

Willoughby City Council 2017 Bike Plan Update Infrastructure Assessment

Client // Willoughby City Council
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Willoughby City Council

2017 Bike Plan Update

Infrastructure Assessment


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GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
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1. Introduction

1.1 Background

Willoughby City Council's bike plan was adopted in 2006 and a review of its implementation was commissioned in 2012. The 2012 review included identifying cycling infrastructure projects and an implementation plan.

This 2017 bike plan review seeks to provide an audit of existing cycling infrastructure throughout the LGA to understand to which extent previously identified cycling infrastructure projects have been implemented. The audit also aims to identify additional priority infrastructure projects which have either not been identified in previous studies or have been identified at a lower priority. Finally, Council have sought feedback on inter-LGA links to the neighbouring Councils of North Sydney, Lane Cove and Ku-ring-gai.

The update will assist guide cycling specific investment, and will aim to support broader policy documents endorsed by Council including the Willoughby City Strategy 2010-2025 (2010), the Community Strategic Plan and Local Environment Plans. Further, there are similarly intended state-level documents prepared by Transport for New South Wales including Sydney's Cycling Future.

1.2 Structure

The report is structured as follows:

- Section 2: Infrastructure Review Findings - Details what has been observed on-site as part of the project and it provides some detail as to background assumptions and reference documents for safe cycling infrastructure.
- Section 3: Reviews Willoughby's LGA boundary with respect to the bordering Councils of North Sydney, Lane Cove and Ku-ring-gai, and provides commentary as to the current integration and links across these boundaries.
- Section 4: Reviews the priority works outlined in the 2012 review and provides commentary on an updated set of priority works where appropriate.

2. Infrastructure Review Findings

2.1 Review Considerations

The site visits have been carried out with reference to the Austroads Guide to Road Safety Part 6A: Road Safety Audit (2009).

It is important to note that whilst comments regarding the potential deficiencies in infrastructure have been broadly reported, this document is not to be used or interpreted as a formal Road Safety Audit document.

Elements considered included:

- path grades *(generally not assessed)*
- path width and quality
- kerb ramps and transitions
- raised thresholds
- pedestrian crossings *(generally not assessed)*
- pedestrian fencing
- pedestrian facilities and protection
- fixed items adjacent to the roadway, including trees and electricity/light poles
- roadside hazards
- adjacent land use access points *(generally not assessed)*
- sight distance and visibility
- readability of alignment and intersections
- intersection layout and geometry
- signage and linemarking
- road surfacing
- pavement condition, including presence of loose material
- landscaping considerations
- lighting *(generally not assessed)*

Due to the size of the study area, the audit cannot be seen as a complete audit of the road and cycle network in Willoughby. The auditors followed the existing and planned cycle routes as identified in the current bike plan. All relevant hazards along the routes were identified and are documented in this report. Site specific upgrade requirements were identified where necessary. Some general comments regarding cycling infrastructure have been made in Table 2.1, with detailed observations recorded within Table 2.2. The locations of the site observations as recorded in Table 2.2 are shown in Figure 2.1.

It is essential for audits of bicycle and pedestrian facilities to consider “usability” issues consistent with the guidelines. These specify consideration of five key design criteria as detailed below.

Coherence

Bicycle and pedestrian network infrastructure should form a coherent unit by linking popular destinations with local residential streets via regional routes and local routes. The network should be continuous and be very clear to the user where the facility leads. Intersections should provide a clear path for bicycle riders and pedestrians as well as for other modes. The quality of network facilities should also be consistent throughout the length of the route regardless of whether the facility uses a separated or shared road profile. Routes should be easy to find from local streets

and the network should be of such a density that there is always a choice of nearby routes available to the user.

Directness

Network infrastructure should be as direct as safely practicable. Long detours should be avoided as human energy is required to travel the distances. This should always be balanced against the problems of topography - a slightly longer route may work better because it contours around a hill rather than tackling it at its steepest climb. Regional route design should take into account both the slowness in operating speed of bicycles up-hill and the relatively high speeds when descending. Delays due to prolonged crossing times of major barriers should be avoided and the aim of the designer should be to ensure that riders and walkers are able to maintain safe, comfortable and consistent travel throughout the length of the route.

Safety

Well-designed cycle network infrastructure improves and enhances the road safety of riders, pedestrians and motorists. Intersections should be designed to explicitly include bicycles as well as other categories of road users. Special intersection designs that include a path for bicycle riders are an important element of integrated network design. Mid-block treatments need to provide safe and easy major roadway crossings for riders. The design of cycle routes past bus stops should be designed for safe accommodation of riders, bus passengers, other pedestrians and vehicles.

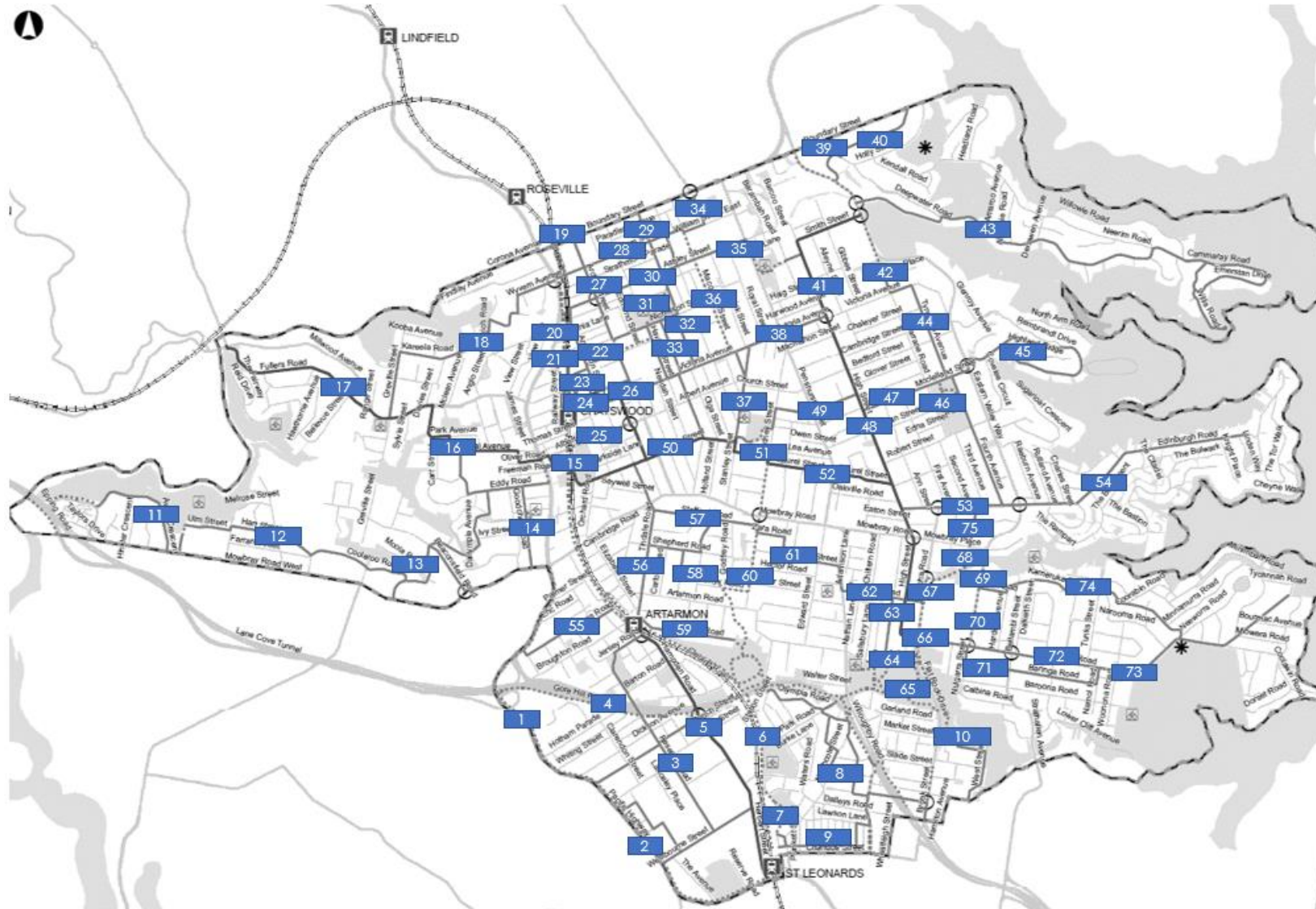
Attractiveness

Community support exists for cycling provided it is an enjoyable activity. Enjoyable cycling requires attractively designed and located facilities. Bicycle network infrastructure, such as regional and local routes, should be fitted into the surrounding environment so that the enjoyment of the experience is enhanced. Clear well-placed signposting should indicate major destinations, while centre lines and edge lines should indicate the serious transport intent of the off-road sections of routes. New housing developments should aim to provide easy to use and attractive bicycle transport facilities. Cycle routes should also feel like socially "safe" places to be. The community prefers well-lit pathways and open-to-view routes rather than dark and dingy alleyways.

Comfort

The bicycle [and pedestrian network] has to be easy to use for all types of riders. A smooth well maintained riding surface is essential both for comfort and operating safety. Depending on the speed and volume of other traffic (motor vehicles or pedestrians), some level of separation is often needed. Clearly marked bicycle facilities that allocate operating space to bicycle users are the most appropriate types of facilities on all but low traffic volume and low speed roads. Effective intersection treatment is a critical factor in joining streets to a coherent route or network, as well as providing safe and comfortable crossings of major arterial roads.

Figure 2.1: Site observation number cross reference diagram



Source: Modified from Willoughby Bike Plan Review 2012, pg. 63

The assumptions described in the table below are general observations and assumptions made during the audit. They are not site specific but occur regularly across the LGA.

Several assumptions can be directly referred to Austroads Guide to Road Design (AGRD) 6A and the NSW Bicycle Guidelines (NSWBG).



Table 2.1: Key Audit Observations and Assumptions

No.	Description of Broad Observation/Assumption	Source (where available)
1	A shared path should be a minimum of 2.5 metres across, and be free from hazards within (and preferably for 0.5 metres outside) of the corridor. Higher volume paths may justify widths of 3-4 metres.	AGRD 6A, pg 44, 24
2	Signage throughout the LGA is generally becoming outdated, and Council may consider a wayfinding strategy to renew directional signage. For designating a 'cycling route' (notwithstanding that a majority of roads are 'cycling roads' per se), road markings are preferred to roadside signage.	NSWBG, Section 9
3	Where an on-road facility exists, a section of green paint through the intersection is desirable to inform/educate drivers of the potential presence of cyclists. Where a shared path crosses a road, there were no associated upgrades assisting a cyclist cross an intersection.	NSWBG, Section 5
4	Where a bollard treatment is present (for example at an access point to a shared path), bollards have standard design treatments including spacing, diameters, height and colouring guidance. A number of bollard treatments were observed not to be consistent with the guidance.	NSWBG, Section 6.5
5	Kerb ramp design is a key comfort and safety element when directing a cyclist to transition between on-road and off-road facility. An abrupt transition point may unseat a cyclist or otherwise damage their equipment (especially wheels). Where a transition point exists, RMS provides guidance on a ramp design that removes the lip.	Appendix A
6	Bicycle design that places a cyclist between a traffic and parking lane can be hazardous for cycling. A cyclist generally prefers to ride slightly outside of the lanes due to the risk of 'dooring'. A dooring injury, especially on faster (for example downhill sections) of road can result in serious injuries or death. As a general comment, shoulder lanes may be appropriate on uphill sections, but are rarely preferred on downhill or windy sections of road. On major routes, unidirectional cycleways may be preferred which places a cycle lane between the kerb and the parked lane, and on downhill sections, mixed traffic treatments are generally preferred, these can be installed without the loss of parking as it is simply the reconfiguration of the existing road corridor.	TMR (Department of Transport and Main Roads) Technical Note 128
7	Where bicycle stencils are to be placed on-road, careful consideration should be given to the placement. Whilst traditionally these have been placed towards the shoulder of the lane, this may lead a cyclist into an unsafe road position space. Today, best practice has generally shown that the bicycle stencils are most appropriately located in the centre of the lane.	City of Sydney is in the process of relocating bicycle stencils from the shoulder to the centre of the lane
8	Speed humps have traditionally been installed with abrupt transition angles which may cause a cyclist to become unseated, impacting the safety and comfort of the riding experience. Guidance has been released which remodels the angles on speed humps which are not discernible to motorists, but improves safety and comfort outcomes for cyclists.	Appendix B
9	Where a shared path crosses a signalised intersection, unless a bicycle lantern is provided, cyclists are legally required to dismount their bicycle and walk their bicycle across the road before remounting. Bicycle lanterns were not observed within the LGA, and this leads to poor coherence of the network and is an inconvenience to cyclists. Council should liaise with RMS to investigate the installation of bicycle lanterns, with the highest priority being along regionally significant, higher volume bicycle routes.	NSW Road Rules Reg 248 part 2
10	Bicycle wheels are far smaller/thinner than vehicular tyres, and this means that cyclists are more prone to becoming unseated when the wheel impacts an intolerance in the path. Path tolerances were generally not assessed across the LGA, but particularly on high volume routes, any tolerances should be closely monitored.	AGRD 6A, pg 25
11	Shared paths have traditionally been used in constrained environments where perhaps vehicular volumes or speeds are high. New guidance from Transport for New South Wales has indicated shared paths are no longer a preferred treatment option.	


Table 2.2 on the following pages has been structured with the following headings:


- i **Location** – A qualitative description of the area/route observed
- ii **2012 Plan Report** – 2012 proposed route type
- iii **2017 Site Visit Review** – An updated observation of the 2012 route type
- iv **Condition description** – A description of the existing conditions of the cycling infrastructure which generally refers to the characteristics noted in Section 2.1 and 2.2. Comment also may be made as to the underlying vehicular traffic conditions where applicable.
- v **Site Observations** – Photos taken on-site indicating the condition description as noted.
- vi **Upgrade requirements** – A brief comment on what a 'next step' may be or what action would be required to upgrade the path to be a more amenable cycling route.
- vii **Time Period for Upgrade** – This input is 'short', 'medium' or 'long' and is generally reflective of GTA's opinion to which extent the upgrade will provide increased safety or connectivity to the existing network. The timeline of the terms is not defined, and should be relatively assessed.
- viii **Route Priority** – This input may be 'low', 'medium' or 'high' depending on GTA's assessment of the priority of the route.




Table 2.2: Site observations



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
1	Pacific Highway between Hotham Parade and Carlotta Street	Proposed off-road route	Shared path	<p>A shared path approximately 400 metres long was signposted on the eastern side of the road corridor.</p> <p>Whilst some widening works were noted, it was generally observed that the path is narrow.</p> <p>Intersections were not observed to have been upgraded as part of the works.</p> <p>Lateral clearances to roadside obstacles were generally observed to be inadequate.</p> <p>There is a short bicycle shoulder lane (<100m) near Hotham Parade which is considered to be too narrow and unsafe.</p>		<p>Examine opportunities to relocate utilities.</p> <p>Examine opportunities to improve intersection design for bicycles.</p> <p>Remove on-road bicycle lane on Pacific Highway as it is narrow and unsafe, and legally, cyclists are obliged to use it.</p>	Medium	High
2	Pacific Highway between Carlotta Street and Reserve Road	Proposed off-road route	No works observed	<p>A standard width footpath was observed with low volume bicycle traffic.</p>		<p>Design near bus stops to be considered.</p> <p>Overall path needs to be widened, signposted and line marked, 'Riding envelope' with consideration of vertical and lateral clearances.</p>	Short	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
3	Reserve Road between Westbourne Street Gore Hill Freeway	Proposed on-road route	No works observed	A medium volume road with a high proportion of heavy vehicles given the land uses and access to Lane Cove Tunnel. Lower volumes of traffic noted south of Frederick Street.		Reconsider Reserve Road as a preferred on-road route. Refer to GTA's 2017 Artarmon Route Option Assessment for upgrade options.	medium	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
4	Naremburn/Gore Hill Cycleway between West Street and Pacific Highway (and accesses)	Existing off-road	Off-road route	The main cycleway is in good condition and broadly appears compliant with relevant guidelines with some exceptions. Access points may need improvement works in some instances.		<p>Three compliance/safety aspects of the route observed refer to images to the left:</p> <p>Top – Dickson Avenue access, significant accumulation of debris</p> <p>Middle – Bollard on cycleway with missing lock (bollard could be removed) adjacent to Punch Street</p> <p>Bottom – Several light posts in the middle of the cycleway near the Merrenburn Avenue overpass</p>	Medium	High



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
5	Hampden Road/ Herbert Street between Artarmon Station and St Leonards Station	Route requiring upgrade	No works observed	A discontinuous and non-coherent mix of treatments including shoulder lanes, roundabout bypasses and unmarked driveways. The shoulder lanes on downhill sections are of concern.		<p>Remove shoulder lanes on downhill sections.</p> <p>Install green paint on lane at driveway access points for delineation and awareness.</p> <p>Consider in conjunction with GTA Report Artarmon route assessment.</p>	Short	High




No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
6	Link between Dalley Road and Chelmsford Avenue (mostly along Francis Street)	Proposed off-road route	A mix of on-road and off-road treatments	A generally high quality off-road link around the western aspect of Naremburn Park which leads to on-road route marked with bicycle stencils along Francis Street to the Gore Hill Freeway.	  	<p>Examine opportunities to provide further bicycle stencils on Francis Street given its narrowness.</p> <p>The kerb lip between Francis Street and Chelmsford Avenue should be remodelled such that it does not have a 'lip'.</p>	Long	Low

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
7	Evans Lane between Christie Street and Ella Street via Francis Street	Proposed off-road route (small section of -on road route)	Shared path	<p>A local access has been provided through on-road markings along Chandos Street which misses street lighting (safety issue at night).</p> <p>A largely non-conforming shared path has been provided linking Chandos Street with Francis Street. Sightlines and lateral dimensions appear not to be consistent with guidelines.</p> <p>Bollard treatments near Francis Street are not consistent with NSW Bicycle Guidelines.</p>	  	Examine opportunities to provide lighting, widen the path, provide a 'riding envelope', and clear vegetation to provide sightlines. Review bollard treatments.	Medium	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
8	Dargan Street, Northcote Street and Moonbria Street	Proposed on-road route	No works observed	A generally low traffic local traffic street which would function in feeding cyclists from the Naremburn cycleway to St Leonards. No markings or signage were observed which would indicate the route has been upgraded.		Install bicycle symbols and arrows as appropriate; introduce wayfinding.	Long	Medium




No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
9	Various local streets including Willoughby Road, Lawson Lane, Ryan Lane and Henry Lane linking Donnelly Road to Christie Street	Existing on-road route	As noted	<p>A short and poorly integrated shared path exists on Willoughby Road between Donnelly Road and Lawson Lane in both directions. The shared path on the western side has a bus stop and signs are present in the middle of the path. The shared path sign is not located on Willoughby Road but on the back of a sign in Lawson Lane.</p> <p>On the eastern side, the path abruptly ends and there is no infrastructure to assist cyclists across the road.</p> <p>Otherwise, an on-road facility exists, but signage is poor and no on-road bicycle stencils were observed through Ryan Lane and Henry Lane.</p>		<p>Rationalise the shared path treatment on Willoughby Road.</p> <p>Install bicycle stencils and signage throughout Ryan Lane and Henry Lane.</p>	Medium	Medium




No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
10	Market Street through to Palmer Street via Quarry Street and West Street	Existing on-road and existing off road facility	As recorded	A low traffic on-road route is an amenable location for cycling. Despite the traffic being primarily local access, greater awareness needs to be made for the presence of cyclists.	  	Consider installing bicycle stencils on the roadway. Remove speedhump at northern end of Quarry Street.	Long	Low




No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
11	Avian Crescent and Willandra Street	Existing on-road route	Partially complete	A low traffic cycling detour into a local access street. Some cycling-specific road side signs were observed but no on-road stencils were present. A short shared path connects Avian Crescent to Ulm Street, bollards are not consistent with NSW bicycle guidelines. The kerb lips were not observed to be flush. A brief shared path exists on Mowbray Road West near the school.	  	Install bicycle stencils on the road, provide lipless kerb and upgrade bollard treatment.	Medium	Medium




No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
12	Hart Street and Coolaroo Road	Existing on-road route	As noted	No bicycle stencils were observed on the road. Outdated bicycle signage was periodically noticed. Dimensions of the road (3 lanes) control traffic speeds.		Install bicycle symbols as appropriate.	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
13	Dalrymple Avenue and Beaconsfield Road	Existing on-road route (Dalrymple) and proposed on-road route (Beaconsfield)	As noted	No bicycle stencils were observed and given the multiple turns required, directional signage was poor.		Install bicycle symbols as appropriate and consider new signage and wayfinding.	Medium	Medium
14	Goodchap Road	Existing on-road route	As noted	No bicycle stencils were observed on this road. Increased traffic volumes were noted during school pick up and drop off periods.		Install bicycle symbols as appropriate.	Medium	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
15	Pacific Highway between Eddy Road and Oliver Road and part of Eddy Road	Existing off-road route (Pacific Highway) and route requiring upgrade (Eddy Road)	As noted No evidence of upgrade on Eddy Road	A shared path was observed on the western side of the highway. Line marking and signage formalises the shared path. Shared path markings are badly faded. No bicycle stencils were observed on Eddy Road. Given the topography, they are appropriate.	  	Remove warning sign about cyclists over 12 prohibited.	Short	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
16	Various local Streets including Park Avenue, Centennial Avenue and Oliver Road between Pacific Highway and Fullers Road	Route requiring upgrade	Unclear if works have been undertaken	On-road route with limited and outdated signage on generally narrow collector streets. No road markings and limited line marking. Given the number of turns which are required, the ability for new users to navigate the streets may be difficult without clearer signage.	  	<p>Provide on-road markings and improve directional signage.</p> <p>Given the proximity to schools, other facilities may be considered, but topography is unfavourable for riding to school.</p>	Long	Low

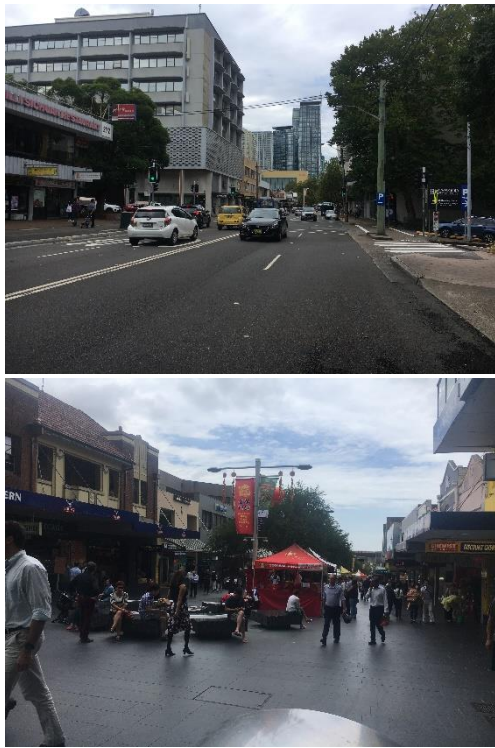
No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
17	Fullers Roads west of Park Avenue	Route requiring upgrade	Unclear if works have been undertaken. On-road route west of Millwood Avenue and shared path east of Millwood Avenue.	A shared path exists on the southern side of the road between Park Avenue and the Millwood Avenue deviation. This shared path appears broadly compliant with guidelines in terms of width, line marking and signage, although it is noted that the treatment around the Millwood Avenue deviation is incoherent. There are several signs within the 'riding envelope'. There is limited information regarding cycling on Fullers Avenue west of the Millwood Avenue deviation which are limited to roadside signs which are not easily visible.	  	<p>Install road markings west of Millwood Avenue.</p> <p>Examine opportunities to relocate existing poles such that they are not in the 'riding envelope'.</p> <p>Examine opportunities to improve intersection crossings.</p> <p>Consider redesigning the Fullers Road-Millwood Avenue intersection to be more coherent to cyclists</p>	Short	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
18	Along various streets including Dulwich Road, Kareela Road and Wyvern Avenue between Pacific Highway and Fullers Road	Proposed on-road route	No works observed	A series of narrow, local streets with no cycling specific upgrades were noted. A minor off-road connection would need to be provided linking Kareela Road with Blue Gum Avenue.	  	<p>Examine providing regular on-road bicycle stencils on the road corridor with directing signage given the numerous turns.</p> <p>The off-road link between Kareela Road and Blue Gum Avenue will require further works with regards to safety given the gradients.</p>	Long	Low

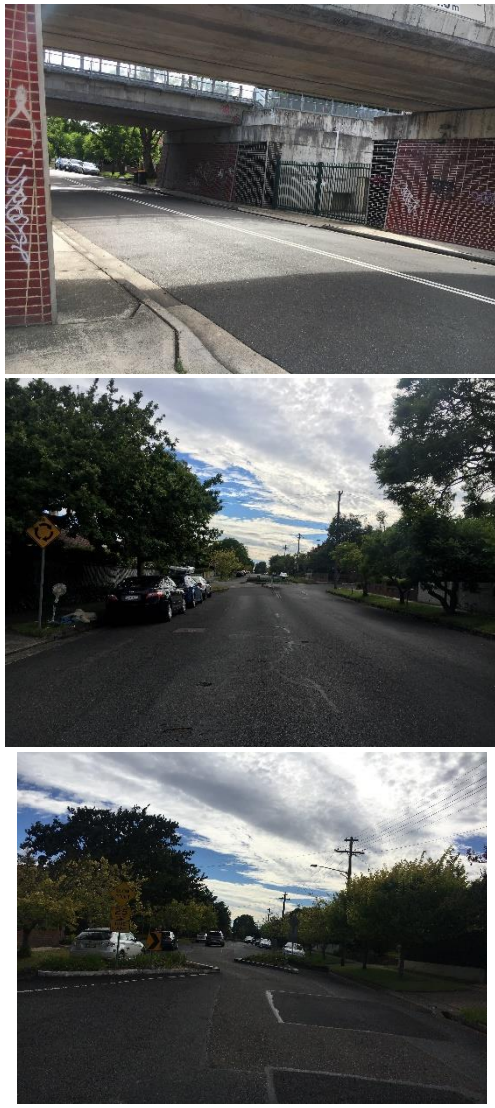
No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
19	Boundary Street between Archer Street and Pacific Highway (On Ku-Ring-Gai LGA land)	Proposed off-road route	Apparent shared path under construction. Partially complete.	On the northern side of Boundary Street, a new path is currently being constructed. It satisfies the width requirements for a shared path, but there is no apparent signage or line markings		Install low profile signage and line marking. Provide bicycle lantern at traffic lights.	Short	Medium
20	Pacific Highway between Railway Street and William Street	Proposed off road route	No works observed	There is no evidence of signage or markings or appropriate dimensions which would indicate that either side of the Pacific Highway is a functioning shared path. Pavers have some deficiencies in terms of providing a smooth riding surface. Some cyclists were observed to be riding on the path.		Examine opportunities to upgrade path to a shared path. The pavers have longitudinal tolerance issues and these will need to be rectified through works or replacement.	Short	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
21	Railway Street between Help Street and Pacific Highway	Proposed off-road route	No works observed	There is no evidence of signage or markings which would indicate that either side of Railway Street is a functioning shared path. Due to the high-density development in the area, high volumes of pedestrians may be expected.		Examine opportunities to upgrade path to a shared path. Pedestrian volumes will need to be considered in evaluating as to whether this treatment is feasible.	Medium	Medium
22	Anderson Street between Ashley Street and Victoria Avenue	Proposed on-road route	Unclear if works have been undertaken	Discontinuous shoulder lanes were observed in both directions with additional markings guiding cyclists to use contraflow McIntosh Street lane. The shoulder lane in the downhill direction should be reconsidered due to the potential for 'dooring'.		Reconsider downhill (southbound) bicycle lane due to 'dooring' hazard. Consider green paint treatments through intersections.	Short	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
23	McIntosh Street between Anderson Street and Help Street	Existing on-road route	As noted	The contraflow lane is observed to be narrow and in poor condition, with the drain, change of road surface and fading of markings.		Examine opportunities to renew facility.	Medium	Low
24	Ferguson Lane between Anderson Street and Archer Street	Proposed on-road route	No works observed	A local access environment where access is controlled/restricted by a boom gate. No bicycle-specific works observed.		Examine opportunities to have a formal cycling bypass for the boom gate.	Medium	Medium
25	Albert Avenue between Archer Street and Thomas Lane	Proposed off-road route	No works observed	An off-road route is appropriate, and the footpath on the northern aspect is observed to likely satisfy dimensional requirements, however, there was no signage or line marking observed which would indicate it currently functions as a shared path.		Provide line marking and signage. The tolerances within the surface would also need to be examined.	Short	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
26	Victoria Avenue between Anderson Street and Havilah Street	Proposed on-road route	No works observed	No works have been observed either through the pedestrianised Victoria Avenue mall or the trafficked sector of Victoria Avenue between Havilah Street and Anderson Street.		<p>Install bicycle symbols on road, or examine opportunities for an off-road facility.</p> <p>Investigate opportunities for treatments to allow cycling on the Victoria Avenue mall.</p>	Short	High

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
27	Archer Street between Boundary Street and Nicolson Street	Proposed on-road route	No works observed	There is no evidence of signage or markings which would indicate that William Street has been upgraded to an on-road cycling route. There is a bus lane in the northbound direction.		<p>Examine opportunities to install on-road bicycle symbols. In the northbound direction, there is a bus lane which can function as a quasi-bicycle lane.</p> <p>Given the high-volume nature of the road, the treatment applied on this section should be carefully evaluated</p>	Short	High

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
28	William Street between Pacific Highway and Macquarie Street	Proposed on road route	No works observed	There is no evidence of signage or markings which would indicate that William Street has been upgraded to an on-road cycling route. William Street east of Archer Street was observed to be a quiet residential street, with low traffic volumes.		Examine opportunities to install on-road bicycle symbols.	Medium	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
29	Darling Street between Boundary Street and Nicolson Street	Mixture of proposed on-road route and existing on-road route	As noted	An on-road facility with bicycle stencils well located towards the middle of the lane on roundabout approaches.		There appeared to be a lack of coherent signage around this sector of the bicycle network.	Short	High
30	Ashley Street between Anderson Street and Darling Street	Proposed on-road route	Unclear if works have been undertaken	East of Archer Street, the bicycle route is rudimentary with bicycle symbols directing cyclists to use speed hump bypasses. West of Archer Street, there are marked bicycle shoulder lanes.		Whilst the intent for speed hump bypasses is clear, the treatment is not suitable in this location (bottom of gully where speeds are high and no stopping clearances either side are insufficient). Relocate bicycle stencils towards middle of lane and remove existing marking. Look to redesign speed humps to have less abrupt angles.	Medium	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
31	Off-road shared path between Darling Street and Nicolson Street	Existing off-road route	As noted	The shared path appears to be in good condition, and is broadly signposted and line marked appropriately.		Install an edge line on path.	Short	Low
32	Baldry Street between Nicolson Street and Victoria Avenue	Proposed on-road route	No works observed	A low volume local street with speed humps and a chicane treatment. Would appear a suitable street for a cycling route.		Examine opportunities to install on-road bicycle symbols.	Short	Medium
33	Blakesley Street between Nicolson Street and Victoria Avenue	Proposed on-road route	No works observed	A low volume local street with speed hump and chicane treatment. Would appear a suitable street for a cycling route. But might question the need for three parallel running on-road cycling streets.		Examine opportunities to install on-road bicycle symbols.	Long	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
34	King Edward Street between Boundary Street and William Street East	On-road route	On-road route	<p>A quiet cul-de-sac street with pedestrian and cyclist access through to Boundary Street.</p> <p>There is a substantial kerb lip on the transition from the road to the path, and it is not clear whether cyclists should move up to Boundary Street up the eastern or western edge of King Edward Street.</p> <p>Whilst the street is classified an existing on-road facility, there is no evidence of on-road markings.</p>		Redesign kerb lip to have a smooth transition point and install bicycle stencils on the road surface.	Long	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
35	Ashley Street east of Macquarie Street through Muston Park	Primarily off-road route	As noted	Signage is present which partially formalises its function as a shared path. The path was still noted to be narrow, and around some trees, the path was observed to have significant tolerance issues.		Line mark path as appropriate and undertake corrective works to the footpath regarding tolerance limits.	Long	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
36	Macquarie Street north of Victoria Avenue	Proposed off-road route	No works observed	An off-road facility was not observed on site, however, given the highly controlled nature of the street, with for example single lane speed humps, an on-road facility may be appropriate.		<p>Install shared path if preferred.</p> <p>If not, consider installing bicycle symbols on the roadway and examine reconfiguring the profile of the speed humps.</p>	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
37	Stanley Street between Victoria Avenue and Mowbray Road	Proposed on-road route	No works observed	A collector road with various traffic control devices such as chicanes and speed humps. No on-road bicycle symbols were observed.		Install bicycle symbols as appropriate.	Medium	Medium
38	Victoria Avenue between Havilah Street and High Street	Separated cycleway	Not installed	No works have been undertaken regarding the installation of a separated cycleway on Victoria Avenue east of Havilah Street.		Investigate the potential for further cycling-specific works.	Short	High

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
39	Warrane Place linking Deepwater Road with Boundary Street	Proposed off-road route	No works observed	An off-road facility was not observed, with a number of stairs also present along the link. Even if a facility could be provided, the street access is steep and would likely not be rideable by a majority of cyclists without dismounting. Upgrading this facility would require considerable civil works.		Examine opportunities to provide an off-road link through to Boundary Street, however, it is acknowledged that this is a challenging link to provide.	Long	Low
40	Rosebridge Avenue between Deepwater Road and Boundary Street	Proposed on-road route	No works observed	A narrow three lane street assists in restricting traffic speeds. This street passes the local school. No cycling-specific works were observed.		Examine installing bicycle symbols as appropriate.	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
41	High Street and Smith Street between Victoria Avenue and Eastern Valley Way	Route requiring upgrade	Unclear if works have been undertaken	Shoulder lanes observed in both directions on this high-volume street. Shoulder lanes on the downhill (northbound) are considered hazardous. Pinch points were observed through median islands. On Smith Street, bicycle symbols are poorly located.		Reconsider shoulder bicycle lanes and consider a broader infrastructure upgrade. Remove and relocate existing bicycle stencils, especially near roundabout.	Short	High

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
42	Eastern Valley Way between Boundary Street and Warrane Road	Proposed off-road route	No works observed	A non-marked path was observed linking Eastern Valley Way to Warrane Road, no other on-road markings were observed on Warrane Road. The road is local access, but with steep gradients. A non-standard bollard treatment was noted.	  	Upgrade bollard treatment at Warrane Road and provide a shared path facility along Eastern Valley Way. Install shared path signage. Install bicycle symbols on the road as appropriate.	Medium	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
43	Castle Cove Drive, Deepwater Road, Cammaray Road (Castle Cove peninsular)	Proposed on-road route	No works observed	On the Castle Cove peninsular, traffic was generally limited to local access, with no cycling-specific upgrade works observed.		Examine installing bicycle symbols as appropriate. High usage by school children on this link has Council prompted to advocate for a shared path treatment.	Medium	Low



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
44	Tyneside Avenue and Fourth Avenue between Victoria Avenue and Edinburgh Road	Proposed on-road route	As noted	Tyneside Avenue is a generally low traffic street and had not had any obvious cycling-specific improvement works. Fourth Avenue is a generally low traffic street and there were some bicycle symbols observed. There was noted to be some speed humps with hazardous transition angles.	  	Examine installing bicycle symbols as appropriate. Remodel speed humps to remove the transition angle. Provide new signage along the route.	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
45	Middle Cove loop around Harbour Lane and Rembrandt Drive	Proposed on-road route	No works observed	On the Castle Cove peninsular, traffic was limited to local access, with no cycling-specific upgrade works observed.		Install bicycle symbols as appropriate.	Long	Low
46	Willoughby Park shared path	Existing off-road route	As noted	The path within the park, although generally compliant in terms of its width was not observed to be signposted or line marked.		Provide line marking and signage.	Medium	Low

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
47	McClelland Street between High Street and Tyneside Avenue	Existing on-road route	As noted	Sporadic bicycle symbols were observed on the roadway. It was observed to generally be a moderate volume traffic street.		Install additional bicycle symbols as appropriate.	Long	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
48	High Street north of Victoria Avenue	Route requiring upgrade	Unclear if works have been undertaken	High Street functions as a major north-south route in the LGA. Shoulder lanes were largely observed along the length of the corridor with cyclist bypasses around median islands/kerb extensions. Green paint treatments through intersections are were observed and appropriate to the local environment.		Given the high turnover of vehicles through the Willoughby Market (near Alexander Avenue), consideration may be given into removing the shoulder lanes to mitigate a 'dooring' hazard.	Short	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
49	Horsley Avenue and Clanwilliam Street	Existing on-road route	No works evident	There was no indication that this route had been upgraded to function as an on-road cycle route. The crossing of Penshurst Street is difficult given the traffic volumes.		Install bicycle symbols as appropriate. Investigate opportunities to provide enhanced crossing of Penshurst Street.	Medium	Low

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
50	Johnson Street	Route requiring upgrade	Unclear if works have been undertaken	A shoulder bicycle lane was observed with a painted buffer. This treatment is desirable and should be a preferred treatment where dimensions permit. Through intersections, the bicycle lanes were delineated, but not marked with green paint.		Explore opportunities to provide green paint through the intersection.	Long	Medium
51	Fry Street	Route requiring upgrade	Unclear if works have been undertaken	A number of successive bicycle symbols on the roadway were observed. The bicycle symbols were appropriately located towards the middle of the road.		No comment.		



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
52	Laurel Street between Sydney Street and High Street	Route requiring upgrade	Unclear if works have been undertaken	Laurel Street functions as a major street linking Chatswood and the eastern extent of the LGA. Shoulder lanes were noted, with poor delineation through intersections.		Provide green paint through intersections or examine opportunities for a broader infrastructure upgrade.	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
53	Edinburgh Road between Eastern Valley Way and High Street	Route requiring upgrade	Unclear if works have been undertaken	A series of intermittent bicycle shoulder lanes with generally incoherent or otherwise ineffective sections of green paint are on this section of road.		Investigate an opportunity to provide a higher-level facility on this section of road and remove and relocate sections of green paint as appropriate.	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
54	Edinburgh Road east of Eastern Valley Way	Existing on-road route	As noted	This section of road is noted to have a combination of marked shoulder lanes and bicycle symbols on the traffic lane depending on the immediate local environment. Some bicycle symbols are poorly placed, for example, on the approach to roundabouts.	  	<p>Renew bicycle stencils where there are existing bicycle lanes, and provide green paint through intersections.</p> <p>On approach to roundabout (as in photo), remove and relocate stencils in the middle of the lane prior to the roundabout.</p>	Short	Medium



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
55	Rimmington Street and Broughton Road between Pacific Highway and Hampden Road	Existing on-road route	As noted	No bicycle symbols were observed. Where cyclists would likely have a preference to ride on the road, there is a join between the concrete slabs and represents a potential crash hazard.		Install bicycle symbols as appropriate.	Medium	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
56	Tindale Road between Burra Road and Shepherd Road	Proposed on-road route	No works observed	A generally low traffic street which would function in feeding cyclists from Artarmon station to the eastern extent of the LGA. No markings or signage were observed to indicate a functioning on-road route and the crossing of Artarmon Road was difficult in the northbound direction given the topography.		Install bicycle symbols as appropriate. Consider intersection treatment at Artarmon Road.	Long	Medium
57	Stafford Road between Sydney Street and Tindale Road. Smith Road between Shepherd Road and Stafford Road	Stafford Road (existing on-road) Smith Road (proposed on-road route)	As noted	Stafford Road was observed to have some bicycle symbols on the roadway. Smith Road was not observed to be upgraded to function as an on-road route.	 	No action required on Stafford Road. Install bicycle symbols as appropriate on Smith Road.	Long	Low

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
58	Shared path between Weedon Road and Smith Road	Existing off-road route	As noted	A shared path runs through a corridor providing enhanced local access. At a pinch point along the corridor, the path narrows on a bend which may result in a collision between users traveling in opposite directions.		Examine opportunities to widen the path through the bend, alternatively, install a mirror to improve sight distance.	Short	High
59	Burra Road between Artarmon Reserve and Tindale Road	Proposed on-road route	As noted	On-road markings were observed on the roadway which is a local access street. Stencils were noted regularly and on the approach and departure legs of intersections.		No comment.		

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
60	Onyx Road and Sydney Street	Proposed off-road route	No works observed	An off-road facility is proposed along this link. There was no evidence of any upgrade works during the site inspection.		Consider widening existing footpath and installing signage and line marking for the route to function as a shared path.	Medium	High




No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
61	Various local streets including Patton Lane, Hector Street and Penkivil Street	Existing on-road route	As noted	Bicycle stencils were observed on the local streets which have low volumes of traffic. The railing/bollard treatment at Penkivil Street was observed to be badly faded		Renew railing for improved visibility.	Long	Medium
62	High Street between Mowbray Road West and Sailors Bay Road	Proposed on-road route	No works observed	A generally low traffic street which would function in feeding cyclists through to the Naremburn cycleway. No markings or signage were observed to suggest the street had been upgraded to be an on-road route.		Install bicycle symbols as appropriate.	Short	Medium


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
63	Marlborough Road between Frenchs Road and Small Street	Proposed on-road route	As noted	A number of bicycle stencils were observed on the roadway. A number of successive speedhumps were noted which control speeds along the street. Some of the speed hump lips were observed to have hazardous transition angles.		Remodel speed humps to remove the transition angle.	Medium	Medium
64	Small Street between Marlborough Road and Flat Rock Drive	Proposed on-road route	No works observed	Small street primarily functions as an access to the Willoughby leisure centre, there was no evidence of works which would indicate that the road had been upgraded to function as an on-road cycling route.		Install bicycle symbols as appropriate.	Medium	Low



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
65	Various access paths between Small Street and Narreburn/ Gore Hill Cycleway	Existing off-road route	As noted	<p>From the path access which runs largely adjacent to Small Street, there is a marked shared path, however, a significant drop off to one side without any protection occurs. Poor markings on the shared access point between the leisure centre and Flat Rock Drive observed.</p> <p>Across the southern aspect of the carpark for the leisure centre, there is a marked shared path. A bollard is hazardously located and not marked in accordance with relevant guidance.</p>		<p>Consider installing a partial barrier to prevent cyclist run off.</p> <p>Remove debris and markings on asphalt on left side of image. Improve overall markings and guidance.</p> <p>Replace/remove bollards consistent with NSW bicycle guidelines.</p>	Short	High



No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
66	Sailors Bay Road between Eastern Valley Way and Flat Rock Drive	Existing on-road route	As noted	A somewhat discontinuous bicycle facility which varies between shoulder lanes, mixed traffic and an advisory cyclist exit to non-compliant shared path.		<p>Rationalise the treatment, and widen the entry angle to the shared path.</p> <p>Widen shared path given its dimensions.</p>	Medium	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
67	Alpha Road between Sailors Bay Road and Foundation Place	Proposed off-road route	Partially complete	A footpath was noted to run the length of the eastern side of Alpha Road. North of Frenchs Road, the path was noted to have dimensions which would be consistent with being able to function as a shared path, but there was no associated line marking or signage. South of Frenchs Road, the path was observed not to be wide enough to function as a shared path.		<p>Provide additional width to path south of Frenchs Road to Sailors Bay Road to allow function as shared path.</p> <p>Provide line marking and signage along the length of the corridor (signage south of Frenchs Road only if the abovementioned works are completed).</p>	Long	Low


No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
68	Shared path linking Garden Place to Foundation Place	Proposed off-road route	Shared path for most of link with on-road route along Foundation Place to Alpha Road	The shared path is generally observed to be of a satisfactory width. However, sightlines due to overgrown vegetation and bollard treatments at the path ends are not in accordance with the guidelines (visibility and spacing).	  	<p>Replace bollards to be consistent with NSW bicycle guidelines.</p> <p>Clear vegetation to provide additional sightlines.</p> <p>Provide bicycle stencils on Foundation Place.</p>	Short	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
69	Eastern Valley Way between Garden Place and Tenilba Road	Proposed off-road route	Shared path	A new pedestrian crossing has been installed and a compliant shared path has been installed. No bicycle lanterns were observed on the new crossing meaning that cyclists are legally obliged to dismount to cross. The intersection treatment at Taraken Crescent might be evaluated for opportunities to improve safety outcomes. Having the path pass between the bus stop seating and kerb is not a preferred design outcome.		Install bicycle lantern at traffic lights, investigate opportunities to improve intersection crossings and evaluate possibility of relocating seating.	Medium	Low

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
70	Eastern Valley Way between Tenilba Road and Sailors Bay Road	Proposed off-road route	No works observed	The shared path on Eastern Valley Way is signed such that it does not pass south of Tenilba Road. The local environment makes installing a shared path past the existing end point difficult due to existing trees.		Examine opportunities to extend shared path along Eastern Valley Way. If space is inadequate, Harden Avenue may also be considered.	Medium	Low
71	Baringa Road between Namoi Road and Eastern Valley Way	Existing on-road route	As noted	Overall, the facility was observed to be sufficient, being a low traffic local access road. Concerns on this route include the path access between Nulgarra Street and Sailors Bay Road, the sightlines and dimensions were observed to be poor. Further, facilitating the safe crossing Strathallen Avenue was noted to be of concern given the volumes of traffic on this road.		Improve sightlines at shared path intersection and consider improving the ability for cyclists to cross Strathallen Avenue.	Long	Low

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
72	Sailors Bay Road between Namoi Road and Eastern Valley Way	Proposed on-road route	No works observed	No bicycle-specific works were observed on Sailors Bay Road. A number of heavy vehicles were observed to use this section of road and given the commercial/retail nature of the area, the infrastructure typology should be carefully considered as 'doorings' may be a risk to cyclists.		Install bicycle symbols as appropriate.	Medium	Medium
73	Sailors Bay Road between Kameruka Road and Namoi Road	Existing on-road route	As noted	A bicycle shoulder lane is present in both directions, however, in the middle of the lane is a join between asphalted road and concrete road. The longitudinal join is particularly hazardous to cyclists.		Re-sheet road surface or remove bicycle lane.	Long	Medium

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
74	Tenilba Road and Kameruka Road between Eastern Valley Way and Sailors Bay Road	Proposed on-road route	As noted	A number of bicycle symbols have been installed on the roadway, with recurring symbols on the approach and departure of intersection legs. Whilst a majority are well-placed on the roadway, a small number are located close to the kerb line, with some parked vehicles obstructing the markings.	 	No comment.		

No.	Location	2012 Plan Report	2017 Site Visit Review	Condition Description	Site Observations	Upgrade Requirements	Time Period for Route Upgrade	Route Priority
75	Windsor Road between Edinburgh Road and Mowbray Place	Proposed on-road route	No works observed	There is no evidence that Windsor Road has been upgraded to be an on-road cycling route. There is a new off-road path linking the end of Windsor Road to Mowbray Place, although this is not of a shared path width and a kerb ramp has not been installed.		Install on-road bicycle symbols as appropriate and provide a lipless kerb ramp at the southern extent of Windsor Road.	Long	Low

2.2 Summary Table

Table 2.3 summarises the main table in providing a matrix between the identified time period for upgrade and its identified priority. As a rule of thumb, the projects towards the top right are the 'high value' projects, the projects in the top left are the 'low hanging fruit' (generally low cost improvement works), and the projects in the bottom left corner are the 'low value' projects.

Table 2.3: Summary of projects

Time Period / Priority	Low	Medium	High
Short	31, 67	5, 15, 17, 19, 20, 22, 25, 32, 48, 54, 62, 68	5, 26, 27, 29, 38, 41, 58, 65
Medium	23, 43, 46, 49, 64, 69, 70	7, 9, 11, 12, 13, 14, 21, 24, 28, 30, 36, 37, 40, 42, 44, 52, 53, 55, 63, 66, 72	1, 4, 60
Long	6, 10, 16, 18, 39, 45, 57, 71, 75	3, 8, 33, 34, 35, 47, 50, 56, 61, 73	N/A

2.3 Review of 2012 Priority Projects

Within the 2012 Bike Plan Review, 15 priority projects were identified. These priority projects serve a regional function within the overall network. All projects were audited and assessed in 2017 and progress/ implementation recorded. An overview is provided in Table 2.4.

Table 2.4: Implementation schedule

From 2012 Review				Additional Comments		
Action	Priority	Description	Route Code	Reference in Table 2.2	Upgrade works since 2012 plan? (see comment below)	Still a priority project?
Short Term	1	Victoria Avenue/Chatswood CBD	EW1	26, 38	None observed	Yes
	2	High Street and Smith Street	NS2	41	Unclear	Yes
	3	Brook Street to Victoria Avenue	NS3	4, 58	Mostly Completed	Yes
	4	Chatswood Park to High Street	EW2	50, 51, 52	Unclear	Yes
	5	Fullers Road to Ellis Street	EW3	16, 17	Partially completed	No
	6	Herbert Street/Hampden Road	NS4	5	Unclear	Yes
	7	Stanley Street, Macquarie Street, William Street and King Edward Street	M6	28, 34	Unclear	Yes
	8	Sydney Street and Onyx Road	M5	60	None observed	Yes
	9	Sailors Bay Road and Nulgarra Street/Baringa Road/Namoi Road	M8	72, 73	Unclear	No
	10	Ashely Street, Penshurst Street and Orara Street	M11	30	Unclear	No
Medium Term	11	Pacific Highway Shared Path	O1	1, 2	Partially completed	Yes
	12	Railway corridor	NS1	N/A	None observed	Yes
	13	Tindale Road, Elizabeth Street, Burra Road, Jersey Road and Reserve Road	M4	3, 56, 59	None observed	No
Long Term	14	Archer Street (Bus Lane)	M7	27	None observed	Yes
	15	Fourth Avenue, Tyneside Avenue, Victoria Avenue, Warrane Road and Eastern Valley Way	M10	21, 22	Partially completed	No

Reproduced from 2012 Willoughby Bike Plan Table 8.4

'Unclear' has been designated in some instances as it is inherently unclear as to what the interpretation of 'route requiring upgrade' includes. For example, on route NS2 above (High Street and Smith Street), the 2017 identified a shoulder lane. However, in some instances, the infrastructure upgrade predated the 2012 bike plan review. In the example of High Street, Google Street View shows that the shoulder lane was already in place in November 2009, well before the 2012 review. A series of photos showing the same location as the cycling environment changes is shown in Figure 2.2 through Figure 2.4 – the photos are located near 258 High Street, Chatswood.

Figure 2.2: High Street, January 2008



Figure 2.3: High Street, November 2009



Figure 2.2 Source: [Google Maps](#), accessed 7 February 2017 – note no bicycle shoulder lane

Figure 2.3 Source: [Google Maps](#), accessed 7 February 2017 – note bicycle shoulder lane

Figure 2.4: High Street, January 2017 (no change relative to November 2009)



Note no observable change to bicycle shoulder lane

In these instances, it is not possible to define the proposed upgrades and compare them with the existing facilities.

A renewed priority project list reflecting existing conditions and the works implemented to-date by Willoughby City Council has been provided in Section 4.

3. Inter-LGA Links

3.1 North Sydney Council

North Sydney Council is located south of Willoughby City Council. Major centres within the North Sydney LGA include parts of St Leonards, Crows Nest, North Sydney and Neutral Bay. Also of importance is that North Sydney Council falls within the area of the Inner Sydney Regional Bicycle Network, which is currently being reviewed by Infrastructure Australia for funding.

High quality links between the Willoughby LGA and the North Sydney LGA will improve not only the connectivity between the two LGAs, but will be particularly important for regional bike routes between the North Shore and the Sydney CBD. Potential linkages between Willoughby and North Sydney occur at St Leonards Station (along the Pacific Highway), through Naremburn (Willoughby Road) and along the Gore Hill Freeway. They all provide potential regional route connections into the Sydney CBD via the Sydney Harbour Bridge.

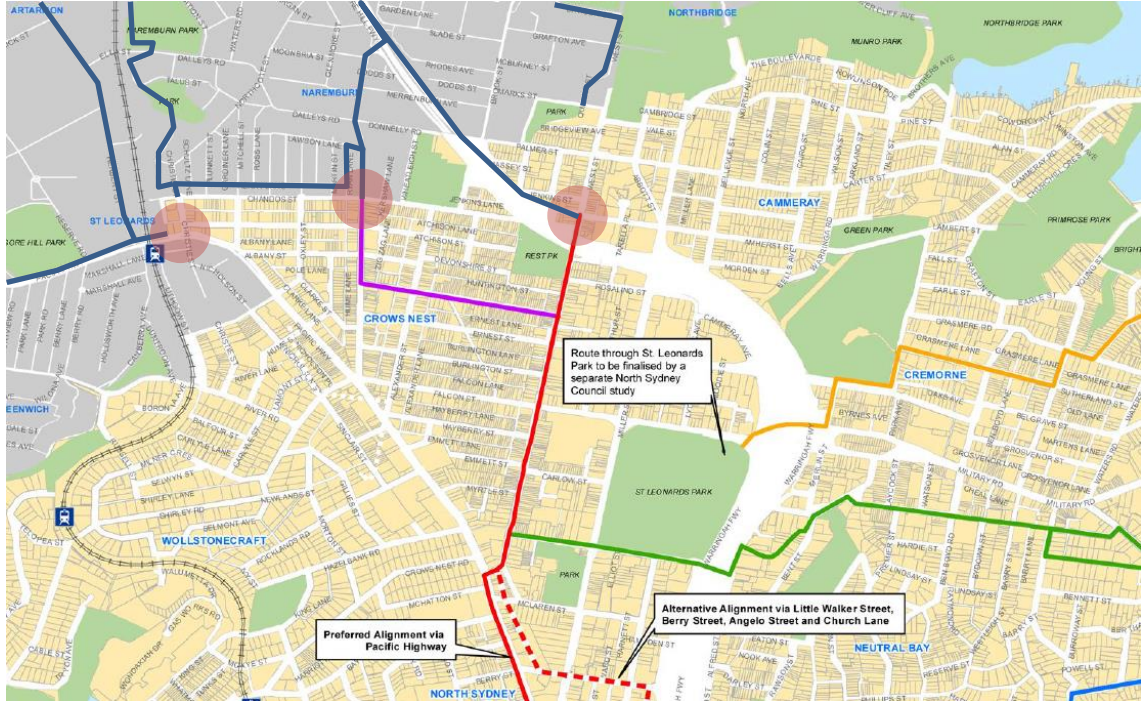
As part of North Sydney's 2013 bike plan, concept designs were developed for a separated cycleway on West Street between Church Street and Amherst Street. West Street forms part of a priority construction route. It would be beneficial to link the Gore Hill/ Warringah Freeway cycleway from Willoughby into the West Street route in North Sydney to provide a regional link between the North Shore and the Sydney CBD.

Off the proposed West Street cycleway, a spur leads to Crows Nest which is identified to run along Holtermann Street, before running north along Willoughby Road to the LGA boundary. This spur was recommended to be a mixed traffic environment. The link along Willoughby Road across the LGA boundary at Chandos Street already exists as a cycle route, however, infrastructural upgrades (e.g. shared path or a cycleway) would be required to turn this into a quality regional link.

A third link could be created along Pacific Highway. This does currently not exist within the North Sydney LGA. On the Willoughby side, a bicycle shoulder lane exists on Herbert Street but ends just north of St Leonards Station. This could potentially be extended to Pacific Highway (approximately 130m) and link into the North Sydney LGA, also providing a link into the Lane Cove LGA (see Section 3.3).

The priority construction routes, and their relation to the LGA boundary with Willoughby are shown in Figure 3.1.

Figure 3.1: North Sydney Priority construction routes (red circles show major integration points and blue line shows selected Willoughby Council cycling routes)



Source: North Sydney Integrated Cycling Strategy, pg. 23

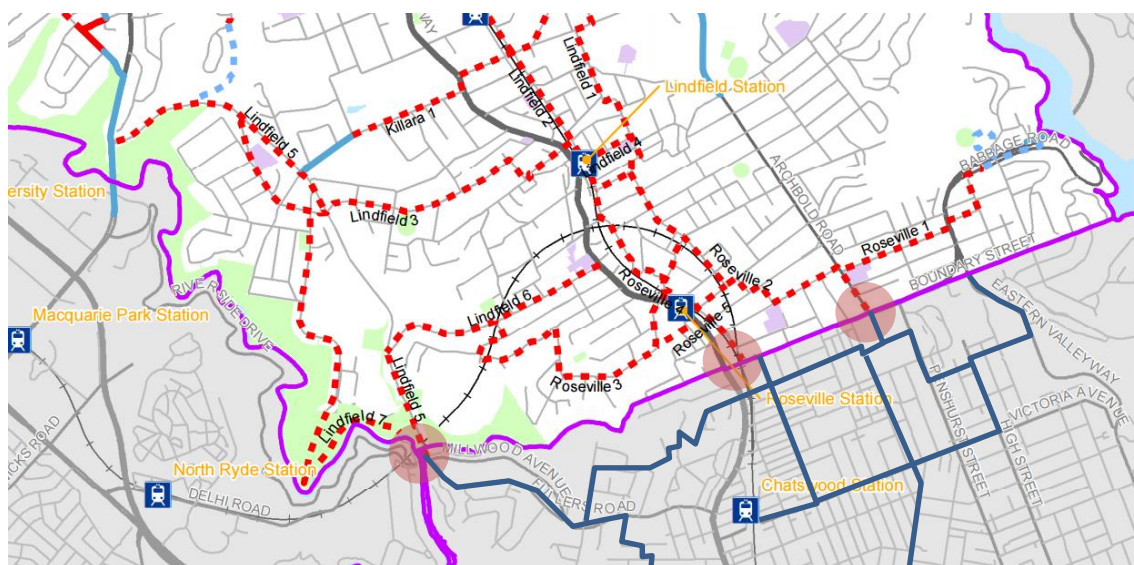
3.2 Ku-ring-gai Council

Ku-ring-gai Council is located to the north of Willoughby City Council and regional points of interest include areas such as St Ives, Pymble and Lindfield. Ku-ring-gai Council's latest bike plan was prepared in 2012.

Multiple routes run south from Ku-ring-gai Council into Willoughby Council, and not all of these match up with routes outlined in Willoughby's Bike Plan Review 2012. All connection points are proposed on-road routes, and it is unknown if Ku-ring-gai Council has upgraded the infrastructure to be consistent with the plans.

The connection points include Lady Game Drive (which corresponds with Fullers Road), Hill Street (which corresponds with Boundary Street and Archer Street) and Archbold Street (which corresponds with King Edward Street). The integration points between the networks are shown in Figure 3.2.

Figure 3.2: Ku-ring-gai Bike Plan 2012 (red circles show major integration points and blue line shows selected Willoughby Council cycling routes)



Source: Ku-ring-gai Bike Plan 2012, pg. 141

Recent residential development on the north side of Boundary Street could strengthen the demand for a quality link into the Chatswood CBD, preferably along Archer Street. This would require a significant upgrade of the Archer Street/ Boundary Street intersection (in cooperation with Ku-Ring-Gai Council) and an upgrade of cycling infrastructure along Archer Street.

A second potential link across Boundary Street could be from Archibald Street through King Edward Street and into Macquarie Street. However, whilst a cycling route along Archibald Street is currently marked in Ku-ring-gai Council's 2012 bike plan, it requires significant upgrades to turn it into a regional route.

3.3 Lane Cove Council

Lane Cove Council commissioned its most recent bike plan in 2008, a review of the bike plan was undertaken in 2013 to document the progress to date. Similar to North Sydney Council, Lane Cove Council is included within the area covered by the Inner Sydney Regional Bike Plan, and there is a key commuter route along Epping Road. The future bike network as in the 2013 review is shown in Figure 3.3.

Willoughby LGA and Lane Cove LGA share a border along Pacific Highway and Mowbray Road where one side of the road belongs to Lane Cove and the other side to Willoughby. Along this border, a number of integration points exist, including Wilandra Street, Ralston Street (which corresponds with Beaconsfield Road, the Gore Hill Freeway cycleway, Helen Street (which corresponds with Bowen Street) and Berry Road (which corresponds with Reserve Road).

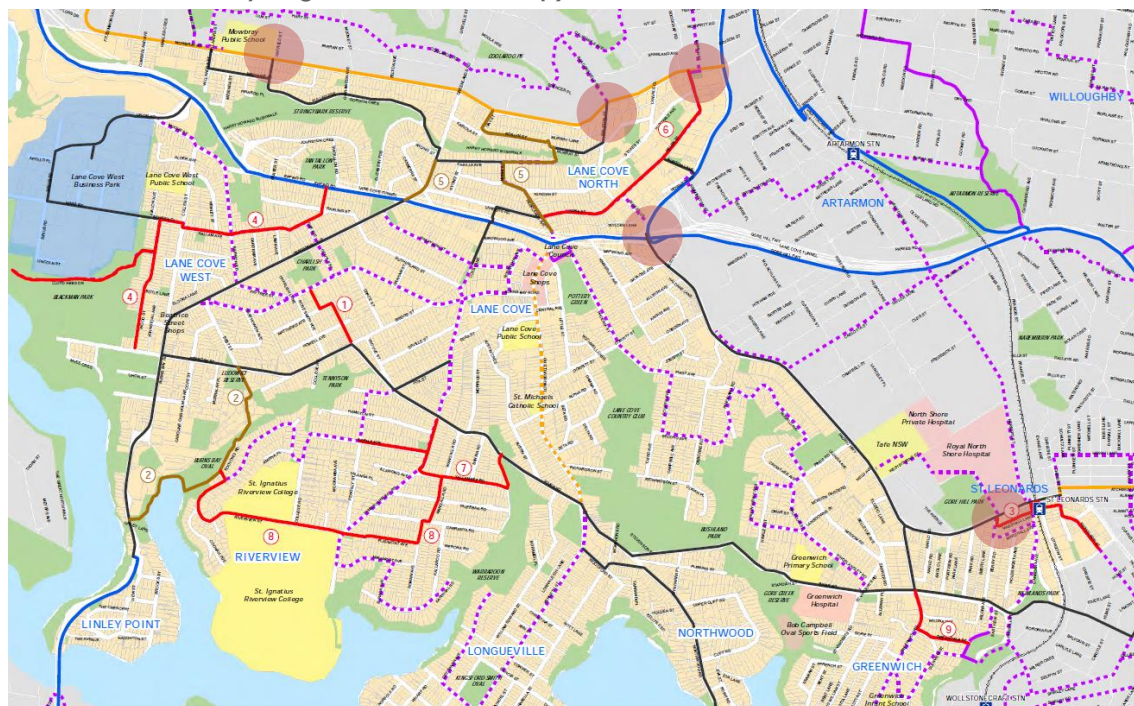
The most integrated link is currently along the Epping Road/ Gore Hill Freeway cycleway, this requires no further upgrades.

A link around St Leonards Station, also linking Lane Cove with North Sydney, was discussed in Section 3.1.

Development along Mowbray Road on both sides includes residential (Lane Cove side) and educational (Willoughby side) buildings. Whilst Mowbray PS and the West Chatswood Library are within the Willoughby LGA, they provide destinations for cycling from Lane Cove as well as Willoughby. Crossing Mowbray Road should be made easy in relevant locations and new traffic lights, such as the intersection Hatfield Road/ Mowbray Road, should have bike lanterns to allow cyclists crossing without having to dismount.

In addition to any cycling connections across Mowbray Road as discussed above, an upgrade of cycling facilities along Mowbray Road on both sides should be considered. This could best be achieved if Lane Cove Council and Willoughby Council agreed a joint approach to development and funding.

Figure 3.3: Lane Cove Bike Plan Review 2013 (red circles show major integration points – Willoughby Council cycling routes shown on map)



Source: Lane Cove Bike Plan Update 2013, pg 12

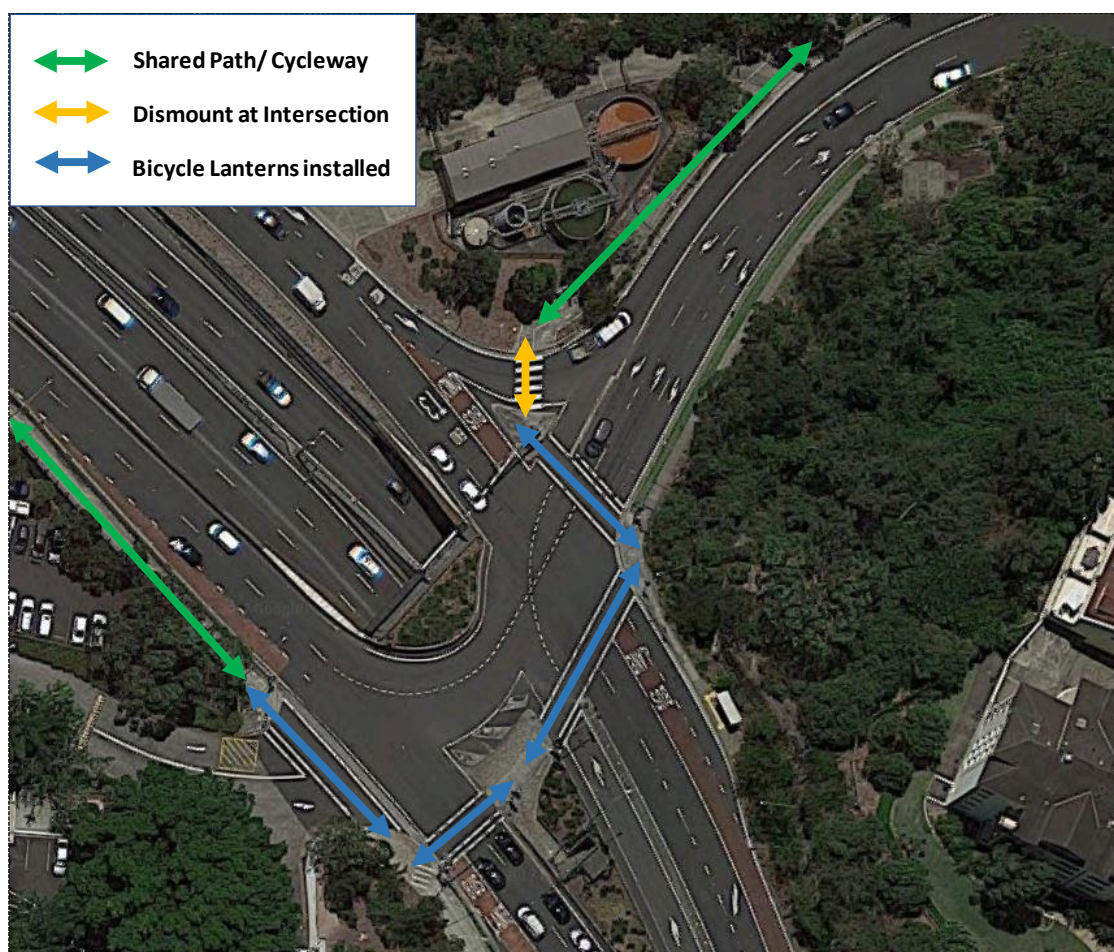
3.4 City of Ryde Council

City of Ryde Council only has two boundary points with Willoughby with road/ traffic interaction. These are at the western end of Mowbray Road West and at the bridge across the Lane Cove River where Millwood Avenue and Delhi Road meet.

The connection along Millwood Avenue and Delhi Road across the Lane Cove River currently does not cater for bicycles. The bridge has a narrow footpath on the northern side that is not suitable for cycling. Cycling along Delhi Road, Millwood Avenue or Fullers Road (parallel to Millwood Avenue) is difficult due to topography and the steep gradients, high traffic volumes and limited road width.

The western end of Mowbray Road is technically a boundary with Lane Cove Council, however, the off-street cycleway on the southern side of Epping Road across the Lane Cove River is a key link between Willoughby and suburbs within the City of Ryde. The current connection from Mowbray Road West to the Epping Road cycleway requires five road crossings (one zebra crossing and four traffic signals). Whilst this is not the most direct connection, all signalised crossings are upgraded for cyclists including bicycle lanterns. Cyclists still have to dismount at the zebra crossing, this can only be upgraded by signalling the crossing which appears to be a costly infrastructure upgrade for limited benefit.

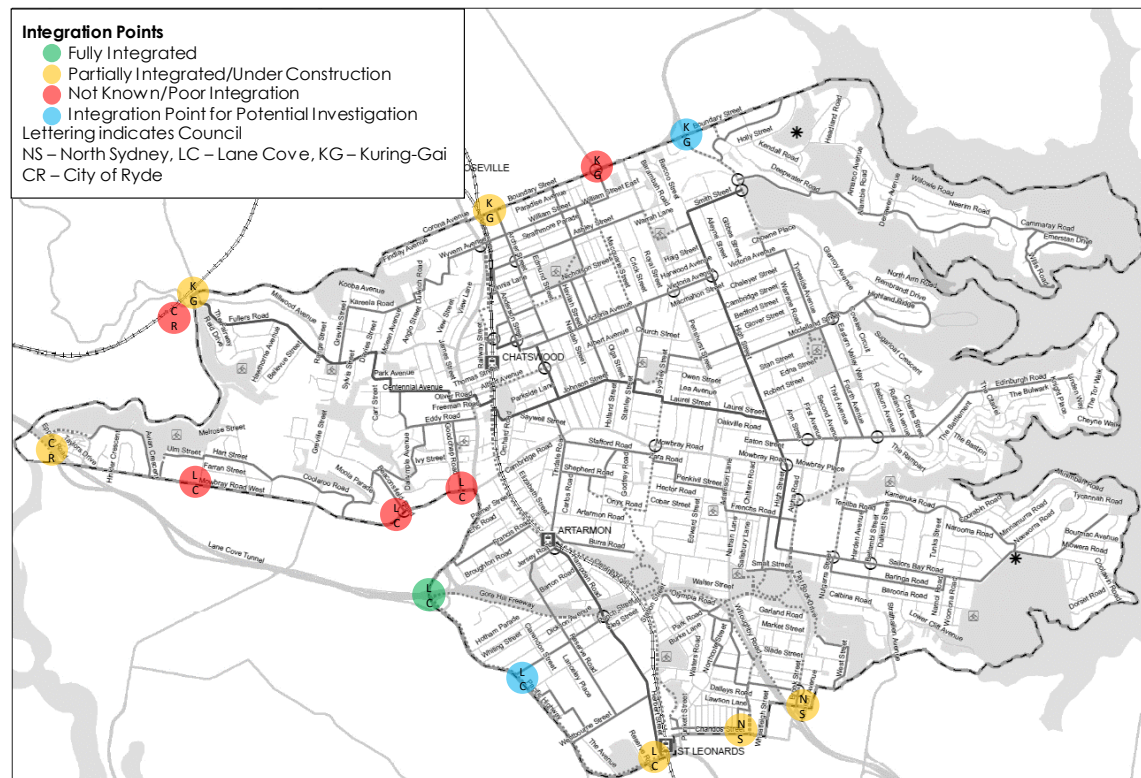
Figure 3.4: Bicycle facilities at Mowbray Road West and Epping Road



3.5 Summary of Inter-LGA Integration Points

Reproducing the 2012 Willoughby Bike Plan map, Figure 3.5 shows the location of the integration points and broadly indicates GTA's opinion as to whether that connection point is integrated or not. To ensure a cohesive and coherent regional network which encourages inter-LGA bicycle trips, dialogue should be had with the relevant Councils with works undertaken where appropriate.

Figure 3.5: Willoughby Bike Plan Integration Points



Source: Modified from Willoughby Bike Plan Review 2012, pg. 63

4. Update of Works Prioritisation

In reviewing the priority infrastructure projects, there are a range of factors which have been to be considered, these include:

- i **Connectivity** – Does the link provide substantially enhanced connectivity to the existing network?
- ii **Inter-LGA Connectivity** – Does the route support the cycling network of neighbouring LGAs?
- iii **Regional Network** – Does the link aim to reinforce or otherwise promote the regional cycling network, namely the Inner Sydney Regional Bicycle Network?
- iv **Land Uses** – Does the link provide enhanced connectivity to areas which may be supportive of cycling journeys? For example, schools, commercial and retail centres, train stations or areas of increased population density.
- v **Only Route** – Does a connection provide the only locally available route between two destinations? For example, there may be limited crossing points of the rail corridor and major roads.
- vi **Cyclist Safety** – Does a proposed route, or route requiring upgrade exist on a road with high speeds and/or high traffic volumes, or is otherwise subject to conditions which may be detrimental to preferred conditions whilst riding, for example, high proportions of heavy vehicles?
- vii **Expected Cyclist Volumes** – Which links currently have sound volumes of cyclists, and which links may aim to support higher rates of cycling in the future?
- viii **Topography** – Is the topography of the proposed link generally supportive of attracting modal shift to cycling?

As an aside, there has been a fundamental shift in the way cycling is planned for, with an increasing tendency to provide (preferably) separated facilities where feasible.

In addition to the projects designated as still relevant in Table 2.4, a new project has been separately identified as a priority project:

- o Albert Avenue off-road route: Pacific Highway and the railway line act as a divider in the Willoughby LGA that is difficult to permeate. As a result, the Chatswood CBD is not well connected to the areas west of the Pacific Highway. A new cycle route along Albert Avenue could provide a connection to the Chatswood CBD from the west and would also provide an east-west link across the rail corridor.

Without assigning project a timeframe, Table 4.1 outlines the projects that in GTA's opinion should be considered as priority projects, and a brief explanation as to why that route would be supportive of cycling within the LGA (or discarded as a priority project from the 2012 review).

Table 4.1: 2017 Review of Proposed Priority Projects

Old/New Project	Description	Recommendation and Reason for Determination
Identified in 2012 Review	Victoria Avenue/ Chatswood CBD	Retained – There is a need for a single high quality infrastructure spine to provide access to Chatswood as it functions as a major commercial, retail and transport centre
	High Street and Smith Street	Retained – Given the largely continuous north-south link that High Street provides through the Willoughby LGA, it is considered that High Street would significantly aid in supporting the use of the proposed Victoria Avenue cycleway
	Brook Street to Victoria Avenue	Retained – Most of this high quality route exists, with improvement works required north of Mowbray Road. If improvement works can be provided north of this line, this has the opportunity to complete the corridor
	Chatswood Park to High Street	Retained – An additional link to support cycling from the east of the LGA to Chatswood is desirable
	Fullers Road to Ellis Street	Downgraded – Anecdotal, cyclists are more likely to utilise the Epping Road cycleway and the attraction of new cyclists is considered unlikely. This is considered a low value link.
	Herbert Street/Hampden Road	Retained – Although the 'rail corridor' would be preferred, and GTA has recently completed a cycling route assessment including part of this route
	Stanley Street, Macquarie Street, William Street and King Edward Street	Retained – This would be supported by the Sydney Street and Onyx Road route which would provide a north-south link through the LGA which provides a Chatswood CBD bypass
	Sydney Street and Onyx Road	Retained – This would be supported by the Stanley Street and Macquarie Street route which would provide a north-south link through the LGA which provides a Chatswood CBD bypass
	Sailors Bay Road and Nulgarra Street/Baringa Road/Namoi Road	Downgraded – Generally a local access area with low vehicular and cycling volumes meaning the link is perceived to be of low value
	Ashley Street, Penshurst Street and Orara Street	Downgraded – Generally serves a limited local function
	Pacific Highway Shared Path	Retained – Generally a path which would support cycling-linked train commuting from St Leonards for individuals who live west of the Pacific Highway. Volumes of cyclists were noted to be moderate without formal route designation
	Railway corridor	Retained – Has the potential to provide a separated recreational route linking several commercial centres on the lower north shore.
	Tindale Road, Elizabeth Street, Burra Road, Jersey Road and Reserve Road	Downgraded – Generally serves a limited local function.
	Archer Street (Bus Lane)	Retained – This route will partially support the connectivity into Ku-ring-gai Council through the new shared path and the new development along the northern aspect of Boundary Street, though a higher quality facility may be considered.
	Fourth Avenue, Tyneside Avenue, Victoria Avenue, Warrane Road and Eastern Valley Way	Downgraded – Should High Street be upgraded, given it is a largely parallel running route, it is considered to be of low marginal value.
New 2017 Projects	Albert Avenue	New Priority – For people travelling to Chatswood, the potential to have an off-road route on the southern aspect of the CBD within close proximity of the major commercial centres is considered to be a high value link and broadly support east-west connectivity. It will also provide an east-west link across the rail corridor.

Appendix A

Kerb Ramp Design



Technical Direction

For Traffic & Transport Practitioners

Policy • Guideline • Advice

For attention of:

Director Road Network Infrastructure, Director Road Safety & Road User Management, Director Client Services, Director Operations, Road Safety personnel, Traffic Management personnel and Councils

KERB RAMPS

BACKGROUND

The RTA's focus is on the safe and efficient movement of people and goods. All RTA activities need to take account of the impact on our customers and their expectation of safe and efficient movement.

Pedestrian safety and amenity at intersections and at mid-block pedestrian facilities is an important issue that needs to be fully considered throughout the process of design and installation of kerb ramps. Kerb ramps not only serve to provide access to pedestrians between the road surface and footpath but are also used by pedestrians with vision impairment to orient and independently navigate themselves across roads. The orientation and location of kerb ramps in relation to other traffic facilities, such as pedestrian push buttons at traffic control signals, and street furniture is an important factor that must be taken into consideration when locating and constructing kerb ramps. The shape of kerb ramps and the need for sharp transitions is critical to their success in guiding pedestrians with vision impairment. Equally, there must be a sharp transition and no lip between the edge of the ramp and the gutter to facilitate pedestrians who use wheelchairs, prams and other wheeled devices.

Action for Transport 2010 outlines the Government's objective to encourage and facilitate walking. The provision of kerb ramps at intersections and mid-block locations is an integral component of the RTA's commitment to facilitating safe and convenient road crossing opportunities for all pedestrians.

This policy and its associated protocols provide clear guidance for the implementation of kerb ramps. This policy is an interim policy and will be updated once research into the use of tactile indicators at kerb ramps has been completed.

OBJECTIVES

The Objectives of this technical direction are:

1. to provide clear guidance for the design and implementation of kerb ramps throughout NSW.
2. to improve consistency in the design and implementation of kerb ramps throughout NSW.
3. To improve customer satisfaction with kerb ramps throughout NSW.

SCOPE

This *technical direction* is to be applied to the design, location and construction of all new kerb ramps throughout NSW.

DEFINITIONS

Kerb – a side barrier to a trafficable surface, including walkways and ramps.

Kerb ramp – an inclined accessway with a length not greater than 1520 mm and a gradient not steeper than 1 in 8, located within a kerb.

PRACTICE

All new kerb ramps must be designed, located and constructed in accordance with RTA Model Drawings MD.R173.B01.A attached to this *technical direction*.

ACTION

This *technical direction* must be adopted and applied as the standard design for kerb ramps across NSW to achieve greater acceptance and customer satisfaction with these facilities.

UPDATES

To ensure that this practice remains current and relevant, minor updates may be made from time to time. This will be done through the RTA's website at www.rta.nsw.gov.au. Select the TRAFFIC then POLICIES AND GUIDELINES tabs to access any electronic updates of this *Technical Direction*.

ADDITIONAL COPIES

Additional copies of this *Technical Direction* can be downloaded from the POLICIES AND GUIDELINES REGISTER on the RTA website. Alternatively, copies can be purchased from the RTA Information Reference Centre / Library (PO Box K198 Haymarket NSW 1238; Tel: (02) 8837 0198, Fax: (02) 8837 0010 or Email: library@rta.nsw.gov.au).

Approved By:

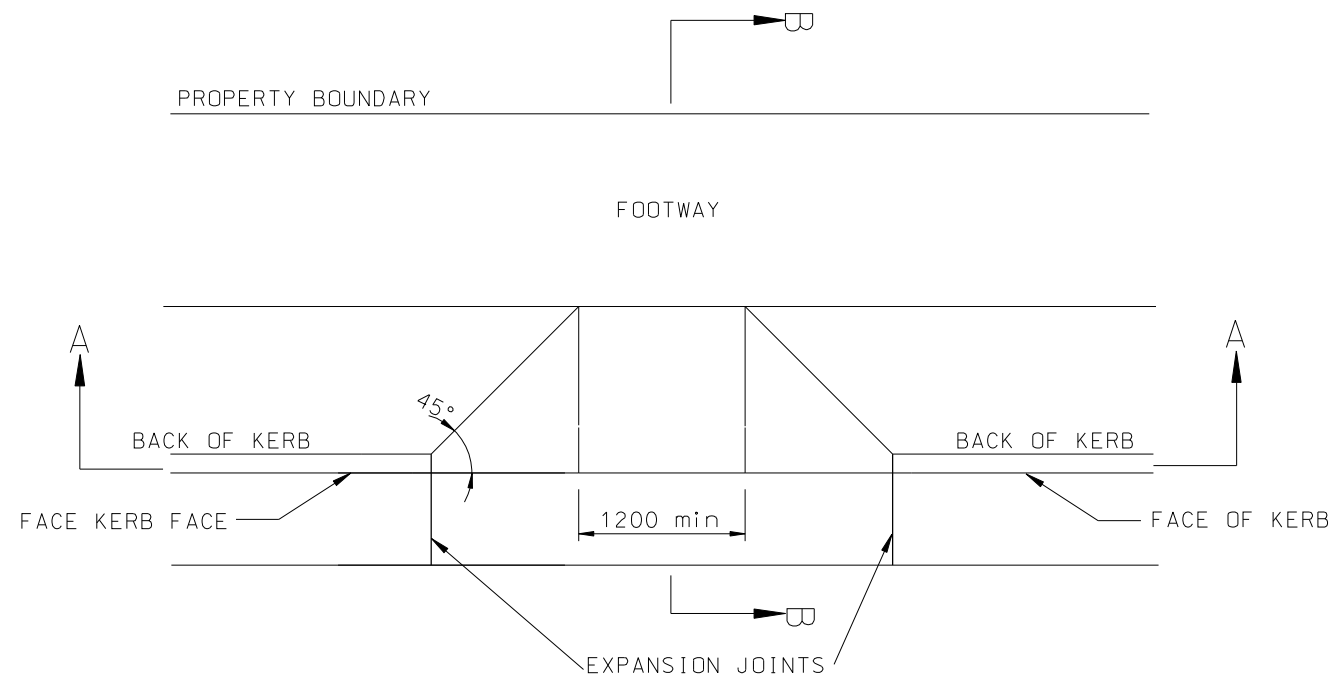
Authorised for use by:

SIGNED

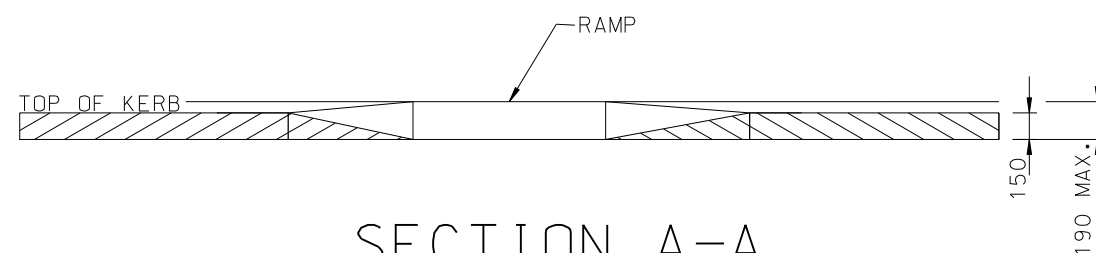
SIGNED

Rolf Lunsmann
General Manager
Bicycles and Pedestrians

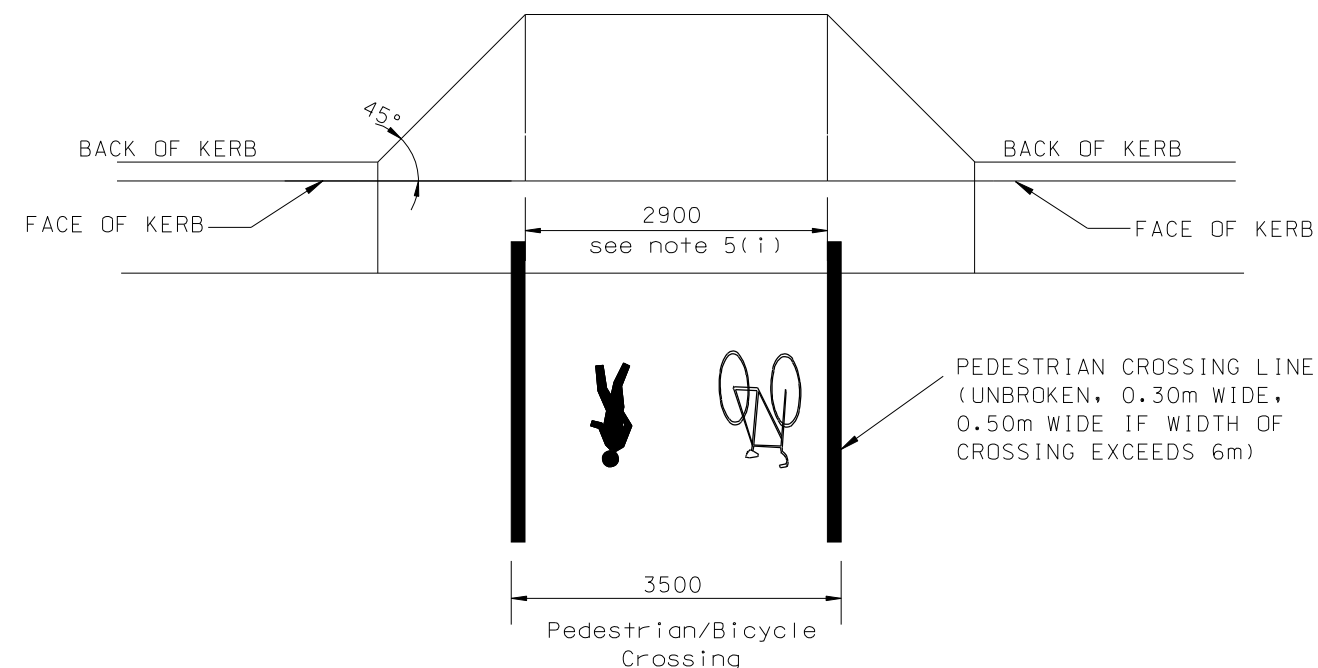
Chris Ford
Director
Traffic and Transport



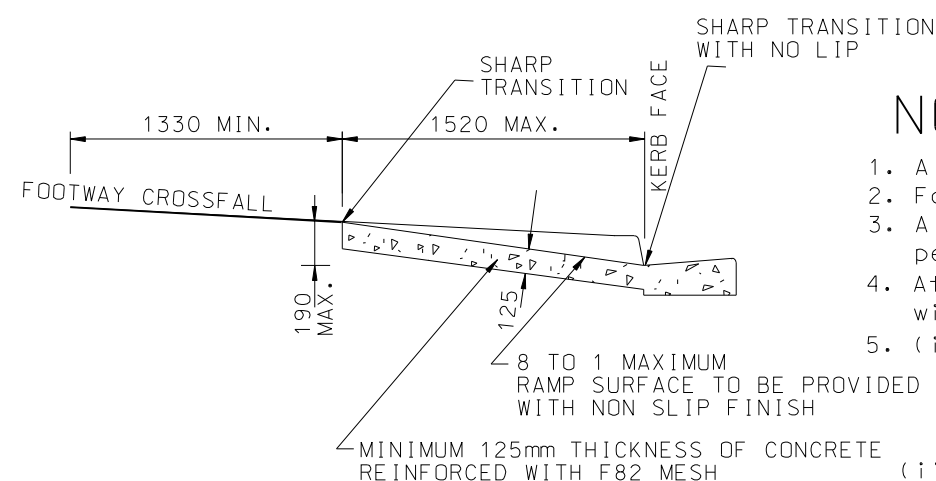
PLAN A



SECTION A-A



PLAN B
MARKED FOOT CROSSING
(Shared Pedestrian/Bicycle Crossing)



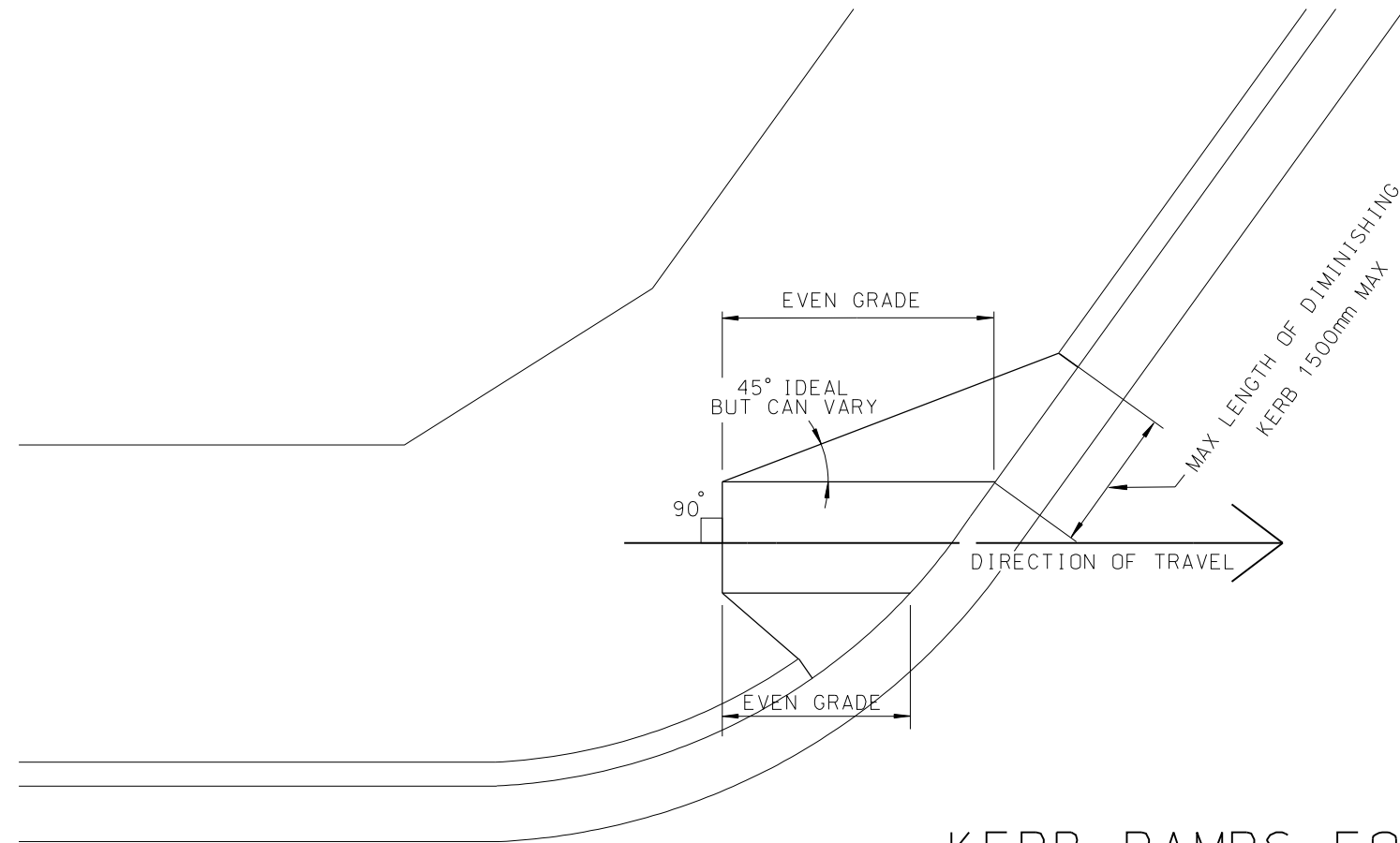
SECTION B-B

NOTES

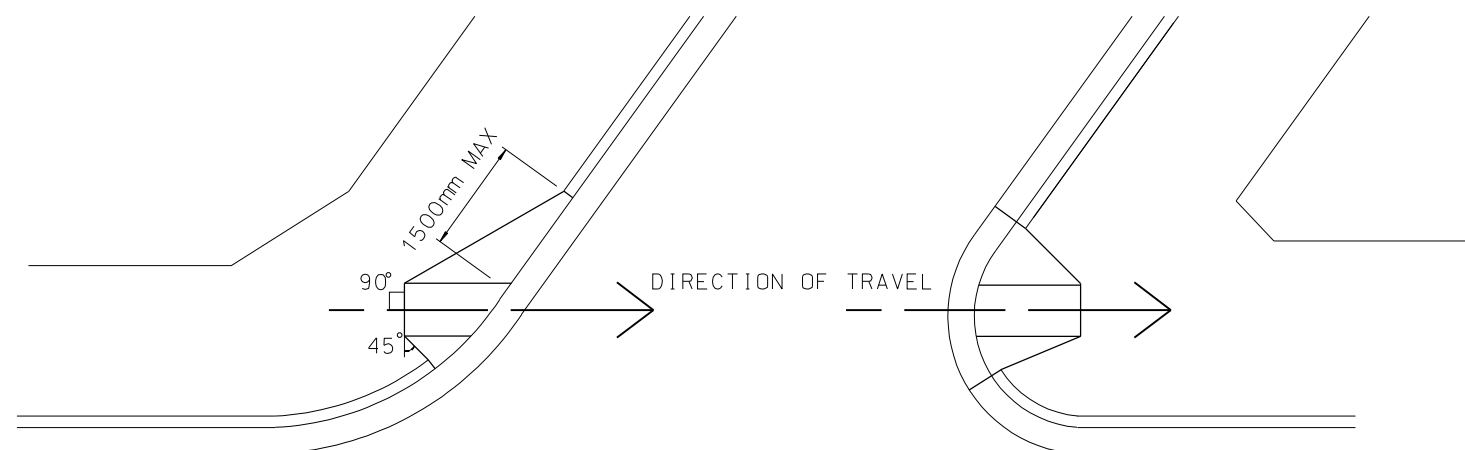
1. All dimensions are in millimetres.
2. For detail of kerb and gutter options, see MD.R15.A01.A.1.
3. All kerb ramps are to be aligned with the desired direction of pedestrian travel, and be a minimum of 1200 wide.
4. At pedestrian crossings and marked foot crossings ramps must line up with crossing and corresponding crossing on other side of road.
5. (i) For a marked foot crossing (shared pedestrian/bicycle crossing) sloping face of ramp should be as wide as the inside of the paint lines with a push button on it at a practical width no less than 1200.
(ii) At pedestrian crossings (zebra) the sloping face of the ramp should be as wide as the outside edge of the zebra stripes. Where this is not possible, the ramp should be at a practical width no less than 1200 wide. (refer to plan C sheet3)
(iii) At marked foot crossings (pedestrian only crossings) the sloping face of the ramp should be as wide as the inside of the paint lines. Where this is not possible, locate ramp close to post with a push button on it, at a practical width no less than 1200.
6. Expansion joints to be provided where ends of kerb ramp abuts kerb and gutter.
7. Separate kerb ramps must be used for adjacent crossings at intersections. (refer to plan E sheet3)

FIRST ISSUED : April 2002

AMENDMENT DETAILS		DATE
Roads and Traffic Authority NSW		
KERB RAMPS		
SCALE N.T.S.	No. OF SHEETS 3	SHEET No. 1
DRAWING NUMBER MD.R173.B01.A		



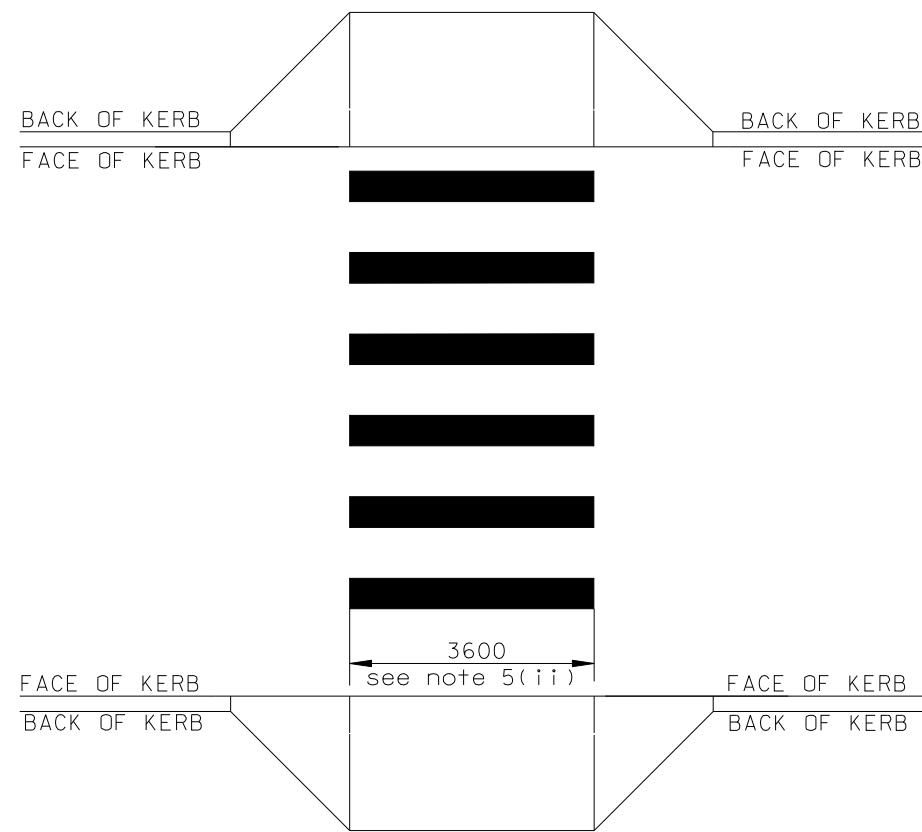
KERB RAMPS FOR
OBTUSE INTERSECTION



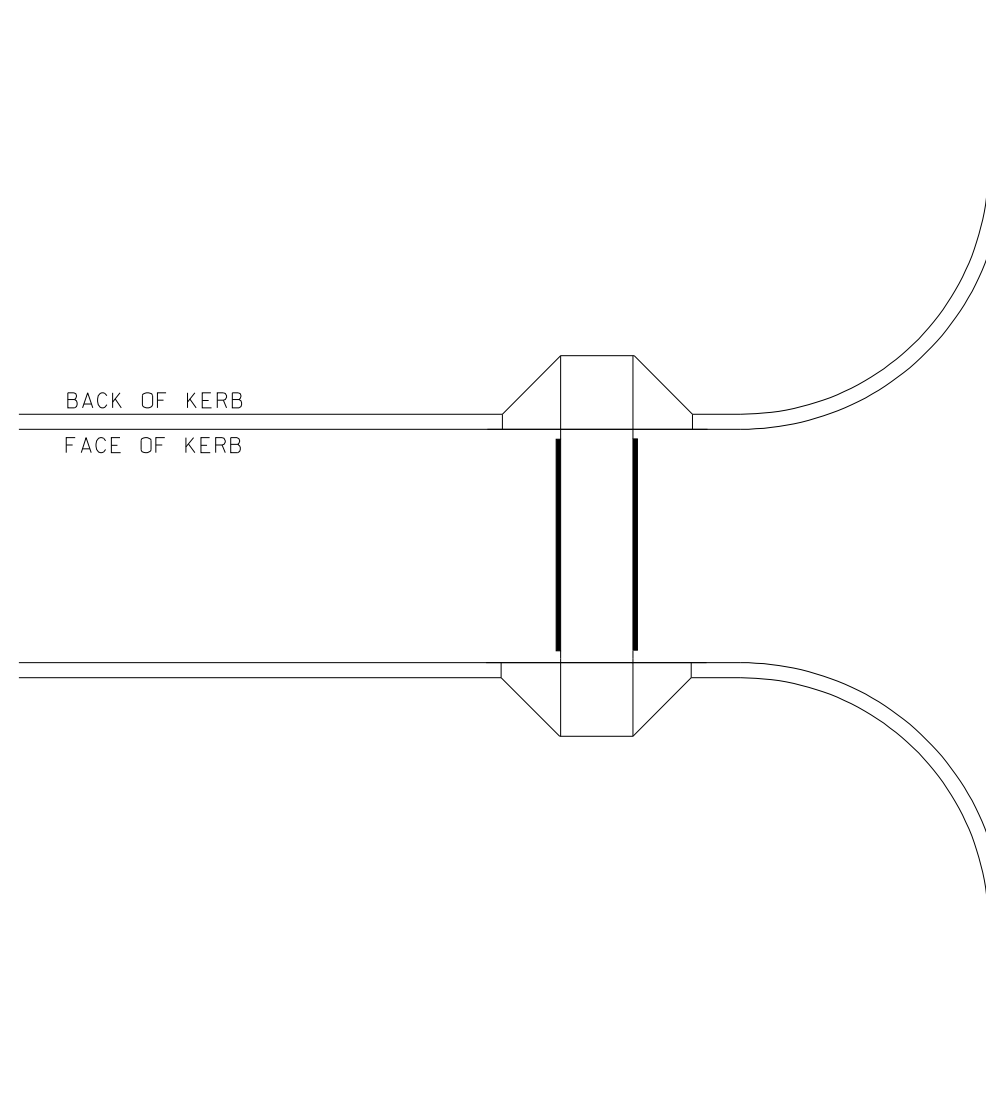
KERB RAMPS FOR
ACUTE/OBTUSE INTERSECTION

AMENDMENT DETAILS		DATE
Roads and Traffic Authority NSW		
TYPICAL APPLICATION OF KERB RAMPS AT INTERSECTION		
SCALE N.T.S.	No. OF SHEETS 3	SHEET No. 2
DRAWING NUMBER MD.R173.B01.A		

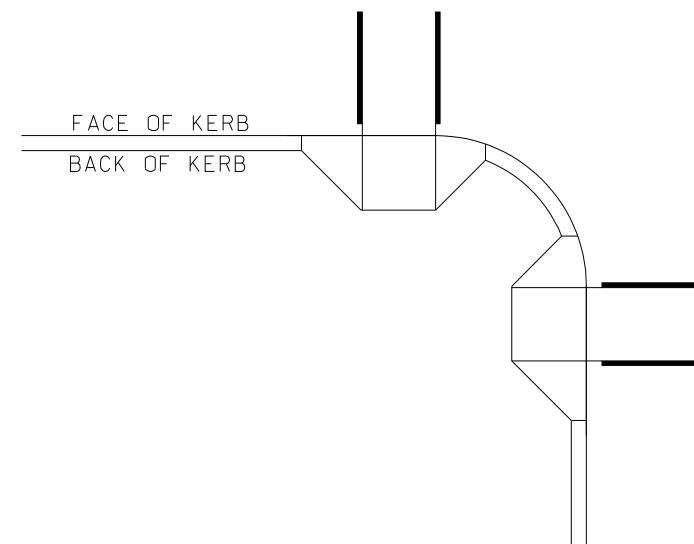
FIRST ISSUED : APRIL 2002



AT PEDESTRIAN
CROSSING (ZEBRA)
See note 5(ii) Sheet 1
PLAN C



ALIGNED KERB RAMPS
See note 4 Sheet 1
PLAN D



ADJACENT CROSSINGS
See note 7 Sheet 1
PLAN E

NOTES

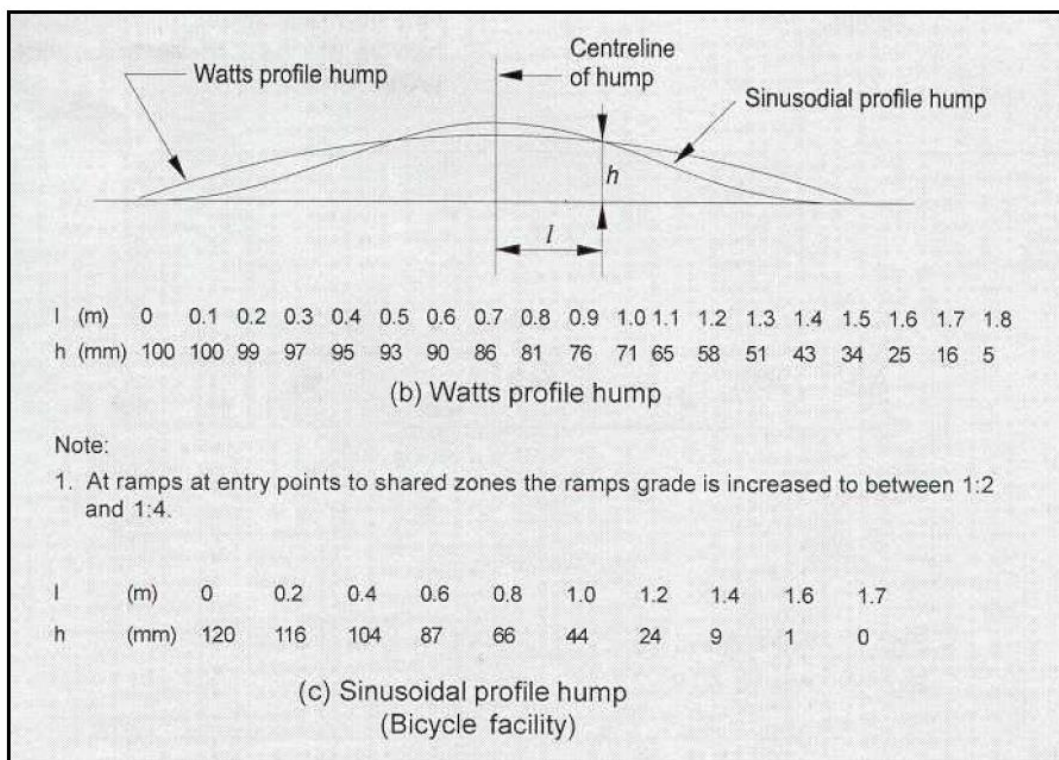
1. All dimensions are in millimetres.
2. For kerb ramp detail see MD.R173.B01.A. Sheet1.

AMENDMENT DETAILS		DATE
Roads and Traffic Authority NSW		
KERB RAMP INSTALLATION		
SCALE N.T.S.	No. OF SHEETS 3	SHEET No. 3
DRAWING NUMBER MD.R173.B01.A		

FIRST ISSUED : April 2002

Appendix B

Speed Hump Profile



Source: Austroads Guide to Traffic Management – Local Area Traffic Management, pg. 69

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