

Bus Priority Infrastructure Program On-time running improvements Hornsby to Blacktown corridor Review of Environmental Factors

August 2017



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Executive summary

The proposal

Transport for NSW, in partnership with Roads and Maritime, is proposing to improve the reliability of buses by making changes to bus stops along the corridor between Hornsby and Blacktown (the proposal). The corridor predominately links Blacktown to Castle Hill, serviced by T70/T71, and Castle Hill to Hornsby, serviced by Metrobus M60, as well as other local and suburban routes which use parts of the corridor. The main features of the proposal are:

- Rationalising bus stop locations to optimise the spacing between bus stops
- Lengthening some bus stops to improve access for buses and assist passenger boarding and alighting
- Relocating some bus stops to optimise spacing and / or address traffic and safety issues
- Improving bus stop infrastructure at some locations including changes to bus stop signage
- Providing new stops to address customer demand.

A summary of the proposed changes is provided below:

- Nine bus stop removals (including the removal of signage and other bus stop infrastructure)
- Four bus stop improvements (including extensions)
- Three bus stop relocations
- Bus stop consolidation at one location (four bus stops consolidated into two)
- One new bus stop.

Need for the proposal

The proposal forms part of the Bus Priority Infrastructure Program and supports *Sydney's Bus Future* (Transport for NSW, 2013) by delivering projects that make buses more reliable.

The Bus Priority Infrastructure Program is consistent with, recognises and progresses NSW Government policies and plans, including the NSW Premier Priorities and Sydney's Bus Futures. The focus of the on improvements in Rapid and Suburban routes, as outlined in Sydney's Bus Future, and targeted corridors that experience lower service reliability.

The Bus Priority Infrastructure Program supports targeted improvements for bus on-time running through a range of initiatives, including:

- Rationalising bus stop locations to optimise the spacing between bus stops, by combining or removing some bus stops where they are spaced close together
- Lengthening some bus stops to accommodate longer articulated buses
- Making it easier for buses to move in and out of bus stops by removing or relocating on-street parking
- Reducing potential delays for buses at traffic signals by moving stops to the departure side of the intersection.

This initiative is the first stage aimed at achieving on-time running improvements of buses. Any future proposal by the NSW Government to develop the corridor into a rapid route would involve further reviewing the bus service along this corridor and consideration of other road and traffic management improvements. This would be subject to further consultation.

Proposal objectives

The objectives of the proposal are to:

1. Achieve more reliable travel times for bus passengers
2. Improve on-time running for buses consistent with the State Priority to maintain or improve reliability of public transport services
3. Minimise impacts for users of suburban and local services

4. Minimise impacts on the environment and the community.

Options considered

Given the nature of the proposal, consideration of options was largely confined to whether the proposal could be justified in the context of the proposal objectives. This is effectively an evaluation of the proposal against the 'do nothing' option.

Key considerations for developing the proposal were derived from *Sydney's Bus Future* (Transport for NSW, 2013) and the draft *Bus Stop Location Guidelines Sydney Metropolitan Area* (Transport for NSW, n.d.) and were as follows:

1. Plan to achieve a general standardised 400 metre spacing between bus stops, while spacing of bus stops between 800 metres and one kilometre apart would be considered as part of planning for a future rapid bus route
2. Ensure bus stops are located close to major patronage generators and community facilities to maximise the efficiency of a bus stop and eliminating redundant and underutilised stops
3. Locate bus stops on the departure side of signalised intersections to improve traffic conditions and help buses to meet the timetable using Public Transport Information and Priority System (PTIPS)
4. Adjust and locate bus stops to improve pedestrian safety
5. Provide suitable bus zone length to allow buses to manoeuvre in and out of bus stops easily without obstructing the adjacent lane.

Another important consideration in developing the proposal was to ensure bus stops used by local and suburban services in the corridor remain accessible. Where removing a bus stop would result in excessive distance between stops for local and/or suburban routes, no changes have been proposed. Transport for NSW will further review bus stops along the corridor and undertake further consultation as part of future planning for a rapid bus route.

The 'do nothing' option (Option 2) involves making no changes to improve bus reliability. While Option 2 would not affect existing bus users (proposal objective 3) and would have no environmental impacts (proposal objective 4), it would not improve bus travel time reliability or improve on-time running (proposal objectives 1 and 2).

The preferred Option 1 best meets proposal objectives 1 and 2, and while it would have some environmental and community impacts, environmental safeguards and management measures have been proposed to address these impacts.

Statutory and planning framework

The proposal is permissible without consent under *State Environmental Planning Policy (Infrastructure) 2007* and requires assessment under Part 5 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Part 5 of the EP&A Act.

The assessment of potential proposal impacts found that it would be unlikely to cause a significant impact on matters of national environmental significance or the environment of Commonwealth land. A referral to the Australian Government Department of the Environment and Energy is not required.

Community and stakeholder consultation

Roads and Maritime has developed a community consultation and stakeholder engagement plan for the proposal. The plan identifies key objectives and the desired consultation outcomes. It focuses on consultation with relevant Government agencies, stakeholders and the community affected by the proposal. The plan's overall objectives are to:

- Provide stakeholders with clear, relevant, timely and accurate information about the proposal, proposed changes and impacts
- Identify local issues to ensure the proposal aligns with community needs
- Inform and consult affected and interested stakeholder groups.

To date consultation has focused on government agencies, particularly local councils. No substantive issues or objections have been raised to date.

The REF will be displayed publicly and submissions will be invited. All issues raised will then be considered and responded to in the subsequent submissions report.

The REF will be displayed on the Roads and Maritime website. A community update will be letterbox-dropped to residents and businesses, and additional stakeholders will receive the community update with a covering email/letter.

During the public display period, potentially affected residents, businesses and other nearby stakeholders will be visited by project team staff near bus stops with significant changes to discuss the proposal and address their issues of concern. Project team staff will also schedule and meet with potentially affected residents and other stakeholders as requested.

Environmental impacts

Impacts during the construction phase include delays to traffic and nuisance from noise, dust, soil and water. These potential impacts are minor and manageable with implementation of appropriate environmental safeguards and management measures.

The main potential operational benefits and impacts associated with the proposal would be:

- Improved reliability of bus services and reduced total travel time
- Improvements in traffic efficiency and road safety at some locations
- Removal and relocation of bus stops which would optimise bus stop spacing across the route to reduce delays but would also increase walking distance to bus stops for some people. The proposal targets 400 metre spacing between bus stops, however greater than 400 metres spacing was considered acceptable at some locations due to road layouts and local conditions. Larger spacing was also accepted where achieving the 400 metre spacing would require relocation of other currently unaffected bus stops
- Localised changes to parking, but a net gain of five car spaces across the corridor.

Environmental safeguards have been proposed for the design phase of the proposal and during construction and operation of the proposal, should it proceed. These include implementing a communication plan and complaints handling process and maintaining accesses to business and properties. These safeguards will minimise potential adverse impacts arising from the proposed works on the surrounding environment.

Justification and conclusion

The proposal to make changes to bus stops on the corridor from Hornsby to Blacktown serviced by T70/T71, Metrobus M60 and other suburban and local services, is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

Several potential environmental impacts from the proposal have been avoided or reduced during the proposal development, including avoiding changes where bus stops are well used or needed to provide suitable access for less mobile people.

The proposal as described in the REF best meets the proposal objectives but would still result in some impacts, including increased walking distances to bus stops for some customers and temporary nuisance during construction. Environmental safeguards and management measures as detailed in this REF would mitigate or minimise these expected impacts.

The environmental impacts of the proposal are not likely to be major and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the EP&A Act. The proposal is unlikely to significantly affect threatened species, populations or ecological communities or their habitats and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on matters of national environmental significance.

On balance, the benefits derived from proceeding with the proposal are considered to outweigh the potential impacts. It is therefore considered justified.

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1 Introduction

1.1 Proposal identification

Transport for NSW is a lead agency in the Transport cluster with responsibility for setting the strategic direction and guiding an extended network of public and private service delivery agencies to provide improved transport outcomes. Roads and Maritime Services (Roads and Maritime) is the delivery agency providing agreed outcomes across the road and maritime networks within the context of an integrated transport strategy. Roads and Maritime delivers projects and programs to reliably and safely improve the movement of people and goods by various transport modes, including through the road and freight network, NSW waterways, the public transport network and active transport such as cycling and pedestrian networks.

Transport for NSW, in partnership with Roads and Maritime, is proposing to improve the reliability of buses by making changes to bus stops along the corridor between Hornsby and Blacktown (the proposal). The main features of the proposal are:

- Rationalising bus stop locations to optimise the spacing between bus stops
- Lengthening some bus stops to improve access for buses and assist passenger boarding and alighting
- Relocating some bus stops to optimise spacing and / or address traffic and safety issues
- Improving bus stop infrastructure at some locations including changes to bus stop signage
- Providing new stops to address customer demand.

A summary of the proposed changes is provided below:

- Nine bus stop removals (including the removal of signage and other bus stop infrastructure)
- Four bus stop improvements (including extensions)
- Three bus stop relocations
- Bus stop consolidation at one location (four bus stops consolidated into two)
- One new bus stop.

The proposal site traverses the suburbs of Baulkham Hills, Castle Hill, West Pennant Hills, Cherrybrook, Pennant Hills, Thornleigh, Normanhurst and Hornsby and is within the Hills Shire and Hornsby local government areas.

The corridor between Hornsby and Blacktown is serviced by T70/T71, Metrobus M60 and a range of suburban and local bus services provide access to important centres including Norwest Business Park and provides opportunities for transport interchange at railway stations on the T1 North Shore and Northern Line.

Implementation of the proposal would take up to two months.

1.2 Purpose of the report

This Review of Environmental Factors (REF) has been prepared by Hills Environmental on behalf of Roads and Maritime. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts have been undertaken in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of section 111 of the EP&A Act, that Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured
- The potential for the proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need, subject to the EPBC Act strategic assessment approval, to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

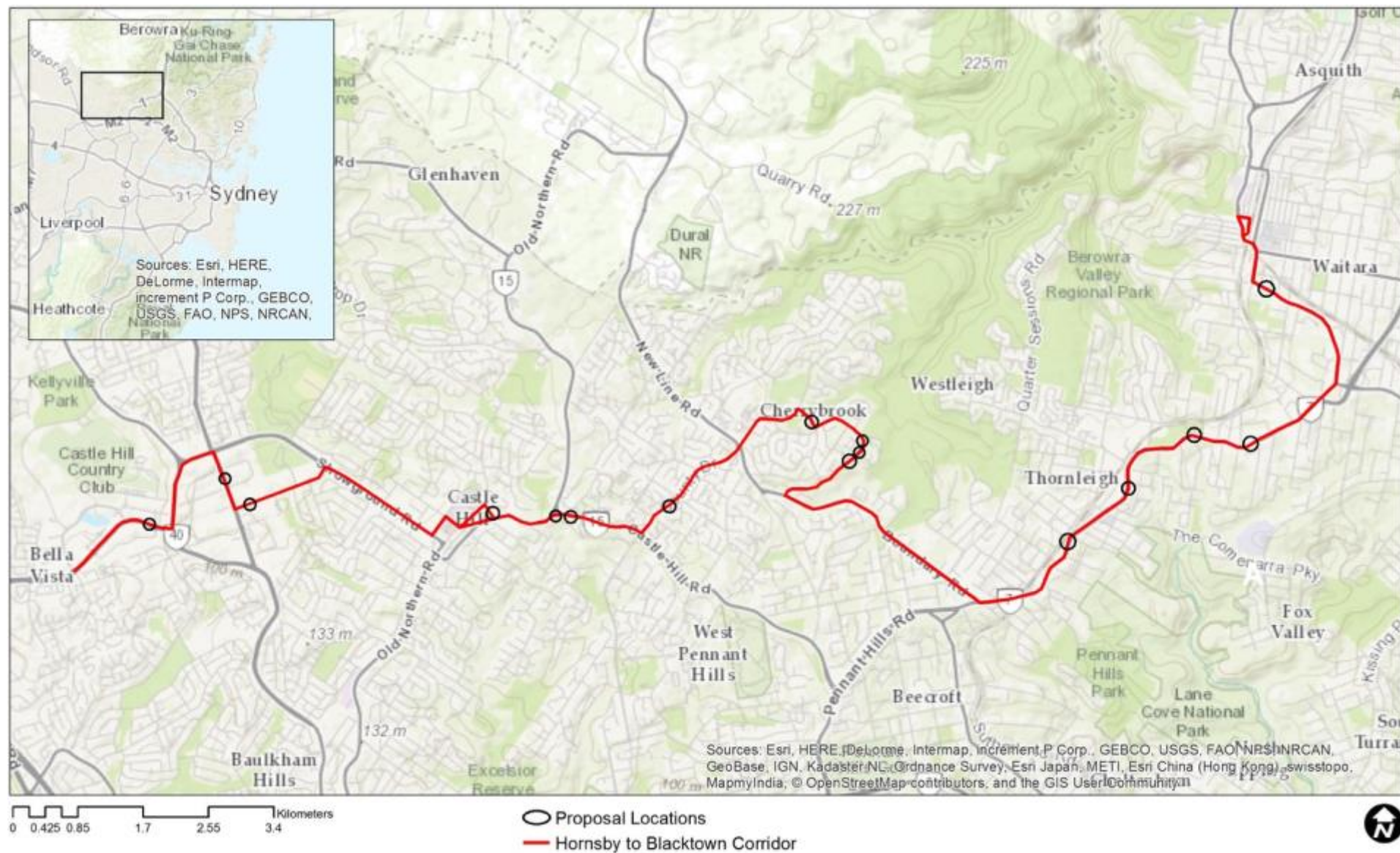


Figure 1-1 Location of the proposal

2 Need and options considered

2.1 Strategic need for the proposal

Sydney's Bus Future

Sydney's Bus Future (Transport for NSW, 2013) is the NSW Government's long term plan to redesign the bus network to meet customer needs now and into the future. This strategic plan was published in December 2013 and is consistent with the *NSW Long Term Transport Master Plan* (Transport for NSW, 2012). *Sydney's Bus Future* identifies the city's most important bus routes, as the focus for investment in bus priority and more frequent services and aims to provide:

- A simpler bus network that is easy for customers to understand and use. It makes routes more direct, reduces duplication and increases the number of locations which customers can travel between by bus
- A faster bus network that gets customers where they want to go in the shortest amount of time. It is reliable and delivers frequent services that connect seamlessly with other buses, trains, light rail and ferries
- A better bus network that is more efficient, convenient and cost-effective with features that include a modern, comfortable fleet, real time customer information and world-class customer service.

Sydney's Bus Future identifies a clear, three-tiered network with each level delivering a defined level of service consistency and reliability. This is illustrated by Figure 2-1.

Rapid	Suburban	Local
<ul style="list-style-type: none">• Frequent 'turn up and go' services without the need for consulting a timetable• 13 routes (2 Growth Centre routes, 5 new end-to-end services and 6 established routes)• Stops every 800 metres to 1 km• Investment in bus priority infrastructure for fast and reliable journeys.	<ul style="list-style-type: none">• A mix of frequent 'turn up and go' and timetabled services• 20 cross-metropolitan routes initially, including 8 new end-to-end services• Additional Suburban routes to be identified and introduced• Stops every 400 metres• Bus priority targeted at key pinch points to speed up services.	<ul style="list-style-type: none">• Timetabled services• Completes the network, providing services such as local shopping services, CBD shuttles, peak expresses• Stops every 400 metres• Peak express services with variable stop spacing• Services use local streets and roads, and bus priority for peak express connections.

Figure 2-1 Sydney's Bus Future route hierarchy

Roads and Maritime and Transport for NSW is working to improve bus travel speeds and service reliability for customers on the corridor between Hornsby and Blacktown which is serviced by T70/71, Metrobus M60 and suburban and local services. The key short-term actions identified for this route in *Sydney's Bus Future* are:

- Short term improvements to services between Castle Hill and Blacktown
- Fill in missing links in bus priority along the corridor
- High capacity vehicles on new end-to-end service
- High quality interchanges with consistent wayfinding and signage
- Address bus pinch points with bus priority treatments on:
 - Pennant Hills Road, Hornsby to Pennant Hills
 - Boundary Road, Pennant Hills to Cherrybrook

- Bus priority route between Cherrybrook and Castle Hill (with The Hills Shire Council)
- Showground Road and Norwest Boulevard between Castle Hill and Bella Vista.

As a longer term initiative, potential conversion to light rail as part of the Western Sydney Light Rail Network would be investigated.

The following customer benefits from these actions were identified as:

- 50 extra bus services every weekday between Hornsby and Blacktown
- Able to carry over 1,500 extra customers each day
- More early morning, evening, night and weekend services.

The Bus Priority Infrastructure Program supports *Sydney's Bus Future* by delivering projects that make bus services more reliable and by allowing a higher frequency of service. This is consistent with the principle that Rapid routes should provide a fast, reliable bus travel for customers between major centres. The proposal is being delivered under the Bus Priority Infrastructure Program.

The current program focuses on improvements in Rapid and Suburban routes, as outlined in *Sydney's Bus Future*, and targeted corridors that experience lower service reliability. It supports targeted improvements for bus on-time running through a range of initiatives, including:

- Combining or removing some bus stops where they are spaced close together
- Lengthening some bus stops to accommodate longer articulated buses
- Making it easier for buses to move in and out of bus stops by removing or relocating on-street parking.

Overall, the proposal is needed to help reduce total travel time and improve bus service reliability, consistent with the aims of the Bus Priority Infrastructure Program and *Sydney's Bus Future*. The results of a review of bus stops along the Hornsby to Blacktown corridor and the proposed action at each location is provided in Chapter 3 (Description of the proposal).

NSW Premier's and state priorities

The NSW Government is working to achieve twelve Premier's priorities and 18 state priorities to grow the economy, deliver infrastructure, protect the vulnerable, and improve health, education and public services across NSW.

The Bus Priority Infrastructure Program is consistent with, recognises and progresses NSW Government policies and plans, including the NSW Premier's priorities and state priorities. The Bus Priority and the proposal specifically addresses the following state priority:

- *Ensure on-time running for public transport* - Maintain or improve reliability of public transport services over the next four years.

NSW Long Term Master Plan

The *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) brings together land use planning and transport planning, integrating planning for freight and passenger movements, as well as all modes of transport. It focuses on the following six key transport challenges:

- Integrating modes to meet customer needs
- Getting Sydney moving again
- Sustaining growth in Greater Sydney
- Providing essential access to regional NSW
- Supporting efficient and productive freight
- State-wide actions.

These challenges are responded to through four types of action:

- Integrate transport services
- Modernise our system

- Grow our networks to meet future demand (including the important tasks of corridor preservation)
- Maintain important road and public transport assets.

The Bus Priority Infrastructure Program and the proposal are consistent with the following specific bus related measures in the *NSW Long Term Transport Master Plan*:

- Increase bus priority measures and investigate Bus Rapid Transit along priority corridors as part of a bus strategy that includes a restructured three-tier network of improved local, intermediate and rapid mass transit services, supported by a bus network redesign, and a better, modern fleet
- Longer term investigation of Bus Rapid Transit on Sydney's busiest corridors that are not served by other mass transit modes
- A Strategic Bus Network program focusing on higher service frequencies and on-road priority for buses along strategic corridors will improve services and better manage road congestion, offering better public transport travel times and reliability at significant pinch points during weekday peak periods.

State Infrastructure Strategy

As part of the *State Infrastructure Strategy* (the Strategy) (NSW Government, 2016), \$20 billion will be invested into new infrastructure across the State. The Strategy highlights the importance of sustaining productivity growth in major centres and regional communities, as well as supporting population growth toward almost six million people in Sydney and more than nine million people in NSW. The Strategy notes that congestion costs Sydney \$5 billion per annum and that this will grow to \$8 billion per annum by 2020 without action.

The proposal is consistent with this focus on addressing congestion and with the \$300 million identified in the *State Infrastructure Strategy* for Bus Rapid Transit and bus priority infrastructure.

2.2 Existing road and infrastructure

The corridor between Hornsby and Blacktown traverses a highly urbanised environment. Adjacent land use is primarily low and medium density residential, with intervening industrial, commercial and open space use and schools. The corridor provides access to important centres including Norwest Business Park, Castle Hill, Pennant Hills, Thornleigh and opportunities for transport interchange at railway stations on the T1 North Shore and Northern Line. The corridor links Blacktown to Castle Hill via the North West T-Way and Sunny Holt Road, serviced by T70/T71, and Castle Hill to Hornsby, serviced by Metrobus M60.

The following sections describe each of the proposal locations where bus stop removal, relocation, improvement or extension is proposed. Where available, opal data for the below stops is included in Table 3-1.

Locations 11 and 12 – Norwest Boulevard near Brookhollow Way and Columbia Circuit, Baulkham Hills (westbound and eastbound)

Norwest Boulevard at this location has two-lanes in each direction divided by a landscaped central median and is classified as a Main Road (MR690). The intersection with Brookhollow Way and Columbia Circuit is immediately to the east and consists of a multi-lane roundabout. 'No stopping' restrictions apply. Adjacent development is business park industrial and educational (Bedford College).

Bus stop 2153140 (#11) and bus stop 215385 (#12) both have plinth signage, bus shelters (without advertising panels) and indented bus bays.



#11 View west to stop 2153140



#12 View west to stop 215385

Figure 2-2 Norwest Boulevard Location #11 and #12 images

Location 20 – Victoria Avenue after Anella Avenue (southbound)

Victoria Avenue at this location has two-lanes in each direction divided by a landscaped central median and is an unclassified regional road (7470). The posted speed limit is 50 kilometres per hour and 'no stopping' restrictions apply in the immediate vicinity of bus stop 215467. Adjacent development is large format / bulky goods retail.

Bus stop 215467 (#20) currently has a bus shelter with advertising panel.



#20 View north to stop 215467

Figure 2-3 Victoria Avenue Location #20 image

Locations 23 and 24 – Carrington Road, Castle Hill (eastbound and westbound)

Carrington Road at this location has two-lanes in each direction, is undivided and is classified as an unclassified regional road (7471). There is a wide kerbside shoulder that is marked for use by cyclists and the posted speed limit is 50 kilometres per hour. Adjacent development is large format retail and industrial.

Bus stop 215493 (#23) (westbound) and bus stop 215469 (#24) (eastbound) both currently have plinth signage and concrete pads.



#23 View to stop 215493



#24 View to stop 215469

Figure 2-4 Carrington Road Location #23 and #24 images

Locations 37 – McMullen Avenue, Castle Hill (eastbound)

McMullen Avenue has two-lanes in each direction, is undivided and is classified as a Main Road (MR672). Bus stop 2154386 (#37) is located on the approach to the signalised intersection with Old Northern Road, where the eastbound lanes are divided in to two dedicated left turn lanes and two dedicated right turn lanes. The posted speed limit is 60 kilometres per hour and 'no stopping' restrictions apply either side of the bus zone. Adjacent development is commercial and the Castle Hill Senior Citizens Centre.

Bus stop 2154386 (#37) currently has bus zone signage, with no other bus stop infrastructure present.



#37 View to stop 2154386

Figure 2-5 McMullan Avenue Location #37 image

Locations 41 and 43 – Castle Hill Road, Castle Hill (westbound)

Castle Hill Road at this location has two-lanes in each direction, is undivided and is classified as a Main Road (MR156). Bus stop 2154186 (#41) is located on adjacent to the dual left turn slip lanes on the approach to the Old Northern Road intersection. The posted speed limit is 60 kilometres per hour, with clearway restrictions delineated by broken yellow edge line. Adjacent development is primarily residential.

Bus stop 2154186 (#41) and bus stop 2154173 (#43) (current location) both have plinth signage and concrete pads. Bus stop 2154173 also has a seat.



#41 View to stop 2154186



#43 View to proposed relocation site for stop 2154173

Figure 2-6 Castle Hill Road Location #41 and #43 images

Location 49 – County Drive, Cherrybrook (northbound)

County Drive at this location has one lane in each direction, is divided by a landscaped central median and is an unclassified regional road (7482). The posted speed limit is 60 kilometres per hour and unrestricted parking is permitted in the wide sealed road shoulder. Adjacent development is residential.

Bus stop 2126136 (#49) currently has plinth signage.



#49 View south to stop 2126136

Figure 2-7 County Drive Location #49 image

Location 62 – Macquarie Drive, Cherrybrook (eastbound)

Macquarie Drive at this location has one lane in each direction, is undivided and is an unclassified local road. The posted speed limit is 50 kilometres per hour and unrestricted parking is permitted in the wide sealed road shoulder. Adjacent development is The Lakes of Cherrybrook retirement village.

Bus stop 2126153 (#62) has plinth signage.



#62 View to stop 2126153

Figure 2-8 Macquarie Drive Location #62 image

Locations 64, 67, 68, 69, 70, 71 and 72 – Francis Greenway Drive, Cherrybrook (eastbound / southbound)

Francis Greenway Drive at these locations has one lane in each direction, is undivided and is an unclassified local road. The posted speed limit is 50 kilometres per hour and unrestricted parking is permitted in the wide sealed road shoulder. Adjacent development is residential.

Bus stops 212694 (#64), 212692 (#67), 212677 (#68), 212678 (#71) and 212691 (#72) all currently have plinth signage.



#64 Proposed location for stop 212694



#67 and #68 View to stops 212692 and 212677



#69 and #70 Proposed location of stops 212692 and 212677



#71 and #72 View to stops 212678 and 212691

Figure 2-9 Francis Greenway Drive Location #64, #67, #68, #69, #70, #71 and #72 images

Locations 99, 102, 108, and 112 – Pennant Hills Road, Pennant Hills. Thornleigh and Normanhurst (northbound)

Pennant Hills Road at these locations typically has three-lanes in each direction and is divided by a central median of varying width, with pedestrian fencing on the median installed at Location #112. Pennant Hills Road is classified as a Highway (part of the Cumberland Highway) (HW13) and has a posted speed limit of 70 kilometres per hour. 'No stopping' or 'no parking' restrictions apply near all the subject locations. Adjacent development is residential (#99), a place of worship (#102), parkland (#108) and educational (#112).

Bus stop 2120165 (#99) and bus stop 207619 (#112) both currently have a plinth signage only. Bus stop 207614 (#108) has a shelter (with adverting) and plinth signage.



#99 View to stop 2120165



#102 View to new stop location



#108 View to stop 207614



#112 View to stop 207619

Figure 2-10 Pennant Hills Road Location #99, #102, #108 and #112 images

Locations 122 and 123 – Pacific Highway, Hornsby (eastbound and westbound)

The Pacific Highway at this location has three-lanes in each direction, is divided by a concrete median and is classified as a Highway (HW10). The posted speed limit is 60 kilometres per hour, except where the 40 kilometre per hour school zone operates on school days between 8:00am and 9:30am, and between 2:30pm and 4:00pm.

‘No stopping’ restrictions apply immediately south of Location #122 while to the north is unrestricted parking. ‘No stopping’ restrictions apply immediately south of Location #123 while to the north is a bus zone (between 7:00am and 9:00am and between 2:00pm and 4:00pm school days) and one hour restricted parking between 9:00am and 2:00pm Monday to Friday and between 8:00am and 12:00pm on Saturday. Unrestricted parking is available to the north of Location #123 at other times.

Adjacent development is commercial / industrial development (Location #122) and Barker College (Location 124#).

Bus stop 2077158 (#122) currently has a plinth signage while bus stop 207735 (#123) has plinth signage and a concrete pad.



#122 View to stop 2077158



#123 View to stop 207735

Figure 2-11 Pacific Highway Location #122 and #123 images

2.3 Proposal objectives

The objectives of the proposal are to:

1. Achieve more reliable travel times for buses passengers
2. Improve on-time running for buses consistent with the State Priority (refer to section 2.1) to maintain or improve reliability of public transport services
3. Minimise impacts for users of suburban and local services
4. Minimise impacts on the environment and the community.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

The methodology for selecting the preferred option was an iterative process that involved several stages of evaluation as described below:

- Stage 1 – Preliminary investigations
 - Performance study carried out by Transport NSW along key corridors outlined in *Sydney's Bus Future*
- Stage 2 – Field investigation / site observations
 - Inspect bus routes by riding the buses during peak periods to understand the bus route operation and identify operational issues
 - Review bus stop location, topography and adjacent land use
 - Conduct a survey on each bus stop to determine the number of passengers using the stop and user's profiles
 - Carry out an audit of each bus stop to prepare an inventory of existing infrastructure at the bus stop
- Stage 3 – Early stakeholder engagement
 - Engage with stakeholders such as bus operators and Councils regarding the proposal corridor
- Stage 4 – Initial assessment
 - Review the survey data and identify deficiencies of existing bus stop infrastructure against the draft *Bus Stop Location Guidelines Sydney Metropolitan Area* (Transport for NSW, n.d.)
 - Carry out a preliminary assessment for each bus stop to determine whether the bus stop should be retained, modified, relocated or consolidated, including a review of:
 - Patronage counts (Opal) to identify usage at each stop including identifying the busiest times and the relative numbers of seniors/pensioners and students
 - PTIPS data showing bus performance along routes, compared with schedule

- Key patronage generators
- Topography and bus stop spacing having regard to the targeted 400 metre spacing which helps efficient bus operation while maintaining suitable walking distances to bus stops.
- Stage 5 – Detailed assessment
 - Carry out additional surveys at the identified bus stops during peak periods covering extended periods for both weekday and weekend
 - Prepare concept drawings (to scale) for each bus stop where modifications are proposed, identifying new / removed / relocated infrastructure
 - Prepare a plan of work including ownership of assets and cost estimate for bus stop modification, relocation and consolidation
- Stage 6 – Environmental assessment
 - Prepare an REF and assess the potential environmental impacts of the proposal
- Stage 7 – Wider community and stakeholder consultation
 - Publicly display the REF and invite community and stakeholder comment
 - Consider community / stakeholder views and modify the proposal as appropriate.

Key considerations for developing the proposal were derived from the *Sydney's Bus Future* (Transport for NSW, 2013) and the draft *Bus Stop Location Guidelines Sydney Metropolitan Area* (Transport for NSW, n.d.) and were as follows:

1. Target a general standardised spacing of 400 metres between bus stops, with a greater than 400 metre spacing accepted at some locations to minimise the number of bus stop relocations across the corridor.
Spacing of bus stops between 800 metres and one kilometre apart would be considered as part of planning for a future rapid bus route
2. Ensure bus stops are located close to major patronage generators and community facilities to maximise the efficiency of a bus stop and eliminating redundant and underutilised stops
3. Locate bus stops on the departure side of signalised intersections to improve traffic conditions and help buses to meet the timetable using Public Transport Information and Priority System (PTIPS)
4. Adjust and locate bus stops to improve pedestrian safety
5. Provide suitable bus zone length to allow buses to manoeuvre in and out of bus stops easily without obstructing the adjacent lane.

Another important consideration in developing the proposal was to ensure bus stops used by local and suburban services in the corridor remain accessible. Where removing a bus stop would result in excessive distance between stops for local and / or suburban routes, no changes have been proposed.

2.4.2 Identified options and analysis

Given the nature of the proposal, consideration of options was largely confined to whether the proposal could be justified in the context of the proposal objectives. This is effectively an evaluation of Option 1 (conducting the works, the proposal) against Option 2 (the 'do nothing') option. The proposal was refined during project development based on information from site inspections, survey data and Opal data.

An overview of the proposal (Option 1) and an evaluation of the proposal against the proposal objectives is provided in Table 2-1, while Table 3-1 in Chapter 3 (Description of the proposal) reviews the need for changes at all bus stops along the corridor and identifies those locations where changes are warranted. The proposal generally involves removal of nine bus stops, relocation of three bus stops, improvements to four bus stops, consolidation of four bus stops into two and one new bus stop on the corridor from Blacktown to Castle Hill, serviced by T70/T71, and Castle Hill to Hornsby, serviced by Metrobus M60.

The 'do nothing' option (Option 2) involves making no changes to improve bus reliability. While Option 2 would not affect existing bus users (proposal objective 3) and would have no

environmental impacts (proposal objective 4), it would not improve bus travel time reliability or improve on-time running (proposal objectives 1 and 2).

Option 1 best meets proposal objectives 1 and 2, and while it would have some environmental and community impacts, environmental safeguards and management measures have been proposed to address these impacts.

Table 2-1 Proposal (Option 1) evaluation

Proposed change	Evaluation
Removal of nine bus stops (215467, 215493, 215469, 2154386, 2154186, 2126136, 2126153, 2120165, 207614)	<ul style="list-style-type: none"> Improves reliability and on-time running consistent with proposal objective No.1 and No.2 Addresses key consideration No.1 Reduced convenience for users who live / work near the existing stops, but retention of alternatives
Minor relocation of three bus stops (2154173, 212694, 207619)	<ul style="list-style-type: none"> Improves reliability and on-time running consistent with proposal objective No.1 and No.2 Addresses key consideration No.1 and No.4 and improves safety (sight distances) Potential for minor impacts associated with bus stop activity
Consolidation of four bus stops (212692, 212677, 212678, 212691) into two new bus stops in Cherrybrook	<ul style="list-style-type: none"> Improves reliability and on-time running consistent with proposal objective No.1 and No.2 Addresses key consideration No.1 Potential for minor impacts for adjacent residences associated with the gathering of bus customers at new location (eg noise)
Improvements (extensions, minor adjustments to bus zones, changes to signage) to four bus stops (2153140, 215385, 2077158, 207735)	<ul style="list-style-type: none"> Addresses key consideration No.5 and improves customer amenity
One new bus stop in Thornleigh	<ul style="list-style-type: none"> Optimises bus stop spacing and locations consistent with proposal objective No.1 and No.3 Potential for minor impacts for adjacent church associated with the gathering of bus customers at new location

2.5 Preferred option

The proposal (Option 1) is the preferred option as it responds to the identified need, addresses the proposal objectives and is consistent with key considerations for bus stop location as shown in Table 3-1 in Chapter 3 (Description of the Proposal).

The principles of ecologically sustainable development encourage the integration of present and future economic, social development and environmental considerations into the decision-making process for all developments. The development of the proposal is consistent with these principles as demonstrated by the proposal objectives which include economic, social and environmental considerations, and the alignment of the preferred option with those objectives.

3 Description of the proposal

3.1 The proposal

3.1.1 Overview

Transport for NSW, in partnership with Roads and Maritime, is proposing to improve the reliability of buses by making changes to bus stops along the corridor between Hornsby and Blacktown and, serviced by T70/T71, Metrobus M60, suburban and local routes (the proposal). The main features of the proposal are:

- Rationalising bus stop locations to optimise the spacing between bus stops
- Lengthening some bus stops to improve access for buses and assist passenger boarding and alighting
- Relocating some bus stops to optimise spacing and / or address traffic and safety issues
- Improving bus stop infrastructure at some locations including changes to bus stop signage
- Providing new stops to address customer demand.

A summary of the proposed changes is provided below:

- Nine bus stop removals (including the removal of signage and other bus stop infrastructure)
- Four bus stop improvements (including extensions)
- Three bus stop relocations
- Bus stop consolidation at one location (four bus stop stops consolidated into two)
- One new bus stop.

Details of the proposal at each location are provided in Section 3.1.2, while concept design drawings are included in Appendix B. Note that while several of the existing bus shelters have an advertising component, new or relocated bus shelter advertising does not form part of the proposal. If proposed, it would be subject to a separate assessment and approval process.

3.1.2 Proposed changes by location

Table 3-1 provides a review of bus stops along the corridor from Hornsby to Blacktown, serviced by T70/T71, Metrobus M60, suburban and local routes, and summarises the proposed bus stop changes. Each of the proposal elements are shown on Figure 3-1 through to Figure 3-8.

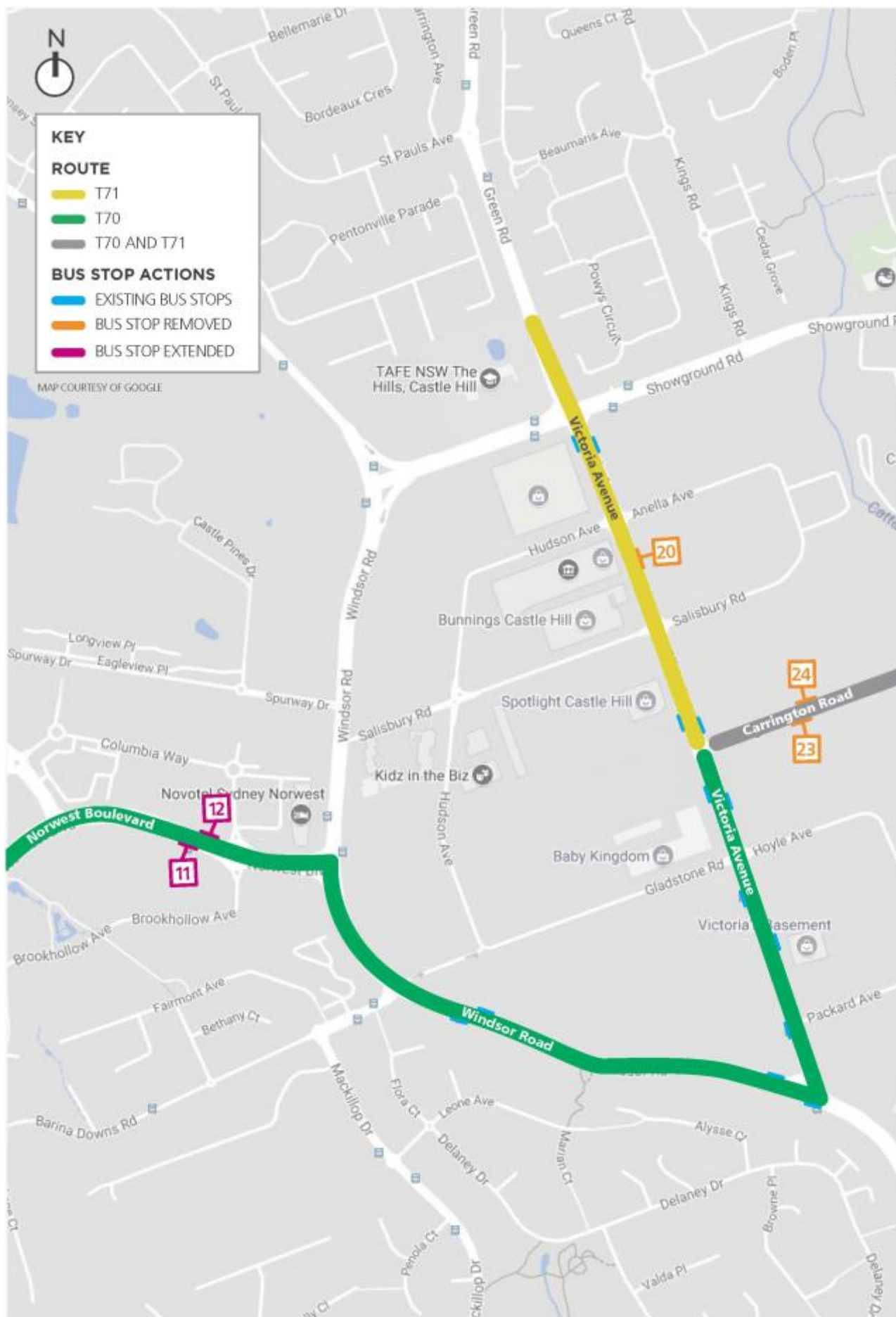
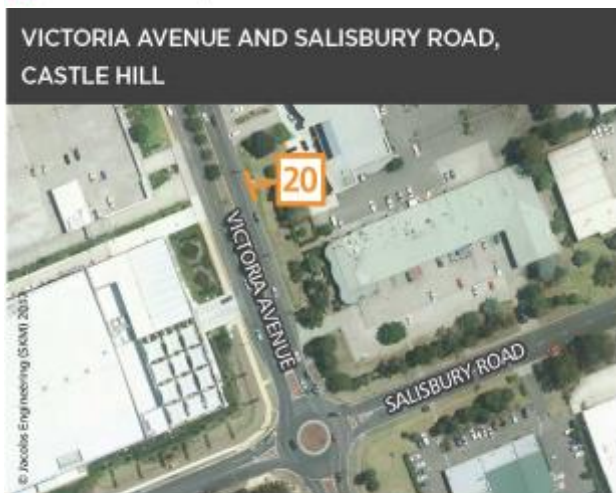


Figure 3-1 Proposed changes on the corridor from Hornsby to Blacktown (Map 1)



11 Extend bus stop about 15 metres west.

12 Extend bus stop about 15 metres west.



20 Remove bus stop and replace with no stopping zone



23 Remove bus stop and replace with no parking zone

24 Remove bus stop and replace with no parking zone

Figure 3-2 Detail of proposed changes (Locations #11, #12, #20, #23, #24)

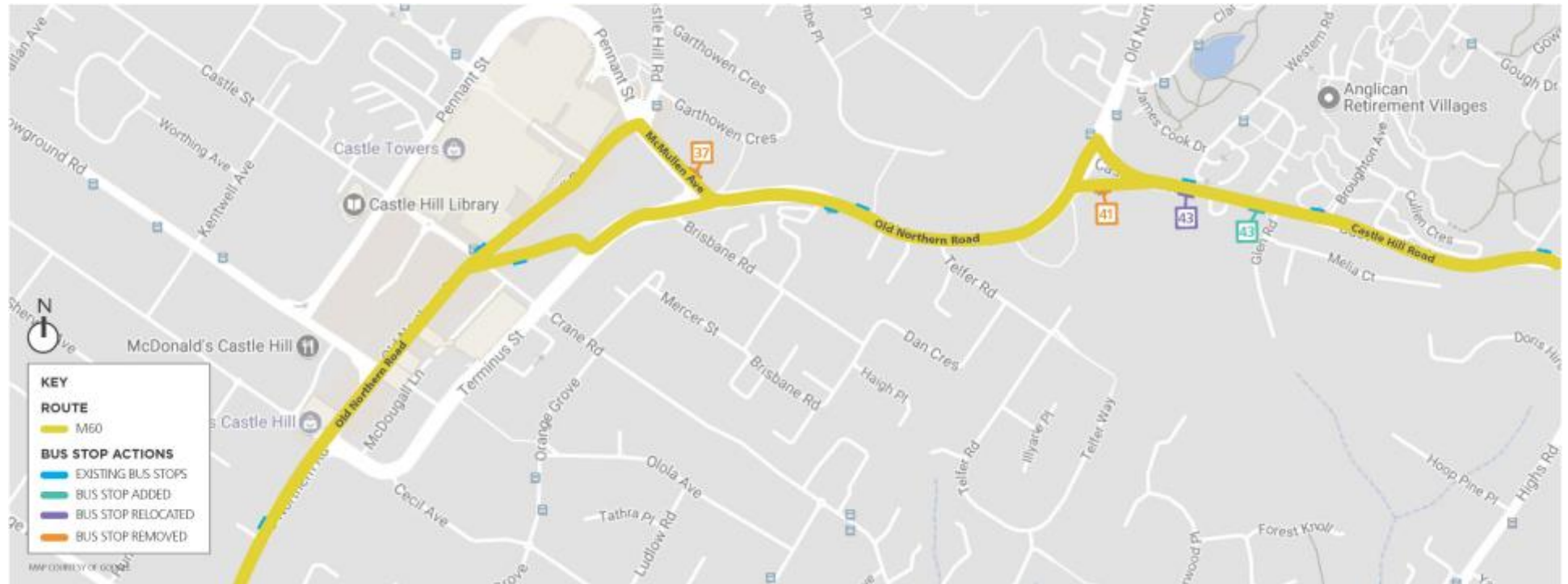
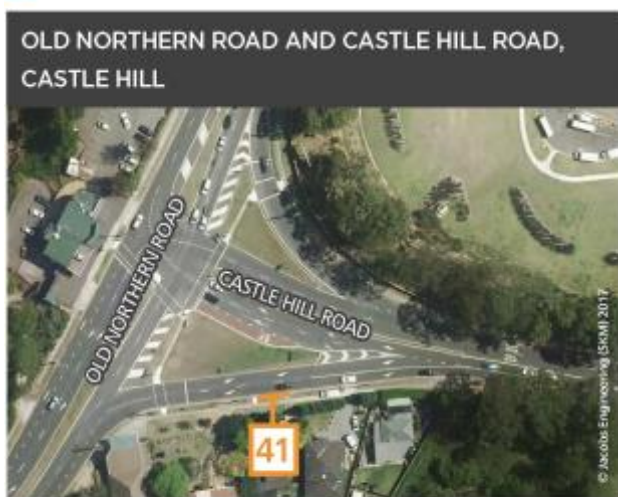


Figure 3-3 Proposed changes on the corridor from Hornsby to Blacktown (Map 2)



37 Remove bus stop and replace with no stopping zone



41 Remove bus stop and replace with no stopping zone



43 Relocate bus stop and replace with no stopping zone

43 New relocated stop replaces no stopping zone

Figure 3-4 Detail of proposed changes (Locations #37, #41, #43)

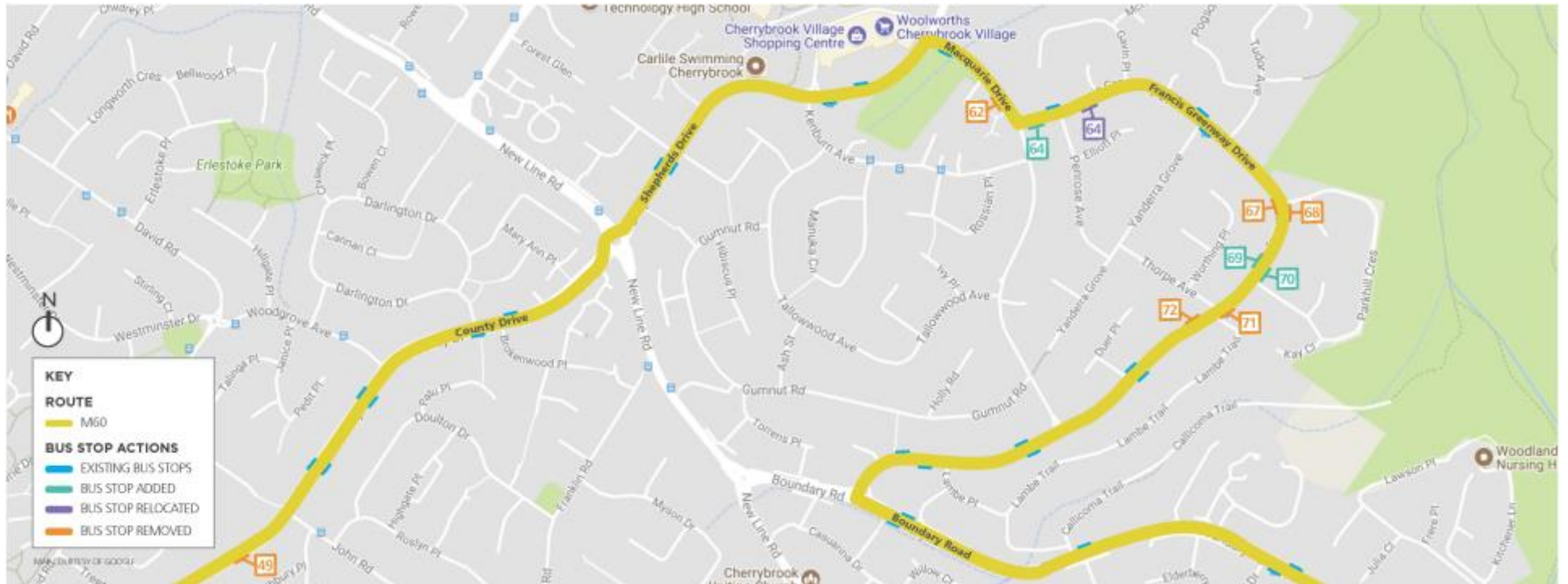
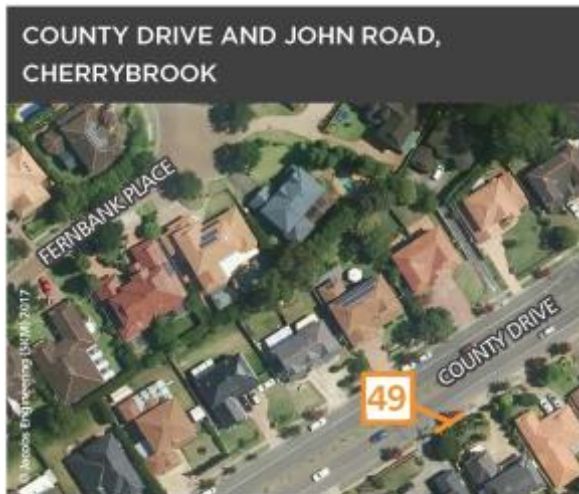


Figure 3-5 Proposed changes on the corridor from Hornsby to Blacktown (Map 3)



- 49** Remove bus stop and replace with parking (+2 spaces)



- 62** Remove bus stop and replace with parking (+2 spaces)
64 Relocate bus stop
64 New bus stop replaces parking (-3 spaces) and remove one tree



- 67** Remove bus stop and replace with parking (+3 spaces)
68 Remove bus stop and replace with parking (+2 spaces)
69 New bus stop replaces parking (-3 spaces)
70 New bus stop replaces parking (-5 spaces)
71 Remove bus stop and replace with parking (+4 spaces)
72 Remove bus stop and replace with parking (+4 spaces)

Figure 3-6 Detail of proposed changes (Locations #49, #62, #64, #67, #68, #69, #70, #71, #72)

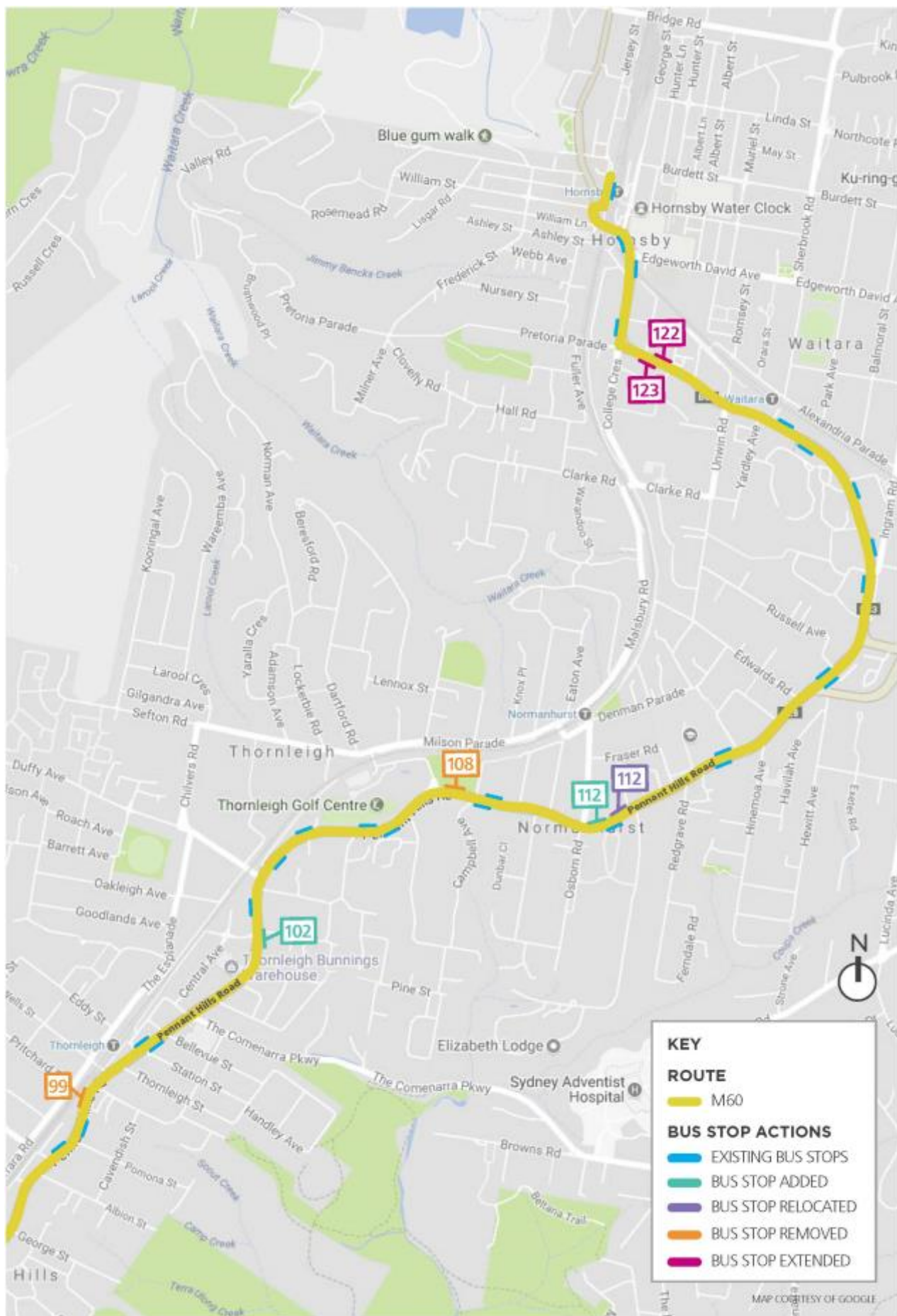


Figure 3-7 Proposed changes on the corridor from Hornsby to Blacktown (Map 4)



99 Remove bus stop and replace with clearway



102 New bus stop replaces no stopping zone



108 Remove bus stop and replace with no parking zone



112 Relocate bus stop and replace with no parking zone

112 New bus stop replaces a no parking zone



122 Extend bus stop about 15 metres west
(-2 parking spaces)

123 Extend bus stop about 15 metres east
(-2 parking spaces)

Figure 3-8 Detail of proposed changes (Locations #99, #102, #108, #112, #122, #123)

Table 3-1 Identified bus stop adjustments – Hornsby to Blacktown corridor

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
1	Norwest Boulevard Before Elizabeth Macarthur Crescent (westbound stop 2153348)	No issues / opportunities identified at this location.	None
2	Norwest Boulevard After Lexington Drive (eastbound stop 2153148)	No issues / opportunities identified at this location.	None
3	Norwest Boulevard before Westwood Way (westbound stop 2153337)	No issues / opportunities identified at this location.	None
4	Norwest Boulevard after Edgewater Drive (eastbound stop 2153337)	No issues / opportunities identified at this location.	None
5	Norwest Boulevard before Solent Circuit (eastbound stop 2153339)	No issues / opportunities identified at this location.	None
6	Norwest Boulevard after Reston Grange (westbound stop 2153336)	No issues / opportunities identified at this location.	None
7	Norwest Boulevard before Reston Grange (westbound stop 2153142)	No issues / opportunities identified at this location.	None
8	Norwest Boulevard before Century Court (eastbound stop 215383)	No issues / opportunities identified at this location.	None
9	Norwest Boulevard before Brookhollow Way (westbound stop 2153141)	No issues / opportunities identified at this location.	None
10	Norwest Boulevard after Century Court (eastbound stop 215384)	No issues / opportunities identified at this location.	None
11	Norwest Boulevard after Brookhollow Way (westbound stop 2153140)	Queued buses currently overhang or wait within the traffic lane which impacts westbound traffic on Norwest Boulevard. There is an opportunity to extend indented bus bay to cater for longer buses.	Extend indented bus bay 15 metres to the west to cater for 12.5 metre and 14.5 metre buses. No loss of parking.
12	Norwest Boulevard before Columbia Circuit (eastbound stop 215385)	Queued buses currently overhang or wait within the traffic lane which impacts eastbound traffic on Norwest Boulevard. There is an	Extend indented bus bay 15 metres to the west to cater for 12.5 metre and

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
		opportunity to extend indented bus bay to cater for longer buses.	14.5 metre buses. No loss of parking.
13	Windsor Road at Norwest Boulevard (westbound stop 2154100)	No issues / opportunities identified at this location.	None
14	Windsor Road after Norwest Boulevard (eastbound stop 2153197)	No issues / opportunities identified at this location.	None
15	Windsor Road opposite Showground Road (eastbound stop 2153439)	No issues / opportunities identified at this location.	None
16	Showground Road after Victoria Avenue (westbound stop 215430)	No issues / opportunities identified at this location.	None
17	Showground Road before Green Road (eastbound stop 215414)	No issues / opportunities identified at this location.	None
18	Victoria Avenue before Showground Road (westbound stop 215496)	No issues / opportunities identified at this location.	None
19	Victoria Avenue after Showground Road (eastbound stop 215466)	No issues / opportunities identified at this location.	None
20	Victoria Avenue after Anella Avenue (eastbound stop 215467)	Bus stop 215467 is located 180 metres from the previous bus stop (#19) 215466 and 300 metres from the next stop (#22) 215468. This stop has low patronage relative to adjacent stops with Opal data showing an average 24-hour weekday demand of 18 passengers, compared with 31 for stop (#19) 215466 and 26 for stop (#22) 215468. There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding and next bus stops would be about 480 metres.	Remove bus stop 215467. Replace with no stopping zone, no loss of parking.
21	Victoria Avenue opposite Carrington Road (westbound stop 215494)	No issues / opportunities identified at this location.	None
22	Victoria Av before Carrington Rd (eastbound stop 215468)	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
23	Carrington Road before Victoria Avenue (westbound stop 215493)	<p>Bus stop 215493 is located 240 metres from the previous bus stop (#26) 215492 and 260 metres from the next stop (#21) 215494. This stop has low patronage relative to the next stop with Opal data showing an average 24-hour weekday demand of nine passengers, compared with 33 for stop (#21) 215494.</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding and next bus stops would be about 500 metres.</p>	<p>Remove bus stop 215493.</p> <p>Replace with no parking zone, no loss of parking.</p>
24	Carrington Road after Victoria Avenue (eastbound stop 215469)	<p>Bus stop 215469 is located 230 metres from the previous bus stop (#22) 215468 and 210 metres from the next stop (#25) 215470. This stop has low patronage relative to the previous stop with Opal data showing an average 24-hour weekday demand of nine passengers, compared with 26 for 215468 (#25).</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding and next bus stops would be about 440 metres.</p>	<p>Remove bus stop 215469.</p> <p>Replace with no parking zone, no loss of parking.</p>
25	9 Carrington Road (eastbound stop 215470)	No issues / opportunities identified at this location.	None
26	44 Carrington Road (westbound stop 215492)	No issues / opportunities identified at this location.	None
27	Carrington Road after Middleton Road (westbound stop 215491)	No issues / opportunities identified at this location.	None
28	Carrington Road before Middleton Road (eastbound stop 215471)	No issues / opportunities identified at this location.	None
29	Carrington Road After Showground Road (westbound stop 215490)	No issues / opportunities identified at this location.	None
30	Carrington Road before Showground Road (eastbound stop 215447)	No issues / opportunities identified at this location.	None
30A	Showground Road opposite Carrington Road (eastbound stop 215417)	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
31	Showground Road opposite Britannia Road (westbound stop 215426)	No issues / opportunities identified at this location.	None
32	Showground Road at Britannia Road (eastbound stop 215418)	No issues / opportunities identified at this location.	None
33	Showground Road before Cecil Avenue (westbound stop 215425)	No issues / opportunities identified at this location.	None
34	Showground Road after Rowallan Avenue (eastbound stop 215419)	No issues / opportunities identified at this location.	None
35	Showground Road after Cheriton Avenue (westbound stop 215424)	No issues / opportunities identified at this location.	None
36	Showground Road after Kentwell Avenue (eastbound stop 215420)	No issues / opportunities identified at this location.	None
37	McMullen Avenue before Old Northern Road (eastbound stop 2154386)	<p>Bus stop 2154386 is located 280 metres from the previous bus stop (#36) 215420 and 300 metres from the next stop (#39) 2154193. Opal data is not available for this stop, however the State Transit Authority has indicated it has low patronage.</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding and next bus stops would be about 580 metres.</p>	<p>Remove bus stop 2154386.</p> <p>Replace with no stopping zone, no loss of parking.</p>
38	St Bernadette's Public School, Old Northern Road (westbound stop 2154188)	No issues / opportunities identified at this location.	None
39	Old Northern Road opposite St Bernadette's Public School (eastbound stop 2154193)	No issues / opportunities identified at this location.	None
40	Old Northern Road after Telfer Road (westbound stop 2154187)	No issues / opportunities identified at this location.	None
41	Castle Hill Road before Old Northern Road (westbound stop 2154186)	Bus stop 2154186 is located 170 metres from the previous bus stop (#43) 2154173 and 500 metres from the next stop (#40) 2154187. This stop has low patronage relative to adjacent stops with Opal data	<p>Remove bus stop 2154186.</p> <p>Replace with 24 hour clearway, no loss of parking.</p>

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
		<p>showing an average 24-hour weekday demand of eight passengers, compared with 28 for stop 2154173 (#43) and 22 for stop 2154187 (#40).</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding (#43) 2154173 and next bus stops (#40) 2154187 would be about 750 metres (with the relocation of stop 2154173 (#43)).</p>	
42	Castle Hill Road before Glen Road (eastbound stop 2154183)	No issues / opportunities identified at this location.	None
43	Castle Hill Road after Glen Road (westbound stop 2154173)	<p>Bus stop 2154173 is located about 970 metres from the previous bus stop (#37) 2126137 and 160 metres from the next stop (#41) 2154186. Opal data shows an average 24 hour weekday demand of 28 passengers.</p> <p>There is an opportunity to optimise the spacing of stops at this location by relocating this stop. The resulting spacing would be about 860 metres from the preceding stop and about 260 metres to the next stop. This represents an improvement on the existing 970 metre distance to stop (#37) 2126137. Consideration is being given to adding a new stop to the east of (#43) 2154173, however this is not part of the current scope and would be subject to separate assessment.</p>	Relocate bus stop 2154173 about 100 metres to the east, to the departure side of the Glen Road intersection. Replace existing stop with no stopping zone and install hardstand, seat, plinth sign and bus zone sign at new location. No loss of parking.
44	Castle Hill Road at Broughton Avenue (eastbound stop 2154184)	No issues / opportunities identified at this location.	None
45	Castle Hill Road at David Road (eastbound stop 2154185)	No issues / opportunities identified at this location.	None
46	Opposite TSN 2145185	Possible future new stop (not part of the current proposal)	None
47	County Drive / Treetops Road (westbound stop 2126137)	No issues / opportunities identified at this location.	None
48	County Dr After Treetops Rd (eastbound stop 2126156)	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
49	County Drive and John Road (westbound stop 2126136)	<p>Bus stop 2126136 is located 250 metres from the previous bus stop (#51) 212619 and 240 metres from the next stop #47 (2126137). Opal data shows an average 24-hour weekday demand of 61 passengers for this stop.</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding (#51) 212619 and next bus stops #47 (2126137) would be about 490 metres.</p>	Remove bus stop 2126136 and replace with two car parking spaces.
50	County Drive opposite John Road (eastbound stop 212638)	No issues / opportunities identified at this location.	None
51	County Drive before John Road (westbound stop 212619)	No issues / opportunities identified at this location.	None
52	County Drive and Woodgrove Avenue (eastbound stop 212639)	No issues / opportunities identified at this location.	None
53	County Drive and Woodgrove Avenue (westbound stop 212618)	No issues / opportunities identified at this location.	None
54	County Drive / Darlington Drive (westbound stop 2126152)	No issues / opportunities identified at this location.	None
55	County Drive / Brokenwood Place (eastbound stop 2126151)	No issues / opportunities identified at this location.	None
56	Shepherds Drive at Lemongrass Place (eastbound stop 2126133)	No issues / opportunities identified at this location.	None
57	Shepherds Drive opposite Lemongrass Place (westbound stop 2126134)	No issues / opportunities identified at this location.	None
58	Shepherds Drive opposite Cherrybrook shops (westbound stop 212669)	No issues / opportunities identified at this location.	None
59	Cherrybrook shops, Shepherds Drive (eastbound stop 2126100)	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
60	Macquarie Drive after Shepherds Drive (eastbound stop 2126131)	No issues / opportunities identified at this location.	None
61	Macquarie Drive before Shepherds Drive (westbound stop 2126143)	No issues / opportunities identified at this location.	None
62	Macquarie Drive opposite Francis Greenway Drive (westbound stop 2126153)	<p>Bus stop 2126153 is located 190 metres from the previous bus stop (#64) 212694 and 160 metres from the next stop (#61) 2126143. This stop has low patronage relative to the next stop with Opal data showing an average 24-hour weekday demand of 51 passengers, compared with 132 for (#61) 2126143.</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding (#64) 212694 and next bus stops would be about 350 metres (#64) 212694.</p>	Remove bus stop 2126153 and replace with two car parking spaces.
63	Francis Greenway Drive opposite Penrose Avenue (eastbound stop 212675)	No issues / opportunities identified at this location.	None
64	Francis Greenway Drive before Penrose Avenue (westbound stop 212694)	<p>Bus stop 212694 is located about 270 metres from the previous bus stop (#66) 212693 and 350 metres from the next stop (#62) 2126153. Opal data shows an average 24 hour weekday demand of 45 passengers.</p> <p>There is an opportunity to optimise the spacing of stops at this location by relocating this stop. The resulting spacing would be about 400 metres from the preceding stop (#66) 212693 and about 220 metres to the next stop (#61) 2126143 (taking into account the proposed removal of (#62) 2126153).</p>	<p>Relocate bus stop 212694 about 120 metres to the west.</p> <p>Replace existing stop with parking and install hardstand, seat, plinth sign and bus zone sign at new location.</p> <p>Remove of one street tree at new location.</p> <p>No net loss of parking.</p>
65	Francis Greenway Drive Opposite Yanderra Grange (eastbound stop 212694)	No issues / opportunities identified at this location.	None
66	Francis Greenway Drive at Yanderra Grange (westbound stop 212693)	No issues / opportunities identified at this location.	None
67	Francis Greenway Drive opposite Parkhill	There are several bus stops on Francis Greenway Drive positioned	Remove bus stop 212692 and replace

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
	Crescent (westbound stop 212692)	close to each other and with low patronage. Bus stop 212692 is within 210 metres of the next stop (#66) 212693 and Opal data shows it has an average 24-hour weekday demand of 21 passengers, compared with 48 for (#66) 212693. To reduce delays, there is an opportunity to consolidate this stop into a new bus stop outside 79 Francis Greenway Drive (Location #69).	with three car parking spaces.
68	Francis Greenway Drive at Parkhill Crescent (eastbound stop 212677)	There are several bus stops on Francis Greenway Drive positioned close to each other and with low patronage. Bus stop 212677 is within 230 metres of the next stop (#71) 212678 and Opal data shows it has an average 24-hour weekday demand of 16 passengers, compared with 43 for (#71) 212678. To reduce delays, there is an opportunity to consolidate this stop into a new bus stop outside 110 Francis Greenway Drive (Location #70).	Remove bus stop 212677 and replace with two car parking spaces.
69	79 Francis Greenway Drive (new westbound stop)	There is an opportunity to reduce delays by consolidating previous and following bus stops into a new stop at this location. The resulting spacing would be 370 metres to the previous stop (#74) 212690 and 300 metres to the next stop (#66) 212693.	Establish new bus stop with hardstand, plinth sign, tactile ground surface indicators (TGSi) and bus zone signage. Remove three car parking spaces.
70	110 Francis Greenway Drive (new eastbound stop)	There is an opportunity to reduce delays by consolidating previous and following bus stops into a new stop at this location. The resulting spacing would be 390 metres to the previous stop (#65) 212676 and 295 metres to the next stop (#73) 212679.	Establish new bus stop bus stop with hardstand, plinth sign, TGSi and bus zone signage. Construct 1.5 metre wide footpath from Parkhill Crescent to new bus stop. Remove five car parking spaces.
71	Francis Greenway Drive opposite Thorpe Avenue (eastbound stop 212678)	There are several bus stops on Francis Greenway Drive positioned close to each other. Bus stop 212678 is within 190 metres of the next stop (#73) 212679 and Opal data shows it has an average 24-hour weekday demand of 43 passengers. To reduce delays, there is an opportunity to consolidate this stop into	Remove bus stop 212678 and replace with four car parking spaces.

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
		a new bus stop outside 110 Francis Greenway Drive (Location #70).	
72	Francis Greenway Drive before Thorpe Avenue (westbound stop 212691)	There are several bus stops on Francis Greenway Drive positioned close to each other. Bus stop 212691 is within 300 metres of the next stop (#67) and Opal data shows it has an average 24-hour weekday demand of 47 passengers. To reduce delays, there is an opportunity to consolidate this stop into a new bus stop outside 79 Francis Greenway Drive (Location #69).	Remove bus stop 212691 and replace with four car parking spaces.
73	Francis Greenway Drive opposite Hallen Road (eastbound stop 212679)	No issues / opportunities identified at this location.	None
74	Francis Greenway Drive at Hallen Road (westbound stop 212690)	No issues / opportunities identified at this location.	None
75	Francis Greenway Drive opposite Macquarie Drive (eastbound stop 212680)	No issues / opportunities identified at this location.	None
76	Francis Greenway Drive before Macquarie Drive (westbound stop 212689)	No issues / opportunities identified at this location.	None
77	Francis Greenway Drive after Lambe Place (eastbound stop 2126119)	No issues / opportunities identified at this location.	None
78	Francis Greenway Drive after Dawes Place (westbound stop 212687)	No issues / opportunities identified at this location.	None
79	Boundary Road before Francis Greenway Drive (westbound stop 2126108)	No issues / opportunities identified at this location.	None
80	Boundary Road and Francis Greenway Drive (eastbound stop 2126129)	No issues / opportunities identified at this location.	None
81	220 Boundary Road (eastbound stop 2126130)	No issues / opportunities identified at this location.	None
82	Boundary Road at Cedarwood Drive (westbound stop 2126107)	No issues / opportunities identified at this location.	None
83	Boundary Road before Cedarwood Drive	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
	(eastbound stop 212681)		
84	Boundary Road after Lee Road (westbound stop 212041)	No issues / opportunities identified at this location.	None
85	Boundary Road after Kitchener Road (eastbound stop 2120215)	No issues / opportunities identified at this location.	None
86	Boundary Road before Lois Lane (eastbound stop 212035)	No issues / opportunities identified at this location.	None
87	Boundary Road before Loftus Road (westbound stop 212040)	No issues / opportunities identified at this location.	None
88	Boundary Road opposite Pennant Hills Public School (eastbound stop 212038)	No issues / opportunities identified at this location.	None
89	Boundary Road opposite Pennant Hills Public School (westbound stop 212039)	No issues / opportunities identified at this location.	None
90	Boundary Road after Pennant Hills Road (westbound stop 2120196)	No issues / opportunities identified at this location.	None
91	St Agatha's Catholic School, Boundary Road (eastbound stop 212045)	No issues / opportunities identified at this location.	None
92	Pennant Hills Road after Boundary Road (eastbound stop 212014)	No issues / opportunities identified at this location.	None
93	Pennant Hills Road and City View Street (westbound stop 212029)	No issues / opportunities identified at this location.	None
94	Pennant Hills Rd and Fisher Ave (new eastbound stop 212015)	No issues / opportunities identified at this location.	None
95	Pennant Hills Rd and Station St (Stand B) (eastbound stop 212019)	No issues / opportunities identified at this location.	None
96	Pennant Hills Rd and Station St (Stand B) (eastbound stop 212018)	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
97	Pennant Hills Road opposite Pomona Street (eastbound stop 2120161)	No issues / opportunities identified at this location.	None
98	Pennant Hills Road before Pomona Street (westbound stop 212028)	No issues / opportunities identified at this location.	None
99	Pennant Hills Road before Wells Street (eastbound stop 2120165)	<p>Bus stop 2120165 is located 190 metres from the previous bus stop (#97) 2120161 and 300 metres from the next stop (#100) 212024. Opal data shows an average 24-hour weekday demand of 38 passengers for this stop.</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding (#97) 2120161 and next bus stops would be about 490 metres (#100) 212024.</p>	Remove bus stop 2120165. Retain clearway operation, no loss of parking.
100	Pennant Hills Road and Railway Parade (eastbound stop 212024)	No issues / opportunities identified at this location.	None
101	Pennant Hills Road at Station Street (westbound stop 212027)	No issues / opportunities identified at this location.	None
102	Frontage of 235 Pennant Hills Road (new westbound stop)	<p>There is currently 900 metres between bus stop 212026 (#104) and bus stop 212027 (#101). There is an opportunity to optimise the spacing of bus stops by providing a new stop on the departure side of the Loch Maree Avenue intersection. The resulting spacing would be 310 metres from the preceding stop and 590 metres to the next stop, which represents an improvement in accessibility over the existing situation.</p> <p>A new bus stop at this location would also allow customers to safely cross Pennant Hills Road at the Loch Maree Avenue traffic signals.</p> <p>Positioning the bus stop on the departure side of the Loch Maree Avenue intersection would also allow buses to take advantage of PTIPS (which extends green time when a bus is approaching traffic signals).</p>	<p>Establish new bus stop the departure side of the Loch Maree Avenue intersection.</p> <p>Install hardstand, plinth sign, TGS1 and bus zone signage.</p> <p>No loss of parking.</p>

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
103	Pennant Hills Road and Duffy Avenue (eastbound stop 212032)	No issues / opportunities identified at this location.	None
104	Pennant Hills Road and Duffy Avenue (westbound stop 212026)	No issues / opportunities identified at this location.	None
105	Pennant Hills Road and Terra Street (eastbound stop 2120166)	No issues / opportunities identified at this location.	None
106	Driving Range, Pennant Hills Road (eastbound stop 212025)	No issues / opportunities identified at this location.	None
107	Pennant Hills Road after Stuart Avenue (westbound stop 207615)	No issues / opportunities identified at this location.	None
108	Pennant Hills Road after Dartford Road (eastbound stop 207614)	<p>Bus stop 207614 is located 350 metres from the previous bus stop (#106) 212025 and 140 metres from the next stop (#110) 207618. Opal data shows an average 24-hour weekday demand of 26 passengers for this stop.</p> <p>There is an opportunity to optimise the spacing of stops at this location to reduce delays by removing this stop. The resulting spacing between the preceding (#106) 212025 and next bus stops would be about 490 metres (#110) 207618.</p>	Remove bus stop 207614 and replace with no stopping zone. No loss of parking.
109	Pennant Hills Road and Campbell Avenue (westbound stop 207668)	No issues / opportunities identified at this location.	None
110	Pennant Hills Road and Campbell Avenue (eastbound stop 207618)	No issues / opportunities identified at this location.	None
111	Loreto Normanhurst School, Pennant Hills Road (westbound stop 207667)	No issues / opportunities identified at this location.	None
112	Pennant Hills Road after Normanhurst Road (eastbound stop 207619)	Bus stop 207619 is located about 480 metres from the previous bus stop (#110) 207618 and 400 metres from the next stop (#114) 2076150. Opal data shows an average 24 hour weekday demand of 51 passengers.	Relocate bus stop 207619 about 80 metres to the west, to the departure side of the Pennant Hills Road / Normanhurst Road intersection.

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
		<p>The existing bus stop location and layout presents issues for bus drivers, customers and other road users due to limited sight distance. Bus drivers have limited opportunity to see waiting passengers while customers have limited time to signal the bus to stop. Further, vehicles coming around the bend after the Pennant Hills Road / Normanhurst Road intersection have limited time to react to a parked bus.</p> <p>There is an opportunity to improve sight distance for bus drivers, passengers and other road users by relocating bus stop 207619 80 metres to the west. This would result in a distance of about 400 metres from the previous stop (#110) 207618 and about 480 metres from the next stop (#114) 2076150.</p>	<p>Install hardstand, plinth sign, TGSi and bus zone signage.</p> <p>Replace existing bus zone with 'no parking' zone. No loss of parking.</p>
113	Pennant Hills Road opposite Normanhurst Boys High School (westbound stop 207666)	No issues / opportunities identified at this location.	None
114	Normanhurst Boys High School (eastbound stop 2076150)	No issues / opportunities identified at this location.	None
115	Pennant Hills Road at Russell Avenue (eastbound stop 207616)	No issues / opportunities identified at this location.	None
116	Pennant Hills Road at Aaron Place (westbound stop 207665)	No issues / opportunities identified at this location.	None
117	Pacific Highway before Ingham Road (eastbound stop 207613)	No issues / opportunities identified at this location.	None
118	Pacific Highway before Ingham Road (westbound stop 2076145)	No issues / opportunities identified at this location.	None
119	Pacific Highway at Carden Avenue (westbound stop 207664)	No issues / opportunities identified at this location.	None
120	Pacific Highway before Yardley Avenue (eastbound stop 207712)	No issues / opportunities identified at this location.	None
121	Waitara Station, Pacific Hwy (westbound stop 077159)	No issues / opportunities identified at this location.	None

Ref#	Location	Identified bus stop issues / adjustments	Proposed action
122	Pacific Highway at James Street (westbound stop 207736)	The bus zone for stop 207736 is relatively short (about 20 metres) and does not comply with the current standard for bus zone length (which is 30 metres consistent with Australian Road Rule 195). There is an opportunity to lengthen this bus stop to improve access.	Extend the bus zone for stop 207736 by 15 metres to the west and adjust signage. Loss of two car parking spaces.
123	Barker College, Pacific Highway (eastbound stop 207735)	The bus zone for stop 207735 is relatively short (about 20 metres) and does not comply with the current standard for bus zone length (which is 30 metres consistent with Australian Road Rule 195). There is an opportunity to lengthen this bus stop to improve access.	Extend the bus zone for stop 207735 by 15 metres to the west and adjust signage. Loss of two car parking spaces.
124	Pacific Highway after Pretoria Parade (eastbound stop 207736)	No issues / opportunities identified at this location.	None
125	Pacific Highway at Edgeworth David Avenue (westbound stop 2077157)	No issues / opportunities identified at this location.	None
126	Pacific Highway opposite Edgeworth David Avenue (eastbound stop 207737)	No issues / opportunities identified at this location.	None
127	Hornsby Station Stand F (westbound stop 207756)	No issues / opportunities identified at this location.	None

3.2 Design

3.2.1 Design criteria

The design criteria for the proposal are outlined in the *Bus Infrastructure Guide* (State Transit, 2011) and the *Standards for Accessible Public Transport 2002*. These guides aim to ensure the installation of bus infrastructure in a consistent, safe and effective manner. It specifies the design elements, which should be considered for the design of a bus stop, including:

- Location, including curvature of road, sight distance, adjacent parking and traffic environment, bus route operation and nearby land uses
- Street furniture in relation to bus stop, such as seats and shelter
- Necessary bus stop signage and information facilities, such as bus stop signs, J-stems, U-stems, blades and plinths
- Bus stop and bus zone configurations
- Bus stop accessibility requirements.

Alternative bus stop designs may be used to suit local streetscapes, following further consultation with Hills Shire Council and Hornsby Shire Council during detailed design.

3.2.2 Engineering constraints

The proposal has the following identified constraints:

- Need to accommodate long buses at some locations
- Need to maintain through traffic and access on roads and footpaths
- Proximity to residences and businesses
- Location of utilities and services
- Existing trees.

3.3 Construction activities

3.3.1 Work methodology

An indicative work sequence for bus stop relocations is provided below

Site establishment and preparation

- Obtain any required working approvals from network authorities (including Transport Management Centre)
- Community notification to impacted residents and businesses
- Establish temporary fencing to secure work site (fencing and/or traffic barriers to re-direct pedestrians and traffic using appropriate directional signage)
- Establish traffic control at worksite including the temporary placement of mobile variable message signs (VMS)
- Establish environmental controls
- Search and identification for underground services and avoid, protect or adjust public utilities if required.

Bus stop removal

- Remove existing bus stop signage
- Remove seating and shelter (where present)
- Remove TGS
- Remove concrete pads where required.
- Make good to match existing.

Bus stop extension

- Adjust footpaths and pavements (where required)

- Construct new pavements, kerb and gutter for bus bay extensions (locations #11 and #12). This would involve:
 - Excavation and levelling of affected roadside area
 - Lay gravel base/sub-base layers for new pavement
 - Apply asphaltic concrete pavement using pavers and rollers
 - Repair existing pavements where required
 - Line marking where required
- Remove redundant signage
- Install new signage.

Bus stop relocation / consolidation, new bus stops

- Remove tree (Location #64)
- Pour concrete for new hardstand areas (Locations #43, #69, #70, #102, #112). Check that there is no sag point and that water drains away from the area sufficiently
- Construct new footpath connection (#70). This would involve:
- This would involve:
 - Excavation and levelling of affected area
 - Lay gravel base layer for new pavement
 - Install formwork
 - Pour concrete pavement, level and finish with broom or wood float
 - Remove formwork.
- Adjust existing footpath where required
- Install new bus stop signage and TGSi.

Completion of works

- Cover the new sign(s) if necessary until the bus stops / shelters or bus zones are ready for use
- Remove temporary fencing and barriers
- Remove traffic control at worksite and notify network authorities
- Re-open footpath to pedestrians.

3.3.2 Construction hours and duration

Works would occur primarily during standard hours as follows:

- Monday to Friday: 7:00am to 6:00pm
- Saturday: 8:00am to 1:00pm
- Sunday: No work
- Public holidays: No work

Some works outside standard hours may be required in order to minimise impacts on traffic. Out of hours works would occur in accordance with the safeguards and management measures identified in section 6.3.5.

The start date for the works is planned for the second half of 2017. Weather permitting, works are expected to be complete within two months of construction commencement. Works at each individual project site would not exceed one week (including removing existing infrastructure and establishing relocated bus stops). Where only bus stop removal is proposed, works would be complete within two days.

3.3.3 Plant and equipment

The proposal would require the use of a range of equipment (varying from site to site based on the required works) including, but not limited to:

- Concrete truck, agitator, vibrator, wacker plate compactor
- Small tip truck Hiab
- Bobcat with broom
- Mini excavator / backhoe

- Paving machine (location #11 and #12 only)
- Roller (location #11 and #12 only)
- Line marking equipment (location #11 and #12 only)
- Hand tools
- Concrete saw.

3.3.4 Earthworks

Earthworks would be limited to the footings of signs and shelters, except at:

- Locations #11 and #12 where excavation and levelling of the roadside area would be required for extension of the bus bays
- Location #70 where minor excavation for a new footpath connection is required.

3.3.5 Source and quantity of materials

The proposal would require small quantities of materials, primarily manufactured steel and glass elements and concrete. The quantities of material required would not result in a regional or local supply shortage and none are likely to be in short supply in the foreseeable future. Materials would be sourced from local commercial suppliers where available.

Non-renewable resources such as petroleum fuels would not be used in large quantities.

3.3.6 Traffic management and access

Access to each proposal site would be directly from the adjacent carriageway.

Some temporary lane closures and minor temporary pedestrian diversions may be needed. These would occur in accordance with a site specific Traffic Management Plan (TMP) and, where necessary, a Road Occupancy Licence.

Where possible, the proposed construction work would be programmed to minimise impact on buses and general traffic along the route. Access for bus passengers to bus stops would be maintained.

Standard traffic management measures would be employed to minimise short-term traffic impacts expected during construction. These measures would be identified in the TMP for the proposal and would be developed in accordance with the Roads and Maritime *Traffic Control at Works Sites Manual* (Roads and Traffic Authority, 2010) and Roads and Maritime Specification G10 – Control of Traffic.

During all stages of construction, access to businesses would be maintained.

Pedestrian and cyclist routes would be managed daily to suit construction activities. These routes would be coordinated with the stages of construction to ensure safe access.

The specific timing of bus stop relocations would be determined in consultation with State Transit.

3.4 Ancillary facilities

A site compound is not required for the proposal. Personnel and equipment would be transported to and from proposal sites daily.

3.5 Public utility adjustment

Major public utility adjustment and / or protection works are not required for the proposal. The need for any minor relocations / protection works would be determined following utilities investigations and, where required, would be undertaken in consultation with the relevant asset owner.

3.6 Property acquisition

Property acquisition is not required for the proposal.

4 Statutory and planning framework

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of the ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. The definition of road infrastructure facilities provided by Clause 93 of the ISEPP includes associated public transport facilities for roads used to convey passengers by means of regular bus services.

As the proposal is for a road and road infrastructure facilities and is to be carried out by Transport for NSW / Roads and Maritime, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Development consent from council is not required. Note that relocation of commercial advertising at bus shelters does not form part of the proposal and where this is required it would be subject to a separate assessment and approval process.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by *State Environmental Planning Policy No. 14 - Coastal Wetlands*, *State Environmental Planning Policy No. 26 - Littoral Rainforests* or *State Environmental Planning Policy (State and Regional Development) 2011* or *State Environmental Planning Policy (Major Development) 2005*.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in Chapter 5 (Stakeholder and community consultation) of this REF.

4.2 Local Environmental Plans

The proposal is located within the Hills Shire and Hornsby Shire local government areas. Land use and development within the areas where physical works are proposed is primarily regulated by *The Hills Local Environmental Plan 2012* (The Hills LEP) and the *Hornsby Local Environmental Plan 2013* (Hornsby LEP). Works required for the proposal would occur in the following zones:

- R2 Low Density Residential
- R4 High Density Residential
- B5 Business Development
- B7 Business Park
- IN2 Light Industrial
- E4 Environmental Living
- SP2 Infrastructure.

Development for the purposes of roads is permitted with development consent in all the above land use zones (except in the SP2 zone under the Hornsby LEP where it is permitted without consent). ISEPP removes the requirement for development consent from The Hills Shire Council or Hornsby Shire Council (see section 4.1.1).

4.3 Other relevant legislation

4.3.1 Protection of the Environment Operations Act 1997

Section 120 of the *Protection of the Environment Operations Act 1997* (POEO Act) prohibits the pollution of waters. The proposal includes measures to address the risk of water pollution - see section 6.7.

Air pollution related sections 124 to 126 (Chapter 5, Part 5.4, Division 1) of the POEO Act require activities to be conducted in a proper and efficient manner. Section 128 (Chapter 5, Part 5.4, Division 1) of the POEO Act requires that all necessary and practicable means are used to prevent or minimise air pollution. Air quality is addressed in section 6.8.

Pollution of land and waste is covered by Part 5.6 of the POEO Act. The Act defines 'waste' for regulatory purposes and establishes management and licensing requirements for waste.

It defines offences relating to waste and sets penalties. The POEO Act also establishes the ability to set various waste management requirements via the *Protection of the Environment Operations (Waste) Regulation 2014*. Waste is addressed in section 6.11 contamination is considered in section 6.6.

Part 3.2 of the POEO Act requires an Environmental Protection Licence for scheduled development work and the carrying out of scheduled activities. The proposal does not trigger these requirements.

4.3.2 Heritage Act 1977

Section 57 of the *Heritage Act 1977* regulates development affecting items on the State Heritage Register or which are the subject of an interim heritage order. The proposal would not affect State listed items either directly or indirectly (refer to section 6.5).

An excavation permit is required to disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed. A permit is also required to disturb or excavate any land on which the person has discovered or exposed a relic. Section 134(4) of the *Heritage Act 1977* makes provision for the issuing of an exception in certain prescribed circumstances. Where items are defined as a 'work' rather than a 'relic', such as early road fabric, kerbing or tram tracks, no excavation permit or exception is required. An excavation permit is not expected to be required for the proposal because works are not likely to affect relics.

4.3.3 National Parks and Wildlife Act 1979

The harming or desecrating of Aboriginal objects or places is an offence under section 86 of the *National Parks and Wildlife Act 1979* (NPW Act). Under section 90, an Aboriginal heritage impact permit may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons. Aboriginal objects and/or places are not expected to be affected by the proposal because the proposal locations are heavily disturbed by urban development and are not near any known Aboriginal sites (refer to section 6.6).

Part 8A of the NPW Act prohibits the harming or picking threatened species, endangered populations or endangered ecological communities. These activities can however occur where they constitute an activity by a determining authority within the meaning of Part 5 of EP&A Act and where the determining authority has complied with that Part. Threatened species, endangered populations or endangered ecological communities would not be affected by the proposal (refer to section 6.2).

4.3.4 Roads Act 1993

Section 138 of the *Roads Act 1993* requires consent from the relevant roads authority for the erection of a structure, or the carrying out of work in, on or over a public road, or the digging up or disturbance of the surface of a road.

Approval under Section 138 would not be required for the proposal. In relation to classified roads, Roads and Maritime may exercise the functions of the roads authority. Further, under clause 5(1) in Schedule 2 of the *Roads Act 1993*, public authorities do not require consent for work on unclassified roads.

4.3.5 Passenger Transport Regulation 2007

The *Passenger Transport Regulation 2007* allows Transport for NSW to appoint bus stops, to be indicated by signs erected or displayed with the approval of the roads authority (under the *Roads Act 1993*).

4.4 Commonwealth legislation

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix A and Chapter 6 (Environmental assessment) of the REF.

A referral is not required for proposed road actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. This is because requirements for considering impacts to these biodiversity matters are the subject of a strategic assessment approval granted under the EPBC Act by the Australian Government in September 2015. Potential impacts to these biodiversity matters are also considered as part of section 6.2 and in Appendix A.

The assessment of potential proposal impacts found that it would be unlikely to cause a significant impact on matters of national environmental significance or the environment of Commonwealth land. A referral to the Australian Department of the Environment is not required.

4.4.2 Disability Discrimination Act 1992

The *Disability Discrimination Act 1992* (DD Act), and supporting standards, are the regulatory means by which governments seek to remove, as far as practicable, discrimination against people with disability. Public transport is a service covered by the DD Act and new bus stop infrastructure delivered as part of the proposal will need to meet the DD Act *Standards for Accessible Public Transport 2002*.

4.5 Confirmation of statutory position

The proposal is within the definition of activity set by Section 110 of the EP&A Act and is being proposed by a public authority. Assessment under Part 5 of the EP&A Act is therefore required.

Roads and Maritime is the proponent and the determining authority under Part 5 of the EP&A Act.

The proposal is categorised as development for the purpose of road infrastructure facilities and is being carried out by or on behalf of a public authority. Under clause 94 of the ISEPP the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Part 5 of the EP&A Act.

This REF fulfils Roads and Maritime's obligation under clause 111 of the EP&A Act to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

The matters prescribed by Clause 228 of the *Environmental Planning and Assessment Regulation 2000*, for consideration by assessments under Part 5, are reviewed at Appendix A.

A referral under the EPBC Act is not required.

Any relocation of commercial advertising at bus shelters does not form part of the proposal and where this is required it would be subject to a separate assessment and approval process.

5 Stakeholder and community consultation

5.1 Community involvement strategy

Roads and Maritime has developed a community consultation and stakeholder engagement plan for the proposal. The plan identifies key objectives and the desired consultation outcomes. It focuses on consultation with relevant Government agencies, stakeholders and the community affected by the proposal. The plan's overall objectives are to:

- Provide stakeholders with clear, relevant, timely and accurate information about the proposal, proposed changes and impacts
- Identify local issues to ensure the proposal aligns with community needs
- Inform and consult affected and interested stakeholder groups.

A mix of communication channels will be used to communicate with the community and stakeholders throughout the proposal's development.

5.2 Community involvement

To date consultation has focused on Government agencies, particularly local councils.

The communication and engagement plan notes that the REF will be displayed publicly and that submissions will be invited. All issues raised will then be considered and responded to in the subsequent submissions report.

The REF will be displayed on the Roads and Maritime website. A community update, advising of the public display of the REF will be letterbox-dropped to residents and businesses, and additional stakeholders will receive the community update with a covering email/letter.

During the public display period, potentially affected residents, businesses and other nearby stakeholders near bus stops with changes, will be visited by Roads and Maritime to discuss the proposal and address their issues of concern. Roads and Maritime will also schedule and meet with potentially affected residents and other stakeholders as requested.

The REF will be on public display for five weeks from 28 August 2017 to 25 September 2017 and written submissions will be invited during this period. Further community consultation will be undertaken during the public display period to enable the community to comment and ask questions about the proposal.

Planned consultation activities associated with the public display include:

- *Internet* - The review of environmental factors will be available as pdf files on the Roads and Maritime Services website at www.rms.nsw.gov.au/bpp
- *Letter box drop* - A letter box drop will be completed to properties within 200 metres of the proposal area publicising the REF display
- *Advertisements* - Advertisements will be placed in the Hills Shire Times and Hornsby Advocate to publicise the REF display.

5.3 Aboriginal community involvement

The proposal has been considered against the requirements of the *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) (Roads and Maritime Services, 2011). This procedure is generally consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Department of Environment, Climate Change and Water, 2010). An outline of the procedure is presented in Table 5-1.

Table 5-1 Procedure for Aboriginal Cultural Heritage Consultation and Investigation

Stage	Description
Stage 1	Initial Roads and Maritime assessment. Desktop assessment to determine whether a Roads and Maritime proposal is likely to harm Aboriginal cultural heritage, and whether further assessment or investigation is required.
Stage 2	Further assessment and site survey. Further assessment and a survey with specific Aboriginal stakeholders and an archaeologist to assess whether a project would impact Aboriginal cultural heritage.
Stage 3	Formal consultation and preparation of cultural heritage assessment report. Aboriginal parties must be involved in the preparation of these reports in accordance with legislative requirements and the <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (Department of Environment, Climate Change and Water, 2010).
Stage 4	Implement project mitigation measures. Undertake salvage and/or project implementation in accordance with an Aboriginal Heritage Impact Permit (AHIP) and/or a Part 5.1/Part 4 approval or Part 5 determination obtained under the EP&A Act.

Aboriginal cultural heritage impacts are not expected as a result of the proposal because the proposal locations are heavily disturbed by urban development and are not near any known Aboriginal sites (see section 6.6). An Aboriginal Heritage Information Management System (AHIMS) search was undertaken on 15 April 2017 and identified 51 registered sites in the wider area around the proposal sites. There are no known sites in the immediate vicinity of proposal locations.

5.4 ISEPP consultation

Part 2 Division 1 of the ISEPP outlines circumstances where consultation with councils and other public authorities is required. The consultation requirements at clauses 13-16 of the ISEPP have been reviewed and it is considered that formal consultation with The Hills Shire Council and Hornsby Shire Council is required.

ISEPP consultation requirements are reviewed in Appendix D. A consultation letter was sent to The Hills Shire Council and Hornsby Shire Council on 3 April 2017 (refer to Appendix D).

The Hills Shire Council responded on 18 July 2017. The issues raised are considered in Table 5-2.

Table 5-2 The Hills Shire Council - issues and responses

Issue	Response
Removal of any bus stops along Carrington Road and Victoria Avenue should only be considered in consultation with the future plans for the development of the Showground Station precinct and the increased residential and commercial densities planned along this corridor to Showground Railway Station	Noted. The proposal does not involve adjustments to any bus stops on the northern part of Carrington Road or on Showground Road.

Issue	Response
Removal of the bus stop on McMullen Avenue, Castle Hill near the Old Northern Road intersection should also be considered in relation to the design for the future realignment of the McMullen Ave/Old Northern Road and Brisbane Road realignment	Noted. It is not expected that the proposed future realignment of the McMullen Ave/Old Northern Road and Brisbane Road realignment will affect or be affected by the removal of bus stop 2154386 (#37).
There are longer term plans to introduce bus routes via Crane Road with a bridge over Excelsior Creek onto Highs Road, and a bus priority lane via Highs Road, Taylor Street and Aiken Road to the M2.	Noted. These longer-term plans would not affect or be affected by the current proposal. Bus stops would be reviewed within changes to bus routes associated with longer-term plans.

Hornsby Shire Council responded on 9 May 2017 raising no issues with the proposal but indicating that consultation with affected residents needs to occur before proceeding with construction. This would occur as discuss below in section 5.6.

Further correspondence from Hornsby Shire Council noted some Council's bus shelters carry advertising under an agreement and that advertising company would need to be notified of new locations. Roads and Maritime will liaise further with Council regarding the relocation of shelters with advertising. This does not form part of the current proposal (refer to section 4.5).

5.5 Government agency and stakeholder involvement

The Hills Shire Council and Hornsby Shire Council have been consulted about the proposal.

Responses to consultation letters were received from The Hills Shire Council and Hornsby Shire Council (refer to section 5.4).

Further consultation with all The Hills Shire Council and Hornsby Shire will occur during the public display of the REF.

5.6 Ongoing or future consultation

As noted in section 5.2, the REF will be publicly displayed and submissions will be invited. All submissions will be reviewed and issues raised will be considered and responded to in a subsequent submissions report, which will be made publicly available.

Nearby residents and businesses will be notified prior to the commencement of any construction. This notification would reference working hours and expected impacts. Contact details of the works supervisor would be made available to residences via a letterbox drop to allow construction phase issues to be raised and addressed.

6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of:

- Potential impacts on matters of national environmental significance under the EPBC Act
- The factors specified in the guidelines *Is an EIS required?* (Department of Urban Affairs and Planning, 1995) and *Roads and Related Facilities – EIS Guideline* (Department of Urban Affairs and Planning, 1996) as required under Clause 228(1)(b) of the *Environmental Planning and Assessment Regulation 2000*
- The factors specified in Clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* are also considered in Appendix A.

Site-specific environmental safeguards and management measures are provided to mitigate the identified potential impacts. These would be documented in a Construction Environment Management Plan (CMEP) which would cover each proposal site and proposed works.

6.1 Socio-economic

6.1.1 Existing environment

Community Profile

Key demographic, social and economic information derived from the 2011 Census (Australian Bureau of Statistics, 2011) for the suburbs of Baulkham Hill, Castle Hill, West Pennant Hills, Cherrybrook, Pennant Hills, Thornleigh, Normanhurst and Hornsby are outlined below in Table 6-1.

The Census data indicates that the use of buses for the journey to work is well above the NSW average (3.7 per cent) for Castle Hill, Baulkham Hills, West Pennant Hills and Cherrybrook. The use of the car is also at or above the NSW average (57.6 per cent) for these suburbs.

Table 6-1 Key social and demographic information

Suburb	Population	Median Age	Household Occupancy	People in labour force	Travel to work	Median weekly household income	Motor vehicles per dwelling
Baulkham Hills	33,945	37	2.9	<ul style="list-style-type: none"> • 18,190 • 63.1% full-time • 27.4% part-time • 4.2% unemployed 	<ul style="list-style-type: none"> • 62.3% car driver • 10.4% bus • 4.2% car passenger 	\$1,872	1.9
Castle Hill	37,915	39	3	<ul style="list-style-type: none"> • 19,877 • 62.9% full-time • 28.3% part-time • 4.2% unemployed 	<ul style="list-style-type: none"> • 63.8% car driver • 9.6% bus • 4.2% car passenger 	\$2,059	2
West Pennant Hills	15,967	41	2.9	<ul style="list-style-type: none"> • 8,798 • 60.4% full-time • 30.6% part-time • 4.3% unemployed 	<ul style="list-style-type: none"> • 59.2% car driver • 10.7% bus • 3.8% car passenger 	\$2,449	2.1
Cherrybrook	18,788	40	3.2	<ul style="list-style-type: none"> • 10,182 • 60.8% full-time • 30.0% part-time • 5.0% unemployed 	<ul style="list-style-type: none"> • 57.6% car driver • 12.5% bus • 3.8% car passenger 	\$2,267	2.0
Pennant Hills	7,031	40	2.8	<ul style="list-style-type: none"> • 3,696 • 59.6% full-time • 30.8% part-time • 5.5% unemployed 	<ul style="list-style-type: none"> • 48.9% car driver • 21.5% train • 3.1% car passenger 	\$1,842	2.8

Suburb	Population	Median Age	Household Occupancy	People in labour force	Travel to work	Median weekly household income	Motor vehicles per dwelling
Thornleigh	8,115	38	2.9	<ul style="list-style-type: none"> • 4,208 • 61.2% full-time • 29.1% part-time • 4.1% unemployed 	<ul style="list-style-type: none"> • 51.3% car driver • 16.5% train • 3.3% car passenger 	\$1,964	2.9
Normanhurst	5,156	40	2.8	<ul style="list-style-type: none"> • 2,422 • 58.1% full-time • 31.8% part-time • 5.2% unemployed 	<ul style="list-style-type: none"> • 51.2% car driver • 18.4% train • 3.4% car passenger 	\$1,775	1.6
Hornsby	19,863	35	2.5	<ul style="list-style-type: none"> • 10,835 • 62.7% full-time • 26.8% part-time • 5.7% unemployed 	<ul style="list-style-type: none"> • 39.3% car driver • 27.1% train • 7.1% walked 	\$1,436	1.3

Accessibility

Table 3-1 in Chapter 3 (Description of the proposal) reviews all bus stops along the Hornsby to Blacktown corridor and provides existing patronage data for those locations where removal or relocation of bus stops is proposed. Figure 3-1 to Figure 3-8 show the location of existing bus stops and their accessibility from surrounding areas.

Key social infrastructure

There is a range of social infrastructure located near the proposal sites. This includes:

- Schools (St Bernadette's Primary School, Normanhurst Public School, Loreto Normanhurst, Normanhurst Boys High School, Barker College)
- Places of worship (Greek Orthodox Church of St Therapon, CABC-Thornleigh (Chinese Australian Baptist Church), Normanhurst Uniting Church, St Stephens Normanhurst Anglican Church)
- Aged care and retirement facilities (ARV Castle Hill Villages, Presbyterian Aged Care Thornleigh, The Lakes of Cherrybrook retirement village)
- Castle Hill Showground
- Castle Hill Library
- Castle Hill Senior Citizens Centre
- Bedford College
- Thornleigh Community Centre
- Child Care Centres (John Road, Cherrybrook; Albion Street, Pennant Hills; Dartford Road, Thornleigh)
- Medical centres (Castle Towers; Pacific Highway, Waitara).

Economic profile and businesses

A snapshot of the economic profile for The Hills Shire and Hornsby Shire local government areas is provided in Table 6-2.

Table 6-2 Economic profile of The Hills and Hornsby local government areas

LGA	Gross regional product	Jobs	Businesses	Largest industry
The Hills Shire	\$8.44 billion	69,468	17,466	Retail trade
Hornsby Shire	\$6.85 billion	54,527	13,024	Health care and social assistance

Source: (National Economics, 2015).

The proposal locations where there is the potential for businesses to be affected are:

- Victoria Avenue (Location #20) (large format retail adjacent to existing stop location proposed for removal)
- Carrington Road (Locations #23 and #24) (large format retail and self-storage adjacent to stops proposed for removal).

6.1.2 Potential impacts

Construction

Issues such as air quality, dust, noise, vibration, visual amenity, traffic delays have the potential to affect the local community and road users during construction of the proposal.

General amenity impacts during construction of the proposal would be minor, temporary and would potentially occur due to the following:

- Increases in noise due to the operation of plant and equipment
- Potential dust mobilisation due to pavement works and minor excavation
- Increase in construction traffic due to the delivery of plant, materials and construction personnel

- Traffic management arrangements and associated minor delays for traffic.

These issues have been outlined and assessed in other sections of this report, as follows:

- Visual impacts (refer section 6.3)
- Noise and vibration (refer section 6.4)
- Air quality (refer section 6.9)
- Traffic and transport (refer to section 6.10).

During construction, access to adjacent properties would be maintained and bus services would still operate servicing established stops along the route. For bus stop improvements, existing bus stops would remain operational during works, with minimal impacts on customers. For bus stop relocations, the existing bus stop would remain operational and signage associated with the relocated stop would be covered until it becomes operational. Changes would be communicated to potentially affected customers in advance. In the event that temporary bus stops are required during the works, this would be managed by the Traffic Management Plan.

Operation

Accessibility

The proposal would result in fewer bus stops and changes to the location of some bus stops along the corridor. While for some people this would mean additional walking distance and reduced convenience, the proposal has targeted a standardised spacing of 400 metres between bus stops to keep bus stops accessible by walking while also minimising delays associated with bus stops being too close together. A greater than 400 metre spacing has been accepted at some locations to account for different road layouts, local conditions and to minimise the number of bus stop relocations across the corridor. Those locations where the proposal would result in a greater than 400 metre spacing between bus stops are as follows:

- Location #20 – resultant spacing would be 480 metres
- Location #23 – resultant spacing would be 500 metres
- Location #24 – resultant spacing would be 440 metres
- Location #37 – resultant spacing would be 580 metres
- Location #41 – resultant spacing would be 750 metres (with the relocation at Location #43)
- Location #43 – resulting spacing would be about 860 metres from the preceding stop and about 260 metres to the next stop
- Location #49 – resultant spacing would be 490 metres
- Location #99 – resultant spacing would be 490 metres
- Location #102 – resulting spacing would be about 310 metres from the preceding stop and about 590 metres to the next stop. Note however that this is a new stop and its addition would improve accessibility with the existing spacing being about 900 metres
- Location #108 – resultant spacing would be 490 metres
- Location #112 – resulting spacing would be about 400 metres from the preceding stop and about 480 metres to the next stop.

The proposed changes would still mean the bus services using the corridor would be accessible and would remain an attractive transport option. Spacing of bus stops between 800 metres and one kilometre apart would be considered as part of a future planned rapid bus route.

An important consideration in developing the proposal was to ensure bus stops used by local and suburban services in the corridor remain accessible. A review of the impact of bus stop removal on suburban and local services found that in most cases there would be limited impact on suburban and local services because all services stop at the preceding and following bus stops and the resulting spacing with the proposal would be consistent with the acceptable spacing discussed above. The results of the review are presented below in Table 6-3.

Table 6-3 Review of impacts on suburban and local services

Ref#	Location	Proposal	Local / suburban routes	Comment
20	Victoria Avenue after Anella Avenue (eastbound)	Remove bus stop	601, 619, T71	All routes stop at preceding and next stops with acceptable spacing maintained.
23-24	Carrington Road near Victoria Avenue (eastbound and westbound)	Remove bus stops	T70, 715	Routes T70 and 715 use stops on Victoria Avenue, south of Carrington Road. With the proposed bus stop removal the resulting spacing for these services would be about 500 metres
37	McMullen Avenue before Old Northern Road (eastbound)	Remove bus stop	600, 603, 621, 631, 632, 633, 635, 644, 651	All routes stop at preceding and next stops with acceptable spacing maintained.
41	Castle Hill Road before Old Northern Road (westbound)	Remove bus stop	600, 633, 635, 651	All routes stop at preceding and next stops with acceptable spacing maintained.
49	County Drive and John Road (westbound)	Remove bus stop	M60	Only used by the M60 route therefore no impact on local and suburban services.
62	Macquarie Drive opposite Francis Greenway Drive (westbound)	Remove bus stop	600, 620X, 621, 622	All routes stop at preceding and next stops with acceptable spacing maintained.
67-72	Francis Greenway Drive consolidation	Consolidate four bus stops into two	600, 620X, 621, 622, 626	All routes stop at preceding and next stops with acceptable spacing maintained.
99	Pennant Hills Road before Wells Street (eastbound)	Remove bus stop	M60	Only used by the M60 route therefore no impact on local and suburban services.
108	Pennant Hills Road after Dartford Road	Remove bus stop	589	Route 589 stops at preceding and following stops with acceptable spacing maintained.

Ref#	Location	Proposal	Local / suburban routes	Comment
	(eastbound)			

Service reliability

With the proposal, users of buses along the route would benefit from improved service reliability and reduced journey times facilitated by improved bus access / exit from bus stops and reduced time spent stationary.

Loss of parking

While the loss of parking at some locations could inconvenience adjacent residents, visitors and customers, the impact is expected to be small in the context of the overall parking supply. There would be parking removed at some locations and parking gained at others with an overall net gain of five car spaces across the corridor. At all locations where parking would be lost there is alternative parking near the proposal site. The changes to parking are summarised below (while potential business impacts associated with the loss of parking are considered in the next section):

- Location #49 – County Drive near John Road – gain of two car spaces
- Location #62 – Macquarie Drive opposite Francis Greenway Drive – gain of two car spaces
- Location #67 – Francis Greenway Drive opposite Parkhill Crescent – gain of three car spaces
- Location #68 – Francis Greenway Drive at Parkhill Crescent – gain of two car spaces
- Location #69 – 79 Francis Greenway Drive – loss of three car spaces. Offset by parking gains at nearby locations (#71 and #72)
- Location #70 – 110 Francis Greenway Drive – loss of five car spaces. Offset by parking gains at nearby locations (#71 and #72)
- Location #71 – Francis Greenway Drive opposite Thorpe Avenue – gain of four car spaces
- Location #72 – Francis Greenway Drive before Thorpe Avenue – gain of four car spaces
- Location #122 – Pacific Highway at James Street – loss of two car spaces. Alternative parking available on the Pacific Highway to the west and on adjacent local streets
- Location #123 – Barker College, Pacific Highway – loss of two car spaces. Alternative parking available on the Pacific Highway to the west.

Business impacts

Businesses can be potentially affected by removal or relocation of bus stops. The potential impacts on local businesses are summarised in Table 6-4. There are no businesses located in close proximity to relocated bus stops.

Table 6-4 Local business impacts and benefits

Ref#	Location	Proposal	Affected businesses	Impacts / benefits
20	Victoria Avenue after Anella Avenue (eastbound)	Remove bus stop No change to parking	Large format retail	Negligible impact. Motor vehicle is likely to be the dominant form of transport to access these businesses for customers, although buses may be used more by employees. Preceding stop 215466 is at a distance of 180 metres. Impacts on convenience of access, business exposure and attractiveness not expected.

Ref#	Location	Proposal	Affected businesses	Impacts / benefits
23	Carrington Road before Victoria Avenue (westbound)	Remove bus stop No change to parking	Self-storage	Negligible impact. Negligible impact. Motor vehicle is likely to be the dominant form of transport to access these businesses for customers, although buses may be used more by employees. Preceding stop 215492 is at a distance of 240 metres. Impacts on convenience of access, business exposure and attractiveness not expected.
24	Carrington Road after Victoria Avenue (eastbound)	Remove bus stop No change to parking	Automotive services, large format retail	Negligible impact. Negligible impact. Motor vehicle is likely to be the dominant form of transport to access these businesses for customers, although buses may be used more by employees. Preceding stop 215468 is at a distance of 230 metres. Impacts on convenience of access, business exposure and attractiveness not expected.

6.1.3 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Socio-economic - communication	<p>A Communication Plan will be prepared and included in the CEMP. The Communication Plan will include (as a minimum):</p> <ul style="list-style-type: none"> Requirements to provide details and timing of proposed activities to affected residents Contact name and number for complaints Procedure to notify adjacent land users for changed conditions during the construction period such as traffic, pedestrian or driveway access. <p>The communication plan will be prepared in accordance with G36 requirements and the Roads and Maritime</p>	Contractor	Detailed design / pre-construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	<i>Community Engagement and Communications Manual (2012).</i>			
Socio-economic - complaints	A complaints handling procedure and register would be included in the CEMP and maintained for the duration of the project.	Contractor	Pre-construction / construction	Standard safeguard
Socio-economic – interruptions to utility services	In the event that utilities relocation would be required, residents would be informed prior to any interruptions to utility services that may be experienced as a result of utilities relocation.	Contractor	Pre-construction / construction	Standard safeguard
Socio-economic – access	Road users, pedestrians and cyclists would be informed of changed conditions, including likely disruptions to access during construction.	Contractor	Pre-construction / construction	Standard safeguard
Socio-economic – access	Access to residences, businesses and retained bus stops will be maintained during construction.	Contractor	Construction	Additional safeguard

6.2 Biodiversity

6.2.1 Methodology

The approach to the assessment of potential biodiversity impacts associated with the proposal first involved evaluating the potential for threatened species, populations, endangered ecological communities, or their habitat to be present at each site. This was done by reference to:

- Review of vegetation mapping (Office of Environment and Heritage, 2009)
- Bionet search dated 23 April 2017 (refer to Appendix E)
- EPBC Act protected matters search dated 23 April 2017 (refer to Appendix E)
- Observations from an inspection of each site.

Conclusions were then drawn about potential impacts, considering the existing environment and the nature and extent of proposed works.

6.2.2 Existing environment

Vegetation communities and flora

The proposal sites are all highly urbanised environments, none of which include remnant native vegetation. At almost all locations, trees are at setback beyond the area of proposed works. One small street tree is located within the works area at Location #64 (in front of 66 Macquarie Drive, Cherrybrook). The location of the affected tree is shown below by Figure 6-1 below and by Figure 2-9 in Chapter 2 (Need and options considered).



Figure 6-1 Location of affected tree on Francis Greenway Drive at Location #64

Several threatened flora species listed under the EPBC Act and / or the TSC Act have been previously recorded within the broader area (see database search results included in Appendix E). The proposal sites do not represent suitable habitat for these species because they consist of urban pavements, exotic groundcovers and bus stop infrastructure including signage structures and bus shelters. Threatened flora is therefore not expected to be present at any of the proposal sites.

Fauna

Several threatened flora species listed under the EPBC Act and / or the TSC Act have been previously recorded within the broader area, such as the Grey-headed Flying-fox and insectivorous bats and birds (see database search results included in Appendix E). None of the proposal sites represent suitable habitat for these species because they consist of urban pavements, one street tree, exotic groundcovers and bus stop infrastructure including signage structures and bus shelters. Threatened fauna is therefore not expected to be present at any of the proposal sites.

6.2.3 Potential impacts

Biodiversity impacts as a result of the proposal would be negligible. One small street tree would be removed at Location #64 while other impacts on vegetation would be limited to disturbance of turfed roadside areas.

While several threatened flying mammal species (i.e. Grey-headed Flying-fox and insectivorous bats, birds) have been previously recorded within the broader area and may fly over the area investigated on occasion. None are expected to use any of the proposal sites and therefore the proposal is not expected to have a significant impact on the local or regional viability of these species, their populations or habitats.

6.2.4 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Safeguard / additional safeguard
Unexpected threatened species impact	If unexpected threatened flora or fauna are discovered, works would stop immediately and the Roads and Maritime Unexpected Threatened Species Find Procedure, identified in the Roads and Maritime <i>Biodiversity Guidelines</i> (Roads and Traffic Authority, 2011) will be implemented.	Contractor	Construction	Standard safeguard
Impacts to fauna	Prior to removal, trees will be checked for nesting birds and arboreal mammals. If present, fauna would be relocated by a qualified wildlife handler.	Contractor	Construction	Additional safeguard

6.3 Visual amenity

6.3.1 Assessment approach

The landscape character and visual assessment was considered in accordance with the *Guidelines for landscape character and visual impact assessment* (Roads and Maritime Services, 2013).

The guidelines establish an assessment process by reference to the sensitivity of the area and magnitude of the proposal in that area. Figure 6-2 illustrates this process.

SENSITIVITY	MAGNITUDE				
		HIGH	MODERATE	LOW	NEGLIGIBLE
	HIGH	HIGH	HIGH - MODERATE	MODERATE	NEGLIGIBLE
	MODERATE	HIGH - MODERATE	MODERATE	MODERATE - LOW	NEGLIGIBLE
	LOW	MODERATE	MODERATE - LOW	LOW	NEGLIGIBLE
	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Figure 6-2 Landscape character / visual impact grading matrix

Landscape character

The landscape character assessment sums up an area's sense of place including all built, natural and cultural aspects, covering towns, countryside and all shades between (Roads and Maritime Services, 2013). The assessment involves identifying landscape character sensitivity and potential impacts attributable to the proposal under consideration.

Visual impact

The visual impact assessment of the proposal involves a consideration of whether any important viewpoints would be affected and, where relevant, an assessment of visual impact.

6.3.2 Existing environment

Landscape character

The proposal sites all occur in an urban context with landscape character sensitivity assessed as ranging from low to moderate. Table 6-5 considers landscape character sensitivity for those sites where new stops are proposed or where bus stops are being relocated, extended or improved. The visual context of these sites is shown by the figures included in section 2.2. There would be negligible visual impact associated with bus stop removal and therefore the locations where bus stop removal has been proposed are not considered further.

Table 6-5 Landscape character sensitivity

Ref#	Location	Sensitivity	Comment
11	Norwest Boulevard after Brookhollow Way (westbound stop 2153140)	Moderate	Urban boulevard with extensive median and road verge landscaping.
12	Norwest Boulevard before Columbia Circuit (eastbound stop 215385)	Moderate	Urban boulevard with extensive median and road verge landscaping.
43	Castle Hill Road after Glen Road (westbound stop 2154173)	Moderate	Urban arterial road environment. Minimal visual interface with adjacent development due to dense screening vegetation along the property boundary. Rating recognises numerous adjacent heritage items.
64	Francis Greenway Drive before Penrose Avenue (westbound stop 212694)	Moderate	Local road in residential context.
69	79 Francis Greenway Drive (new westbound bus	Moderate	Local road in residential context.

Ref#	Location	Sensitivity	Comment
	stop)		
70	110 Francis Greenway Drive (new eastbound bus stop)	Moderate	Local road in residential context.
102	Frontage of 235 Pennant Hills Road (new westbound bus stop)	Low	Urban arterial road environment. Minimal visual interface with adjacent development.
112	Pennant Hills Road after Normanhurst Road (eastbound stop 207619)	Low	Urban arterial road environment. Minimal visual interface with adjacent development.
122	Pacific Highway at James Street (eastbound stop 2077158)	Low	Urban arterial road environment with adjacent commercial / industrial development.
123	Barker College, Pacific Highway (westbound stop 207735)	Moderate	Urban arterial road environment. Rating recognises numerous adjacent heritage items.

Views

The proposal locations were not assessed as having scenic views or high quality vistas. Views at all sites listed above in Table 6-5 are considered to have low sensitivity.

6.3.3 Potential impacts

Visual impacts during construction would be associated with presence of work vehicles and the construction site itself. These impacts would be minor and very short-term.

Table 6-6 evaluates the potential landscape character and visual amenity impacts of the proposal once works are complete. There would be negligible visual impact associated with bus stop removal and therefore Table 6-6 only covers those sites where bus stops are being relocated or improved. In these cases, there is the potential for visual impacts associated with new signage, shelters (where proposed) and other bus stop infrastructure.

Table 6-6 Landscape character and visual amenity impacts

	Location	Proposed works	Sensitivity	Magnitude	Impact	Comment
11	Norwest Boulevard after Brookhollow Way (westbound stop 2153140)	Improvement-bus stop extension	Moderate	Negligible	Negligible	Extension of bus bay resulting in a minor change to the appearance of the road formation. Significant views would not be affected.
12	Norwest Boulevard before Columbia Circuit (eastbound stop 215385)	Improvement-bus stop extension	Moderate	Negligible	Negligible	Extension of bus bay resulting in a minor change to the appearance of the road formation. Significant views would not be affected.
43	Castle Hill Road after Glen Road (westbound stop 2154173)	Relocation of bus stop	Moderate	Low	Moderate-Low	Minor relocation with similar bus stop infrastructure. Minimal impact on property frontage given dense vegetation screening.
64	Francis Greenway Drive before Penrose Avenue (westbound stop 212694)	Relocation of bus stop	Moderate	Low	Moderate-Low	Minor relocation with similar bus stop infrastructure. Minimal impact on adjacent property frontage given it is a side boundary with densely planted vegetation screening. Minor amenity impact associated with the removal of one small street tree.
69	79 Francis Greenway Drive (new westbound bus stop)	New bus stop	Moderate	Low	Moderate-Low	New signage and other elements would be small scale, generally consistent with existing streetscape and would not affect any significant views. New infrastructure limited to bus zone signage, plinth sign, concrete pad and TGSi. No shelter is proposed at this location.
70	110 Francis Greenway Drive (new eastbound bus stop)	New bus stop	Moderate	Low	Moderate-Low	New signage and other elements would be small scale and generally consistent with existing streetscape and would not affect any significant

	Location	Proposed works	Sensitivity	Magnitude	Impact	Comment
	stop)					views. New infrastructure limited to bus zone signage, plinth sign, concrete pad and TGSI. No shelter is proposed at this location.
102	Frontage of 235 Pennant Hills Road (new westbound bus stop)	New bus stop	Low	Negligible	Negligible	New signage and other elements would be small scale, generally consistent with existing streetscape and would not affect any significant views. New infrastructure limited to bus zone signage, plinth sign, concrete pad and TGSI. No shelter is proposed at this location.
112	Pennant Hills Road after Normanhurst Road (eastbound stop 207619)	Relocation of bus stop	Low	Negligible	Negligible	Minor relocation with similar bus stop infrastructure. Minimal impact on property frontage given vegetation screening and setbacks to uses on adjacent site.
122	Pacific Highway at James Street (eastbound stop 2077158)	Improvement-bus stop extension	Low	Negligible	Negligible	Minor change to signage would be consistent with the existing streetscape and would not affect any significant views.
123	Barker College, Pacific Highway (westbound stop 207735)	Improvement-bus stop extension	Moderate	Negligible	Negligible	Minor change to signage would be consistent with the existing streetscape and would not affect any significant views.

6.3.4 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Loss of street trees - landscape character / visual amenity	Opportunities to provide replacement tree plantings (Francis Greenway Drive) or otherwise to mitigate streetscape impacts will be explored in consultation with the relevant local council.	Transport for NSW / Roads and Maritime	Pre-construction	Additional safeguard
Construction related visual impacts	The work site would be left in a tidy manner at the end of each work day.	Contractor	Construction	Standard safeguard
Bus stop design	Bus stop signage and other infrastructure will comply with applicable Transport for NSW requirements and standards.	Transport for NSW / Roads and Maritime	Detailed design	Additional safeguard

6.4 Noise and vibration

6.4.1 Methodology

The Roads and Maritime *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) and associated Construction Noise Estimator were used to determine the potential for construction noise impacts at the nearest residential receivers.

Construction noise calculations for most sites have assumed the presence of workers, the use of hand tools, the use of a truck, the use of a jackhammer and the use of a concrete saw. At Location #11 and Location #12, where the existing bus bays are proposed to be extended, the use of a paver, excavator and roller was also assumed. None of the locations were identified as having existing barriers that would reduce the propagation of noise.

In most cases works would have a duration of less than one day. Works would be primarily carried out during standard construction hours, although some evening and night works may be required to minimise impacts on traffic.

As no significant changes to traffic volumes or road geometry are proposed, operation noise modelling was not conducted. Qualitative assessment of operational noise is provided in section 6.4.4.

6.4.2 Existing environment

Existing noise in the area is dominated by road traffic noise. Sensitive receivers include primarily include residences and schools. The nearest receivers are located at distances of between five and 85 metres.

Based on guidance provided by the *Roads and Maritime Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) and associated Construction Noise Estimator, the following variables were adopted for the construction noise assessment:

- Representative noise environment for Locations #11 to #49 #99 to #123: the background noise environment is influenced by road traffic noise on the adjacent arterial road (R3)
- Representative noise environment for Locations #62 to #72: the background noise environment is influenced by road traffic noise on the adjacent local road (R2)
- Background noise levels: 50 dBA day, 45 dBA evening and 40 dBA night
- Timing: Day is 7am to 6pm, evening is 6pm to 10pm and night is 10pm to 7am.

6.4.3 Criteria

Construction noise

Noise management goals for construction are given in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009).

For residential receivers, the guideline provides that the construction noise should not exceed the background by more than 10 dBA during standard hours, and by more than 5 dBA out of hours (that is, for night-time works). This is referred to as the noise management level (NML). The level of 75 dBA is identified as the point above which there may be a strong community reaction to noise.

The guideline provides the following noise management goals for other receivers:

- Active recreation areas (such as parks): external L_{Aeq} , 15min 65dBA (when in use)
- Industrial premises: external L_{Aeq} , 15min 75dBA
- Offices, retail outlets: external L_{Aeq} , 15min 70dBA
- Places of worship L_{Aeq} , 15min 45dBA (internal) (when in use)
- Hospital wards and operating theatres L_{Aeq} , 15min 45dBA (internal)
- Classrooms at schools L_{Aeq} , 15min 45dBA (internal) (when in use).

It is anticipated that the proposal would take no more than one week to complete at each location and would therefore be appropriately categorised as short-term infrastructure maintenance under the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009).

Construction vibration

The publication *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006) sets out human comfort criteria for continuous, impulsive and intermittent vibration. Where vibration is intermittent, as would be the case with the proposal, the dose values in Table 6-7 are applicable.

Table 6-7 Acceptable vibration dose values for intermittent vibration (m/s 1.75)

Location	Daytime ⁽¹⁾		Night time ⁽¹⁾	
	Preferred	Maximum	Preferred	Maximum
Critical areas ⁽²⁾	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

1) Daytime is 7.00am to 10.00pm and night time is 10.00pm to 7.00am.

2) Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source: *BS 6472-1992 Guide to evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)* (British Standards Institution, 1992).

In relation to potential building damage, *BS 7385-2 1993 Evaluation and measurement for vibration in buildings* (British Standards Institution, 1993) sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. For residential or light commercial buildings, the following recommended limits are given:

- 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz
- 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

6.4.4 Potential impacts

Construction noise

Table 6-8 shows construction noise predictions for those sites where physical works are proposed. The results presented show that, due to the proximity of receivers, noise management levels are likely to be exceeded for the nearest residential and commercial receivers. At all locations, the 75 dBA highly noise affected criteria would also be exceeded. These exceedances represent a worst case and would only occur for short periods while the noisiest equipment is being used. Works at each site would not exceed one week.

Table 6-8 Construction noise predictions

Ref #	Location	Nearest receiver type	Receiver distance (metres)	NML (day)	Prediction L_{Aeq} 15min dBA	Exceedance above NML (standard hours)
11	Norwest Boulevard after Brookhollow Way (westbound stop 2153140)	Education	40	55 (external)*	79	24
12	Norwest Boulevard before Columbia Circuit (eastbound stop 215385)	Education	10	55 (external)*	93	38
20	Victoria Avenue after Anella Avenue (eastbound stop 215467)	Commercial	25	70	82	12
23	Carrington Road before Victoria Avenue (westbound stop 215493)	Commercial	15	70	88	18
24	Carrington Road after Victoria Avenue (eastbound stop 215469)	Commercial	20	70	85	15
37	McMullen Avenue before Old Northern Road (eastbound stop 2154386)	Commercial	15	70	88	18
41	Castle Hill Road before Old Northern Road (westbound stop 2154186)	Residential	15	60	88	28
43	Castle Hill Road after Glen Road (westbound stop 2154173)	Residential	20	60	85	25
49	County Drive and John Road (westbound stop 2126136)	Residential	10	60	91	31
62	Macquarie Drive opposite Francis Greenway Drive (westbound stop 2126153)	Residential	10	55	91	36
64	Francis Greenway Drive before Penrose Avenue (westbound stop 212694)	Residential	10	55	91	36
67	Francis Greenway Drive opposite Parkhill Crescent (westbound stop 212692)	Residential	10	55	91	36
68	Francis Greenway Dr at Parkhill Cr (eastbound stop 212677)	Residential	10	55	91	36
69	79 Francis Greenway Drive (new westbound stop)	Residential	10	55	91	36
70	110 Francis Greenway Drive (new eastbound stop)	Residential	10	55	91	36
71	Francis Greenway Drive opposite Thorpe Avenue	Residential	10	55	91	36

Ref #	Location	Nearest receiver type	Receiver distance (metres)	NML (day)	Prediction L _{Aeq} 15min dBA	Exceedance above NML (standard hours)
	(eastbound stop 212678)					
72	Francis Greenway Drive before Thorpe Avenue (westbound stop 212691)	Residential	10	55	91	36
99	Pennant Hills Road before Wells Street (eastbound stop 2120165)	Residential	30	60	80	20
102	Frontage of 235 Pennant Hills Road (new westbound stop)	Place of worship	15	55 (external)*	88	33
108	Pennant Hills Road after Dartford Road (eastbound stop 207614)	Recreation	5	60 (passive)	97	37
112	Pennant Hills Road after Normanhurst Road (eastbound stop 207619)	Education	5	55 (external)*	97	42
122	Pacific Highway at James Street (westbound stop 207736)	Commercial	5	70	97	27
123	Barker College, Pacific Highway (eastbound stop 207735)	Education	10	55 (external)*	91	36

* As per the *Interim Construction Noise Guideline* - A conservative estimate of the difference between internal and external noise levels is 10 dB for buildings other than residences.

Construction vibration

Having regard to the types of equipment that could be used and the typical distance to nearby buildings, vibration is not expected to be an issue in terms of both structural damage and human response. The Transport for NSW *Construction Noise Strategy* (Transport for NSW, 2012) sets out minimum working distances for vibration intensive plant to avoid building damage and human response. These are summarised in Table 6-9.

Table 6-9 Minimum safe working distances for vibration intensive plant

Plant Item	Rating / Description	Safe Working Distance	
		Cosmetic Damage	Human Response
Jackhammer	Hand held	1 m (nominal)	Avoid contact w/structure

Operational noise and vibration

The proposal would not result in changes to road geometry (except at Locations #11 and #12 where the change would be minor), traffic volumes or traffic mix and therefore a change in operational road traffic noise is not expected.

At locations where new / relocated bus stops are proposed, some short term static noise associated with pick-up and departure of buses, and waiting passengers at bus stops, may be noticeable. This would be periodic as per the bus timetable and would be experienced in the context of existing road traffic noise from other vehicles. The same static noise impacts would be eliminated at other locations where bus stops are removed, noting that there is an overall reduction in the number of bus stops. Buses would not be idling for extended periods at any of the new / relocated bus stops.

The proposal would not introduce new sources of vibration during operation and therefore vibration impacts are not expected.

6.4.5 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Construction noise and vibration	<p>A Construction Noise and Vibration Management Plan (CNVMP) would be prepared as part of the CEMP in accordance with the Roads and Maritime <i>Construction Noise and Vibration Guideline</i> (2016). This plan would include but not be limited to:</p> <ul style="list-style-type: none">• A map indicating the locations of sensitive receivers including residential properties• Management measures to minimise the potential noise impacts (including implementation of EPA	Contractor	Pre-construction / construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	<p><i>Interim Construction Noise Guideline</i> (DECCW, 2009)</p> <ul style="list-style-type: none"> • A risk assessment to determine potential risk for activities likely to affect receivers • Mitigation measures to avoid noise and vibration impacts during construction activities • A process for assessing the performance of the implemented mitigation measures • A process for documenting and resolving issues and complaints • A process for updating the plan when activities affecting construction noise and vibration change • Identify in toolbox talks where noise and vibration management is required. 			
Construction noise and vibration - complaints	During work hours, a community liaison phone number and site contact would be provided to enable complaints to be received and responded to.	Contractor	Construction	Standard safeguard
Construction noise and vibration - complaints	If deemed necessary, attended compliance noise and vibration monitoring would be undertaken upon receipt of a complaint. Monitoring would be reported as soon as possible. In the case that exceedances are detected, the situation would be	Contractor	Construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	reviewed in order to identify means to minimise the impacts to residences, the appropriate changes made and the NVMP updated accordingly.			
Construction noise and vibration - training	<p>The environmental induction program will include specific noise and vibration issues awareness training including, but not limited to, the following:</p> <ul style="list-style-type: none"> • Avoiding use of radios during work outside normal hours • Avoiding shouting and slamming doors • Where practical, operating machines at low speed or power and switching off when not being used rather than left idling for prolonged periods • Avoiding dropping materials from height and avoiding metal to metal contact on material. 	Contractor	Pre-construction / construction	Standard safeguard
Construction noise and vibration impacts	Where feasible and reasonable, construction will be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels will be scheduled during less sensitive time periods.	Contractor	Construction	Additional safeguard
Construction noise and vibration impacts	Quieter and less vibration emitting construction methods will be used where feasible and reasonable.	Contractor	Construction	Additional safeguard
Construction noise and	The noise levels of plant and equipment must have	Contractor	Construction	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
vibration impacts	operating Sound Power or Sound Pressure Levels compliant with the criteria in Appendix H of the <i>Construction Noise and Vibration Guideline</i> (Roads and Maritime Services, 2016).			
Construction noise and vibration impacts	Night time construction noise shall be limited to two consecutive nights High noise generating works will be completed before 11:00pm.	Contractor	Construction	Additional safeguard

6.5 Non-Aboriginal heritage

6.5.1 Existing environment

A search of the NSW State Heritage Inventory was undertaken for The Hills Shire and Hornsby Shire local government areas on 23 April 2017. It returned 1032 records. A similar search of the Australian Heritage Database returned 50 records. The Hills Shire LEP, the Hornsby LEP and Roads and Maritime Heritage Conservation Register were also searched with no additional items identified.

Figure 6-3 to Figure 6-6 show the location of heritage items and conservation areas in relation to proposal locations. There would be negligible potential impacts on heritage values associated with bus stop removal and these are only shown for context.

There are no World Heritage or National Heritage Places proximate to the proposal.

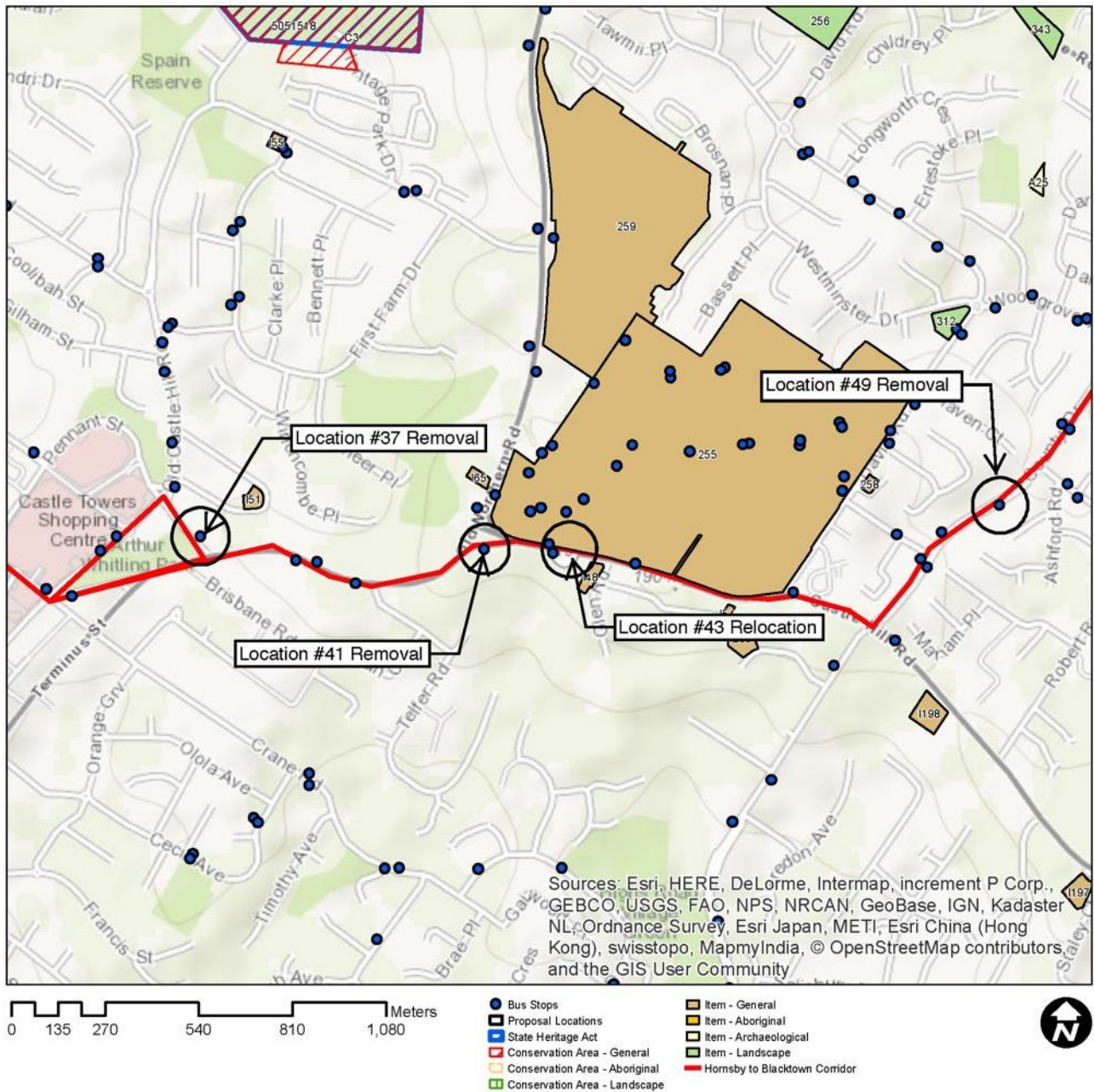


Figure 6-3 Heritage items – Map 1

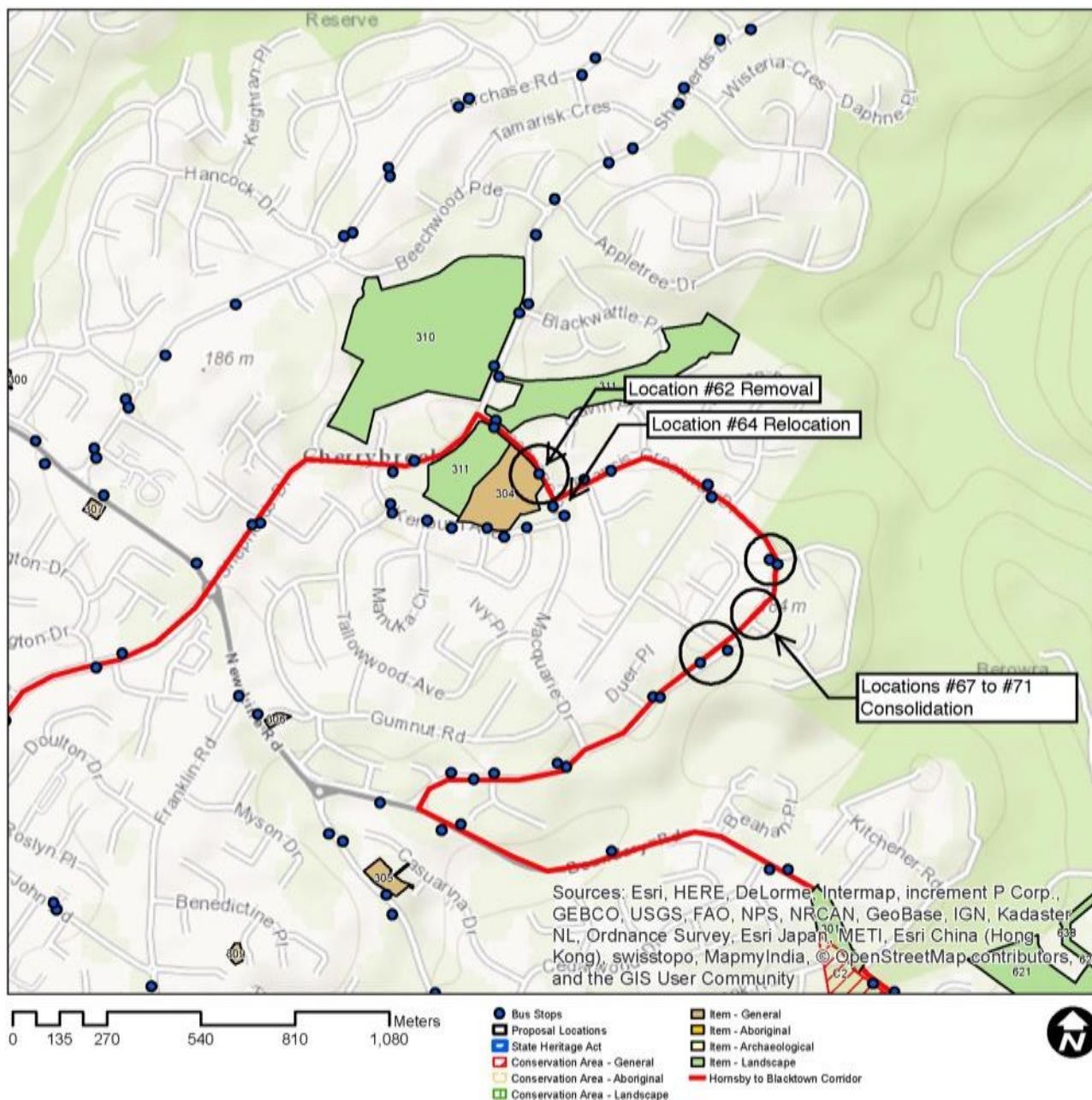


Figure 6-4 Heritage items – Map 2

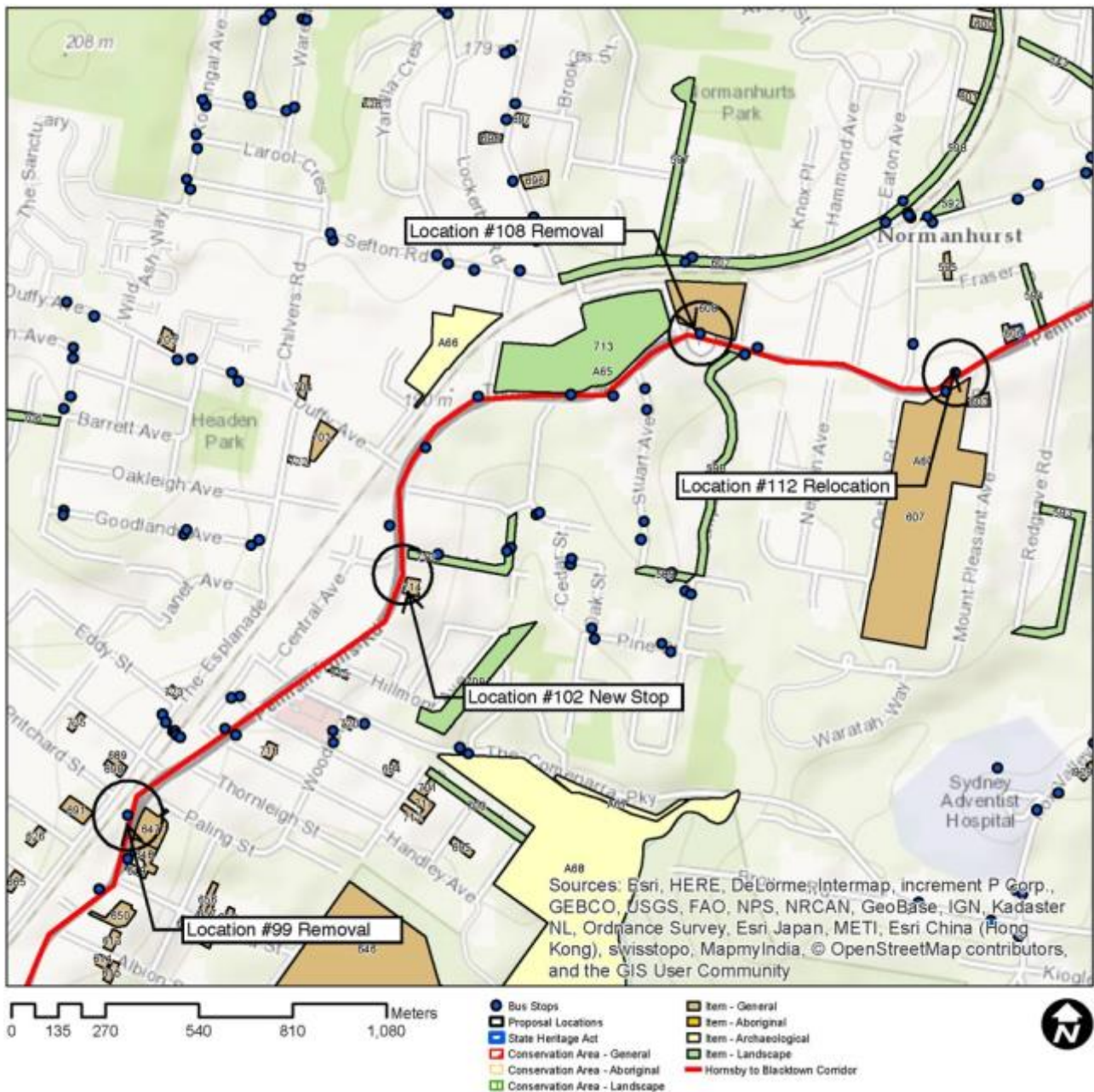


Figure 6-5 Heritage items – Map 3

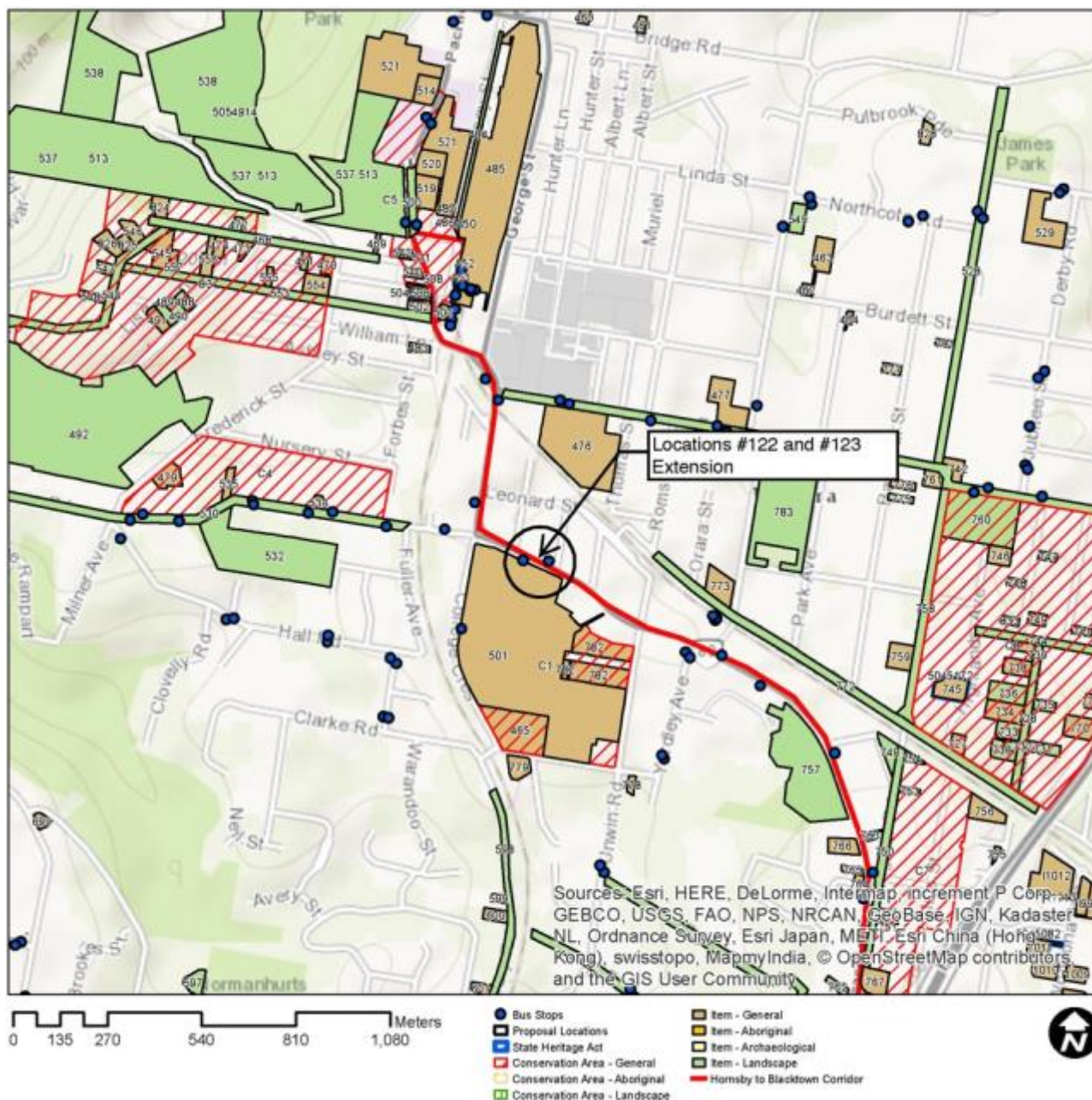


Figure 6-6 Heritage items – Map 4

6.5.2 Potential impacts

Table 6-10 reviews potential impacts on adjacent heritage items and conservation areas. There would be negligible potential impacts on heritage values associated with bus stop removal, because physical works would be limited to the removal of existing bus stop infrastructure, and therefore the locations where bus stop removal is proposed are not discussed further.

Table 6-10 Review of potential non-Aboriginal heritage impacts

Location / works	Items / conservation areas	Impact
Location #43 Castle Hill Road after Glen Road (westbound stop 2154173)	Locally significant "Fairholme" (I45) is located adjacent to this site.	No impact. The proposed signage and other elements would be consistent with the existing streetscape and would not affect

Location / works	Items / conservation areas	Impact
Relocate bus stop 2154173 about 100 metres to the east, to the departure side of the Glen Road intersection.		the heritage values of the nearby item. Works would not occur within the curtilage of the heritage item and dense screening vegetation would minimise visibility of the bus stop from the item.
Location #102 Frontage of 235 Pennant Hills Road (new westbound stop). Establish new bus stop the departure side of the Loch Maree Avenue intersection.	Locally significant "' Loch Maree House' and garden'" (714) is located immediately to south this site.	No impact. The proposed signage and other elements would be consistent with the existing streetscape and would not affect the heritage values of the nearby item.
Location #112 Pennant Hills Road after Normanhurst Road (eastbound stop 207619). Relocate bus stop 80 metres to the west.	Locally significant "Loretto Convent group, grounds, gates and cemetery" (607) is located opposite this site.	No impact. The proposed signage and other elements would be consistent with the existing streetscape and would not affect the heritage values of the nearby item.
Location #122 Pacific Highway at James Street (westbound stop 207736). Extend bus stop by 15 metres to the west.	Locally significant "Barker College, group of buildings, grounds and gate" and Barker College Heritage Conservation Area is located opposite this site.	No impact. The proposed signage and other elements would be consistent with the existing streetscape and would not affect the heritage values of the nearby item.
Location #123 Barker College, Pacific Highway (eastbound stop 207735). Extend bus stop by 15 metres to the east.	Locally significant "Barker College, group of buildings, grounds and gate" and Barker College Heritage Conservation Area is located adjacent to this site.	No impact. The proposed signage and other elements would be consistent with the existing streetscape and would not affect the heritage values of the nearby item. Works would not occur within the curtilage of the heritage item or within the conservation area.

At all proposal locations, there has been previous disturbance of the natural soil profile associated with urban development, road construction and utilities. Given the minor nature of proposed excavations (shelter footings, signage footings and concreted pads) archaeological potential is likely to be low.

6.5.3 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Unexpected impacts on heritage values	If unexpected heritage item/s, archaeological remains or potential relics are uncovered during the works, all works would cease in the vicinity of the material / find and the <i>Standard Management Procedure: Unexpected Heritage Finds</i> (Roads and Maritime Services, 2015) would be followed.	Roads and Maritime Contractor	Construction	Standard safeguard
Inadvertent impacts on known heritage items and unexpected impacts on heritage values	Non-Aboriginal heritage awareness training would be provided for workers prior to commencement of construction work to communicate potential heritage items that may be impacted during works, and the procedure required to be carried out in the event of discovery of historical heritage materials, features or deposits.	Contractor	Pre-construction	Additional safeguard

6.6 Aboriginal heritage

6.6.1 Existing environment

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken on 15 April 2017 and identified 51 registered sites in the wider area around the proposal sites. None of the sites are near proposal locations. There are no declared Aboriginal places near the proposal sites. All the proposal sites have been highly disturbed by urban development, road construction and the utilities placement.

6.6.2 Potential impacts

Aboriginal cultural heritage impacts are not expected as a result of the proposal. There are no known Aboriginal sites near proposal locations, works would be confined to highly disturbed areas and excavation would be shallow and unlikely to disturb natural soil profiles. The Roads and Maritime Aboriginal Cultural Heritage Officer for Sydney Region has provided the following advice in relation to the proposal (refer to Appendix C):

- The proposal is unlikely to harm known Aboriginal objects or places
- The AHIMS search did not indicate any known Aboriginal objects or places in the immediate study area
- The study area does not contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due Diligence Code of Practice for*

the Protection of Aboriginal objects in NSW (Department of Environment, Climate Change and Water, 2010) and the Roads and Maritime procedure (Roads and Maritime Services, 2011)

- The cultural heritage potential of the study area appears to be reduced due to past disturbance.

6.6.3 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Disturbance of Aboriginal objects	The <i>Standard Management Procedure: Unexpected Heritage Finds</i> (Roads and Maritime Services, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. Work will only re-commence once the requirements of that procedure have been satisfied.	Roads and Maritime Contractor	Construction	Additional safeguard

6.7 Water quality

6.7.1 Existing environment

The proposal sites are within the Hawkesbury-Nepean, Parramatta River and Lane Cove River catchments. Details are as follows:

- Locations #11 and #12 – Strangers Creek catchment (Hawkesbury-Nepean)
- Locations #20, #23, #24, and #37 – Cattai Creek catchment (Hawkesbury-Nepean)
- Locations #41 and #43 – Excelsior Creek catchment (Parramatta River)
- Location #99 – Lane Cove River
- Locations #49, #62, #64, #67 - #72, #108, #112, #122 and #123 – Berowra Creek catchment (Hawkesbury-Nepean).

Water quality that drains to the urbanised parts of these catchments is generally poor and flows are altered by the constructed stormwater system. Stormwater from the urban catchment is generally not treated (except for gross pollutants). Common urban stormwater pollutants would include gross pollutant and litter, sediments and suspended solids, nutrients, toxic organics, heavy metals and hydrocarbons.

6.7.2 Potential impacts

The construction of the proposal has the potential to result in impacts on local water quality through:

- Accidental spills of fuels, oils or other chemicals from construction vehicles or equipment
- Discharge of water containing suspended solids from disturbed areas at work sites.

Without appropriate safeguards, such pollutants (such as fuel, chemicals or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially reach nearby

stormwater drains and flow into waterways. These pollutants could then affect aquatic life and the amenity value of the receiving waterways.

No groundwater extraction would be required for construction of the proposal and it is unlikely that the water table would be intercepted given excavations would be shallow and generally limited to the depth of existing pavements and subbase material.

Concrete for new hardstand areas (Locations #43, #69, #70, #102, #112) is to be poured so that there is no sag point and water drains away from the area sufficiently.

Following construction there would be no remaining disturbed surfaces and there would be negligible change to runoff from each site. There would be no operational water quality impacts associated with the proposal.

6.7.3 Environmental safeguards and mitigation measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Erosion and sedimentation	<p>Erosion and sediment control measures will be implemented and maintained in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) to:</p> <ul style="list-style-type: none"> • Minimise sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site • Minimise the amount of material transported from site to surrounding pavement surfaces • Divert off site water around the site. 	Contractor	Pre-construction / construction	Standard safeguard
Erosion and sedimentation	Erosion and sedimentation controls are to be checked and maintained on a regular basis and after a rain event of 10 millimetres or greater (including clearing of sediment from behind barriers) and records kept and provided on request.	Contractor	Construction	Standard safeguard
Erosion and	Any material transported	Contractor	Construction	Standard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
sedimentation	onto pavements will be swept and removed at the end of each working shift and prior to rainfall.			safeguard
Erosion and sedimentation	Erosion and sediment control measures are not to be removed until the works are complete or areas are stabilised.	Contractor	Construction	Standard safeguard
Pollution from site runoff	Refuelling, storage of fuels, vehicle wash down and concrete washout will occur at a dedicated location offsite.	Contractor	Construction	Additional safeguard
Spills	An emergency spill kit is to be kept on-site at all times. All staff are to be made aware of the location of the spill kit and trained in its use. If a spill or incident occurs, the <i>Environmental Incident Classification and Management Procedure</i> (Roads and Maritime Services, 2015) is to be followed and the Roads and Maritime Contract Manager notified immediately.	Contractor	Construction	Standard safeguard
Stockpiling	If temporary stockpiles are required on-site they would be located away from drainage lines and removed before the end of each shift.	Contractor	Construction	Additional safeguard
New hardstand	Concrete for new hardstand is to be poured so that there is no sag point and water drains away from the area sufficiently.	Contractor	Construction	Additional safeguard

6.8 Air quality

6.8.1 Existing environment

The main influence on air quality at the proposal sites is road traffic. The nearest Environment Protection Authority air quality monitoring site is in William Lawson Park at Prospect. Table 6-11 presents data from the Prospect site for the period January to December 2016 and compares that data to standards / goals from the National Environment Protection (Ambient Air Quality) Measure (NEPM).

Table 6-11 Air quality - EPA site at Prospect

Pollutant	Averaging time	NEPM maximum	Exceedance goal	Exceedances over NEPM maximum
Carbon monoxide	8 hours	9.0 ppm	1 day/year	-
Nitrogen dioxide	1 hour	0.12 ppm	1 day/year	-
	1 year	0.03 ppm	None	0
Ozone	1 hour	0.10 ppm	1 day/year	1
	4 hours	0.08 ppm	1 day/year	0
Sulfur dioxide	1 hour	0.20 ppm	1 day/year	0
	1 day	0.08 ppm	1 day/year	-
	1 year	0.02 ppm	None	-
Particulate matter (PM10)	1 day	50 µg/m ³	5 days/year	4
Particulate matter (PM2.5)	1 day	25 µg/m ³	-	-
	1 year	8 µg/m ³	-	5

6.8.2 Potential impacts

Potential impacts associated with the proposal during construction include minor emissions from machinery (eg delivery vehicles, construction plant).

Emissions from construction vehicles / equipment would be minor and short term due to the short amount of time needed to complete the works at each proposal site.

Sources of dust associated with the construction of the proposal include minor excavation works and wind erosion of the exposed surfaces. Small amounts of dust may be generated from these activities. The total amount of dust would depend on the silt and moisture content in the soil and the types of activities being carried out.

The mobilisation of dust associated with the proposal is expected to be below nuisance levels given the very small areas of ground disturbance.

The proposal would not alter traffic composition or volumes and therefore operational air quality impacts are not expected.

6.8.3 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Dust	Measures (including watering or covering exposed areas) will be documented in the CEMP and used to minimise or prevent air pollution and dust, where necessary.	Contractor	Pre-construction / construction	Standard safeguard
Dust and other emissions	Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.	Contractor	Construction	Standard safeguard
Other emissions	Works (including the spraying of paint and other materials) will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely. Plant, vehicles and equipment will be maintained in good condition and in accordance with manufacturer's specifications. Plant and machinery will be turned off when not in use.	Contractor	Construction	Standard safeguard
Dust and other emissions	Visual monitoring of air quality will be undertaken to verify the effectiveness of controls and enable early intervention.	Contractor	Construction	Standard safeguard

6.9 Traffic and transport

6.9.1 Existing environment

The existing traffic and transport environment is described in section 2.2.1.

6.9.2 Potential impacts

Construction of the proposal would create an increase in construction vehicles travelling to and from each proposal site via the motorway network, the wider arterial road network and the local road network. The relatively small number of construction vehicles required for the proposal is not likely to affect traffic flow on these roads, however there may be very short delays associated with vehicles accessing each site.

Temporary kerbside lane closures along the route may be required to allow for mobile crane access (for bus shelter installation) and any pavement works. Any such closures would be short-

term and would occur in accordance with a Road Occupancy Licence in order to minimise impacts on road users.

The proposal would result in a net gain of five on-street car parking spaces. The impact of parking losses and gains at specific proposal site locations has been considered in section 6.1.

During operation, the proposal would reduce total travel time and improve bus service reliability by improving access into and out of bus stops and reducing the amount of bus stops, consistent with the aims of the Bus Priority Infrastructure Program and *Sydney's Bus Future*.

6.9.3 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / Additional safeguard
Road safety and impacts to traffic flow.	A traffic management plan will be prepared and implemented in accordance with <i>Traffic control at worksites</i> (Roads and Traffic Authority, 2010).	Contractor	Pre-construction / construction	Standard safeguard
Property access	Vehicular property access would be maintained where possible including pre-schools, places of worship and all commercial premises.	Contractor	Construction	Standard safeguard
Pedestrian and cyclist access	Pedestrian and cyclist access is to be maintained throughout construction. Provision of signs outlining the pedestrians and cyclists diversion routes would be displayed during construction.	Contractor	Construction	Standard safeguard
Bus stop access	Access for bus passengers to bus stops would be maintained during construction.	Contractor	Construction	Additional safeguard

6.10 Hazards and risks

6.10.1 Potential impacts

Hazards and risks associated with the construction of the proposal would potentially include:

- Work close to sensitive receivers such as schools, childcare centres and hospitals
- Undertaking work within or next to major arterial and regional roads
- Work which may impact or restrict emergency access from existing building and/or emergency vehicles undertaking work within highly pedestrianised areas
- Carrying out work within close proximity to existing buildings and vibration sensitive structures.

- Carrying out work within the vicinity of existing services and utilities (eg high voltage power lines and gas mains)
- The use and storage of hazardous materials
- The use of heavy machinery
- Unexpected excavation of contaminated land.

A review of the list of contaminated sites notified to the Environment Protection Authority as at (5 April 2017) and a search of the record of notices kept under section 58 of the *Contaminated Land Management Act 1997* (as at 24 April 2017) did not identify any sites potentially affecting the proposal.

Construction hazards and risks are considered to be manageable through the application of standard mitigation measures, which would be developed by the construction contractor prior to construction.

Hazards or risks associated with the operation of the proposal would be limited to the potential for changed pedestrian behaviour associated with new bus stop locations (for example, crossing major roads away from signalised crossings). Operational hazards and risks are manageable through design and standard mitigation measures and plans (such as emergency response plans).

6.10.2 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Construction hazards and risks	As part of the site specific CEMP, a Hazard and Risk Management Plan, including an emergency response plan, will be prepared. The plan will identify construction phase hazards and risks detail measures to mitigate those risks.	Contractor	Pre-construction	Additional safeguard
Pedestrian safety	A safety review of all new bus stop locations will be conducted during the design phase to identify whether any additional pedestrian safety measures are required.	Roads and Maritime	Pre-construction	Additional safeguard
Contamination	In the event that indications of contamination are encountered (known and unexpected, such as odorous or visually contaminated materials), work in the area would cease until a contamination assessment can be prepared to advise on the need for	Contractor	Construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	remediation or other action, as deemed appropriate.			

6.11 Waste minimisation and management

6.11.1 Policy setting

Transport for NSW and Roads and Maritime are committed to ensuring the responsible management of unavoidable waste and promotes the reuse of such waste in accordance with the resource management hierarchy principles outlined in the *Waste Avoidance and Resource Recovery Act 2001*. These resource management hierarchy principles, in order of priority are:

- Avoidance of unnecessary resource consumption
- Resource recovery (including reuse, reprocessing, recycling and energy recovery)
- Disposal.

By adopting the above principles, Roads and Maritime aims to efficiently reduce resource use, reduce costs, and reduce environmental harm in accordance with the principles of ecologically sustainable development (refer section 8.2).

6.11.2 Potential impacts

The proposal is not expected to generate large quantities of waste materials. The following waste streams have been identified:

- Spoil
- Waste concrete
- Materials from decommissioned bus stops (steel, aluminium, glass, plastic)
- One cleared street tree
- General garbage and refuse.

The proposal would require small quantities of materials, primarily manufactured steel and glass elements and concrete. The quantities of material required would not result in a regional or local supply shortage and none are likely to be in short supply in the foreseeable future. Materials would be sourced from local commercial suppliers where available.

Non-renewable resources such as petroleum fuels would not be used in large quantities.

6.11.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Construction waste management	<p>The following resource management hierarchy principles will be followed:</p> <ul style="list-style-type: none"> • Avoid unnecessary resource consumption as a priority • Avoidance would be followed by resource 	Roads and Maritime Contractor	Construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	<p>recovery (including reuse of materials, reprocessing, and recycling and energy recovery)</p> <ul style="list-style-type: none"> Disposal would be undertaken as a last resort (in accordance with the <i>Waste Avoidance and Resource Recovery Act 2001</i>). 			
Construction waste management	<p>All wastes will be managed in accordance with the <i>Protection of the Environment Operations Act 1997</i>.</p> <p>All wastes will be disposed of legally in accordance with their classification under the <i>Waste Classification Guidelines Part 1: Classifying Waste</i> (Department of Environment, Climate Change and Water, 2009).</p>	Contractor	Construction	Standard safeguard
Resource use	Procurement will endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.	Roads and Maritime Contractor	Detailed design / pre-construction	Standard safeguard
Waste tracking	Types of waste collected, amounts, date / time and details of disposal are to be recorded in a waste register.	Contractor	Pre-construction / construction	Standard safeguard
Litter	Works sites would be maintained, kept free of rubbish and cleaned up at the end of each working day.	Contractor	Construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Waste disposal	<p>Suitable waste disposal locations would be identified and used to dispose of litter and other wastes on site, during construction. Suitable containers would be provided for waste collection.</p> <p>Wastes would be removed from each site at the end of each work shift.</p>	Contractor	Pre-construction / construction	Standard safeguard

6.12 Cumulative impacts

Cumulative impacts have the potential to arise from the interaction of individual elements within the proposal as well as interaction with other projects that may be occurring or planned within the locality or the broader region. Clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* requires that potential cumulative impacts be considered during the environmental impact assessment process.

Construction traffic volumes associated with the proposal would be relatively small. Impacts from the interaction with construction traffic from other development projects are therefore not expected. There would be the loss of one street tree associated with the proposal. The loss would be minor and unlikely to contribute to cumulative impacts on local biodiversity. Water quality in receiving watercourses is another area where cumulative effects are possible. The main potential water quality impacts associated with the proposal would be during construction and measures have been proposed to address these impacts. Cumulative water quality impacts are therefore not expected.

Minimising impacts attributable to the proposal is the best way to address any potential cumulative effects and various measures have been proposed throughout this chapter.

The proposal would deliver cumulative reliability benefits to buses using the route and in conjunction with other projects being delivered as part of the Bus Priority Infrastructure Program.

6.12.1 Environmental safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Construction phase cumulative impacts	The CEMP will be revised to consider potential cumulative impacts from surrounding development activities as they become known. This will include a process to review and update mitigation measures as new work begins or complaints are	Contractor	Pre-construction / construction	Standard safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	received.			

7 Environmental management

7.1 Environmental management plans (or system)

A number of environmental safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures will be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Project Environmental Management Plan (PEMP) and a Construction Environmental Management Plan (CEMP) will be prepared to describe environmental safeguards and management measures identified. These plans will provide a framework for establishing how these measures will be implemented and who will be responsible for their implementation.

The PEMP and CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP will be developed in accordance with the specifications set out in QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), QA Specification G40 – Clearing and Grubbing and QA Specification G10 - Traffic Management.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measure outlined in this document will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These environmental safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The environmental safeguards and management measures are summarised in Table 7-1.

Table 7-1 Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing
GEN1	General - minimise environmental impacts during construction	<p>A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity.</p> <p>As a minimum, the CEMP will address the following:</p> <ul style="list-style-type: none"> • Any requirements associated with statutory approvals • Details of how the project will implement the identified safeguards outlined in the REF • Issue-specific environmental management plans • Roles and responsibilities • Communication requirements • Induction and training requirements • Procedures for monitoring and evaluating environmental performance, and for corrective action • Reporting requirements and record-keeping • Procedures for emergency and incident management • Procedures for audit and review. <p>The endorsed CEMP will be implemented during the undertaking of the activity.</p>	Contractor / Roads and Maritime	Pre-construction / detailed design
GEN2	General - notification	<p>All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity. The notification letter will include (as a minimum):</p> <ul style="list-style-type: none"> • Contact name and phone number • Working hours and proposed construction period • Complaints process. 	Contractor / Roads and Maritime	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
GEN3	General – environmental awareness	<p>All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings.</p> <p>The environmental awareness training is to include (as a minimum):</p> <ul style="list-style-type: none"> • Environmentally sensitive locations • Requirement to report and the process for reporting environmental issues ineffective environmental controls • Erosion and sediment control measures • Incident management process • Site staff environmental responsibilities. 	Contractor / Roads and Maritime	Pre-construction / detailed design
GEN4	General - notification	The Roads and Maritime Project Manager must notify the Roads and Maritime Regional Environmental Officer at least five working days prior to commencement of works.	Roads and Maritime	Pre-construction
SOE1	Socio-economic - communication	<p>A Communication Plan will be prepared and included in the CEMP. The Communication Plan will include (as a minimum):</p> <ul style="list-style-type: none"> • Requirements to provide details and timing of proposed activities to affected residents • Contact name and number for complaints • Procedure to notify adjacent land users for changed conditions during the construction period such as traffic, pedestrian or driveway access. <p>The communication plan will be prepared in accordance with G36 requirements and the Roads and Maritime Community Engagement and Communications Manual (2012).</p>	Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
SOE2	Socio-economic - complaints	<p>A complaints handling procedure and register would be included in the CEMP and maintained for the duration of the project. The environmental awareness training is to include (as a minimum):</p> <ul style="list-style-type: none"> • Environmentally sensitive locations and/or no go zones • Requirement to report and the process for reporting environmental issues on site • Requirement to report and the process for reporting damaged environmental controls • Erosion and sediment control • Incident management process • Site staff environmental responsibilities. 	Contractor	Pre-construction / construction
SOE3	Socio-economic – interruptions to utility services	In the event that utilities relocation would be required, residents would be informed prior to any interruptions to utility services that may be experienced as a result of utilities relocation.	Contractor	Pre-construction / construction
SOE4	Socio-economic – access	Road users, pedestrians and cyclists would be informed of changed conditions, including likely disruptions to access during construction.	Contractor	Pre-construction / construction
SOE5	Socio-economic – access	Access to residences, businesses and retained bus stops will be maintained during construction.	Contractor	Construction
BIO1	Unexpected threatened species impact	If unexpected threatened flora or fauna are discovered, works would stop immediately and the Roads and Maritime <i>Unexpected Threatened Species Find Procedure</i> , identified in the Roads and Maritime <i>Biodiversity Guidelines</i> (Roads and Traffic Authority, 2011) will be implemented.	Contractor	Construction
BIO2	Impacts to fauna	Prior to removal, trees will be checked for nesting birds and arboreal mammals. If present, fauna would be relocated by a qualified wildlife handler.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
VIS1	Loss of street trees - landscape character / visual amenity	Opportunities to provide replacement tree plantings (Francis Greenway Drive) or otherwise mitigate streetscape impacts will be explored in consultation with the relevant local council.	Transport for NSW / Roads and Maritime	Pre-construction
VIS2	Construction related visual impacts	The work site would be left in a tidy manner at the end of each work day.	Contractor	Construction
VIS3	Bus stop design	Bus stop signage and other infrastructure will comply with applicable Transport for NSW requirements and standards.	Transport for NSW / Roads and Maritime	Detailed design
NVI1	Construction noise and vibration	<p>A Construction Noise and Vibration Management Plan (CNVMP) would be prepared as part of the CEMP, in accordance with the Roads and Maritime <i>Construction Noise and Vibration Guideline</i> (2016). This plan would include but not be limited to:</p> <ul style="list-style-type: none"> • A map indicating the locations of sensitive receivers including residential properties • Management measures to minimise the potential noise impacts from the quantitative noise assessment (including implementation of EPA <i>Interim Construction Noise Guideline</i> (DECCW, 2009) • A risk assessment to determine potential risk for activities likely to affect receivers • Mitigation measures to avoid noise and vibration impacts during construction activities • A process for assessing the performance of the implemented mitigation measures • A process for updating the plan when activities affecting construction noise and vibration change • A process for documenting and resolving issues and complaints • Identify in toolbox talks where noise and vibration management is required 	Contractor	Pre-construction / construction

No.	Impact	Environmental safeguards	Responsibility	Timing
NV2	Construction noise and vibration - complaints	During work hours, a community liaison phone number and site contact would be provided to enable complaints to be received and responded to.	Contractor	Construction
NV3	Construction noise and vibration - complaints	If deemed necessary, attended compliance noise and vibration monitoring would be undertaken upon receipt of a complaint. Monitoring would be reported as soon as possible. In the case that exceedances are detected, the situation would be reviewed in order to identify means to minimise the impacts to residences, the appropriate changes made and the NVMP updated accordingly.	Contractor	Construction
NV4	Construction noise and vibration - training	The environmental induction program will include specific noise and vibration issues awareness training including, but not limited to, the following: <ul style="list-style-type: none"> • Avoiding use of radios during work outside normal hours • Avoiding shouting and slamming doors • Where practical, operating machines at low speed or power and switching off when not being used rather than left idling for prolonged periods • Avoiding dropping materials from height and avoiding metal to metal contact on material. 	Contractor	Pre-construction / construction
NV5	Construction noise and vibration impacts	Where feasible and reasonable, construction will be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels will be scheduled during less sensitive time periods.	Contractor	Construction
NV6	Construction noise and vibration impacts	Quieter and less vibration emitting construction methods will be used where feasible and reasonable.	Contractor	Construction
NV7	Construction noise and vibration impacts	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Appendix H of the <i>Construction Noise and Vibration Guideline</i> (Roads and Maritime Services, 2016).	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
NV8	Construction noise and vibration impacts	Night time construction noise shall be limited to two consecutive nights High noise generating works will be completed before 11:00pm.	Contractor	Construction
NAH1	Unexpected impacts on heritage values	If unexpected heritage item/s, archaeological remains or potential relics are uncovered during the works, all works would cease in the vicinity of the material / find and the <i>Standard Management Procedure: Unexpected Heritage Finds</i> (Roads and Maritime Services, 2015) would be followed.	Roads and Maritime Contractor	Construction
NAH2	Inadvertent impacts on known heritage items and unexpected impacts on heritage values	Non-Aboriginal heritage awareness training would be provided for workers prior to commencement of construction work to communicate potential heritage items (including those associated with Windsor Road) that may be impacted during works, and the procedure required to be carried out in the event of discovery of historical heritage materials, features or deposits.	Roads and Maritime Contractor	Construction
ABH1	Disturbance of Aboriginal objects	The <i>Standard Management Procedure: Unexpected Heritage Finds</i> (Roads and Maritime Services, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. Work will only re-commence once the requirements of that procedure have been satisfied.	Roads and Maritime Contractor	Construction
WQU1	Erosion and sedimentation	Erosion and sediment control measures will be documented in the CEMP and implemented and maintained in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) to: <ul style="list-style-type: none"> • Minimise sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site • Minimise the amount of material transported from site to surrounding pavement surfaces • Divert off site water around the site. 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
WQU2	Erosion and sedimentation	Erosion and sedimentation controls are to be checked and maintained on a regular basis and after a rain event of 10 millimetres or greater (including clearing of sediment from behind barriers) and records kept and provided on request.	Contractor	Construction
WQU3	Erosion and sedimentation	Any material transported onto pavements will be swept and removed at the end of each working shift and prior to rainfall.	Contractor	Construction
WQU4	Erosion and sedimentation	Erosion and sediment control measures are not to be removed until the works are complete or areas are stabilised.	Contractor	Construction
WQU5	Pollution from site runoff	Refuelling, storage of fuels, vehicle wash down and concrete washout will occur at a dedicated location offsite.	Contractor	Construction
WQU6	Spills	An emergency spill kit is to be kept on site at all times. All staff are to be made aware of the location of the spill kit and trained in its use. If a spill or incident occurs, the <i>Environmental Incident Classification and Management Procedure</i> (Roads and Maritime Services, 2015) is to be followed and the Roads and Maritime Contract Manager notified immediately.	Contractor	Construction
WQU7	Stockpiling	If temporary stockpiles are required on site they would be located away from drainage lines and removed before the end of each shift.	Contractor	Construction
WQU8	New hardstand	Concrete for new hardstand is to be poured so that there is no sag point and water drains away from the area sufficiently.	Contractor	Construction
AQU1	Dust	Measures (including watering or covering exposed areas) will be documented in the CEMP and used to minimise or prevent air pollution and dust, where necessary	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
AQU2	Dust and other emissions	Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.	Contractor	Pre-construction / construction
AQU3	Other emissions	<p>Works (including the spraying of paint and other materials) will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.</p> <p>Plant, vehicles and equipment will be maintained in good condition and in accordance with manufacturer's specifications.</p> <p>Plant and machinery will be turned off when not in use.</p>	Contractor	Construction
AQU4	Dust and other emissions	Visual monitoring of air quality will be undertaken to verify the effectiveness of controls and enable early intervention	Contractor	Construction
TTR1	Road safety and impacts to traffic flow.	A traffic management plan will be prepared and implemented in accordance with <i>Traffic control at worksites</i> (Roads and Traffic Authority, 2010).	Contractor	Pre-construction / construction
TTR2	Property access	Vehicular property access would be maintained where possible including pre-schools, places of worship and all commercial premises.	Contractor	Construction
TTR3	Pedestrian and cyclist access	<p>Pedestrian and cyclist access is to be maintained throughout construction.</p> <p>Provision of signs outlining the pedestrians and cyclists diversion routes would be displayed during construction.</p> <p>There will be advance notification of any construction works that affect pedestrians and cyclists.</p>	Contractor	Construction
TTR4	Bus stop access	Access for bus passengers to bus stops would be maintained during construction.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
HZR1	Construction hazards and risks	As part of the site specific CEMP, a Hazard and Risk Management Plan, including an emergency response plan, will be prepared. The plan will identify construction phase hazards and risks detail measures to mitigate those risks.	Contractor	Pre-construction
HZR2	Pedestrian safety	A safety review of all new bus stop locations will be conducted during the design phase to identify whether any additional pedestrian safety measures are required.	Roads and Maritime	Design
HZR3	Contamination	In the event that indications of contamination are encountered (known and unexpected, such as odorous or visually contaminated materials), work in the area would cease until a contamination assessment can be prepared to advise on the need for remediation or other action, as deemed appropriate.	Contractor	Construction
WMM1	Construction waste management	The following resource management hierarchy principles will be followed: <ul style="list-style-type: none"> • Avoid unnecessary resource consumption as a priority • Avoidance would be followed by resource recovery (including reuse of materials, reprocessing, and recycling and energy recovery) • Disposal would be undertaken as a last resort (in accordance with the <i>Waste Avoidance and Resource Recovery Act 2001</i>). 	Roads and Maritime Contractor	Construction
WMM2	Construction waste management	All wastes will be managed in accordance with the <i>Protection of the Environment Operations Act 1997</i> . All wastes will be disposed of legally in accordance with their classification under the <i>Waste Classification Guidelines Part 1: Classifying Waste</i> (Department of Environment, Climate Change and Water, 2009)	Contractor	Construction
WMM3	Resource use	Procurement will endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.	Roads and Maritime Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
WMM4	Waste tracking	Types of waste collected, amounts, date/time and details of disposal are to be recorded in a waste register.	Contractor	Pre-construction / construction
WMM5	Litter	Works sites would be maintained, kept free of rubbish and cleaned up at the end of each working day.	Contractor	Construction
WMM6	Waste disposal	Suitable waste disposal locations would be identified and used to dispose of litter and other wastes on site during construction. Suitable containers would be provided for waste collection. Wastes would be removed from each site at the end of each work shift.	Contractor	Pre-construction / construction
CUI1	Construction phase cumulative impacts	The CEMP will be revised to consider potential cumulative impacts from surrounding development activities as they become known. This will include a process to review and update mitigation measures as new work begins or complaints are received.	Contractor	Pre-construction / construction

7.3 Licensing and approvals

Where required, an applicable Road Occupancy Licence would be in place prior to the commencement of works.

No other specific licencing/approval requirements have been identified.

8 Conclusion

8.1 Justification

The proposal forms part of the Bus Priority Infrastructure Program and supports *Sydney's Bus Future* (Transport for NSW, 2013) by delivering projects that make bus services more reliable. Specifically, the proposal targets a general standardised 400 metre spacing between bus stops, while spacing of bus stops between 800 metres and one kilometre apart would be considered as part of planning for a future rapid bus route.

While there would be some environmental impacts as a consequence of the proposal, they have been avoided or minimised wherever possible through design and site-specific safeguards summarised in Chapter 7 (Environmental management).

The benefits of the proposal are considered to outweigh the mostly temporary adverse impacts and risks associated with the proposal.

8.2 Objects of the EP&A Act

A consideration of the proposal in the context of the objects of the EP&A Act is presented in Table 8-1 below.

Table 8-1 Objects of the EP&A Act review

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The proposal would improve the reliability of bus services. Social and economic impacts are assessed in section 6.1. The assessment includes management measures to avoid and / or minimise impacts.
5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.	Not relevant to the proposal.
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	Not relevant to the proposal.
5(a)(iv) To encourage the provision of land for public purposes.	The proposal represents the improvement of a public asset.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	The proposal aims to deliver improved reliability in bus services.

Object	Comment
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	The proposal would have only minor potential impacts on native animals and plants. It is not expected to have a significant impact on threatened species, populations and ecological communities, and their habitats. Refer to section 6.2.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in sections 8.2.1 – 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the proposal.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Not relevant to the proposal.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	The REF will be displayed publicly and submissions will be invited. All issues raised will then be considered and responded to in the subsequent submissions report. Refer to Chapter 5 (Stakeholder and community consultation).

8.3 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The principles of ESD have been a consideration throughout the development of the proposal.

The EP&A Act recognises that ESD requires the effective integration of economic and environmental considerations in decision-making processes. The four main principles supporting the achievement of ESD are considered in the context of the proposal below.

8.3.1 Precautionary principle

The precautionary principle deals with certainty in decision-making. It provides that where there is a threat of serious or irreversible environmental damage, the absence of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation.

In the case of this proposal case there is no threat of serious or irreversible environmental damage. Where practicable, management measures have been included to manage potential impacts of the proposal.

8.3.2 Intergenerational equity

Social equity is concerned with the distribution of economic, social and environmental costs and benefits. Inter-generational equity introduces a temporal element with a focus on minimising the distribution of costs to future generations.

The impacts of the proposal have been identified as short term and manageable. Improved reliability of bus services would be experienced over a longer period.

8.3.3 Conservation of biological diversity and ecological integrity

The twin principles of biodiversity conservation and ecological integrity have been a consideration during the design and assessment process with a view to identifying, avoiding, minimising and mitigating impacts.

The proposal is not expected to have significant biodiversity impacts (refer to section 6.2).

8.3.4 Improved valuation, pricing and incentive mechanisms

The principle of internalising environmental costs into decision making requires consideration of all environmental resources which may be affected by a project, including air, water, land and living things. While it is often difficult to place a reliable monetary value on the residual, environmental and social effects of the proposal, the value placed on environmental resources within and around the corridor is evident in the extent of environmental investigations, planning and design of impact management measures to prevent adverse environmental impacts.

8.4 Conclusion

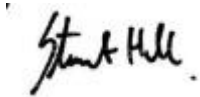
The proposal to improve the reliability of buses by making changes to bus stops between Hornsby and Blacktown, and is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of conservation agreements and plans of management under the NPW Act, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some impacts including increased walking distances to bus stops for some customers, construction noise and changes to visual amenity. Environmental safeguards have been proposed for the design phase of the proposal and during construction and operation of the proposal, should it proceed. These include implementing a communication plan and complaints handling process and maintaining accesses to business and properties. These safeguards will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the EP&A Act. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance.

9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.



Stuart Hill

Environmental Planner, Hills Environmental

Date: 21 August 2017

I have examined this review of environmental factors and the certification by Stuart Hill (Hills Environmental) and accept the review of environmental factors on behalf of Roads and Maritime Services.

Roopa Jogunoori

Project Manager

Roads and Maritime Services, Sydney Region

Date: 21 August 2017

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Terms and acronyms used in this REF

Term	Meaning
CEMP	Construction environmental management plan
EIA	Environmental impact assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
FM Act	<i>Fisheries Management Act 1994</i> (NSW)
Heritage Act	<i>Heritage Act 1977</i> (NSW)
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
NES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
TGSI	Tactile ground surface indicators
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW)
QA Specifications	Specifications developed by Roads and Maritime Services for use with roadworks and bridgeworks contracts let by Roads and Maritime Services

Appendix A

Consideration of clause 228(2) factors and matters of national environmental significance

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline as detailed in the REF, the following factors, listed in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000*, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Factor	Impact
<p>a. Any environmental impact on a community?</p> <p>There would be some short-term impacts on communities due to disruption associated with construction. In the longer-term bus users would benefit from more reliable bus services, but some users may have to walk a short distance further to their nearest bus stop. Localised impacts for businesses may result from decreased business exposure and changes to parking.</p>	<p>Short-term negative (minor)</p> <p>Long-term positive and negative</p>
<p>b. Any transformation of a locality?</p> <p>The proposal would not transform a locality.</p>	Nil
<p>c. Any environmental impact on the ecosystems of the locality?</p> <p>The proposal would not affect habitats on which native plants and animals (including threatened species) would be reliant.</p>	Nil
<p>d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>Short-term minor impacts associated with the removal of one street tree.</p>	Short-term negative (minor)
<p>e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</p> <p>Some proposal sites are adjacent to heritage items, but all proposed works are minor in nature, consistent with existing streetscapes and would not detract from heritage values.</p>	Negligible
<p>f. Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>There would be no impacts on the habitat of protected fauna. Refer to section 6.2.</p>	Nil
<p>g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The proposal would not endanger any species of animal, plant or other form of life, except for one street tree and limited to disturbance of turfed roadside areas.</p>	Nil
<p>h. Any long-term effects on the environment?</p> <p>Longer term bus reliability improvements are expected and this represents a social and economic benefit.</p>	Long-term positive

Factor	Impact
<p>i. Any degradation of the quality of the environment?</p> <p>The proposed works would potentially degrade the quality of the environment in the short-term, however the potential impacts would be minimised with the implementation of the environmental safeguards and management measures given in Chapter 7 (Environmental management) of this REF.</p>	Short-term negative (minor)
<p>j. Any risk to the safety of the environment?</p> <p>Measures have been proposed to ensure the proposal does not represent a risk to the safety of the environment.</p>	Nil
<p>k. Any reduction in the range of beneficial uses of the environment?</p> <p>The proposal would not reduce the range of beneficial uses of the environment.</p>	Nil
<p>l. Any pollution of the environment?</p> <p>No pollution of the environment is expected to result from the works, provided appropriate safeguards are implemented.</p>	Nil
<p>m. Any environmental problems associated with the disposal of waste?</p> <p>Waste generated during construction would be removed from site and disposed of legally. No environmental problems are anticipated for the disposal of waste.</p>	Nil
<p>n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>The proposed works would not increase demand for resources, which are, or are likely to become, in short supply.</p>	Nil
<p>o. Any cumulative environmental effect with other existing or likely future activities?</p> <p>The proposed works have the potential to have cumulative environmental effects with other existing or likely future activities, however cumulative effects are not expected due to the limited scope of works.</p>	Nil
<p>p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The works would not influence coastal processes and / or coastal hazards.</p>	Nil

Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment.

Factor	Impact
a. Any impact on a World Heritage property? There are no world heritage properties proximate to the proposal. Direct or indirect impacts are not expected	Nil
b. Any impact on a National Heritage place? There are no National Heritage Places proximate to the proposal. Direct or indirect impacts are not expected.	Nil
c. Any impact on a wetland of international importance? The proposal is not within the catchment of a wetland of international importance.	Nil
d. Any impact on a listed threatened species or communities? A number of Commonwealth listed threatened species have the potential to occur in the local area. The nature, scale and location of the proposal are such that impacts on these species or their habitats are not expected. Indirect impacts are also not expected.	Nil
e. Any impacts on listed migratory species? A number of Commonwealth listed migratory species have the potential to occur in the local area. The nature, scale and location of the proposal is such that impacts on these species or their habitats are not expected. Indirect impacts are also not expected.	Nil
f. Any impact on a Commonwealth marine area? As there are no Commonwealth Marine areas near the proposal sites, there would be no environmental impact on a Commonwealth Marine area.	Nil
g. Does the proposal involve a nuclear action (including uranium mining)? The proposed works do not constitute a nuclear action.	Nil
h. Any impact on a water resource, in relation to coal seam gas development and large coal mining development? The proposal is not for coal seam gas development or large coal mining development.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land?	Nil

Appendix B

Concept drawings

Appendix C

Aboriginal cultural heritage advice



27/6/2017

Emma-Lyn Horvath
Project Environmental Engineer
Easing Sydney's Congestion Program Office | Journey Management

Dear Emma-Lyn

Re: Preliminary assessment results for the Clearways on Bus Priority Program On-time running improvements for Phase 3 Route 11, Hornsby to Blacktown corridor REF, proposal based on Stage 1 of the *Procedure for Aboriginal cultural heritage consultation and investigation* (the procedure).

The project, as described in the Stage 1 assessment checklist, was assessed as being unlikely to have an impact on Aboriginal cultural heritage. The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate any known Aboriginal objects or places in the immediate study area.
- The study area does not contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Roads and Maritime Services' procedure.
- The cultural heritage potential of the study area appears to be reduced due to past disturbance.

Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me and your regional environmental staff to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Roads and Maritime Services' *Unexpected Archaeological Finds Procedure*.

For further assistance in this matter and do not hesitate to contact me.

Yours sincerely

Mark Lester
Aboriginal Cultural Heritage Officer – Sydney Region



Appendix D

ISEPP consultation checklists and letters

Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a <i>substantial</i> impact on the stormwater management services which are provided by council?	No		ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will <i>strain</i> the existing road system in a local government area?	No		ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a <i>substantial</i> impact on the capacity of any part of the system?	No		ISEPP cl.13(1)(c)
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a <i>substantial</i> volume of water?	No		ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a <i>minor</i> or <i>inconsequential</i> disruption to pedestrian or vehicular flow?	Yes	Consultation with The Hills Shire Council and Hornsby Shire Council has occurred. Refer to section 5.5.	ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than <i>minor</i> or <i>inconsequential</i> excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Yes	Consultation with The Hills Shire Council and Hornsby Shire Council has occurred. Refer to section 5.5.	ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than <i>minor</i> or <i>inconsequential</i> ?	No	Any impacts would be minor or inconsequential.	ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a <i>minor</i> extent?	No		ISEPP cl.15

Public authorities other than councils

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the <i>National Parks and Wildlife Act 1974</i> ?	No	Office of Environment and Heritage	ISEPP cl.16(2)(a)
Marine parks	Are the works adjacent to a declared marine park under the <i>Marine Parks Act 1997</i> ?	No	Department of Planning and Environment	ISEPP cl.16(2)(b)
Aquatic reserves	Are the works adjacent to a declared aquatic reserve under the <i>Fisheries Management Act 1994</i> ?	No	Office of Environment and Heritage	ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the <i>Sydney Harbour Foreshore Authority Act 1998</i> ?	No	Department of Planning and Environment	ISEPP cl.16(2)(d)
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No		ISEPP cl.16(2)(f)



3 April 2017

Mr David Walker
General Manager
The Hills Shire Council
PO Box 7064
BAULKHAM HILLS BC NSW 2153

Dear Mr Walker

**RE: Consultation regarding bus priority program initiatives
Hornsby to Blacktown corridor (Metrobus M60 route)**

Transport for NSW, in partnership with Roads and Maritime, is proposing to improve the reliability of bus services using the corridor between Hornsby and Blacktown (Metrobus M60 route) by making changes to bus stops at several locations.

Under *State Environmental Planning Policy (Infrastructure) 2007*, Roads and Maritime is required to consult with The Hills Shire Council under clause 13(1)(e) and 13(1)(f) due to impacts on Council managed pavements and the enclosing of public space during construction respectively.

For your reference, details of the proposal are included in the attachment to this letter.

It would be appreciated if you could provide any comments regarding this proposal at the earliest opportunity. Council's views will be considered before finalising the proposal.

Roads and Maritime would be pleased to provide further information if required. In this regard, I can be contacted on [REDACTED] or by [REDACTED].

Yours sincerely

David Keane
Project Manager

Roads & Maritime Services

27 Argyle Street, Parramatta, NSW, 2150 | PO Box 973 Parramatta CBD NSW 2124
T 131 782 | F [REDACTED] | E [REDACTED]

www.rms.nsw.gov.au | 131 782



3 April 2017

Mr Gary Bensley
General Manager
Hornsby Shire Council
PO Box 37
HORNSBY NSW 1630

Dear Mr Bensley

**RE: Consultation regarding bus priority program initiatives
Hornsby to Blacktown corridor (Metrobus M60 route)**

Transport for NSW, in partnership with Roads and Maritime, is proposing to improve the reliability of bus services using the corridor between Hornsby and Blacktown (Metrobus M60 route) by making changes to bus stops at several locations.

Under *State Environmental Planning Policy (Infrastructure) 2007*, Roads and Maritime is required to consult with Hornsby Shire Council under clause 13(1)(e) and 13(1)(f) due to impacts on Council managed pavements and the enclosing of public space during construction respectively.

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It would be appreciated if you could provide any comments regarding this proposal at the earliest opportunity. Council's views will be considered before finalising the proposal.

Roads and Maritime would be pleased to provide further information if required. In this regard, I can be contacted on [REDACTED] or by [REDACTED].

Yours sincerely

David Keane
Project Manager

Roads & Maritime Services

Appendix E

EPBC Act protected matters search and Bionet search

Data from the Biodiversity Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations distorted (* rounded to 0.1°, ** rounded to 0.01°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria: Public Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Entities in selected area (North: -33.68 West: 150.95 East: 151.12 South: -33.79) returned a total of 1,481 records of 69 species. Report generated on 23/04/2017 12:21 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3118	<i>Pseudophryne australis</i>		Red-crowned Toadlet	V,P		36	
Animalia	Amphibia	Hylidae	3166	<i>Litoria aurea</i>		Green and Golden Bell Frog	E,L,P	V	7	
Animalia	Aves	Columbidae	0023	<i>Phapitreron superbus</i>		Superb Fruit Dove	V,P		4	
Animalia	Aves	Artedidae	0196	<i>Isobrychus flavicastris</i>		Black Bittern	V,P		3	
Animalia	Aves	Accipitridae	0226	<i>Haliaeetus leucogaster</i>		White-bellied Sea Eagle	V,P	C	2	
Animalia	Aves	Accipitridae	0225	<i>Ninoxus boobook</i>		Little Eagle	V,P		6	
Animalia	Aves	Accipitridae	0230	** <i>Lophocircus lucas</i>		Square-tailed Kite	V,P,3		4	
Animalia	Aves	Falconidae	0236	** <i>Falco hypoleucos</i>		Grey Falcon	E,L,P,2		1	
Animalia	Aves	Cacatuidae	0268	** <i>Colaptes auratus</i>		Gang-gang Cockatoo	V,P,3		61	
Animalia	Aves	Cacatuidae	0268	** <i>Colaptes auratus</i>		Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V,P,3		57	
Animalia	Aves	Cacatuidae	0265	** <i>Colaptes auratus</i>		Glossy Black-Cockatoo	V,P,2		12	
Animalia	Aves	Ptilinidae	0260	<i>Glossopsitta pusilla</i>		Little Lorikeet	V,P		13	
Animalia	Aves	Ptilinidae	0309	** <i>Lophophanes alba</i>		Swift Parrot	E,L,P,3	CE	13	
Animalia	Aves	Ptilinidae	0277	** <i>Polytelus swainsonii</i>		Superb Parrot	V,P,3	V	2	
Animalia	Aves	Strigidae	0246	** <i>Ninox connexa</i>		Barking Owl	V,P,3		8	
Animalia	Aves	Strigidae	0248	** <i>Ninox strenua</i>		Powerful Owl	V,P,3		251	
Animalia	Aves	Tyrannidae	0250	** <i>Tyto novaehollandiae</i>		Masked Owl	V,P,3		4	
Animalia	Aves	Meliphagidae	0603	<i>Anthochaera phrygia</i>		Regent Honeyeater	E4A,P,3	CE	6	
Animalia	Aves	Meliphagidae	8303	<i>Meliphaga gularis gularis</i>		Black-chinned Honeyeater (eastern subspecies)	V,P		1	
Animalia	Aves	Neotitidae	0549	<i>Daphoenositta chrysostera</i>		Varied Sittella	V,P		5	
Animalia	Aves	Artamidae	8519	<i>Artamus cyanopterus cyanopterus</i>		Dusky Woodswallow	V,P		23	
Animalia	Aves	Petroicidae	0380	<i>Petroica boodang</i>		Scarlet Robin	V,P		4	
Animalia	Aves	Petroicidae	0382	<i>Petroica phoenicea</i>		Flame Robin	V,P		1	
Animalia	Aves	Petroicidae	0383	<i>Petroica radiata</i>		Pink Robin	V,P		1	
Animalia	Mammalia	Dasyuridae	1008	<i>Dasyurus maculatus</i>		Spotted-tailed Quail	V,P	E	5	
Animalia	Mammalia	Phascogasteridae	1162	<i>Phascogaster cinerea</i>		Koala	V,P	V	2	
Animalia	Mammalia	Pseudocheiridae	1133	<i>Pseudocheirus volans</i>		Greater Glider	P	V	2	
Animalia	Mammalia	Pteropodidae	1280	<i>Pteropus poliocephalus</i>		Grey-headed Flying-fox	V,P	V	111	
Animalia	Mammalia	Emballonuridae	1321	<i>Saccolaimus flaviventris</i>		Yellow-bellied Shearwater	V,P		11	
Animalia	Mammalia	Molossidae	1329	<i>Mormopterus nasutus</i>		Eastern Freetail Bat	V,P		21	
Animalia	Mammalia	Vespertilionidae	1353	<i>Chalinorhinus dryi</i>		Large-eared Pied Bat	V,P	V	1	
Animalia	Mammalia	Vespertilionidae	1372	<i>Falsotis australis</i>		Eastern False Pipistrelle	V,P		12	
Animalia	Mammalia	Vespertilionidae	1346	<i>Miniotropis australis</i>		Little Bristwing Bat	V,P		12	
Animalia	Mammalia	Vespertilionidae	1334	<i>Miniotropis schreibersi</i>		Eastern Bristwing Bat	V,P		82	
Animalia	Mammalia	Vespertilionidae	1357	<i>Myotis macropus</i>		Southern Myotis	V,P		7	
Animalia	Mammalia	Vespertilionidae	1361	<i>Scotophilus nuxleyi</i>		Greater Broad-nosed Bat	V,P		12	
Animalia	Gastropoda	Camaenidae	8306	<i>Meristodon cuneolatus</i>		Cumberland Plain Land Snail	E1		4	
Animalia	Gastropoda	Camaenidae	8310	<i>Polytropis dorsalis</i>		Dural Woodland Snail	E1	E	5	
Plantae	Flora	Dilleniaceae	11250	<i>Wibbenia superba</i>			E,L,P		95	
Plantae	Flora	Ericaceae	6205	<i>Teucrium glandulosum</i>			V,P		125	
Plantae	Flora	Ericaceae	7752	<i>Epacris purpurascens</i> var. <i>purpurascens</i>			V,P		234	
Plantae	Flora	Ericaceae	9549	<i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i>			E,L,P		6	
Plantae	Flora	Fabaceae (Mimosoidae)	3728	<i>Acacia bynoensis</i>		Bynoe's Wattle	E,L,P	V	4	
Plantae	Flora	Fabaceae (Mimosoidae)	3741	<i>Acacia dunnii</i> var. <i>rossiae</i>		Kananga Wattle	V,P		1	
Plantae	Flora	Fabaceae (Mimosoidae)	7229	<i>Acacia gordonii</i>			E,L,P	E	3	
Plantae	Flora	Fabaceae (Mimosoidae)	3860	<i>Acacia pubescens</i>		Downy Wattle	V,P	V	15	
Plantae	Flora	Graminaceae	9471	** <i>Graminella stenophylla</i>		Narrow-leaf Finger Fern	E,L,P,3		3	
Plantae	Flora	Haloragaceae	3257	<i>Haloragadenia lucasii</i>			E,L,P	E	3	
Plantae	Flora	Malvaceae	6140	<i>Lasiacis lucasii</i>			V,P	V	2	
Plantae	Flora	Myrtaceae	4007	** <i>Callistemon linearifolius</i>		Netted Bottle Brush	V,P,3		4	
Plantae	Flora	Myrtaceae	4024	<i>Danthonia biflora</i>			V,P	V	193	
Plantae	Flora	Myrtaceae	4031	<i>Danthonia pedunculata</i>			V,P		18	
Plantae	Flora	Myrtaceae	4057	<i>Eucalyptus camfieldii</i>		Camfield's Stringybark	V,P	V	25	
Plantae	Flora	Myrtaceae	4134	<i>Eucalyptus nicholii</i>		Narrow-leaved Black Pepper	V,P	V	6	
Plantae	Flora	Myrtaceae	3907	<i>Eucalyptus scoparia</i>		Wallangarra White Gum	E,L,P	V	1	
Plantae	Flora	Myrtaceae	11892	<i>Eucalyptus sp. Cattoi</i>			E4A,P		8	
Plantae	Flora	Myrtaceae	8314	<i>Lophostatum laevis</i>			V,P	V	14	
Plantae	Flora	Myrtaceae	6809	<i>Melaleuca bicolorata</i>		Bicolor Paperbark	V,P	V	1	
Plantae	Flora	Myrtaceae	4248	<i>Melaleuca deanei</i>		Deane's Paperbark	V,P	V	31	
Plantae	Flora	Myrtaceae	4293	<i>Syzygium paniculatum</i>		Magenta Lilly Pilly	E,L,P	V	12	
Plantae	Flora	Orchidaceae	4464	** <i>Genoplesium basum</i>		Baum's Midge Orchid	E,L,P,2	E	11	
Plantae	Flora	Orchidaceae	9671	** <i>Genoplesium plumosum</i>		Tallong Midge Orchid	E4A,P,2	E	1	
Plantae	Flora	Orchidaceae	7324	** <i>Pterostylis nigricans</i>		Dark Greenhood	V,P,2		1	
Plantae	Flora	Proteaceae	5365	** <i>Grevillea caleyi</i>		Caley's Grevillea	E4A,P,3	E	1	
Plantae	Flora	Proteaceae	5458	** <i>Persoonia hirsuta</i>		Hairy Geobung	E,L,P,3	E	17	
Plantae	Flora	Proteaceae	8995	<i>Persoonia mollis</i> subsp. <i>mollis</i>			E,L,P	E	5	
Plantae	Flora	Proteaceae	5457	<i>Persoonia rotunda</i>		Nodding Geobung	E,L,P	E	1	
Plantae	Flora	Rubiaceae	5630	<i>Gallium australe</i>		Tangled Bedstraw	E,L,P		7	
Plantae	Flora	Thymelaeaceae	6905	<i>Pimelea curviflora</i> var. <i>curviflora</i>			V,P	V	21	



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 10/08/17 14:46:44

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	45
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	9
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	54
Nationally Important Wetlands:	None
Key Ecological Features (Marine):	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Blue Gum High Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Macquaria australasica Macquarie Perch [86632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Isodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Other		
Pommerhelix duralensis Dural Land Snail [85268]	Endangered	Species or species habitat known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Darwinia biflora [14619]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat known to occur within area
Hibbertia spanantha Julian's Hibbertia [88475]	Critically Endangered	Species or species habitat known to occur within area
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia mollis subsp. maxima [56075]	Endangered	Species or species habitat known to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyaneoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited

Listed Marine Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [856]		Species or species

Name	Threatened	Type of Presence
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		habitat may occur within area Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves

[Resource Information]

Name	State
Berowra Valley	NSW
Berowra Valley	NSW
Dural	NSW
Lane Cove	NSW

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Alauda arvensis</i> Skylark [656]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Carduelis carduelis</i> European Goldfinch [403]		Species or species habitat likely to occur within area
<i>Carduelis chloris</i> European Greenfinch [404]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Lonchura punctulata</i> Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Passer montanus</i> Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
<i>Pycnonotus jocosus</i> Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area
<i>Turdus merula</i> Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area

Frogs

Name	Status	Type of Presence
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Spreng's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within

Name	Status	Type of Presence area
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i> Boneseed [16905]		Species or species habitat likely to occur within area
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> Bitou Bush [16332]		Species or species habitat likely to occur within area
<i>Cytisus scoparius</i> Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
<i>Dolichandra unguis-cati</i> Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
<i>Eichhornia crassipes</i> Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
<i>Genista linifolia</i> Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
<i>Genista monspessulana</i> Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
<i>Genista</i> sp. X <i>Genista monspessulana</i> Broom [67538]		Species or species habitat may occur within area
<i>Lantana camara</i> Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] <i>Lycium ferocissimum</i> African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
<i>Nassella neesiana</i> Chilean Needle grass [67699]		Species or species habitat likely to occur within area
<i>Nassella trichotoma</i> Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
<i>Opuntia</i> spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
<i>Pinus radiata</i> Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
<i>Protasparagus densiflorus</i> Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
<i>Protasparagus plumosus</i> Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
<i>Rubus fruticosus</i> aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
<i>Sagittaria platyphylla</i> Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur

Name	Status	Type of Presence
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		within area
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans. State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.701436 150.901581,-33.701436 150.901581,-33.704721 151.105948,-33.743556 151.11024,-33.743984 150.901006,-33.701436 150.901581

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- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- [Natural history museums of Australia](#)
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
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- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.