolments in the next five years.

The traffic environment is as follows:

- The principal constraint is the Pacific Highway/ Peats Ferry Road which dissects the suburb and isolates part of the school catchment from Asquith PS, and the eastern part of the suburb from the shops.
- Royston Parade is classified as a Regional Road with volumes of about 6,600vpd and 85th percentile speeds of 68km/h in a 60km/h speed limit area; Sherbrook Road, a regional road has volumes over 10,000vpd near Winston Street.
- Amor Street is a collector road with volumes of about 2,600vpd and 85th percentile speeds of 56km/h with a speed limit of 50km/h.
- Bicycle crashes have occurred at the intersections of Bridge Road with Peats Ferry Road and Sherbrook Road.
- The 1998 Bike Plan proposed a local route along Sherbrook Road linking to Bridge Road and a trunk route along Jersey Street linking to the station.
- Traffic management improvements as set out in the DCP include a pedestrian footbridge over the Highway south of the Baldwin Street, extension of Wattle Street to Amor Street, centre median on the Highway to prevent right hand turns and road widening of the Baldwin Avenue/Royston Parade intersection.

The main opportunities are

- Cycling shoppers/commuters both east and west of the Highway can access the Hornsby Town Centre and railway station safely.
- Cycling facilities are incorporated into the DCP traffic management improvements.

- Children who reside on the eastern side of the Pacific Highway can cycle safely to Asquith PS.

Table 3.1 Asquith Bicycle Routes

Route	Location	Facility Type
Asquith PS shared paths	Dudley St along school frontage and to Royston Parade	2.5m shared path
	Along Royston Parade on eastern side to signals, then cross Baldwin Avenue on Sherbrook Road eastern side to pedestrian crossing, cross to western side and on path to Haldane St	2.5m shared path
	Along Baldwin Avenue southside from signals to Haldane St pedestrian refuge, across pedestrian refuge to footpath	2.5m shared path
	Over the rail bridge and descending to signals at Asquith station	Narrow footpath, cyclists dismount and walk
Local Connector Routes	Sutton Street from Galston Road to Ida Street	Mixed traffic lanes with logos
	Old Berowra Road south of Amor Street	Pedestrian/bike refuge
	Wattle Street from Amor Street to Pacific Highway signals	Mixed traffic lanes with logos
Commuter Route to Hornsby Town Centre - start of route	Haldane Street from Baldwin Avenue to Lockwood Street	Mixed traffic lanes with logos
Local Connector/ Commuter / Model Route	Amor Street from Pacific Highway to Old Berowra Road on southern side	2.5m shared path

3.2 HORNSBY AND HORNSBY NORTH

Hornsby and Hornsby North is a sprawling area which includes the Hornsby Town Centre, Hornsby Station, the old Hornsby Centre on Peats Ferry Road, the TAFE, the Aquatic Centre, a business/industrial area abutting the Hornsby Town Centre and the Hornsby Hospital. There are three distinct areas – the eastern side from George Street to the M2, the western section from the railway line to the Hornsby Quarry and the south western area which is primarily residential west of Pacific Highway and south of Hornsby Centre.

The Hornsby North growth area is:

- Galston road - town houses - 167 dwelling units yield.
- Belair Close - five storey residential – 217 dwelling units yield.
- Hornsby West Side – 16-20 storey mixed use – 1000 dwelling units and 30,000 m² retail/commercial.
- Centre Masterplan on Peats Ferry Road indicates redevelopment with high rise housing up to 20 storeys high.

The local primary schools are Hornsby North PS and Hornsby South PS, and both are west of the Pacific Highway. Hornsby South PS on Clarke Road has an estimated 3 cyclists per day. There were 642 children enrolled in the school in 2017, and the school is expected to grow to 740 enrolments in the next five years. Hornsby North PS on Ida Parade did not respond to the survey. Waitara PS services the Hornsby suburb east of Sherbrook Road.

The Traffic Environment is as follows:

- The Pacific Highway, George Street and Jersey Street are State Roads.
- Regional roads include Edgeworth David Avenue, Sherbrook Road, College Crescent and the Pacific Highway from Galston Road to Jersey Road.
- The highest volumes on the Regional Roads are:
 - Edgeworth David Avenue with 13,000-22,000vpd
 - Sherbrook Road with over 13,000vpd,
 - Malsbury Road with over 13,000vpd,
 - Clarke Road with over 12,500vpd.
- The highest volumes and speeds on the local roads are:
 - Albert Street, is a local road accessing Hornsby Town Centre carries over 11,000vpd.
 - Silvia Street with 1800vpd and 85th percentile speeds of 46km/h with a speed limit of 50km/h in the area.
 - Stephen Street with 1000vpd and 85th percentile speeds of 45km/h with a speed limit of 50km/h in the area.
 - Clarinda Street with 450vpd and 85th percentile speeds of 44km/h with a speed limit of 50km/h in the area.
 - Pretoria Parade has 85th percentile speeds of 59km/h in a 50 km/h zone. No other speed counts were available.
 - Bicycle crashes have occurred on Edgeworth David Avenue at the intersections with the Pacific Highway, Arthur Street and Balmoral Street; also in Derby Street behind the hospital. At Palmerston/Burdett intersection and on Peats Ferry Road in the shopping area.

- The 1998 Bike Plan proposed trunk facilities on Jersey Street, Sherbrook Road and an off road route from Pretoria Parade to Clarke Road. Local routes were also indicated.

The constraints to local cycling in this area are

- The steep topography and poor visibility on road curves west of the Pacific Highway.
- State Roads, and high volumes on Regional Roads.
- The railway line with overbridges which form significant pinch points.

The main opportunities are

- To ensure that as many children as possible are able to cycle to school locally where the topography permits and streets are continuous away from the trafficked roads.
- Longer distance shopping and commuter routes encourage cycling to Hornsby Town Centre, the TAFE and Hornsby Station.

Table 3.2 Hornsby and Hornsby North Bicycle Routes

Route	Location	Facility Type
Hornsby North PS shared paths	Galston Road (east-side) from Cawthorne St to refuge near Sutton St	2.5m shared path
	Ida St west side from school to Link Road	2.5m shared path
Hornsby North Local connector routes	Sutton Street from Galston Road to Ida Street	Mixed traffic lanes with logos
	Link Road from Sutton Street to Old Berowra Road	Mixed traffic lanes with logos
	Old Berowra Road south of Amor Street	Pedestrian/bike refuge
Commuter Route Asquith to Hornsby station	Jersey Street on western side from Peats Ferry Road signals to Bridge Road signals	2.5m shared path
	Jersey Street from Peats Ferry Road signals to Station Street	Mixed traffic lanes with logos
Hornsby North Model Route/ Local Connector/ Commuter Route to HTC	Ethel Street from Galston Road to Rosamund Street	Mixed traffic lanes with logos
	Rosamund Street from Ethel Street to Carrington Road	Mixed traffic lanes with logos
	Carrington Road from Rosamund Street to Sylvia Street	Mixed traffic lanes with logos
	Sylvia Street from Carrington Road to Roper Lane	Mixed traffic lanes with logos
	Roper lane from Sylvia Street to Bridge Road	Mixed traffic lanes with logos
	Bridge Road on northern side from Roper Lane to Peats Ferry Road signals	2.5m shared path
	Bridge Road on northern side from Peats Ferry Road signals to Jersey Street signals	2.5m shared path
	Peats Ferry Road western side from Bridge Road signals to Dural Street	2.5m shared path
Commuter Route from HTC to Asquith	Lockwood Street from Heath Street to Lessing Street	Mixed traffic lanes with logos
	Lessing Street from Lockwood Street to	Mixed traffic lanes with logos

Route	Location	Facility Type
Hornsby South PS	Stephen Street	
	Stephen Street/Railway Parade to Denison Street	Mixed traffic lanes with logos
	Denison Street from Railway Parade to Miller Avenue	Mixed traffic lanes with logos
	Miller Avenue from Denison Street to Bridge Road signals	Mixed traffic lanes with logos
	Hunter Street from Bridge Road signals to Hornsby Town Centre	Mixed traffic lanes with logos
	Clarke Road from school crossing eastwards to Malsbury Road on school side (southern)	2.5m shared path
	Clarke Road from school crossing westwards on northern verge to bend in road	2.5m shared path
	Neutral Road on western side to Hall Road.	2.5m shared path
Recreation Route to Lisgar Gardens	William Street from Peats Ferry Road to Lisgar Road	Mixed traffic lanes with logos
	Lisgar Road from William Street to entry of park	Mixed traffic lanes with logos
Commuter Route to HTC from south-west	William Street from Peats Ferry Road to Frederick Street	Mixed traffic lanes with logos
	Frederick Street from William Street to No Stopping signs north of Nursery Street	Mixed traffic lanes with logos
	From No Stopping signs north of Nursery Street to Pretoria Parade roundabout	Separated one way bike lanes on both sides of the road
	Clovelly/Hall Roads from to Pretoria Parade roundabout to Neutral Road	Mixed traffic lanes with logos
	Neutral Road	Mixed traffic lanes with logos
	Clarke Road from Neutral Road to Malsbury Road	Mixed traffic lanes with logos
Commuter Route from HTC to Hornsby Hospital	Florence Street from Hornsby Mall to Muriel Street roundabout	Mixed traffic lanes with logos
	Muriel Street from roundabout to Edgeworth David Avenue	Mixed traffic lanes with logos
	Edgeworth David Avenue on northern side eastwards from Muriel Street to signals	2.5m shared path
	Edgeworth David Avenue on southern side eastwards from Muriel Street signals to Palmerston Road signals	2.5m shared path
	Palmerston Road from Edgeworth David Avenue signals to hospital entry	Mixed traffic lanes with logos

3.3 WAITARA AND WAHROONGA

The Waitara and Wahroonga area spans west and east of the Pacific Highway. It is adjacent to the Hornsby Town Centre, includes Waitara Station, a business/industrial area south of the railway line, existing high rise south of Edgeworth David Road to the railway line, which is still being developed. There are two distinct areas – the area east of the Highway, and the area west of the Highway which is low density residential with two large private colleges. There is a small shopping centre at the intersection of Palmerston Road/Edgeworth David Avenue. There is no shopping area west of the Highway, the nearest being Normanhurst.

The Waitara growth area is:

- Balmoral Street - five storey residential – 1213 dwelling units yield.
- Park Avenue - ten storey residential – 920 dwelling units yield.
- Palmerston Road – five storey mixed use - 91 dwelling units and 4,200 m² retail/commercial.

Waitara PS is the only public primary school in the area. It has an estimated 5 cyclists per day. There were 881 children enrolled in the school in 2017, and the school is expected to grow to 1000 enrolments in the next five years.

The Traffic Environment is as follows:

- The Pacific Highway and Pennant Hills Road are State Roads. Regional Roads include Edgeworth David Avenue and Sherbrook Road.
- The highest volumes on the Regional Roads are
 - Edgeworth David Avenue with 22,000vpd and 85th percentile speeds of 54km/h in a 60km/h speed limit area,
 - Sherbrook Road with over 13,000vpd,
 - Ingram Road with about 10,500vpd,
 - Alexandria Parade with between 8,500-10,000vpd and
 - Romsey Street with 9,000vpd.
- Jubilee Street is a local road with volumes of approximately 3,700vpd and 85th percentile speeds of 42km/h with a speed limit of 50km/h.
- Bicycle crashes have occurred on Edgeworth David Avenue at the intersection with Balmoral Street; at Unwin/Clarke Roads intersection and on the Pacific Highway at the M1 Motorway.
- The 1998 Bike Plan proposed a trunk facility on Yardley Avenue/Waitara Avenue/Sherbrook Road. Edgeworth David Avenue was indicated as a local route to Sherbrook Avenue.

The principal constraint is the Pacific Highway which dissects the area and isolates half the catchment from the Hornsby Town Centre. The crossings over the Highway are at signals.

The main opportunities are:

- Cycling a potential mode for local and cross suburban trips due to a fairly level topography.
- To ensure that as many children as possible are able to cycle to Waitara PS and the local parks and ovals, especially from the high rise developments and from both sides of Edgeworth David Avenue.
- Shoppers are encouraged to cycle to the local shops, as well as Hornsby Town Centre.
- A commuter route from Hornsby Station to Hornsby Hospital is developed which avoids the

topographic constraints.

Table 3.3 Waitara and Wairoa Bicycle Routes

Route	Location	Facility Type
Waitara PS shared paths	Edgeworth David Avenue eastwards from Myra St to Churchill Ave, southern side	2.5m shared path
	Edgeworth David Ave westwards from Myra St to Balmoral Ave, southern side	2.5m shared path
	Myra St (school side) to Oleander Rd	2.5m shared path
Local connector route Waitara	Edgeworth David Ave westwards from Balmoral Avenue to signals at Romney Street, southern side (as in Hospital Route)	2.5m shared path
Local connector/recreation route Waitara	Through open space from Romney Street to Orana Street cul-de sac	2.5m shared path
	Orana Street cul-de sac to Waitara Avenue	2.5m shared path
	Waitara Avenue eastern side along reserve to Park lane	2.5m shared path
	Park Lane from Waitara Avenue to Myra Street	Mixed traffic lanes with logos
	Park Lane from Park Avenue to Myra Street	Speed humps
Waitara Commuter Route to HTC	Myra Avenue at Park Lane	Pedestrian/cyclist gaps in existing median
	Florence Street from Hornsby Mall to Muriel Street (as in Hospital Route)	Mixed traffic lanes with logos
	Muriel Street from Florence Street to Edgeworth David Ave (as in Hospital Route)	Mixed traffic lanes with logos
	Edgeworth David Avenue on northern side eastwards from Muriel Street to signals (as in Hospital Route)	2.5m shared path
	Waitara Avenue from Edgeworth David Ave cul-de-sac head to Alexandra Parade	Mixed traffic lanes with logos
	Alexander Parade from Waitara Avenue to Kuring-gai Council boundary at freeway overbridge	Mixed traffic lanes with logos
Waitara/Wairoa Commuter Route to Waitara Station	Clarke Road from roundabout at railway overbridge to Unwin Road	Mixed traffic lanes with logos
	Clarke Road from Unwin Road to Yardley Avenue eastbound	Mixed traffic lanes with logos
	Clarke Road from Yardley Avenue westbound to Unwin Road	Separated one-way bike lane
	Yardley Avenue from Clarke Road northbound to Pacific Highway	Mixed traffic lanes with logos
	Yardley Avenue southbound from Pacific Highway to Clarke Road	Separated one-way bike lane
	Pacific Highway southern side from Yardley Avenue to pedestrian signals	2.5m shared path
	Dismount and cross over to station entry	Mixed pedestrian/bike shared way

Route	Location	Facility Type
Wahroonga Commuter Link to Normanhurst	Unwin Road from Clarke Road to Edwards Road	Mixed traffic lanes with logos
	Edwards Road from Unwin Road to Denman Parade	Mixed traffic lanes with logos
Wahroonga/Waitara Commuter Route to HTC	Karinya Place from Unwin Road to walkway	Mixed traffic lanes with logos
	Marillian Avenue from walkway to Clarke Road	Mixed traffic lanes with logos
	Clarke Road through roundabout to College Crescent off road path on western side	
	College Crescent off road path on western side to pedestrian refuge on Pretoria Parade	Existing 2.5m shared path on western side
	Pretoria Avenue Link from College Crescent to Pretoria Avenue	2.5m shared path behind residential properties
	Across Pretoria Avenue east of railway overpass	Pedestrian/bike refuge
	Wanderers Way from Pretoria Avenue to Pound Road	Mixed traffic lanes with logos
	Pound Road and Government Road to Pacific Highway	Mixed traffic lanes with logos
Pacific Highway from Government Road on southern side to High Street	2.5m shared path	

4. SOUTHERN DISTRICT ROUTES

4.1 NORMANHURST, THORNLEIGH AND WESTLEIGH

Normanhurst and Thornleigh form a large low density residential settlement and industrial area west and east of the Pacific Highway. Westleigh is an outlying residential suburb. East of Pennant Hills Road, the topography slopes to Coups Creek. West of Pennant Hills Road, the topography is more level, but with some distinct valley areas.

There are two railway stations in this area – Normanhurst and Thornleigh.

The Normanhurst Road Commercial centre growth area is:

- Denman Parade - five storey mixed use - 79 dwelling units and 3,700 m² retail/commercial.

Thornleigh Station area growth is:

- Station Street - five storey residential - 439 dwelling units.

Pennant Hills Road Commercial Centre - ten storey mixed use - 390 dwelling units and 7,000 m² retail/commercial.

There are three public primary schools in the area. Thornleigh West PS in Giblet Avenue has an estimated 10-15 cyclists per day. There were 600 children enrolled in the school in 2017, and the school is expected to grow modestly to 630 enrolments in the next five years. Normanhurst West PS on Dartford Road and Normanhurst PS on Normanhurst Road did not respond.

The main shopping areas are Thornleigh shopping centre at the Pennant Hills Road/The Comenara Parkway intersection, Normanhurst Village near Normanhurst station and Westleigh neighbourhood centre on Duffy Avenue. A small local clutch of shops is on Sefton Road/Gilgandra intersection in Thornleigh.

The Traffic Environment is as follows:

- The area has highly trafficked Regional roads in the area some of which carry industrial traffic:
 - The Esplanade – at Wells Street – 24,400vpd+ (2009)
 - Sefton Road – west of Adamson Street – over 19,500vpd
 - Milson Parade – between Harris Road and Bryan Avenue – close to 18,700vpd with 85th percentile speeds of 63km/h in a 60km/h speed limit zone.
 - Chilvers Road – south of Sefton Road – over 18,500vpd (2009)
 - Duffy Avenue near Pioneer Avenue – over 10,00vpd (2009)
 - Quarter Sessions Road – between Duffy Avenue and Bottle Brush Road – approximately 4,500vpd with 85th percentile speeds of 57km/h in a 50km/h speed limit zone.
- Bicycle crashes have occurred on the Pacific Highway, Sefton Road near Lockerbie Avenue, and in the Central Avenue industrial area, Thornleigh.
- The 1998 Bike Plan indicated RTA Regional routes on The Esplanade, Chilvers Road, Duffy Avenue. Trunk routes were also indicated on Midson Road/Malsbury Road.

The principal constraint is the number of regional roads which carry high volumes of industrial traffic. While Pennant Hills Road dissects the suburbs, connections across are available at signals and in one instance, an

overbridge.

The main opportunities are:

- to create local bypass routes to the highly trafficked routes
- to ensure that footpaths are of a high standard and safe crossing facilities are installed in order to encourage children to cycle to school where the topography permits,
- shoppers are encouraged to cycle to local shops
- a safe commuting route is established to link to Hornsby Town Centre.

Table 4.1 Normanhurst, Thornleigh and Westleigh Bicycle Routes

Route	Location	Facility Type
Thornleigh West PS shared paths	Quarter Sessions Road on school side from Duffy Ave to pedestrian refuge south of Nicholson Ave.	2.5m shared path
	Duffy Ave west of Quarter Sessions Road southside to Eucalyptus Drive	2.5m shared path
	Duffy Ave east of Eucalyptus Drive	Pedestrian/bike refuge
Normanhurst West PS	Dartford Road from Sefton Road to bend on eastern side	2.5m shared path
	Sefton Road to Larool Crescent on northern side	2.5m shared path
	Milson Parade from Dartford Road to Harris Rd northern side	2.5m shared path
Normanhurst Rd PS	Normanhurst Road from pedestrian school crossing to Pennant Hills Road	2.5m shared path
	Normanhurst Road on western side from pedestrian school crossing to Denham Parade	2.5m shared path
	Pennant Hills Rd from Normanhurst Road to Fraser Road northside	2.5m shared path
Normanhurst local Link to Brickpit Park/Kenley Park	Dartford Road from signals at Milson Parade to signals at Pennant Hills Road on western side	2.5m shared path
	Across signals at Pennant Hills Road on northern side to Huddart Avenue	2.5m shared path
	Huddart Avenue from Pennant Hills Road to Denman Parade	Mixed traffic lanes with logos
	Denman Parade from Huddart Avenue to railway overbridge	Mixed traffic lanes with logos
Westleigh local Link to Berowra Valley off road path	Quarter Sessions Road from Duffy Avenue to Timbarra Road	Mixed traffic lanes with logos
	Timbarra Road from Quarter Sessions Road to entry to off road shared path	Mixed traffic lanes with logos
Westleigh local Link from Sefton Road to Duffy Avenue	Wild Ash Way from Sefton Road to Duffy Avenue	Mixed traffic lanes with logos
Thornleigh/Normanhurst local Link to Brickpit Park/Kenley Park	Dartford Road from signals at Milson Parade to signals at Pennant Hills Road on western side	2.5m shared path

Route	Location	Facility Type
Westleigh/Pennant Hills Town Centre Link	Across signals at Pennant Hills Road on northern side to Huddart Avenue	2.5m shared path
	Huddart Avenue from Pennant Hills Road to Denman Parade	Mixed traffic lanes with logos
	Denman Parade from Huddart Avenue to railway overbridge	Mixed traffic lanes with logos
	Nicolson Avenue from Quarter Sessions Road to Dobson Street	Mixed traffic lanes with logos
	Dobson Street from Nicolson Avenue to Giblett Avenue from Dobson Street to Edmonson Close	Mixed traffic lanes with logos
	Over Zig Zag Creek and Reserve to Dale Close	2.5m shared path
	Dale Close to Morgan Close	Mixed traffic lanes with logos
	Morgan Close from Dale Close to Tillock Street	Mixed traffic lanes with logos
Westleigh/Thornleigh commuter route to Normanhurst Station	Tillock Street southbound to off road walkway	Mixed traffic lanes with logos
	Off road from Quarter Sessions Road opposite Coorang Road through reservoir reserve to Sefton Road	2.5m shared path
	Sefton Road on northern side from off road path to Milson Parade east of Hammond Avenue	2.5m shared path
	Milson Parade between Hammond Avenue/Denman Avenue railway bridge	Pedestrian/bike refuge
	Milson Parade between pedestrian/bike refuge and Denman Avenue railway bridge on southern side	2.5m shared path
Quarter Sessions Road Model Route / commuter / recreation & school link	Denman Avenue railway bridge on eastern side then northern side to railway station entry	2.5m shared path
	Quarter Sessions Road from Duffy Avenue to Warrigal Drive (south)	On road separated 2 way bike lanes
	Quarter Sessions Road from Warrigal Drive to Western Crescent (north)	Mixed traffic lanes with logos
	Opposite Ruddock Park	Pedestrian/bike refuge
	Near Warrigal Drive (south)	Pedestrian/bike refuge
	Near Barkala Place	Pedestrian/bike refuge
Normanhurst Commuter Route to HTC	Near Silver Crescent	Pedestrian/bike refuge
	Opposite playground north of Western Crescent	Pedestrian/bike refuge
	Milson Parade/Malsbury Road from Hammond Avenue to Clarke Road on north/western side	2.5m shared path
	North of Clarke road rail bridge cross over Malsbury Road	centre median
Thornleigh/Normanhurst local Link to Brickpit	Malsbury Road short link to Normanhurst shops and station through Eaton Avenue signals, then on southern side of Malsbury Road to railway bridge	2.5m shared path
	Dartford Road from signals at Milson Parade to signals at Pennant Hills Road	2.5m shared path

Route	Location	Facility Type
Park/Kenley Park	on western side Across signals at Pennant Hills Road on northern side to Huddart Avenue Huddart Avenue from Pennant Hills Road to Denman Parade Denman Parade from Huddart Avenue to railway overbridge	2.5m shared path Mixed traffic lanes with logos Mixed traffic lanes with logos
Normanhurst Commuter Route from Normanhurst shops Wahroonga/Waitara	Denman Parade from railway station entry to Edwards Road	Mixed traffic lanes with logos
Commuter link from Duffy Avenue to The Esplanade	Duffy Avenue from end of bike/parking lane northern side to Chilvers Road signals	2.5m shared path
	The Esplanade eastern side from Duffy Avenue to start of bike/parking lane	2.5m shared path

4.2 PENNANT HILLS AND PENNANT HILLS WEST

Pennant Hills and Pennant Hills West are principally low density residential settlement with a small residential area east of Pennant Hills Road together with Pennant Hills Park. There is one railway station in the area which attracts commuters from Cherrybrook, Castle Hill and the villages in the rural area. A multistorey commuter car park services the parking demand, which is accessed from Pennant Hills Road.

Pennant Hills redevelopment is:

- Fisher Avenue - five storey residential - 133 dwelling units.

West Pennant Hills area growth is:

- Thompsons Corner - five storey mixed use - 347 dwelling units and 16,000m² retail/commercial.

There are two public primary schools in the area. Pennant Hills PS in Weemala Avenue which has about 8 cyclists per day. There were 550 children enrolled in the school in 2017, and the school is expected to grow modestly to 600 enrolments in the next five years. Pennant Hills West PS on Church Street has about 20 cyclists per day. There were 651 children enrolled in the school in 2017, and the school is expected to grow to 700 enrolments in the next five years.

The main shopping areas are Pennant Hills shopping centre accessed from Yarra Road and West Pennant Hills Shopping Centre at the Pennant Hills Road/Castle Hill Road intersection.

Bicycle crashes haven occurred on

- Pennant Hills Road,
- Yarra Road near Ramsay Road,
- Bellamy Street east of Boundary Road,
- Victoria Road west of Wilson Road and at New Line Road.

The Traffic Environment is as follows:

- The area has some highly trafficked Regional Roads in the area:
 - Yarra Road – near Wells Street – 24,100vpd+ (2016)
 - Bellamy Street - between Malahide Road and Laurence Street – approximately 17,200vpd with 85th percentile speeds of 55km/h in a 50km/h speed limit area.
 - Stevens Street – near Willis Avenue – over 15,500vpd (2010)
 - Bellamy Street – near Boundary Road – about 11,500vpd (2016)
 - Victoria Road – between Loftus Road and Wilson Road – around 3,400vpd with 85th percentile speeds of 56km/h in a 50km/h speed limit area.
- Ramsay Street is a local road with volumes of about 5,000vpd and 85th percentile speeds of 37km/h with a speed limit of 50km/h.
- The 1998 Bike Plan indicated RTA Regional routes on The Esplanade, Bellamy Road and Victoria Road. Boundary Road is indicated as a trunk route. The only local routes indicated are connectors to Pennant Hills High School.

The principal constraint is the trafficked Regional Roads which surround the Pennant Hills shopping centre area. These are all residential streets with driveways and on street parking.

The main opportunities are:

- Create local bypass routes to the highly trafficked routes and/or create high quality facilities by restricting on street parking where feasible and traffic management to restrict speeds.
- Ensure that footpaths are of a high standard and safe crossing facilities are installed in order to encourage children to cycle to school where the topography permits.
- Shoppers are encouraged to cycle to the Pennant Hills regional shopping centre and the local Pennant Hills West centre.

Table 4.2 Pennant Hills and Pennant Hills West Bicycle Routes

Route	Location	Facility Type
Pennant Hills PS shared paths	Weemala Road from Trebor Road to Ramsay Rd on north-western side	2.5m shared path
	Rosemount Avenue from Ramsay Road to Stephens Street on north-western side	2.5m shared path
	Ramsay Rd from Weemala Road to Bellamy Street south-west (school side)	2.5m shared path
	Greycliffe Avenue fronting school	2.5m shared path
Pennant Hills West PS shared paths	Church Street southern side	2.5m shared path
	Cardinal Avenue western side from Church Street to Pennant Hills Road	2.5m shared path
Pennant Hills West PS shared path/Model Route	Castle Hill Road eastern side from New Line Road to overhead bridge over Castle Hill Road	2.5m shared path
	Victoria Road from New Line Road to Boundary Road southside	2.5m shared path
Thornleigh/Pennant Hills Park Recreation Link	Yarra Road northside from Eddy Street to Ramsey Road signals	2.5m shared path
	Ramsey Road signals on southside to overpass on Pennant Hills Road	2.5m shared path
	On overpass to Hampden Road then to The Crescent	Mixed traffic lanes with logos
	The Crescent from Hampden Road to Charlotte Road/ Britannia Street into Pennant Hills Park	Mixed traffic lanes with logos
Westleigh/Pennant Hills Town Centre Link	From walkway on Tillock Street to Westwood Street	Mixed traffic lanes with logos
	Westwood Street from Tillock Street to Stevens Street	Mixed traffic lanes with logos
	From Westwood Street north to existing raised pedestrian crossing on Stephens Street	2.5m shared path
	Rosemount Avenue northern side from Stephens Street to Ramsay Road (also school route)	2.5m shared path
Cherrybrook/Pennant Hills Town Centre Link	Boundary Road eastern side from Francis Greenway Drive to Bellamy Street signals	2.5m shared path
	Bellamy Street south eastern side from signals to Malahide Road	2.5m shared path
	Malahide Road to shared path link to Leith Road	Mixed traffic lanes with logos

Route	Location	Facility Type
	Leith Road from shared path to Ramsay Road	Mixed traffic lanes with logos
	Ramsay Road from Leith Road to Yarra Road	Mixed traffic lanes with logos
Victoria Road/ Bellamy Street Commuter Route	Victoria Road from New Line Road to Boundary Street signals – change treatment	Mixed traffic lanes with logos
	Victoria Road from New Line Road to Boundary Street signals	4 speedhumps
	Bellamy Street from Boundary Road signals to Stephens Street	Mixed traffic lanes with logos
	Bellamy Street from Boundary Road signals to Stephens Street	3 speedhumps
	Stephens Street from Bellamy Street to Yarra Road	Mixed traffic lanes with logos
	Stephens Street near Willis Avenue	1 speedhump
Shopping/station link	Cardinal Avenue from Victoria Road to Pennant Hills Road	Mixed traffic lanes with logos
	Pennant Hills Road north-western side from Cardinal Avenue to shopping centre	2.5m shared path
	Castle Hill Road eastern side from New Line Road to Cherrybrook Station	2.5m shared path
New Farm Road local links	New Farm Road from New Line Road to Boundary Road signals	Mixed traffic lanes with logos
	Cheyne Walk from New Farm Road to Campbell Park	Mixed traffic lanes with logos
	Attunga Avenue/Wilga Street to Campbell Park	Mixed traffic lanes with logos

4.3 CHERRYBROOK AND CASTLE HILL

Cherrybrook and Castle Hill are low density residential settlements on the fringe of the urban area.

The Cherrybrook station is being constructed on Castle Hill Road. This will be completed within the next 3 years. Presently there is a high reliance on the private car for commuting. The Cherrybrook Station Precinct will include - five storey mixed use - 2815 dwelling units and 2,400m² retail/commercial.

There are three public primary schools in the area:

- Oakhill Drive PS on Oakhill Drive has a catchment area which extends east over New Line Road to the James Henty Drive area, it has about 2-3 cyclists per day. There were 753 children enrolled in the school in 2017. The principal pointed out that the hilly area mitigates against cycling.
- John Purchase PS and Cherrybrook PS did not respond to the survey.

The main shopping areas are Cherrybrook Shopping Village on Shepherds Drive, the Apple Tree neighbourhood shopping centre on Shepherds Drive and the Oakhill Village Shopping Centre on David Road /Oakhill Drive intersection.

The existing Traffic Environment is as follows:

- Boundary Road is a State Road;
- The area has the following Regional Roads:
 - County Drive – between Treetops Road and John Road – approximately 15,900vpd with 85th percentile speeds of 65km/h in a 60km/h speed limit area.
 - New Line Road – near Cedarwood Drive – over 14,000vpd (2016).
- Major collectors and local collectors are:
 - Shepherds Drive –speed/volume counts at two separate locations.
 - 24 Shepherds Drive - approximately 13,400vpd and 85th percentile speeds of 54km/h in a 50km/h speed limit zone.
 - 91 Shepherds Drive - approximately 7,400vpd and 85th percentile speeds of 54km/h in a 50km/h speed limit zone.
 - Macquarie Drive – near Callistemon Crescent - over 6,300vpd (2016)
 - Purchase Road – between Hancock Drive and Kentia Parade - approximately 2,100vpd with 85th percentile speeds of 63km/h with a designated speed limit of 50km/h.
 - Cedarwood Drive – near Maybush Place – around 1,400vpd with 85th percentile speeds of 60km/h in a 50km/h speed limit area.
- Only one bicycle crash was documented on Shepherds Drive at the Apple Tree neighbourhood shopping centre.
- The 1998 Bike Plan indicated a trunk route on Boundary Road to David Road, then along Oakhill Drive to Tawmii Place, then Old Northern Road.

The principal constraints are:

- Very steep gradients on approach to Castle Hill Road.
- Lack of speed restrictions and safe crossing points on collector roads.
- Curvilinear roads which encourage speeding and visibility problems for active transport.

- Lack of crossing facilities for pedestrians/cyclists at the Boundary Road/County Drive intersection encouraging vehicle use for short local trips.

The main opportunities are:

- Create a safer local road environment by restricting the speed of vehicles.
- Ensure that footpaths are of a high standard and safe crossing facilities are installed in order to encourage children to cycle to school.
- Upgrading of the Boundary Road/County Drive intersection to signals to encourage active transport for the shopping trip to Cherrybrook Village Centre and recreation facilities which exist in that precinct.

Table 4.3 Cherrybrook and Castle Hill Bicycle Routes

Route	Location	Facility Type
Cherrybrook PS shared paths	New Line Road on western side (school side) from park/playground near Boundary Road roundabout to Victoria Road roundabout	2.5m shared path
	Near New Farm Road	Pedestrian/bike refuge
John Purchase PS shared paths	Purchase Road from Eldridge St to New Line Road on southern (school) side	2.5m shared path
	Purchase Road from school crossing to Eldridge Street	5 speed humps
Oakhill Drive PS shared paths	David Road from Oakhill Dr roundabout to Woodgrove Ave roundabout on southern (school) side	2.5m shared path
	Cross to south of roundabout	gap in roundabout median
	Woodgrove Avenue southern side from David Road to County Drive signals	2.5m shared path
	Oakhill Drive from David Rd roundabout southern (school) side to Springthorpe Way	2.5m shared path
East-west local connector route	Haven Court from David Road to path through reserve	Mixed traffic lanes with logos
	Path through reserve and cross at County Drive signals	2.5m shared path
	John Road on northern side from County Drive signals to Franklin Road	2.5m shared path
	Franklin Road western side from John Road to Neale Avenue	2.5m shared path
	Franklin Road south of Neale Avenue intersection at start of 40km/h school zone	speedhump
	Neale Avenue from Franklin Road to Bowerman Place	Mixed traffic lanes with logos
	Bowerman Place	Mixed traffic lanes with logos
	Bowerman Place path from Bowerman Place to New Line Road	2.5m shared path
	New Line Road from Bowerman Place path on western side shared path (school route) to existing pedestrian refuge	Signage
	New Line Road eastern side from existing pedestrian refuge to	2.5m shared path

Route	Location	Facility Type
	Cedarwood Drive	
	Cedarwood Drive from New Line Road to Boundary Road	Mixed traffic lanes with logos
	Boundary Road on southern side from Cedarwood Road to new pedestrian/bike refuge	2.5m shared path
	Boundary Road 55m south of Cedarwood Drive intersection to link with Boundary Road shared path	Pedestrian/bike refuge
David Road/New Line Road connector	David Road from New Line Road to Oakhill Drive	Mixed traffic lanes with logos
Macquarie Drive / Francis Greenway Drive Link	Macquarie Drive western side from Shepherds Drive to Francis Greenway Drive	2.5m shared path
	Macquarie Drive between Kenburn Avenue and Francis Greenway Drive	Pedestrian/bike refuge
	Kenburn Avenue intersection with Macquarie Drive	Intersection median
	Tallowood Avenue intersection with Macquarie Drive	Intersection median
	Gumnut Road intersection with Macquarie Drive	Intersection median
	Francis Greenway Drive on northern side from Macquarie Drive to Boundary Road signals	2.5m shared path
Kenburn Avenue connector to shops	Kenburn Avenue from Macquarie Drive to Shepherds Drive	Mixed traffic lanes with logos
Francis Greenway Drive connector	Francis Greenway Drive from Macquarie Drive near Kenburn Avenue to Macquarie Drive roundabout	Mixed traffic lanes with logos
	Mixed traffic lanes with logos	5 speed humps
Shepherds Drive Model Route/ school & shopping connector	Shepherds Drive on northern side from existing shared path to existing pedestrian refuge north of Macquarie Drive	2.5m shared path
	Shepherds Drive on western side from existing pedestrian refuge to 20m from roundabout at Beechworth Parade	Separated 2 way bike lanes
	Shepherds Drive on western 20m south and north of roundabout at Beechworth Parade	2.5m shared path
	Shepherds Drive on western side from shared path 20m north of Beechworth Parade roundabout to existing pedestrian refuge opposite Appletree Shopping Centre	Separated 2 way bike lanes
	Shepherds Drive on western side from existing pedestrian refuge opposite Appletree Shopping Centre to Elridge Street	2.5m shared path
Cherrybrook Station Castle Hill Road Commuter Route	Castle Hill Road from David Street to overpass at Pennant Hills West shopping centre	2.5m shared path
Cherrybrook Station north-south commuter connector	Shepherds Drive/County Drive/Boundary Road intersection	Traffic signals



Route	Location	Facility Type
	County Drive western side from Boundary Road to John Road	2.5m shared path
	County Drive eastern side from John Road to Castle Hill Road	2.5m shared path

4.4 CHELTENHAM, BEECROFT AND EPPING NORTH

Cheltenham, Beecroft and Epping North constitute that part of the Shire from which all land south of the M2 motorway was re-distributed to Parramatta Council. Links still exist with that land in the form of the Hornsby DCP designating land use changes, an operating school catchment, and links to a the Epping regional centre which services the Epping North area.

The commercial centres in the area are:

- Epping Town Centre – just outside the Shire
- Beecroft Village at the railway station.
- Malton Road neighbourhood centre in North Epping.

The Beecroft area growth is:

- Beecroft Road in commercial centre - five storey mixed use - 8557 dwelling units and 2,300m² retail/commercial.

There are three public primary schools which service the area. Unfortunately none of these schools responded to the survey:

- Beecroft PS (712 students in 2013) and Epping North PS (414 students in 2013) have a catchment which is fully within the Shire.
- Epping Heights PS (322 students in 2013) is located south of the M2 motorway with a catchment north of the motorway.

The area is serviced by the Beecroft and Cheltenham railway stations within the Shire as well as Epping station.

The Traffic Environment is as follows:

- Beecroft Road is a State Road.
- Copeland Road in Beecroft is classified as a Regional Road.
- All other streets are classified as collector and local Council roads.
- Volumes are available for the following roads:
 - Sutherland Road Beecroft, a collector – over 1,300vpd (2016), with 85th percentile speeds of 62km/h in a 50km/h zone.
 - Kirkham Street Beecroft, a major collector - over 5,300vpd (2012), with 85th percentile speeds of 50km/h in a 50km/h zone.
- Bicycle crashes have occurred:
 - At the Beecroft Road/Copeland Road intersection, and one on the overbridge of the M2 motorway.
 - At the On Castle Howard Road mid block
 - At the Dalton Road/Boundary Road intersection, Epping North.
- The 1998 Bike Plan proposed the following as trunk routes:
 - Sutherland Road.
 - Chapman Avenue/Cardinal Avenue linking across Pennant Hills Road to Victoria Road.

Beecroft Road redevelopment in the area bounded by Chapman Avenue and Wongala Crescent will yield 855 dwellings and 2,300m² of retail and commercial area.

The principal constraint is Beecroft Road which dissects the two northern suburbs and splits the school and retail village catchments.

The main opportunities are:

- Ensure that as many children as possible are able to cycle to school, from both sides of the Beecroft Road.
- Shoppers and recreation cyclists are encouraged to cycle to the Beecroft shops and recreation facilities, and in the Epping North area to the oval and Epping North neighbourhood centre.

Table 4.4 Cheltenham, Beecroft and Epping North Bicycle Routes

Route	Location	Facility Type
Beecroft PS shared paths	Copeland Road, on southern side from existing shared path to Beecroft Rd	2.5m shared path
	Cheltenham Rd (part)	
	Beecroft Road on school side (southern side) to Cheltenham Road	2.5m shared path
Epping North PS shared paths	Kirkham Street from Beecroft Road to Boronia Avenue	2.5m shared path
	Boundary Road southern side from North Epping Oval to Norfolk Road	2.5m shared path
Epping North Local connector routes	Norfolk Road from Boundary Road eastern side to Grayston Road	2.5m shared path
	Norfolk Road from Boundary Road to Epping Oval Athletic Track entry (part school route)	2.5m shared path
Beecroft Centre local connector routes	Malton Road from Norfolk Road eastwards past shopping area to Boundary Road	Mixed traffic lanes with logos
	Copeland Road east crossing over rail bridge into Wongala Crescent	shared path
	Wongala Crescent from rail bridge on eastern side to Chapman Avenue	2.5m shared path
	Chapman Avenue southern side from Wongala Crescent to Beecroft Road	2.5m shared path
	Beecroft Road eastern side from Chapman Road to Hannah Doyle Street	2.5m shared path
Beecroft/Cheltenham local routes	Hannah Doyle Street	Mixed traffic lanes with logos
	Cardinal Avenue from Pennant Hills Road to Copeland Road	Mixed traffic lanes with logos
Cheltenham station connector	Beecroft Road northern side from overbridge to The Crescent	2.5m shared path
	Cheltenham Road from Boronia Avenue to The Crescent	Mixed traffic lanes with logos
Beecroft/Pennant Hills Park connector	Railway overbridge eastern side	2.5m shared path
	Sutherland Road from north of Copeland Road to Tristania Way	Mixed traffic lanes with logos
	Tristania Way to shared path to Clement Close, Pennant Hills	Mixed traffic lanes with logos
	Clements Close /Azalea Grove/Liguori Way Pennant Hills connecting to	Mixed traffic lanes with logos



Route	Location	Facility Type
	Hampden Road	
Pennant Hill-Epping Link	In development by Council	Off road path along railway alignment

5. SCHEDULE OF WORKS

5.1 SCHOOL ROUTES

A Schedule of Works for school routes has been prepared for the school routes for all public Primary Schools in the study area. The cost estimates for each item are based on site work and unit rates from Council and other sources for replacing footpaths with 2.5m shared paths, and constructing footpaths where none presently exist. Additional on-road traffic management such as medians, pedestrian/cyclist refuges and speed devices are not costed as they lie outside the sole domain of bicycle facility costing.

Table 5.1 summarises the estimated costs of upgrading the school routes so that there are continuous routes for cycling and walking to all public primary schools in the urban area of the Shire. While the 2.5m shared paths are part of Bike Plan costs, the extension of footpaths should not be included in the Bike Plan costs.

Table 5.1 Schedule of Works – School Routes

Sub District	School	2.5m footpath	Cost/m	2.5 m cost	1.2m footpath	Cost/m	1.2 m cost	Total	
N1	Mount Colah PS	2250 m	\$120	\$270,000	230 m	\$60	\$13,800	\$283,800	
N1	Mount Kuring-Gai PS	480 m	\$120	\$57,600	0 m	\$60	\$0	\$57,600	
N2	Hornsby Heights PS	1350 m	\$120	\$162,000	720 m	\$60	\$43,200	\$205,200	
N3	Berowra PS	900 m	\$120	\$108,000	1200 m	\$60	\$72,000	\$180,000	
N3	Wideview PS	650 m	\$120	\$78,000	1300 m	\$60	\$78,000	\$156,000	
C1	Asquith PS	680 m	\$120	\$81,600	390 m	\$60	\$23,400	\$105,000	
C2	Hornsby South PS	730 m	\$120	\$87,600	20 m	\$60	\$1,200	\$88,800	
C2	Hornsby North PS	700 m	\$120	\$84,000	120 m	\$60	\$7,200	\$91,200	
C3	Waitara PS	750 m	\$120	\$90,000	140 m	\$60	\$8,400	\$98,400	
S1	Thornleigh West PS	480 m	\$120	\$57,600	1840 m	\$60	\$110,400	\$168,000	
S1	Normanhurst West PS	1110 m	\$120	\$133,200	490 m	\$60	\$29,400	\$162,600	
S1	Normanhurst PS	440 m	\$120	\$52,800	480 m	\$60	\$28,800	\$81,600	
S2	West Pennant Hills PS	760 m	\$120	\$91,200	0 m	\$60	\$0	\$91,200	
S2	Pennant Hills PS	1850 m	\$120	\$222,000	740 m	\$60	\$44,400	\$266,400	
S3	Cherrybrook PS	1300 m	\$120	\$156,000	1770 m	\$60	\$106,200	\$262,200	
S3	Oakhill Drive PS	1350 m	\$120	\$162,000	190 m	\$60	\$11,400	\$173,400	
S3	John Purchase PS	1600 m	\$120	\$192,000	2960 m	\$60	\$177,600	\$369,600	
S4	Epping North PS	2000 m	\$120	\$240,000	400 m	\$60	\$24,000	\$264,000	
S4	Epping Heights PS	750 m	\$120	\$90,000	0 m	\$60	\$0	\$90,000	
S4	Beecroft PS	3080 m	\$120	\$369,600	800 m	\$60	\$48,000	\$417,600	
Total				\$2,785,200	Total				\$827,400
Total Cost for School Routes								\$3,612,600	

5.2 MODEL ROUTES

In developing the rough costing for the Model Routes, the type of treatment recommended is based on the Engineering Design Principles discussed in Working Paper 1, as well as the 'AUSTROADS – Guide to Engineering Practice - Bicycles' and the RMS NSW Bicycle Guidelines. The following general principles, based on the AUSTROADS standards and RMS guidelines, are followed in calculating generalised costs:

- Bicycle warning signs are located on all side roads;
- Shared off-road path regulatory signage is located every 500 metres and/or at intersections;
- Bicycle lane regulatory signage is located every 500 metres and/or at intersections;
- Bicycle network route directional signage is located at decisions points; such as the beginning and end of a route, where two routes intersect or where a route changes direction;
- Bicycle lane logos are located every 75 metres and/or at intersections;
- Shared off-road path logos located every 200 metres and/or at intersections;

Table 5.2 Schedule of Works – Model Routes

Sub District	Route	Cost estimate
N2	Somerville Road, Hornsby Heights	\$23,319.34
C1 - C2	Amor Street / Jersey Street link, Hornsby/Asquith	\$247,755.36
C2	TAFE -Old Hornsby Town Centre link, Hornsby North/Hornsby	\$71,500.84
S1	Quarter Sessions Road, Westleigh	\$1,382,469.43
S2	Victoria Road, Pennant Hills	\$180,610.68
S3	Shepherds Drive, Cherrybrook	\$1,210,256.64
Total Cost		\$3,115,912.29

