

# Parramatta Road and Shaftesbury Road Intersection Upgrade

Review of environmental factors

November 2016

# **Roads and Maritime Services**

# Parramatta Road and Shaftesbury Road Intersection Upgrade Review of environmental factors

November 2016

Prepared by NGH Environmental and Roads and Maritime Services

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# **Approval and authorisation**

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# **Executive summary**

# The proposal

Roads and Maritime Services (Roads and Maritime), propose to duplicate the right turn lane from Parramatta Road (citybound) to Shaftesbury Road (southbound) and duplicate the southbound through lane on Shaftesbury Road to provide additional capacity. The proposed works are required to improve traffic flow and reduce the risk of rear end, side swipe and lane change crashes on Parramatta Road on the approach to the intersection with Shaftesbury Road.

Key features of the proposal would include:

- Pavement widening on the northern side of Parramatta Road, adjacent to Concord Oval to allow for an additional right turn lane into Shaftesbury Road
- Pavement widening on the western side of Shaftesbury Road to allow two southbound through lanes
- Relocation of traffic signals to suit the new intersection layout
- Relocation of utilities affected by the proposed widening
- Signage and line marking adjustments
- Property acquisitions and adjustments on Parramatta Road and Shaftesbury Road
- Upgrade to stormwater drainage infrastructure
- Landscaping
- Construction compound site.

Construction is anticipated to commence in first half of 2018 and is expected to require 9 months of construction work. The majority of works would be completed as night works to minimise traffic delays locally and to the wider road network.

# **Need for the proposal**

The proposal forms part of NSW Government's \$246 million Pinch Point Program (PPP), which aims to reduce delays, manage congestion and maintain travel times on Sydney's main roads particularly during week day peak periods.

Currently, there is a high volume of traffic passing through the intersection during morning and afternoon peak periods with queuing as a result of insufficient right turn capacity from Parramatta Road to Shaftesbury Road southbound. The current proposal aims to improve intersection efficiency by duplicating the right turn lane on Parramatta Road, and duplicating the southbound through lane on Shaftesbury Road.

# Proposal objectives and criteria

The objectives of the proposal are to:

- Reduce traffic congestion on Parramatta Road in the city bound direction at the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes
- Increase the physical capacity of the right turn movement from Parramatta Road to Shaftesbury Road
- Improve the safety of Parramatta Road on approach to the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing into the through lane
- Minimise environmental and community impacts.

The proposal options were also assessed against the following criteria:

- Minimise property impacts. This is to include consideration of potential impact to operation of adjacent businesses.
- Minimise utility impact
- Provide value for money

# **Options identification and analysis**

Two options and a do nothing option were evaluated during the development of the proposal. Each of these options were evaluated against the proposal objectives and criteria outlined above The proposal options are outlined below;

#### Option 1 – Do nothing

This option would result in the existing conditions remaining in place for Parramatta Road and Shaftesbury Road intersection. The existing arrangement includes a 60 metre length single right hand turn lane into a single southbound lane on Shaftesbury Road.

Option 2a— Widening Parramatta Road to the north (adjacent to Concord Oval) to construct an additional right hand turn lane into Shaftesbury Road. The intersection layout would need to be modified to suit the new dual turning lane arrangement. Widening Shaftesbury Road to the west is proposed to construct dual southbound lanes. (preferred option).

Option 2b – Widening Parramatta Road to the south (adjacent to the service station and bus depot) to construct an additional right hand turn lane into Shaftesbury Road. The intersection layout would need to be modified to suit the new dual turning lane arrangement. Widening Shaftesbury Road to the west is proposed to construct dual southbound lanes.

From the options analysis completed (refer to section 2 for more detail) option 2a was identified as the preferred option overall as it best met the proposal objectives and criteria. Design refinements were made as the design developed, such as reducing designed lane widths, to further reduce property impacts.

# Statutory and planning framework

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. Clause 94 of 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. As the proposal is for a road and is to be carried out on behalf of Roads and Maritime Services, it can be assessed under Part 5 of the Environmental Planning and Assessment Act 1979. Development consent from council is not required.

# **Community and stakeholder consultation**

A 'Have your Say' consultation letter was distributed to the local community and relevant stakeholders in May 2016 to seek feedback on the proposal and concept design. Distribution of the consultation letter included delivery to:

- 1000 residents and businesses in Concord and Burwood
- City of Canada Bay and Burwood Councils
- Direct mail to emergency services, government agencies, schools and businesses in the local area
- Provided as part of a doorknock to residents and businesses affected by widening on Shaftesbury Road on Monday 16 May.

The purpose of the consultation was to seek comment, feedback, ideas, and suggestions to consider when developing the proposal and carrying out the REF. Consultation closed in late June 2016 and Roads and Maritime received comments from 15 people, raising 77 different matters. These matters were addressed (refer to table 5-1 within this REF for more information) and individual responses were provided to respondents. The response material also noted that the REF would be put on public display in late 2016 for an opportunity for the community to comment on the proposal.

The REF will be on public display for 2 weeks from Monday 5 December 2016 to Monday 19 December 2016 and written submissions will be invited during this period. The consultation process includes:

- Community information sessions with project representatives available
- Published on the Roads and Maritime website
- Hard copy display of the Review of Environmental Factors in Council and local library
- Letterbox drop to local residents providing information on the REF display and information sessions
- Advertisement in key local papers.

Additional details on the consultation process are outlined in detail in section 5.7 of this REF.

# **Environmental Impacts**

The proposed intersection upgrade at Parramatta Road and Shaftesbury Road, Concord/ Burwood would result in a number of environmental impacts including:

- Construction noise impacts including exceedance of the highly affected noise criteria
- Traffic impacts for the duration of construction
- Long term visual impact through the removal of road side trees
- Partial property acquisitions
- Impact to street and private property parking
- Cumulative noise and traffic impacts with other nearby road projects
- Relocation of the Historical plaque at the corner of Parramatta Rd and Loftus Street

#### **Justification and Conclusion**

The environmental impacts of the proposal are summarised above. The proposal also provides a benefit by increasing the capacity for the turning movement at the intersection. Modelling has shown this upgrade to improve the throughput of traffic travelling on Parramatta Road. The proposal also reduces potential for accidents caused by vehicles queuing beyond the right turn bay into the through lane.

The proposal as described in the REF best meets the project objectives but would still result in some construction noise and vibration impacts and traffic impacts, property acquisitions and impacts on visual amenity. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also improve road safety and reduce traffic congestion. The REF has determined that the benefits of the proposal would outweigh the potential environmental impacts and that the proposal is therefore justified.

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# 1 Introduction

# 1.1 Proposal identification

Roads and Maritime Services (Roads and Maritime), propose to duplicate the right turn lane from Parramatta Road (citybound) to Shaftesbury Road (southbound) and duplicate the southbound through lane on Shaftesbury Road to provide additional capacity. The proposed works are required to improve traffic flow and reduce the risk of rear end, side swipe and lane change crashes on Parramatta Road on the approach to the intersection with Shaftesbury Road.

Key features of the proposal would include:

- Pavement widening on the northern side of Parramatta Road, adjacent to Concord Oval to allow for an additional right turn lane into Shaftesbury Road
- Pavement widening on the western side of Shaftesbury Road to allow two southbound through lanes
- Relocation of traffic signals to suit the new intersection layout
- Relocation of utilities affected by the proposed widening
- Signage and line marking adjustments
- Property acquisitions and adjustments on Parramatta Road and Shaftesbury Road
- Upgrade to stormwater drainage infrastructure
- Landscaping.

The proposal is located in the Burwood Council Local Government Area (LGA) and City of Canada Bay Council LGA in the Roads and Maritime Sydney Region. The proposal is located in a residential area, and would require property acquisition and adjustment in relation to four lots within the Concord Oval on the northern side of Parramatta Road and four properties on the western side of Shaftesbury Rd.

The regional context of the proposal is shown in Figure 1-1 and the local context of the proposal is provided in Figure 1-2.

The following definitions have been used in this report:

- The 'proposal area' refers to the area that may be directly impacted by the proposal, in which construction activities would occur, including the location of the construction compounds (refer to Figure 1-1)
- The 'study area' consists of land near to, and including, the proposal site. The study area is a wider area surrounding the proposal site, including land that has the potential to be indirectly impacted by the proposal. The study area varies as required for the environmental issue assessed.

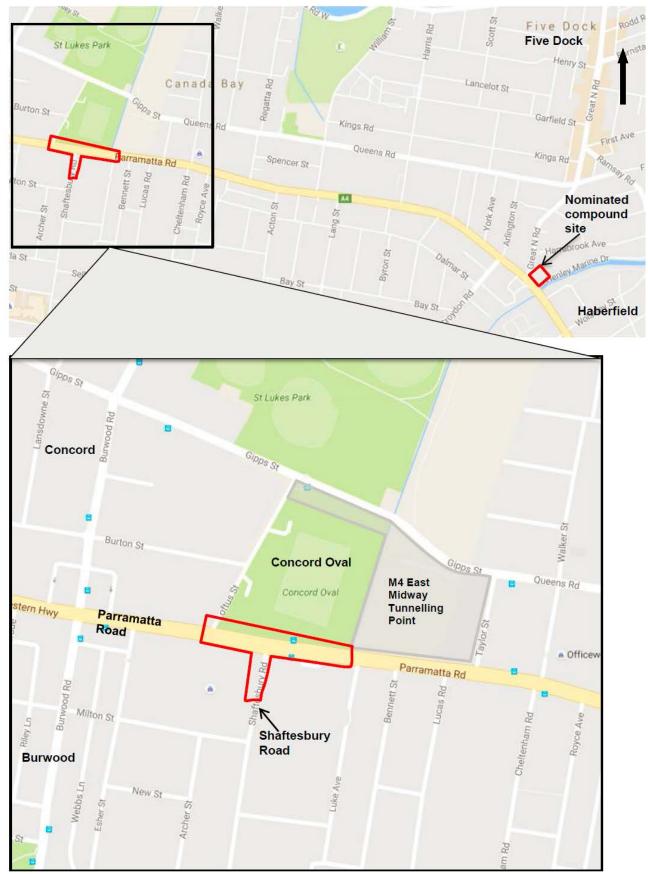


Figure 1-1: Locality map for the proposal.

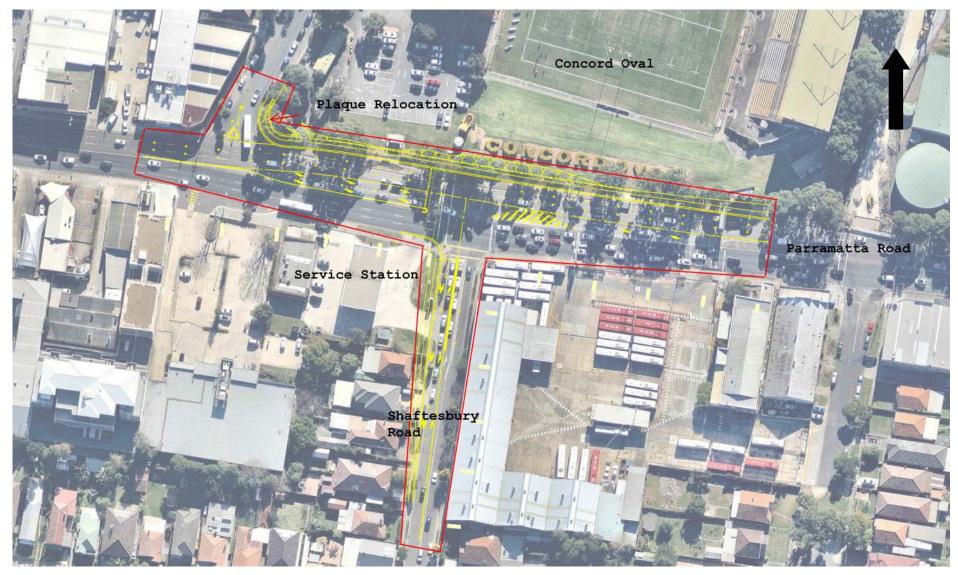


Figure 1-2 Design of the proposed Parramatta Road & Shaftesbury Road intersection upgrade. The proposal area boundary is shown in red.

# 1.2 Purpose of the report

This review of environmental factors (REF) has been prepared by NGH Environmental on behalf of Roads and Maritime Sydney Region. 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 work and associated environmental impacts have been undertaken in the context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the factors in *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (Is an EIS required? guidelines) (DUAP, 1995/1996), 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 for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

# 2 Need and options considered

# 2.1 Strategic need for the proposal

Parramatta Road is an important east-west major arterial road which is part of route A4. The A4 connects Western Sydney and the Inner West with the Sydney CBD. It also provides access to major roads such as the Hume Highway, Homebush Bay Drive/Centennial Drive and connects to the City West Link via Wattle Street.

The proposal forms part of NSW Government's \$246 million Pinch Point Program (PPP), which aims to reduce delays, manage congestion and maintain travel times on Sydney's main roads particularly during week day peak periods.

Currently, there is a high volume of traffic passing through the intersection during morning and afternoon peak periods with queuing as a result of insufficient right turn capacity from Parramatta Road to Shaftesbury Road southbound. The current proposal aims to improve intersection efficiency by duplicating the right turn lane on Parramatta Road, and duplicating the southbound through lane on Shaftesbury Road.

# NSW 2021: A plan to make NSW number one

The plan (DPC, 2011) sets goals and identifies actions in five key areas:

- Rebuild the economy
- Return quality services
- Renovate infrastructure
- Strengthen our local environment and communities
- Restore accountability to government.

The plan aims to deliver strategic infrastructure projects and better coordinate different transport modes to provide clean, reliable, safe, efficient and integrated transport services. Reducing travel times is identified as a goal of the plan. The proposal is consistent with the plan because it would reduce travel times around Parramatta Road/Shaftesbury Road.

#### **NSW Long Term Transport Master Plan**

The NSW Long Term Transport Master Plan (Transport for NSW, 2012) sets the framework and the overall priorities to guide where transport funding is invested. The Master Plan identifies Parramatta Road as a key bus corridor that is congested, with the Burwood to Sydney CBD route a significant route in Sydney's strategic bus network. The Master Plan aims to improve public transport on Parramatta Road. The proposal would improve traffic flow on Parramatta Road and would support improved bus services in the area.

#### **NSW State Infrastructure Strategy 2012-2032**

The State Infrastructure Strategy 2012-2032 (Infrastructure NSW 2011): 'First Things First' is an assessment of priority infrastructure problems and solutions for the next two decades for the NSW Government, the community, business and all who have an interest in the success of NSW. The Strategy builds on the NSW Government's existing public commitments and outlines a forward program of more than 70 urban and regional projects and reforms across transport, freight, aviation, energy, water, health, education and social infrastructure that should take priority over the next five, 10 and 20 years. The strategy acknowledges the issues of traffic congestion along Parramatta Road. The proposal is consistent with the plan because it would improve traffic flow along Parramatta Road.

#### Sydney's Bus Future

Sydney's Bus Future (Transport for NSW, 2013) sets out a plan to meet the growing demand for bus services and the changing customer needs now and in the future. The plan proposes a three-tiered network:

- Rapid service routes
- Suburban routes
- Local routes

The network will operate with each level delivering a defined level of service consistency and reliability:

Parramatta Road is identified as a potential route for Rapid Bus Transit in the future and is also expected to accommodate increased services between Burwood and Sydney CBD. The proposal would improve traffic flow on Parramatta Road and would support improved bus services in the area.

# 2.2 Existing infrastructure

#### Roads

Parramatta Road carries a significant volume of traffic (over 55,000-85,000 vehicles per day along the corridor), including heavy vehicles in both directions, as it provides a strategic transport link between Sydney, the western suburbs and the Blue Mountains.

Parramatta Road is a dual carriageway with three lanes in both directions separated by a concrete median and painted separation line. The alignment in the vicinity of the proposal is straight and has a slight grade sloping down towards the east. The intersection of Parramatta Road and Shaftesbury Road is a signal controlled three way intersection. The lane configurations at the intersection with Shaftesbury Road are as follows:

- Eastbound approach along Parramatta Road has four lanes: three through lanes, and a right turn lane around 60 metres long
- Eastbound departure has three through lanes. There is also a 70 metre long right turn lane into the bus depot
- Westbound approach along Parramatta Road has three through lanes
- Westbound departure has three through lanes. Left turns into Shaftesbury Road are allowed from the kerb side lane.

Shaftesbury Road is a two way council controlled road (Burwood Council), which links Burwood to Parramatta Road and carries about 10,000 vehicles per day. It includes dual lanes in the northbound direction and a single lane in the southbound direction. The carriageways are separated by a concrete median around 25 metres long and painted separation line. The lane configurations at the intersection are as follows:

- Northbound approach along Shaftesbury Road has two lanes: a shared left and right turn lane, and a dedicated right turn lane
- Southbound departure along Shaftesbury Road: one through lane.

Loftus Street is a two way single lane council road (Canada Bay Council) with an unsignalised give-way T intersection with Parramatta Road.

The lane configuration at the intersection is illustrated in Figure 2-1.

Signalised pedestrian crossings are provided across Shaftesbury Road and across Parramatta Road on the western side of the intersection.

The existing sign posted speed for Parramatta Road and Shaftesbury Road is 60km/h and 50km/h respectively.



Figure 2-1 Parramatta Road and Shaftesbury Road intersection

# Drainage

Parramatta Road grades towards the east to an existing stormwater channel to the east of Concord Oval. Stormwater on the road is captured by kerbs and a series of drainage pits along the northern and southern side of Parramatta Road. A stormwater box culvert runs below Parramatta Road from south to north just west of Shaftesbury Road then runs east within and along the boundary of Concord Oval.

Shaftesbury Road grades towards the south. Stormwater on the road is captured by kerbs and a series of drainage pits along both sides of the road.

#### Other utilities

Street lighting within the proposal area include:

- Six street lights located on the northern side of Parramatta Road
- Four on the southern side of Parramatta Road
- Two on Shaftesbury Road.

Additional utilities within the proposal area include:

- Electricity (overhead and underground)
- Gas
- Sydney Water
- Telecommunications (underground)
- Traffic Control Signals
- Variable Message Signs

Further information on the existing features within and surrounding the proposal area are detailed in chapter 6 of the REF.

# 2.3 Proposal objectives and development criteria

#### 2.3.1 Proposal objectives

The objectives of the proposal include:

- Reduce traffic congestion on Parramatta Road in the city bound direction at the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes
- Increase the physical capacity of the right turn movement from Parramatta Road to Shaftesbury Road
- Improve the safety of Parramatta Road on approach to the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing into the through lane
- Minimise environmental and community impacts.

# 2.4 Alternatives and options considered

# 2.4.1 Methodology for selection of preferred option

In 2012, a Parramatta Road corridor study was completed to identify intersections which could be targeted for short to medium term works to achieve improvements to the road network as well as the improve traffic efficiency for the corridor. Parramatta Road and Shaftesbury Road intersection was one of five intersections identified within the corridor for further investigation. A strategic design was then developed for this intersection to identify and review different intersection improvement options. These options were evaluated against the proposal objectives outlined above in section 2.3.1 and the following criteria:

- Minimise property impacts. This is to include consideration of potential impact to operation of adjacent businesses.
- Minimise utility impact
- Provide value for money

The options are outlined below in section 2.4.2 and an overview of the options evaluation against the objectives and criteria are provided below in section 2.4.3.

## 2.4.2 Identified options

Option 1 – Do nothing

This option would result in the existing conditions remaining in place for Parramatta Road and Shaftesbury Road intersection. The existing arrangement includes a 60 metre length single right hand turn lane into a single southbound lane on Shaftesbury Road.

Option 2a— Widening Parramatta Road to the north (adjacent to Concord Oval) to construct an additional right hand turn lane into Shaftesbury Road. The intersection layout would need to be modified to suit the new dual turning lane arrangement. Widening Shaftesbury Road to the west is proposed to construct dual southbound lanes. (preferred option).

Option 2b – Widening Parramatta Road to the south (adjacent to the service station and bus depot) to construct an additional right hand turn lane into Shaftesbury Road. The intersection layout would need to be modified to suit the new dual turning lane arrangement. Widening Shaftesbury Road to the west is proposed to construct dual southbound lanes.

#### 2.4.3 Analysis of options

#### Option 1 – Do Nothing

This option would not meet the proposal objectives or criteria. This option would not improve road safety or traffic flow. It would not reduce the number of crashes associated with overflow from the

right turn bay from Parramatta Road to Shaftesbury Road. There would be no construction environmental impacts associated with this option (Table 2-1).

Table 2-1 Option 1. Assessment against proposal objectives and criteria.

Objectives	Assessment	
Reduce traffic congestion on Parramatta Road in the city bound direction at the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes	The lane configurations would be maintained. This option would not reduce traffic congestion.	
Increase the physical capacity of the right turn movement from Parramatta Road to Shaftesbury Road	The lane configurations would be maintained. This option would not increase the physical capacity of the right turn movement from Parramatta Road to Shaftesbury Road.	
Improve the safety of Parramatta Road on approach to the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing into the through lane.	The lane configurations would be maintained. This option would not improve road safety.	
Minimise environmental and community impacts	This option would have no construction related impacts. However, road safety would continue to be compromised and traffic congestion would increase.	
Minimise property impacts. This is to include consideration of potential impact to operation of adjacent businesses.	This option would have no property impacts.	
Minimise utility impact	This option would not impact utilities.	
Provide value for money	This option has no direct cost however the continued cost of asset maintenance in considered to be a disadvantage of this option. Traffic congestion also has associated downstream economic costs relating to reduced productivity.	

Option 2a –Widening Parramatta Road to the north (adjacent to Concord Oval) to construct an additional right hand turn lane into Shaftesbury Road. Widening Shaftesbury Road to the west is proposed to construct dual southbound lanes. (preferred option).

This would include modifications to the layout of the intersection to accommodate the change in vertical and horizontal geometry of the intersection and approaches and space for new dual turning lanes. This option would reduce traffic congestion and improve road safety for through traffic and drivers undertaking right turn movement from Parramatta Road to Shaftesbury Road. The proposed works would involve property acquisition from eight lots, adjustment and protection of utilities, temporary traffic impacts for road users, and construction noise impacts to sensitive receivers. The safeguards and management measures identified in chapter 7 would minimise these impacts.

Table 2-2 Option 2a. Assessment against proposal objectives

Objectives	Assessment
Reduce traffic congestion on	This option would duplicate the right turn lane increasing
Parramatta Road in the city	the capacity for right turn movements into Shaftesbury

Objectives	Assessment
bound direction at the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes	Road reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes.
Increase the physical capacity of the right turn movement from Parramatta Road to Shaftesbury Road Improve the safety of Parramatta Road on approach to the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing into the through lane.	This option would duplicate the right turn lane increasing the capacity for right turn movements into Shaftesbury Road reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes.  This option would duplicate the right turn lane increasing the capacity for right turn movements into Shaftesbury Road reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes. Road safety would therefore be improved.
Minimise environmental and community impacts  Minimise property impacts. This	This option would have a number of environmental and community impacts including noise and traffic impacts during construction. This option would also require the partial acquisition of 8 lots to allow the road widening works. Road side trees would also need to be removed. Environmental impacts would be managed through the safeguards summarised in chapter 7.  This option would require acquisition of eight lots.
is to include consideration of potential impact to operation of adjacent businesses.	Acquisition of the western side of the service station would be required however preliminary investigation of service station infrastructure found that this would not impact the service station underground fuel infrastructure and therefore would avoid the need to modify the infrastructure (and also avoid potential associated contamination risks) and the service station ability to operate. Acquisition of the Concord Oval frontage requires tree removal though it does not impact the land use of the property, does not impact the carpark and can avoid the feature hedge along the roadside. This option also avoids impact to the bus depot and its ability to operate. Potential impact to the commercial premises on the corner of Loftus Street can be avoided through refinements to the road design.
Minimise utility impact	This option would require impact to utilities including electricity, gas, Telstra and Sydney Water assets. Impact to the electronic Variable Message Sign (VMS) located on the frontage of Concord Oval was able to be avoided by tapering the road design at this point.
Provide value for money	Strategic cost estimates developed for this options found it to have greatest value for money of the options considered and consistent with the strategic objectives of the Pinch Point program.

Option 2b – Widening Parramatta Road to the south (adjacent to the service station and bus depot) to construct an additional right hand turn lane into Shaftesbury Road. Widening Shaftesbury Road to the west is proposed to construct dual southbound lanes.

This option is similar to option 2a except for potentially greater property impacts. Parramatta Road would be widened to the south which would impact the service station and bus depot. Assessment of the service station infrastructure revealed that the proposal would potentially significantly impact

the above and below ground service station infrastructure and consequently could potentially impact its ability to operate. The service station also recently underwent a major upgrade. Widening towards the bus depot was also found to potentially impact the operation of the bus facility and could require more land take (than if widened to the opposite Concord Oval side). This is because the modifications to the intersection alignment are greater than those required for option 2a because the Parramatta Road westbound approach has greater changes in vertical and horizontal alignment required to achieve a desirable intersection layout which meets AustRoads Road Design standards. This includes issues with turning path for vehicles travelling left from Parramatta Road westbound into Shaftesbury Road. Widening for this corner could potentially impact the large built brick structure in the bus depot.

Table 2-3 Option 2b. Assessment against proposal objectives and criteria

Objectives	Assessment
Reduce traffic congestion on Parramatta Road in the city bound direction at the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes	This option would duplicate the right turn lane increasing the capacity for right turn movements into Shaftesbury Road reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes.
Increase the physical capacity of the right turn movement from Parramatta Road to Shaftesbury Road  Improve the safety of Parramatta Road on approach to the intersection with Shaftesbury Road by reducing the frequency of the right turn bay overflowing into the through lane.	This option would duplicate the right turn lane increasing the capacity for right turn movements into Shaftesbury Road reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes.  This option would duplicate the right turn lane increasing the capacity for right turn movements into Shaftesbury Road reducing the frequency of the right turn bay overflowing and blocking vehicles in the through lanes. Road safety would therefore be improved.
Minimise environmental and community impacts	This option would have a number of environmental and community impacts including noise and traffic impacts during construction. This option would also require acquisition for the road widening works. Impacts along the frontage of Concord Oval may be able to be avoided.
Minimise property impacts. This is to include consideration of potential impact to operation of adjacent businesses.	This option would require acquisition of five lots including strip acquisition in front of three residential premises on Shaftesbury Road. The amount of acquisition required includes potential impact the operation of two businesses including the service station and bus depot. Acquisition would impact both the Parramatta Road and Shaftesbury Road side of the service station which could potentially impact its ability to operate. Impact to the Parramatta Road frontage would also impact above and underground infrastructure. If relocation of the infrastructure was feasible, this would require substantial time and cost implications which would be prohibitive for a pinch point strategy solution. This may also present environmental risks associated with potential contamination risk. This option would also require acquisition along the Parramatta Road frontage of the bus depot which would impact its capacity to store buses and reduce its level of operation.

Objectives	Assessment
Minimise utility impact	This option would require impact to utilities including electricity, gas, Telstra and Sydney Water assets. The VMS located in front of the bus depot may not be able to be avoided as it is closer to the intersection (than in option 2a).
Provide value for money	This option may incur significant cost associated with potential impact to the service station and potential full commercial acquisition if its ability to operate was permanently affected.

# 2.5 **Preferred option**

Option 2a was selected as the preferred option as it best meets the proposal objectives overall. Both options 2a and 2b required property impacts though option 2a was found to have comparatively less impact. Option 2a would result in environmental impacts which can be managed in accordance with the measures detailed in this REF.

# 2.6 **Design refinements**

Widening of Shaftesbury Road to the east (towards the bus depot) was considered during strategic design though was not pursued as it was found to impact the large brick building associated with the bus depot with potential impact to the entire structure and consequently to the functionality of the bus depot. Widening to the west was retained, however to reduce potential property impacts the design was reviewed and the originally proposed lane widths were reduced slightly to minimise the required property acquisition on the western side of Shaftesbury Road from seven to four properties. The design of the median and footpath were also narrowed slightly to reduce the required land take.

# 3 Description of the proposal

# 3.1 The proposal

Roads and Maritime proposes to upgrade the Parramatta Road and Shaftesbury Road signalised intersection to improve safety and alleviate traffic congestion. The proposal includes widening along Parramatta Road and Shaftesbury Road intersection approaches to accommodate for the extra lanes. The key features of the proposal are shown in Figure 3-1. A concept design is provided in Appendix A.

Figure 3-2 and Figure 3-3 provide proposed configuration of Parramatta and Shaftesbury roads respectively within the proposal area.

Key features of the proposal include:

#### **Parramatta Road**

- Duplicating the right turn from Parramatta Road into Shaftesbury Road southbound, around 60 metres in length including the modification of the existing median on Parramatta Road
- Creating the space needed for the dual turn lanes by widening up to 3.5 metres along the northern side of Parramatta Road for around 200 metres between Loftus Street and Luke Avenue, adjacent to Concord Oval. This would include the removal and reinstatement of the existing footpath
- Removal of up to 25 mature street trees along the northern side of Parramatta Road between Loftus Street and Luke Avenue, along the Concord Oval frontage for the widening. The Concord Oval hedge would not be impacted
- Removal of existing concrete island and construction of new concrete island at Loftus Street to allow for widening of Parramatta Road
- Adjustments to the eastern kerb line of Loftus Street at the Parramatta Road intersection to allow for the widening. This would include the relocation of a historical plaque at this corner, a few metres to the north. in consultation with City of Canada Bay Council
- Partial property acquisition of four lots along the northern side of Parramatta Road (Concord Oval) to allow the widening (refer to section 3.6 for details)
- Reduction in length of the right turn lane into the bus depot along Parramatta Road from 70 metres to 40 metres in length to accommodate the new road alignment and provide safe vehicle movement. This would be undertaken by providing a painted median. No changes to driveway access will be required for the Bus Depot.

#### **Shaftesbury Road**

- Duplicating the southbound through lane on Shaftesbury Road, around 60 metres in length
- Creating the space needed for the additional southbound lane by widening up to three metres
  along the western side of Shaftesbury Road for around 80 metres. The pavement adjustment
  would include relocation of the concrete median and the removal and reinstatement of the
  existing western footpath
- Acquisition of around 140 square metres would be acquired from the service station. The
  driveway on Shaftesbury Road and the entry driveway on Parramatta Road would be adjusted
  to allow the proposed widening. These adjustments would be completed in consultation with
  the service station
- Relocation of the intersection signal infrastructure to suit the new intersection layout
- Partial acquisitions of four lots along Shaftesbury Road to allow for the road widening (refer to Section 3.6 for details). This would require adjustments to existing driveways and the frontage of the properties in consultation with property owners
- Removal of two small road side trees along the western side of Shaftesbury Road
- Permanent removal of seven road side parking spaces along the southbound lane of Shaftesbury Road to allow for a merge lane.

#### **Loftus Street**

• Change the unsignalised give-way left turn to a stop sign.

#### Other requirements

- Tree trimming on approaches to the intersection (entirely within the proposal area boundary shown in Figure 1-2) is required to create sight distances for relocated traffic signals and relocated/new directional signage
- Utility adjustments within the proposal area boundary including (refer to section 3.5 for details)
  - Relocation by up to three metres of underground and overhead power, powerpoles and street lighting, along Shaftesbury Avenue and Parramatta Road
  - Relocation of gas and water mains
  - Relocation of traffic control signals
  - o Installation of new drainage pipe with outlet into the existing box culvert
  - Protection of a section of the box culvert in the proposed widening area on Parramatta Road may be required pending instruction from Sydney Water
- Signage and line marking adjustments
- Landscaping in accordance with a landscape plan approved by local councils

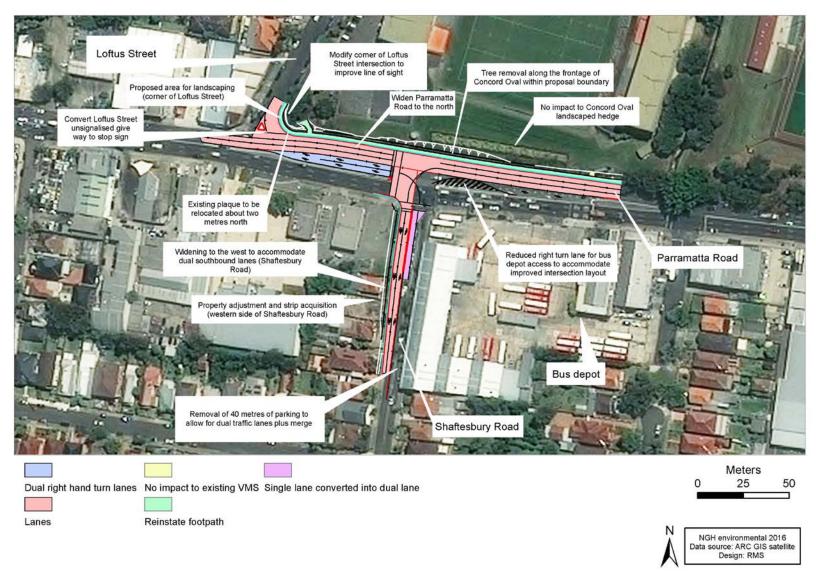


Figure 3-1 Key features of the proposed Parramatta Road and Shaftesbury Road intersection upgrade

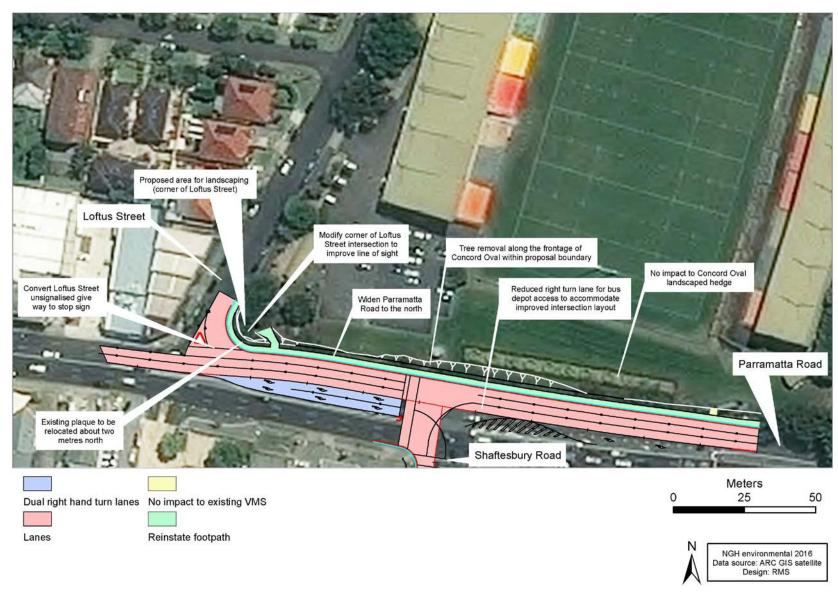


Figure 3-2 Key features of the proposal on Parramatta Road

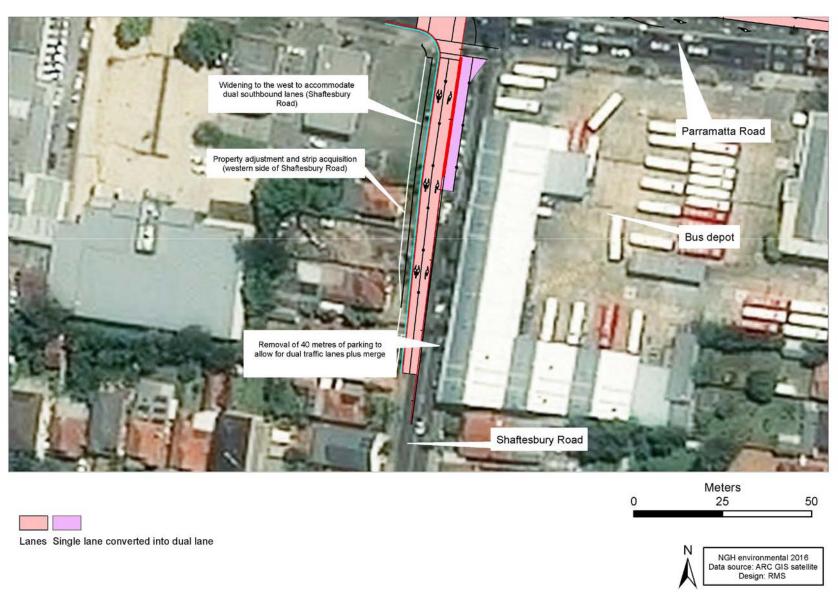


Figure 3-3 Key features of the proposal at Shaftesbury Road

# 3.2 Design

#### 3.2.1 Design criteria

The proposed intersection would cater for the following design vehicles (Table 3-1). Typical cross sections for Parramatta and Shaftesbury Roads are provided at Figure 3-4 and Figure 3-5 respectively.

Table 3-1 Vehicles used to assess design criteria

Vehicle Movement	Design Vehicle
Parramatta Road / Shaftesbury Road intersection	12.5m single unit truck/bus and car turning
(right turn southbound)	simultaneously
Parramatta Road / Shaftesbury Road intersection	12.5m single unit truck/bus
(left turn northbound)	-

The following design criteria have been adopted (Table 3-2).

Table 3-2 Design of Parramatta and Shaftesbury Roads

	Parramatta Road	Shaftesbury Road
Design speed	60 km/h	50 km/h
Lane width	2.95 – 3.1 m	3.0 m
Verge width	2.3 m	1.8 m
Footpath width	1.2 m	1.2 m

The following road design guidelines and standards have also been adopted:

- Austroads Guide to Road Design
- Published New South Wales supplements to Austroads Guides
- Australian Standards
- Published New South Wales supplements to Australian Standards
- The authorised scope of works and technical criteria

#### 3.2.2 Traffic control signals

Traffic control signals and signs at the Parramatta Road and Shaftesbury Road intersection, and the intersection at Parramatta Road and Loftus Street would require upgrading. The upgrade would require relocation of the existing traffic control signals due to the relocation of the verge and widening of the road.

#### 3.2.3 Engineering constraints

Constraints for the intersection design included:

- Requirement to adjust/relocate utilities in a narrow road corridor
- Heavy traffic along Parramatta Road
- The design will need to take into consideration the Burwood bus depot including storage capacity and operation which limits the area available for widening the road
- The design will need to take into consideration the required safety clearance areas from the 7-Eleven petrol station underground petrol and gas tanks
- Variable message sign. The design will need to take into consideration that the variable message sign will not be relocated from its current position.

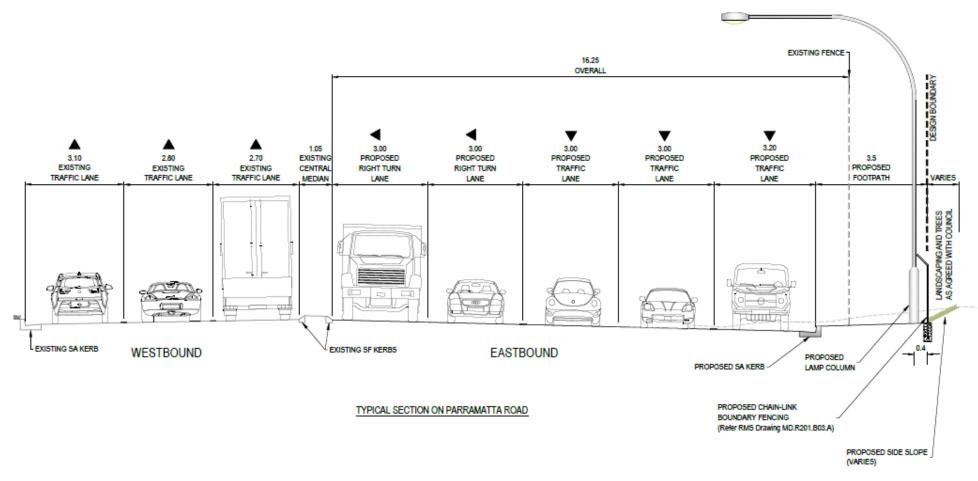
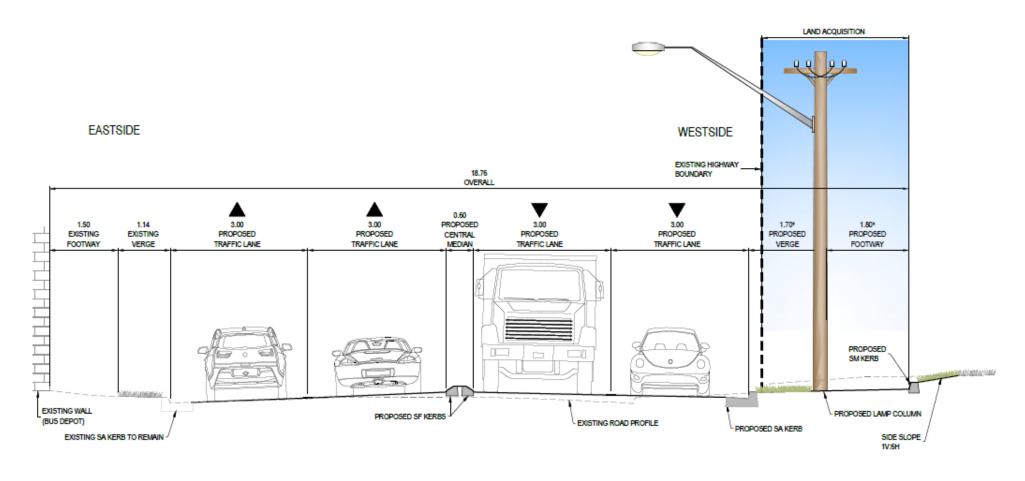


Figure 3-4 View of a typical cross section showing the proposed road design on Parramatta Road at the turning bay



TYPICAL SECTION ON SHAFTESBURY ROAD

Figure 3-5 View of a typical cross section showing the proposed road design on Shaftesbury Road

# 3.3 Construction activities

# 3.3.1 Staging and plant/equipment

The construction program stages are outlined below. in Table 3-3. Representative plant and equipment for the required activities across phases are also outlined. This staging plan and equipment list is indicative only and would be developed by the successful construction tenderer and subject to construction constraints (such as wet weather and road occupancy permits).

Table 3-3 Indicative proposal stages

Stage 1	Plant and equipment	
Preliminary works		
-		
Establish site compound	Excavator, crane	
Utility investigation including survey and	Non-destructive excavation truck/van/ute	
potholing.		
Survey set out		
Identifying the trees to be removed and	Truck, wood chipper (can be completed	
then removal of trees using equipment such	during the day if necessary), Elevated Work	
as chain saws.	Platform (EWP), excavator	
Saw cut the lip of kerb	Road saw	
Adjust all properties acquired to allow for	Excavator, truck	
construction works i.e. install fencing at new		
boundary and relocate petrol station		
furniture		
Utility relocation within the identified		
proposal area boundary		
Relocate underground and overhead	Excavator, truck, roller, EWP, truck	
electrical asset	mounted auger/setter/digger	
Relocate Jemena gas asset	Excavator, truck, roller	
Relocate Telstra telecom asset	Excavator, truck, roller	
Relocate/protect Sydney Water asset	Excavator, truck, roller	
Re-linemarking and barriers	Orio dan an watar blastar	
Grind out existing line marking and reduce width of lanes (if possible)	Grinder or water blaster	
Install concrete barriers along Shaftesbury	Truck mounted crane and trucks	
and Parramatta roads to provide safety for workers.		
Stage 2		
Stormwater drainage		
Construct drainage along Parramatta Road	Excavator, jumping jack, truck	
Construct drainage along Shaftesbury Road	Excavator, jumping jack, truck	
Widening on Shaftesbury Rd	Executator, jumping juck, truck	
Widening of road, which includes	Excavator and truck	
excavation of footpath area on west side of	Exodivator and track	
Shaftesbury Road.		
Conduct preparation works for placement of	Roller	
pavement such as compact, test and survey		
Place select material zone (SMZ) which	Excavator, roller, truck	
involves placing material and compacting	, ,	
the material under the concrete layer		
Place lean mix concrete (LMC) along the	Concrete agitator truck	

widening section, then test and cure			
Build base concrete, tie in to existing and	Concrete agitator truck, drill		
align transverse joints with existing, test and	,		
cure			
Build SA kerb and gutter (where not	Extruded or slipform machine		
integral) and subsoil drain	·		
Traffic control signal works to be completed			
during widening works			
Construct footpath	Concrete agitator truck		
Construct driveways	Concrete agitator truck, drill		
Construct verge	Excavator, roller, truck		
Widening on Parramatta Rd			
Excavate to floor of cut	Excavator and truck		
Compact, test and survey	Roller		
Place SMZ, test and survey	Excavator, roller, truck		
Place LMC, test and cure	Concrete agitator truck		
Build base concrete, tie in to existing and	Concrete agitator truck, drill		
align transverse joints with existing, test and			
cure			
Build SA kerb and gutter (where not	Extruded or slipform machine		
integral) and subsoil drain			
Construct footpath	Concrete agitator truck		
Construct verge	Excavator, roller, truck		
Finalise property adjustment works			
Stage 3			
Asphalt removal which includes milling,	Paving machine, trucks, rollers, bob cats		
then placing asphalt for the wearing	and utes		
course			
Reinstate lane configuration including	Stick and stomps and spray paint		
line marking	D 1		
Construct median on Shaftesbury Rd	Road saw, concrete agitator, excavator,		
and line mark to new configuration and	truck and line marking trucks		
sign posting			
Stage 4	Evenyeter roller truels and utan		
Landscaping	Excavator, roller, truck and utes		

#### 3.3.2 Construction hours and duration

Construction is anticipated to commence in first half of 2018. The duration of the proposed works is expected to be 9 months, including utility relocation works.

Proposed working hours would include work shifts during standard hours and night works (out of hours works) which are outlined below

Standard work hours: 7am to 6pm (Mon to Fri), 8am to 1pm (Saturday)

Out of hours works: 6pm to 7am (Mon to Fri) No works on Sundays or Public Holidays

Out of hours works will be required for the majority of construction to minimise impacts on traffic.

Parramatta Road is a key transport corridor for motorists, freight and public transport and connects Sydney CBD with Parramatta. Traffic volumes in the day peak at 2362 vehicles an hour and reduce to 1794 vehicles an hour at night. Night time works would create substantially less impact to traffic than if the works were completed during the day.

The majority of the works would require a lane closure and a speed reduction to 40 Km/hour. This is necessary to ensure the work crew have sufficient working space and a safe clearance from live traffic. Consequently, the majority of works would be completed as night works to minimise traffic delays locally and to the wider road network.

Many activities would require consecutive nights of work in order to complete the task. For example, utility connections cannot be completed in intervals with breaks in between because it would disrupt the service and may also create safety hazards (I.e. open utility pits/trenches or confusion over active and offline services).

Works that are sufficiently set back from live traffic and do not require truck movements may be able to be undertaken during the day i.e. landscaping, property adjustment, fencing works and a component of the utility relocation and pavement construction works.

#### 3.3.3 Earthworks

The proposal would require earthworks along some sections of the road widening and verge relocation. Earthworks would generally include removal of topsoil, excavating to the floor of cut and moving material along the alignment from cutting to fill embankment areas and batter treatments. Maximum batter heights would be 600mm. Batters would be required at the following locations:

- Cut along the northern side of Parramatta Road from Loftus Street to 140 metres to the east. Gradient of the slope would be between 1:2 and 1:6.
- Cut along the western side of Shaftesbury Road from Parramatta Road to 20 metres to the south. Gradient of the slope would be around 1:6.

Table 3-4 provides the estimated volumes of earthworks that would be required.

### 3.3.4 Source and quantity of materials

The proposal would require some earthworks. Select fill and the pavement materials would be imported to the work site from licensed suppliers within or near the Sydney region. Spoil material that is either surplus or unsuitable for re-use in the proposal would be removed and either transported to a licensed disposal or recycling facility or stockpiled for re-use in another construction project. Volumes are provided in Table 3-4.

The process for management of excess material would be detailed in a Resource and Waste Management Plan (RWMP) that would form part of the CEMP. Water for dust suppression would typically be sourced from a local hydrant or in rare instances where a hydrant is not available, a water cart.

Table 3-4 Earthworks volumes and other material quantities

Description of work and materials	Quantities to be excavated	Quantities to be imported
Clearing and grubbing		
Demolition of concrete (median and footpath)	150.22 m <sup>3</sup>	

Description of work and materials	Quantities excavated	to be	Quantities imported	to	be
Stormwater drainage					
Excavation for stormwater drainage	464.53 m <sup>3</sup>				
structures					
Trench drains					
Filter material			81.78 m <sup>3</sup>		
Selected material backfill			112.35 m <sup>3</sup>		
Earthworks					
Topsoil	167.02 m <sup>3</sup>				
General earthworks	1327.47 m <sup>3</sup>				
Construction of verges					
Haul and place verge material from	41.42 m <sup>3</sup>				
off-site					
Construction of unbound and					
modified pavement course					
Supply and place base			381.01 m <sup>3</sup>		
Lean mix concrete subbase					
Supply and place concrete on subbase			133.24 m <sup>3</sup>		
Cold milling of road pavement materials					
Milling to specified depth of cut	192.54 m <sup>3</sup>				
Heavy duty dense graded asphalt					
Dense graded asphalt			612.81 t		
General concrete paving					
Concrete paving			295.37 m <sup>3</sup>		
Landscape planting					
Turfing for lawn areas along medians and roadsides			414.20 m <sup>2</sup>		

#### 3.3.5 Traffic management and access

Construction impacts for each stage of the proposal would be managed through a stage-specific Traffic Management Plan in accordance with AS 1742 3 – 2009 and Traffic Control at Work Sites (RTA 2010) and a Road Occupancy Licence. The Traffic Management Plan would include the guidelines, general requirements and procedures to be used when activities or areas of work have the potential to impact on existing traffic arrangements. It is anticipated that only temporary lane closures would be required with no detours expected.

#### Road/lane closures

The majority of the widening works on Parramatta Road would be completed at night under 1 of 2 and 2 of 3 lane closures on Parramatta Road eastbound. Concrete barriers would be placed along the kerb to enable day works to be completed safely.

The majority of the widening works on Shaftesbury Road would be completed at night under 1 of 2 lane closure on Shaftesbury Road northbound. Concrete barriers would be placed along the kerb to enable day works to be completed safely.

Where possible lanes would be narrowed allowing room for concrete barriers to be placed in front of the kerb (on the road pavement) for the length of the widening. In areas where this is not possible due to lane widths or TMC restrictions, barriers would be installed in the footway behind the kerb, or works would need to be carried out with lane closures and traffic control.

#### **Property access**

Entry and exit to property and businesses would be maintained during the construction works and managed under traffic control. Driveways would only need to be closed when the driveway is being reconstructed. The construction contractor and VBAJV would maintain communication with the occupants of the properties and provide sufficient notice and necessary parking arrangements during the construction works.

#### **Bus stop relocations**

Bus stops would not be affected outside of construction hours. During construction hours buses would be managed under traffic control. The bus stop and shelter on Parramatta Road eastbound opposite the bus depot would be relocated around 1.5 m north (towards Concord Oval).

#### **Parking loss**

40 metres of parking (around seven spots) would be lost on Shaftesbury Road southbound as part of the design.

#### Site access for construction vehicles

The closed lane would be utilised for truck/plant movement. Trucks will enter/exit the closed lane under traffic control and in accordance with a TMP.

# 3.4 **Ancillary facilities**

A construction compound would be required for the duration of works and would be used for:

- Construction plant and vehicles
- Site office and amenities
- Traffic signals equipment
- Drainage pipes and pits
- Container for tools, signs, materials, etc.
- Stockpile area

Where practicable, plant and equipment would be stored at the compound, but may also be parked within the traffic lane closures within the proposal area.

One location has been nominated for potential use as a compound site for the proposal and is shown in locality Figure 1-1 and in detail below in Figure 3-6. The lot is located about two kilometres east of Shaftesbury Road at the corner of Great North Road and Parramatta Road, Five Dock, and may potentially be fully acquired by RMS as a result of a separate RMS project. This compound site is also proposed for use by a separate RMS project, Parramatta Road and Great North Road intersection upgrade at Five Dock. The potential cumulative impacts of this are assessed in section 6.12.



Figure 3-6 Proposed compound site located on the corner of Parramatta Road and Great North Road

# 3.5 Public utility adjustment

A number of above and underground utilities are located at the proposal site including:

- Street lighting
- Electricity (overhead and underground)
- Gas
- Sydney Water
- Telecommunications (underground)
- Traffic Control Signals

All utilities, with the exception of the underground Optus telecommunication asset and the Variable Message Sign along Parramatta Road, are expected to be impacted. Utility adjustments works are all within the proposal footprint as shown in Figure 1-2 and are outlined below.

All utility authorities and asset owners have been contacted and would need to certify and approve the relevant utility relocation design currently being developed. VBAJV would work in accordance with asset owner requirements to minimise interruptions to services.

#### **Electricity**

Three lighting and power poles and the overhead and underground electrical asset currently extending in the footway on Shaftesbury Road (west side) would need to be relocated. The asset extends for a length of 100 metres from the intersection with Parramatta Road. The asset would need to be relocated to the relocated footway on Shaftesbury Road.

Five lighting and power poles and the overhead and underground electrical asset currently extending in the footway on Parramatta Road (north side) would need to be relocated. The asset extends east on Parramatta Road (north side) from the intersection with Loftus Street for a length of 200 metres. The asset would need to be relocated to the relocated footway on Parramatta Road.

#### Gas

The Jemena gas asset currently extending in the footway on Shaftesbury Road (west side) would need to be relocated. The asset extends south for a length of 100 metres on Shaftesbury Road (west side) from the intersection with Parramatta Road. The asset would need to be relocated to the relocated footway on Shaftesbury Road.

#### **Telstra**

One Telstra manhole and the underground telecommunication asset currently extending in the footway on Shaftesbury Road (west side) would need to be relocated. The asset extends for a length of 100 metres on Shaftesbury Road (west side) from the intersection with Parramatta Road. The asset would need to be relocated to the relocated footway on Shaftesbury Road.

The underground Telstra telecommunication asset currently extending in the footway on Parramatta Road (north side) would need to be relocated. The asset extends on Parramatta Road (north side) for a length of 120 metres. The asset would need to be relocated to the proposed footway on Parramatta Road.

### **Sydney water**

Sydney Water infrastructure within the proposal area includes an underground asset at the corner of Parramatta Road and Shaftesbury Road and the Sydney Water underground culvert crossing Parramatta Road (20 metres east of Loftus Street). Protection of these assets may be required pending instruction from Sydney Water and will be further investigated as the project progresses.

# 3.6 Property acquisition

Property acquisition would be required within properties along Shaftesbury Road and Parramatta Road as indicated in Table 3-5 and Figure 3-7 to Figure 3-12.

Table 3-5: Proposed property acquisition

Lot and DP	Total area	Current owner	Land use zone (LEP)
Lot 1 DP 773472	140 m²	7-Eleven	B6 (Enterprise Corridor)
Lot 5 DP 70456	45 m <sup>2</sup>	Residential	R2 (Low Density Residential)
Lot 6 DP 70456	30 m <sup>2</sup>	Residential	R2 (Low Density Residential)
Lot 3 DP 202439	15 m <sup>2</sup>	Residential	R2 (Low Density Residential)
Lots 8, 9 & 10 DP 719520	120 m <sup>2</sup>	Concord Oval	RE1 (Public Recreation)
Lot 1 DP 1210747	170 m <sup>2</sup>	Concord Oval	RE1 (Public Recreation)



Figure 3-7 Proposed property acquisition at 1A Shaftesbury Road



Figure 3-8 Proposed property acquisition at 1 Shaftesbury Road



Figure 3-9 Proposed property acquisition at 3 Shaftesbury Road



Figure 3-10 Proposed property acquisition at 5 Shaftesbury Road



Figure 3-11 Proposed property acquisition at Concord Oval



Figure 3-12: Proposed property acquisition at Concord Oval

# 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 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.

As the proposal is for a road and is to be carried out on behalf of Roads and Maritime Services, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Development consent from council is not required.

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, 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 of this REF.

# 4.2 Local Environmental Plans

Parramatta Road at the proposal site forms the boundary between the Burwood Council LGA to the south and the City of Canada Bay Council LGA to the north.

## 4.2.1 Burwood Local Environmental Plan 2012

The proposed works are within the Burwood LGA on land zoned as SP2 Infrastructure, B6 Enterprise Corridor and R2 Low Density Residential. Refer to Table 4-1 for a list of the required work activity within land zones. A map showing the zoning of the site and surrounding area is provided in Figure 4-1.

Table 4-1 Zoning and consent requirements (Source: Burwood LEP, 2012)

Zone	Category	Relevant objectives	Relevant work activity	Consent requirements
SP2	Infrastructure	To provide for infrastructure and related uses.  To prevent development that is not compatible with or that may detract from the provision of infrastructure.	Road widening	Roads permitted without consent
В6	Enterprise Corridor	To promote businesses along main roads and to encourage a mix of compatible uses.  To provide a range of employment uses (including	Road widening	Roads permitted without consent

Zone	Category	Relevant objectives	Relevant work activity	Consent requirements
		business, office, retail and light industrial uses). To maintain the economic strength of centres by limiting retailing activity. To provide for residential uses, but only as part of a mixed use development.		
R2	Low Density Residential	To provide for the housing needs of the community within a low density residential environment.  To enable other land uses that provide facilities or services to meet the day to day needs of residents.	Road widening	Roads permitted without consent

Clause 65 of the Infrastructure SEPP removes the need for consent.

# 4.2.2 Canada Bay Local Environmental Plan 2013

The proposed works are within the Canada Bay LGA on land zoned B6 Enterprise Corridor and RE1 Public Recreation. Refer to

Table 4-2 for a list of the required work activity within land zones. A map showing the zoning of the site and surrounding area is provided in Figure 4-1.

Table 4-2: Zoning and consent requirements (Source: Canada Bay LEP, 2013)

Zone	Category	Relevant objectives	Relevant work activity	Consent requirements
RE1	Public Recreation	To enable land to be used for public open space or recreational purposes.  To provide a range of recreational settings and activities and compatible land uses.  To protect and enhance the natural environment for recreational purposes.  To facilitate public access to and along the foreshore.  To conserve public open space that enhances the scenic and environmental quality of Canada Bay.	Road widening	Roads permitted with consent

B6	Enterprise Corridor	To promote businesses along main roads and to encourage a	Road widening	Roads permitted with consent
		mix of compatible uses.		
		To provide a range of		
		employment uses (including		
		business, office, retail and light		
		industrial uses).		
		To maintain the economic		
		strength of centres by limiting		
		retailing activity.		
		To provide for residential uses,		
		but only as part of a mixed use		
		development.		

Clause 65 of the Infrastructure SEPP removes the need for consent.



Figure 4-1 Land zoning in vicinity of the proposal. Red line indicates the proposal area. SP2 Infrastructure; B6 Enterprise Corridor; R2 Low Density Residential; RE1 Public Recreation (Source: DP&E Planning Viewer, 2015)

# 4.3 Other relevant legislation

# 4.3.1 Threatened Species Conservation Act 1995 (TSC Act)

The *Threatened Species Conservation Act 1995* aims to conserve and protect certain classes of threatened, endangered and vulnerable species, populations and ecological communities.

Section 5A of the EPA&A Act lists a number of factors to be taken into account when deciding if there is the likelihood of a significant impact on threatened species, populations and their habitat or on ecological communities. If there is a chance of an impact, then an

Assessment of Significance would be required to determine the significance of the impact. If there is likelihood for a significant impact on threatened species, populations and their habitat or on ecological communities then a Species Impact Statement is required. Threatened species impacts are discussed in chapter 6 of the REF.

### 4.3.2 Contaminated Land Management Act 1997

The general object of this Act is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation.

Particular objects of this Act are:

- a) to set out accountabilities for managing contamination if the EPA considers the contamination is significant enough to require regulation under Division 2 of Part 3, and
- b) to set out the role of the EPA in the assessment of contamination and the supervision of the investigation and management of contaminated sites, and
- c) to provide for the accreditation of site auditors of contaminated land to ensure appropriate standards of auditing in the management of contaminated land, and
- d) to ensure that contaminated land is managed with regard to the principles of ecologically sustainable development.

Contaminated land is likely to be encountered in the proposal area due to the proximity of the bus depot and service station. Any contaminated land would need to be managed in accordance with the Act.

### 4.3.3 Protection of the Environment Operations Act 1997

The Protection of the Environment Operations Act 1997 (PoEO Act) provides a integrated system of licenses administered by the Office of Environment and Heritage, to set out protection of the environment policies (PEP's) and to adopt more innovative approaches to reduce pollution in the environment.

The objects of this Act are as follows:

- (a) to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development,
- (b) to provide increased opportunities for public involvement and participation in environment protection,
- (c) to ensure that the community has access to relevant and meaningful information about pollution,
- (d) to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following:
  - (i) pollution prevention and cleaner production,
  - (ii) the reduction to harmless levels of the discharge of substances likely to cause harm to the environment,
  - (iia) the elimination of harmful wastes,
  - (iii) the reduction in the use of materials and the re-use, recovery or recycling of materials.
  - (iv) the making of progressive environmental improvements, including the reduction of pollution at source,
- (v) the monitoring and reporting of environmental quality on a regular basis,
- (e) to rationalise, simplify and strengthen the regulatory framework for environment protection.
- (f) to improve the efficiency of administration of the environment protection legislation,
- (g) to assist in the achievement of the objectives of the Waste Avoidance and Resource Recovery Act 2001.

# 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 B and chapter 6 of the REF.

A referral is not required for proposed road activities 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 chapter 6 of the REF.

# Findings – matters of national environmental significance (other than biodiversity matters)

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment under the EPBC Act.

# Findings – nationally listed biodiversity matters

The assessment of the proposal's impact on nationally listed threatened species, populations, endangered ecological communities and migratory species found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Chapter 6 of the REF describes the safeguards and management measures to be applied.

# 4.5 Confirmation of statutory position

The proposal is categorised as development for the purpose of a road 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.

Roads and Maritime is the determining authority for the proposal. 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.

# 5 Consultation

# 5.1 Consultation strategy

Community engagement would be undertaken in accordance with Roads and Maritime's Community Involvement Practice Notes and Resource Manual. A draft Community Engagement Plan has been prepared as part of the proposal (Appendix C). The overall aim of the consultation process for the proposal is to keep the community and stakeholders informed about the proposal.

In the delivery of communications on the proposal, the project team aims to:

- Identify stakeholders, potential issues and recommended communication activities during design
- Keep key stakeholders, businesses and residents informed of the progress of design
- Provide a general level of awareness for those in the broader community.

Relevant stakeholders captured in the consultation process include:

- Local residents and business owners
- City of Canada Bay Council
- Burwood Council
- Local Members of Parliament
- Emergency Services
- State Transit Authority (STA)
- Taxi services
- Utility providers
- Burwood Bus Depot

Communication to inform stakeholders of the proposal would include:

- Door knocking
- Site signage
- Community displays/posters
- Stakeholder meetings/briefings
- · Community information sessions
- Newsletters
- Email updates
- Roads and Maritime road projects website
- Link to external websites e.g. council
- Newspaper advertisement

# 5.2 Community involvement

Consultation with relevant stakeholders, including property owners, was undertaken in October 2015 during early site investigations to inform the design. Consultation involved doorknocks of affected properties to seek approval to access the properties for the investigations.

A 'Have your Say' letter was then distributed to the local community and relevant stakeholders in May 2016 to seek feedback on the proposal and concept design. The letter provided in Appendix C was provided to the following:

- Delivered to 1000 residents and businesses in Concord and Burwood
- Delivered to City of Canada Bay and Burwood Councils
- Direct mailed to emergency services, government agencies, schools and businesses in the local area
- Doorknocked to residents and businesses affected by widening on Shaftesbury Road on Monday 16 May.

The purpose of the consultation was to:

- Seek comment, feedback, ideas, and suggestions to consider when developing the proposal and carrying out the REF
- Build a database of interested and concerned community members with whom Roads and Maritime can continue to engage with during the proposal's development.

The consultation closed on 24 June 2016. Roads and Maritime received comments from 15 people, raising 77 different matters. A summary of these issues and how they were addressed is provided below in Table 5-1.

Concerns and suggestions not within Roads and Maritime's area of responsibility were forwarded to the relevant authorities.

Table 5-1: Summary of issues raised during the Have Your Say consultation period in May/ June 2016

CATEGORY	MATTERS RAISED	ROADS AND MARITIME'S RESPONSE
Project background	Why was this location chosen?  The westbound traffic should be targeted not eastbound traffic.	The NSW Government's \$246 million Pinch Point and Clearways Program aims to reduce traffic delays, manage congestion and improve travel times on Sydney's major roads, particularly during weekday peak periods.
nine eastbound traffic comments	In 2012, the Parramatta Road corridor between Strathfield and Petersham was investigated as part of the \$246 million Pinch Point and Clearways Program. The intersection of Parramatta Road and Shaftesbury Road was identified as a Pinch Point which would benefit from a low cost, high benefit solution to ease congestion and facilitate increased local traffic capacity for motorists in the growing Burwood residential and commercial areas.	
		Eastbound congestion on Parramatta Road during peak periods is caused by vehicles queueing to turn right into Shaftesbury Road, and overflowing into the through traffic lanes.
		Further information on the Pinch Point Program can be found at www.rms.nsw.gov.au/projects/key-build-program/pinch-point-program/246m-pinch-point-program.html
	Why are you only adding one extra lane? Why not two based on expected growth in the area.	Roads and Maritime considered a number of options to ease congestion at this intersection. We carried out traffic modelling, including predicted future volumes, to help determine the best option.
		Providing one additional turn lane from Parramatta Road into Shaftesbury Road provided the smallest impact to the community and environment as well as delivering the best value for money solution.
		Adding two extra turn lanes would require significant widening on both Parramatta Road and Shaftesbury Road. The high cost and community impact of property acquisition and utility relocation that would be required for this option was not considered feasible.

The new WestConnex tunnel and M4 widening will ease congestion on Parramatta Road and make this work unnecessary.	WestConnex will complete key 'missing links' in Sydney's motorway network by widening and extending the M4 to the inner city, duplicating the existing M5 East and providing an airport link. It will remove over 3,000 trucks off Parramatta Road and improve travel times on Parramatta Road.
	Modelling has demonstrated that once WestConnex is operational, Shaftesbury Road will continue to be heavily used by local traffic to access the Burwood CBD and shopping centre. This proposal aims to further improve travel times on Parramatta Road by ensuring there is enough space for vehicles turning right into Shaftesbury Road without blocking the eastbound through traffic lanes.
How does this proposal affect Shaftesbury Road?	We propose to widen Shaftesbury Road to introduce an additional southbound lane to accommodate the additional right turn lane from Parramatta Road.
	To accommodate traffic from the additional right turn lane from Parramatta Road and to facilitate traffic movement in Shaftesbury Road, about 40 metres (or about seven car spaces) of parking is also proposed to be removed.
	The environmental assessment for this proposal (Review of Environmental Factors) will be put on public display later this year. The community will be able to comment on the removal of parking on Shaftesbury Road during the display period.
Could widening of Parramatta Road occur in other positions, such as the southern side of Parramatta Road between Burwood Road and	Widening on the southern side of Parramatta Road was considered but would have an unacceptable impact on the Burwood Bus Depot and other businesses.
Shaftesbury Road?	Acquiring land from Burwood Bus Depot would decrease the depot's storage capacity and has potential to significantly impact bus services.

Is this part of the WestConnex funding and proposals?	This proposal is not part of the WestConnex program of works. The proposal to upgrade the intersection of Parramatta Road and Shaftesbury Road is being managed by Roads and Maritime Services and is part of the NSW Government's \$246 million Pinch Point and Clearways Program, which aims to reduce delays, manage congestion and improve travel times on Sydney's main roads, particularly during week day peak periods.
What alternatives have been considered?	The objective of the proposal is to improve traffic flow for the eastbound through lanes on Parramatta Road by providing additional capacity for cars turning right into Shaftesbury Road.
	Roads and Maritime considered alternate design options to ease congestion at this intersection including widening on the southern side of Parramatta Road. The environmental assessment for this proposal (Review of Environmental Factors) includes a review of alternate options and describes the evaluation criteria applied in determining the preferred option. Once this preferred design was adopted, refinements were also made as the design progressed in order to further minimise impacts. This included adjusting lane widths to minimise property impacts.
Does the proximity of a bus depot affect the parameters of the problem?	Buses turning into Burwood Bus Depot have a dedicated right turn lane further east along Parramatta Road, so the capacity on Parramatta Road does not need to be increased to accommodate buses. However, the location of Burwood Bus Depot does mean that the widening on Shaftesbury Road was found influence the feasibility of options considered. Increasing the capacity of the right turn lane from Parramatta Road into the widened Shaftesbury Road would reduce traffic queuing in the Parramatta Road through lanes and improve traffic flow along the Parramatta Road corridor.

Traffic and congestion Five	How will the project improve congestion in Shaftesbury Road?	The objective of the proposal is to improve traffic flow for the eastbound through lanes on Parramatta Road by providing additional capacity for vehicles turning right into Shaftesbury Road.
comments		This would be achieved by duplicating the right turn lane from Parramatta Road into Shaftesbury Road to reduce the frequency of the right turn lane overflowing and blocking the eastbound through lanes of Parramatta Road.
		Shaftesbury Road would be widened and about 40 metres of parking is proposed to be removed to accommodate the dual right turn lanes from Parramatta Road. This would facilitate the movement of traffic in Shaftesbury Road.
		The environmental assessment for this proposal (Review of Environmental Factors) will be put on public display later this year. The community will be able to comment on the removal of parking in Shaftesbury Road during the display period.
	There are delays as vehicles bank up at the mouth of Shaftesbury Road as many vehicles stop to turn right into Milton Street.	The proposed improvements are to facilitate improved traffic flow on Parramatta Road. Shaftesbury Road and Milton Street are local roads under the care and control of Burwood Council. Your comment has been forwarded onto the Burwood Local Traffic Committee, administered by Burwood Council, for consideration.
	Buses in Shaftesbury Road routinely encroach on oncoming traffic, particularly near the intersection with Parramatta Road.	The widening of Shaftesbury Road and installation of a concrete median would alleviate this issue. Buses turning left from Parramatta Road into Shaftesbury Road would have an extra lane and should not encroach on oncoming traffic.
	What traffic modelling has been completed? Can we see the traffic modelling?	Traffic modelling was carried out in 2012 during the development stage of the proposal. It found that approximately 5500 and 6000 motorists use the intersection during the AM and PM peak periods.
		It also found that motorists experience long delays during the peak periods, with right turn queue lengths on Parramatta Road often exceeding

the available storage of the turn bay, which impacts the capacity of the The proposal does not address differing local as eastbound through traffic movement. opposed to regional traffic management This proposal is expected to reduce the time motorists spend delayed at obiectives. The increase in high-rise the intersection and reduce the lengths of the queues. development around Burwood and on Parramatta Road will increase pressure for Parramatta Road being used as a local rat-run. Does the traffic modelling show how the Widening of Loftus Street is not proposed as part of this project. Minor widening of Loftus Street and Parramatta Road adjustments would be made to the north east corner of Loftus Street to will impact on traffic in Loftus Street on a 24/7 align with the widening of Parramatta Road. Loftus Street would be the basis? same width following completion of the project. Traffic modelling does not assess Loftus Street as traffic movement on Loftus street is not considered to be impacted by this proposal. The eastbound lane closest to the median strip The objective of this proposal is to improve traffic flow for the eastbound through lanes on Parramatta Road by providing additional capacity for stretching back to Burwood Road will still be a vehicles turning right into Shaftesbury Road. source of congestion and promotion of dangerous lane changing following This would be achieved by duplicating the right turn lane from Parramatta widening. Road into Shaftesbury Road and reducing the frequency of the right turn lane overflowing and blocking the eastbound through lanes on Parramatta Road. It is not expected to encourage lane changing.

	Wentworth Avenue and Shaftesbury Road are key access routes for connections to the Burwood area. Adding additional cars to the queue that don't impede eastbound traffic is not a fix.	This proposal is funded by the NSW Government's \$246 million Pinch Point and Clearways Program which aims to reduce traffic delays, manage congestion and improve travel times on Sydney's major roads, particularly during weekday peak periods.  The proposal specifically aims to improve traffic flow on the Parramatta Road corridor by adding an additional right turn lane from Parramatta Road into Shaftesbury Road, reducing traffic queuing in the eastbound through lanes on Parramatta Road and improving the operation of the Parramatta Road corridor.  Wentworth Avenue and Shaftesbury Road are local roads under the care
		and control of Burwood Council. It is the responsibility of Council to manage congestion on local roads.
	The left turn out of Loftus Street onto Parramatta Road is dangerous. Cars coming out of Loftus Street to turn right onto Shaftesbury Road cross	In response to community feedback, this proposal includes the introduction of a stop sign and stop line at the intersection of Loftus Street and Parramatta Road.
	three lanes of traffic. This is made worse by the current traffic that is banked up in the fast lane and oncoming traffic.	The additional right turn lane would also assist vehicles turning left out of Loftus Street and right into Shaftesbury Road, joining a one of two shorter queues on Parramatta Road.
		The environmental assessment for this proposal (Review of Environmental Factors) will be put on public display later this year. The community will be able to comment on the proposed stop sign and stop line control on Loftus Street during the display period.
Traffic light phasing Three	Adjust the traffic lights to allow more time for cars to turn right into Shaftesbury Road.	The traffic lights on the Parramatta Road are linked to Sydney Coordinated Adaptive Traffic System (SCATS). SCATS synchronises nearby traffic signals to optimise traffic flow across the road network. It evaluates all traffic approaches on a cycle by cycle basis, and automatically distributes

comments	Owners the search search traffic and a final traffic	the green light phases in an equitable arrangement.
	Currently eastbound traffic receives two phases per cycle to turn right onto Shaftesbury Road. Will this reduce to a single phase as there is potential for twice the capacity?	The introduction of an additional right turn movement, or a longer green light allowance from Parramatta Road eastbound into Shaftesbury Road will only occur when set criteria have been met. This dynamic approach allows SCATS to introduce a repeat right turn phase, but only when there is demand. At other times the system will give priority to traffic on Parramatta Road.
	Will the phasing of the traffic lights be modified?	The right turn filter from Parramatta Road into Shaftesbury Road would be removed and vehicles would be able to turn right on the green arrow signal only. This is necessary due to two right turn lanes.
		For safety reasons, with the introduction of an additional right turn lane from Parramatta Road, the traffic lights at the intersection would be modified so that eastbound traffic turning right into Shaftesbury Road would only be able to do so on a green arrow signal.
Road widening	Is Loftus Street being widened?	Widening of Loftus Street is not proposed as part of this project. Lot Street would remain in its current configuration of one lane in each
Five comments	Widening Loftus Street will encourage rat runs through the street.	direction. There would be minor adjustments to the north east corner of Loftus Street at Parramatta Road, to align with the widening of Parramatta Road. The concrete traffic island on Loftus Street would be modified to
	How much will Loftus Street be widened?	ensure Loftus Street remains the same width.
	The widening of Loftus Street and Parramatta Road is unacceptable to the community.	
	Is Loftus Street being widened to facilitate the movement of semi-trailers?	
	The proposed widening on Parramatta Road will not accommodate the amount of traffic.	Increasing the capacity of the right turning lane from Parramatta Road into a widened Shaftesbury Road would reduce the incidence of traffic queuing in the Parramatta Road eastbound though lanes and improve the operation of the Parramatta Road corridor.

	Why is the western side of Shaftesbury Road being widened? The eastern side would be a better choice as it is already public land. The cost to widen on the eastern side would also be less as there are more public utilities to be relocated on the western side. Widening the eastern side would also have less of an impact on residential properties and business'.	Roads and Maritime considered alternate design options to ease congestion at this intersection, including widening on the other side of Parramatta Road and Shaftesbury Road. The environmental assessment for this proposal (Review of Environmental Factors) includes a review of alternate options and describes the evaluation criteria applied in determining the preferred option. Once this preferred design was adopted, refinements were also made as the design progressed in order to further minimise impacts. This included adjusting lane widths to minimise property impacts.  Providing one additional turn lane from Parramatta Road into Shaftesbury Road provided the smallest impact to the community and environment as well as delivering the best value for money solution.  Widening the eastern side of Shaftesbury Road was assessed as not feasible because it would decrease Burwood Bus Depot's storage capacity and significantly impact bus services.
Road alignment	Current alignment on Parramatta Road causes vehicles to run over the kerb at the corner of Loftus Street.	The new alignment and wider lanes will reduce the likelihood of vehicles travelling over the kerb at the corner of Loftus Street.
comments	The two proposed turning lanes merge at a point level with the first house in Shaftesbury Road, only 15 metres from Parramatta Road. This is not sufficient distance to allow two lanes of traffic to clear Parramatta Road.	The additional lane in Shaftesbury Road would provide a merge distance of 70 metres, to allow space for the two lanes of traffic to clear Parramatta Road.  Traffic modelling indicates that increasing the capacity of the right turning lane from Parramatta Road into a widened Shaftesbury Road would reduce the incidence of traffic queuing in the Parramatta Road eastbound
	Traffic travelling southbound up Shaftesbury Road is restricted by the width of the residential street.	through lanes and improve the operation of the Parramatta Road corridor.

	Shaftesbury Road, south of the existing 'no stopping zone' is congested due to the narrowness past the 'no stopping' zone. The current proposed end of the dual lanes is not enough if the aim is to reduce the traffic queuing across the westbound carriageway of Parramatta Road.				
Local road impacts	Shaftesbury Road needs to be upgraded and resurfaced if this proposal is to go ahead.	Shaftesbury Road is a local road that falls under the care and control of Burwood Council.			
Five comments	Shaftesbury Road should only allow light vehicles of up to 4.5 tonnes to use the road.	Roads and Maritime Services is proposing an upgrade of the intersection of Parramatta Road and Shaftesbury Road to improve traffic flow on			
	The sub-base of the road has failed and sunk in two locations between Meryla Street and Parramatta Road, along Shaftesbury Road.	Parramatta Road. As this proposal includes widening the first section of Shaftesbury Road, we would resurface 90 metres of Shaftesbury Road from the corner of Parramatta Road.			
	Tarramana ricaa, along chancozary ricaar	Requests for maintenance and other changes to Shaftesbury Road have been forwarded to Burwood Council for their consideration.			
	Will this project involve allowing trucks access to residential streets?	To facilitate this project, a site compound would be established and would be in use throughout the construction of the proposed intersection upgrade works.			
		Vehicles, including trucks would need to access the site during construction hours. The location of the compound is being investigated as part of the environmental assessment process. Stakeholders will be able to comment on the proposed site compound location when the Review of Environmental Factors is displayed for community comment later this year.			
	The proposed changes will increase the traffic in Loftus and Barton Streets.	Traffic on Loftus and Barton Streets is not expected to increase as a result of the proposed changes.			
	The proposed widths of the footpath and verge on the western side of Shaftesbury Road are greater than what is required. Why is this proposed?	The footpath width of 3.5 metres has been designed in accordance with Australian standards to accommodate the relocation of underground utilities and underground relocation of overhead cables.			

Why is the central median strip on Shaftesbury The central median width of 0.6 metres has been designed in accordance Road being widened? with the Australian standards. Acquisition for a verge is not necessary as there The design has been modified to provide a footpath and grass verge in accordance with Australian standards. is currently no verge on the western side of Shaftesbury Road. During the consultation period for this proposal, Roads and Maritime used At every opportunity that council and the a number of methods to consult with the community and stakeholders: Government have had to be upfront about plans • We distributed over 1000 community updates to residents and for Loftus Street, they have chosen to mislead businesses in the local area and gone forward with whatever they planned, regardless of the disruption to people who live • Community updates were directly mailed to key stakeholders here. including councils, members of parliament, emergency services, utilities, businesses, education facilities and community groups • Residents and businesses directly affected by widening on Shaftesbury Road were doorknocked and given an opportunity to ask the project team questions about the proposal • Signs were located at the intersection of Shaftesbury Road and Parramatta Road A media release was issued. Roads and Maritime consults to understand the concerns and needs of the community, so that this feedback can be considered in the final clearway solution, in addition to the data collected and surveyed for this location. The community will be able to comment on the environmental impacts of the proposal and changes to the concept design during the Review of Environmental Factors display period. The service station located at the corner of Shaftesbury Road needs to be widened further south past the service Shaftesbury Road and Parramatta Road has station to ensure enough space is provided for vehicles to merge to a ample land to accommodate this proposal. single lane.

Local business	How will you maintain a safe proximity from the fuel tanks under the service station?	Investigations into safe distances from underground utilities have been carried out and this information will inform the final design.	
One comment	How will safe access to the service station be maintained?	The final design will take into consideration the turning angle of vehicles to ensure safe access for vehicles and pedestrians.	
Environmenta I assessment	Has the environmental assessment taken into consideration the impact of bringing Parramatta Road closer to Loftus Street and enhancing the	Roads and Maritime assesses to the fullest extent possible, all matters affecting or likely to affect the environment as part of the environmental assessment process for this project.	
Four comments	access for truck and road traffic?	The Review of Environmental Factors (REF) includes a Traffic and Transport section which assesses the potential construction and operational impacts of the proposal The REF will be put on public display later this year to allow comment.	
	Will the cumulative impacts on resident's health be taken into consideration through	· · · · · · · · · · · · · · · · · · ·	
	environmental assessments?  We want health impact assessment be conducted to assess the impact of road widening on the health of residents.	The REF describes the proposal, documents the likely impacts on the environment and details mitigation measures to be implemented. It includes assessment of noise, air quality, visual and socio-economic impacts. The REF will be put on display later this year and the community	
	What independent modelling has been undertaken to show the impact of the proposal on the heath and quality of life of the community?	will be able to comment on the environmental impacts of the proposal during the display period.	
	Residents in this area are being forced to live in a construction zone.		
	There is no benefit to Shaftesbury Road residents as noise, pollution and air quality will only increase.		

	Health issues and an unclean environment have been caused due to proximity to a busy road and amount of construction activity.	
	What economic, social, environmental and health parameters will you be using to determine the impact to the community? What independent experts will you have assessing these impacts?	Roads and Maritime assess to the fullest extent possible, all matters affecting or likely to affect the environment, as part of the Review of Environmental Factors (REF). An independent, professional environmental consultant has been engaged to prepare this assessment.
	Who is the company or organisation conducting the environmental assessment? What is their relationship to Roads and Maritime? What is their expertise? What other projects have they worked with you on? What modelling have they conducted on the flow of traffic in and out if our community and the impact on quality of life from removing mature trees, bringing Parramatta Road closer to the community and enhancing the access to Loftus Street.	The REF has a section assessing biodiversity, visual and landscape character impacts of the proposal.  The REF will be put on public display later this year. The community will be able to comment on the assessments and expected impacts to the environment during the display period.
Tree removal Three comments	The removal of trees along Concord Oval is unacceptable to the community. The trees along Parramatta Road provide the last possible screening between the environment and noise pollution for the residents of Loftus Street.	Vegetation provides an effective noise barrier only where there is a substantial density and depth. The removal of the row of trees along the Concord Oval frontage would not change road traffic noise levels.  The potential visual and amenity impacts of the vegetation removal will be addressed within the environmental assessment.  The removal of these trees is an unavoidable impact required to accommodate the proposal. Mitigation measures to address this impact include a landscaping plan prepared in consultation with Canada Bay Council. The plan includes replacement trees being planted at the corner of Loftus Street.

# 5.3 Aboriginal community involvement

A search of the Aboriginal Heritage Information Management System (AHIMS) was carried out in November 2015, in accordance with the Roads and Maritime *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) Stage 1 (refer to Appendix E). There are no registered Aboriginal heritage sites in the vicinity of the proposal and consultation with the Aboriginal community was not required under PACHCI.

### 5.4 **ISEPP consultation**

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.

Appendix F contains an ISEPP consultation checklist that documents how ISEPP consultation requirements have been considered. Burwood Council and City of Canada Bay Council have been consulted about the proposal as per the requirements of clause 13 of the ISEPP as the proposed works would require the excavation of a road or an adjacent footpath for which council is the roads authority and responsible for maintenance. The councils were also provided copies of the 'Have your say' letter to seek further feedback on the proposal. The draft landscape plans were also provided to seek their feedback. The results of the consultation from consultation to date are outlined in Table 5-2

# 5.5 Government agency and stakeholder involvement

Various government agencies and stakeholders have been consulted about the proposal during the development of the concept design, including:

- City of Canada Bay Council
- Burwood Council
- Burwood bus depot and State Transit Authority of NSW (STA)
- Utility providers

In regards to utility providers, the following was undertaken:

- VBA submitted plans to Telstra showing the impact of the proposed widening on the Telstra asset. Telstra is developing the Telstra relocation design.
- The Sydney Water coordinator submitted an application on behalf of VBA to Sydney Water to review the proposed project impacts on the Sydney Water asset. VBA is waiting for a response from Sydney Water.
- The Accredited service provider level 3 (ASP3) contacted Ausgrid on behalf of VBA and submitted plans showing the impact of the proposed widening on the Ausgrid underground/overhead asset. Ausgrid issued the design information package to VBA to proceed with the electrical relocation design.
- VBA submitted plans to Jemena showing the impact of the proposed widening on the Jemena asset. Jemena developed and provided a drawing for the relocation of the impacted asset and is developing an estimate for the relocation works.

Issues that have been raised as a result of consultation with these agencies and stakeholders are outlined below in Table 5-2. Burwood Council did not provide any comments.

Table 5-2: Issues raised through stakeholder consultation

Agency	Is	ssue raised	Response / where an REF	ddressed	
Burwood Council	N	lo feedback was received	Not applicable		
City C Canada Ba Council	• ay	Concord Oval listed as heritage – trees to be removed may be heritage	Concord oval as a not listed as a heritage listing for 'St Luke gateway/entranceand trees only'. referred to in the correspond to the at the entrance Street. These trees not be impacted.	tage item. ng is only 's Park —gates The trees he listing 5 fig trees on Loftus	
City of Canada Ba	of •	Concord Oval garden to be retained	be retained as the proposed cut slop 1.5m away from th	top of the e is about	
City C Canada Ba Council	of •	Grass adjoining road is not supported due to difficulty in performing maintenance in accordance with WHS – widen footpath to kerbline	<ul> <li>Accepted and in concept design (or to Parramatta Road</li> </ul>	nly applies	
City C Canada Ba Council	of •	Path through corner of Loftus Street and Parramatta Road should be included	<ul> <li>Accepted and in concept design</li> </ul>	cluded in	
City C Canada Ba Council	of •	No objection to upgrading intersection of Loftus Street and Parramatta Road to a 'Stop' control provided it is warranted	Proposed to avoid of vehicles over-ru line considerir proposed S-lane including narrow la on Parramatta Roa	unning the ng the treatment ane widths	
City c Canada Ba Council	of •	Clarification as to proposed landscaping treatment on sloping area	VBA engaged a la consultant to landscaping plan D) in consultate Council and Romaritime.	develop (Appendix	

Canada Bay Council and the bus depot and bus service provider (STA) were also informed of the following as part of consultation of the design;

 The bus shelter and stop on Parramatta Rd eastbound (opposite the depot) will be impacted by the proposed widening and will need to be relocated around 1.5 metres north (towards the Concord Oval) to suit the proposed road alignment design.

• The right turning lane into the Burwood bus depot will be reduced by 15 metres. This is required to accommodate for the proposed road alignment design. The right turning lane will be reduced by increasing the painted chevron

Canada Bay Council noted acceptance of the above design features. STA raised no concerns and requested to be kept informed regarding the proposal

# 5.6 Ongoing or future consultation

VBA, on behalf of Roads and Maritime, would consult with the community and stakeholders prior to and during construction of the proposal. Consultation activities would be in accordance with the Community Engagement Plan for the proposal as summarised in section 5.1.

The REF would be put on public display to seek feedback from the community. All submissions made regarding the REF would be considered and responded to in a submissions report which will be made available to the public.

# 5.7 Consultation during public display

The REF will be on public display for 2 weeks from Monday 5 December 2016 to Monday 19 December 2016 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:

#### Information session

A community information session to give local residents and businesses an opportunity to view the plans and discuss the Proposal with members of the project team will be held at the Concord Function Centre, Wednesday 14 December between 4.30pm and 7.30pm.

#### 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/projects.

#### Display:

The review of environmental factors can be viewed at Concord Library and Five Dock Library.

#### Letter box drop:

A letter box drop will be completed to properties within 200 metres of the proposal area publicising the REF display and community information session.

#### Advertisements:

Advertisements will be placed in the "Inner West Weekly" and "Weekly Times" to publicise the REF display and community information session.

# 5.7.1 Making a submission

To make a submission on the proposal, please send your written comments to:

Email: nswenquiries@vbajv.com.au

or

Mail: Ventia Boral Amey JV, C&SE, PO Box 838, Rockdale, NSW, 2216

or

Call Ventia Boral Amey JV on 1800 677 700.

Submissions must be received by Monday 19 December 2016.

# 5.8 Post-public display consultation

### 5.8.1 Submissions report

At the conclusion of the public display period for the REF, Roads and Maritime Services will acknowledge receipt of feedback from each respondent. The issues raised by respondents will be consolidated and considered by Roads and Maritime Services.

A Submissions Report will be prepared summarising the key impacts identified in this REF, demonstrating how Roads and Maritime Services considered issues raised during the public display period, and include a summary of mitigation measures proposed to minimise the impacts of the Proposal. The Submissions Report will be made available on Roads and Maritime Services website at www.rms.nsw.gov.au/projects and everyone who made a submission will be individually notified of the outcome.

### 5.8.2 Construction phase

Should Roads and Maritime Services proceed with the Proposal, consultation activities would continue up to and during construction. These consultation activities would ensure that:

- The community and stakeholders have a high level of awareness of all processes and activities associated with the Proposal
- Accurate, up to date and accessible information is made available
- timely response is given to issues and concerns raised by the community.

The project team would keep the community, local Councils and other key stakeholders informed of progress, identify further issues as they arise, and develop additional mitigation measures to minimise potential impacts of the Proposal. Targeted consultation activities such as door knocks, meetings, newsletters, notifications, advertising, signage and verbal communications would continue during the construction phase.

# 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? (DUAP 1995/1996) as required under clause 228(1) of the Environmental Planning and Assessment Regulation 2000 and the Roads and Related Facilities EIS Guideline (DUAP 1996). The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix B.

Site-specific safeguards and management measures are provided to mitigate the identified potential impacts.

### 6.1 Noise and vibration

### 6.1.1 Methodology

A Construction and Operational Noise and Vibration Assessment was carried out to evaluate and predict the potential impact of the construction and operation of the proposed Upgrade of the Parramatta Road and Shaftsbury Road Intersection. It is included in Appendix L.

The assessment quantifies the potential operational noise impacts to sensitive receivers from road traffic, as well as the potential noise and vibration impacts during construction of the project. This includes potential impacts associated with the construction compound located on the corner of Henley Marine Drive and Parramatta Road.

Noise was assessed in accordance with the EPA's Interim Construction Noise Guideline (ICNG) and Road Noise Policy (RNP) as well as RMS's Construction Noise and Vibration Guideline (CNVG) and Environmental Noise Management Manual (ENMM). The noise assessment involved:

- Identifying and classifying the sensitive receivers
- Conducting unattended long-term noise monitoring as well as short term attended noise monitoring to determine the existing background noise levels
- Modelling the noise sources, receiver locations, and operating activities to determine noise emissions
- Assessment of noise models against the relevant noise criteria for construction works and operational traffic

Vibration was assessed in accordance RMS's Construction Noise and Vibration Guideline (CNVG), the DECC (now OEH) 'Assessing Vibration; a technical guideline' and with reference to the British Standard 7385 and German Standard DIN4150-3. Both building structural damage and human disturbance impacts were assessed based on the proposed plant items to be used during construction and their distance to sensitive receivers.

Feasible and reasonable mitigation and management measures were then identified based on the predicted noise and vibration impacts associated with the proposed works.

# **6.1.2 Existing Environment**

The proposal site consists of two separate sites. One being that within and immediately adjacent to the Parramatta Road and Shaftesbury Road Intersection ('the intersection site') and the other at the proposed construction compound located on the corner of Henley Marine Drive and Parramatta Road ('the compound site').

The intersection site is surrounded by a mixture of commercial, residential and recreational land uses. Nineteen sensitive receivers (refer to Figure 6-1) were identified as the nearest affected receivers, comprising:

- Seven single storey residences
- One double storey residences
- Ten commercial buildings
- One football field

Receiver locations R3, R4 and R5 are the nearest residential sensitive receivers at the intersection and are located approximately 5 metres west of the proposed works. The nearest commercial receivers are locations R9 and R10 situated approximately three metres west of the proposed works. Concord Oval football field (R19) is located approximately 45m north of the proposed works.

The compound site is surrounded by a mixture of commercial, residential and recreational land uses. Twenty one sensitive receivers (refer to Figure 6-2) were identified as the nearest affected receivers, comprising:

- Four single story residences
- Two double story residences
- Three multi story residences
- Seven single story commercial buildings
- One double story commercial buildings
- Two single story industrial buildings
- One double story industrial building
- One childcare centre

Receiver locations R4C and R5C are the nearest residential sensitive receivers to the compound site. R4C is located 4 metres north and R5C is located 4 metres east of the compound site. A childcare centre is located 77 metres south of the proposed site compound.

The background noise levels at each monitoring location for both the intersection site and compound site can be seen in Table 6-1 below. Road noise is generally the primary contributor to background noise levels at both the intersection site and compound site.

Table 6-1– Measured Existing Traffic (Leq) & Background (L90) Noise Levels, dB(A)

	L <sub>Aeq</sub> Traffic Noise Levels				L <sub>A90</sub> Background Noise Levels		
Noise Monitoring Location	Day	Night	Off-peak (12pm- 1pm)	Peak (5pm- 6pm)	Day	Evening	Night
Intersection Site							
Location M1 – Concord Oval	64	64	nm	nm	53	53	46
Location S1 – 1A Shaftesbury Rd	nm	nm	67	67	nm	nm	nm
Compound site							

Location M1C - 8	3 Great North	nm	nm	nm	nm	55	52	46
Rd								

nm = not measured



Figure 6-1:Locality map showing the intersection site, nearest sensitive receivers and noise monitoring locations



Figure 6-2: Locality map showing the compound site, nearest sensitive receivers and noise moniotring location

#### 6.1.3 Criteria

#### **Construction Noise Criteria**

The recently released RMS CNVG provides guidance for the establishment of construction noise management levels (NMLs) and the methods for assessing construction noise. There are two parts to the CNVG that are used to determine the type of assessment required to be undertaken:

- Duration of the impact to affected receivers
- · Number of affected receivers.

The proposed intersection works are anticipated to occur for more than six weeks and the number of receivers potentially affected by the noise impacts would be many, in accordance with the CNVG. Based on the proposed duration of works and many affected receivers, a quantitative assessment in accordance with the noise objectives of the ICNG has been undertaken.

The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.

The rating background level (RBL) is used when determining the noise management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). Residential receivers are considered 'noise affected' where construction noise levels are greater than the noise management levels identified in Table 6-2. The noise affected level represents the point above which there may be some community reaction to noise. Where predicted and/or measured construction noise levels exceed noise management levels, all feasible and reasonable work practices will be applied to meet the management levels. During standard construction hours a highly affected noise objective of L<sub>Aeq(15min)</sub> 75 dB(A) applies at all receivers.

Construction noise management levels for residential areas surrounding the intersection upgrade were previously established as part of the WestConnex project and are in accordance with the principles and requirements of the ICNG. In order to maintain consistency, the noise management levels from the WestConnex project will be used for the assessment of construction noise associated with the proposed works.

Table 6-2 identifies the construction noise management levels (NMLs) established for the WestConnex project and applicable for the nearest affected residential receivers identified in Figure 6-1 and Figure 6-2.

Table 6-2 - Summary of Construction Noise Management Levels at Residential Receivers, dB(A)

Time of Day	Noise Management Levels at Residential Receivers – Lawq(15min)					
Time of Day —	Receivers R1 to R2 <sup>1</sup>	Receivers R3 to R8 <sup>2</sup>	Receivers R1C to R9C <sup>3</sup>			
During recommended standard hours (day)	59	60	65			
utside recommended standard hours (evening)	52	55	57			
Outside recommended standard hours (night)	46	48	51			

- Notes: 1. Receivers located within Noise Catchment Area HFS01 as identified in the Construction Noise and Vibration Management Plan (ref. M4E-ES-PLN-PWD-00241, dated 29 June 2016)
  - 2. Receivers located within Noise Catchment Area HFS02
  - 3. Receivers located near site compound

Other noise sensitive land uses are considered 'noise affected' where construction noise levels are greater than the ICNG noise management levels identified in Table 6-3.

Table 6-3 - Noise Management Levels at Other Noise Sensitive Land Uses

nd Use Noise Management Level L <sub>Aeq (15 min)</sub>				
Classrooms at schools and other educational institutions	Internal noise level	45 dB(A)		
Commercial premises	External noise level	70 dB(A)		
Active recreation areas	External noise level	65 dB(A)		

Notes: 4. Noise Management Levels only apply when premises are in use

#### Based on in Table 6-3 above:

- The NML for receivers R9 to R18 at the intersection site and receivers R10C, R12C, R14C, R16C, R17C, R18C, R19C and R20C at the compound site is 70dB(A) as they are commercial type premises.
- The NML for receiver R19 is 65dB(A) as it is an active recreation area
- The NML for receiver R11C is 45dB(A) for internal areas and 55dB(A) for external areas as it is a childcare centre. This is based on adopting a conservative 10dB(A) reduction from external to internal noise levels.
- The NML for receivers R13C, R15C and R21C is 75dB(A) as they are industrial type premises.

The NML for sleep disturbance for the purposes of this construction noise assessment is set as LAmax 65dB(A) for residential receivers only. This is based on the discussion on sleep disturbance provided in the NSW Environmental Criteria for Road Traffic Noise (ECRTN, Environment Protection Authority 1999, pp 25-30) as referred to in ICNG.

### Construction vibration criteria

Construction vibration is associated with three main types of impact:

- disturbance to building occupants
- potential damage to buildings
- potential damage to sensitive equipment in a building.

Generally, if disturbance to building occupants is controlled, there is limited potential for structural damage to buildings.

The DECC guideline 'Assessing Vibration; a technical guideline' (DECC, 2006) provides criteria for vibration on human occupants of a building and is based on British Standard BS 6472-1992 'Evaluation of human exposure to vibration in buildings (1-80Hz)'. Sources of vibration are defined as either 'Continuous', 'Impulsive' or 'Intermittent':

- Continuous Continues uninterrupted for a defined period (usually throughout the day-time and/or night-time). Examples include machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).
- Impulsive Rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on frequency and damping). Includes infrequent activities that create up to three distinct vibration events in an assessment period. For example, occasional dropping of heavy equipment, occasional loading and unloading.
- Intermittent Can be defined as interrupted periods of continuous or repeated periods of impulsive vibration that varies significantly in magnitude. Examples include trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers.

it is important to note that the three directional axes are referenced to the human body, i.e. x-axis (back to chest; upright position), y-axis (right side to left side; upright position) or z-axis (foot to head, lateral position). Vibration criteria are defined as a single weighted root mean square (rms) acceleration source level in each orthogonal axis. The human comfort criteria (preferred and maximum values) for different sources of vibration and receiver type are presented in Table 6-4.

Table 6-4: Preferred and Maximum Levels for Human Comfort

Vibration source &	Assessment	Preferred values		Maximum values					
receiver type	period*	z-axis	x & y axis	z-axis	x & y axis				
Continuous vibration	Continuous vibration (weighted rms acceleration, m/s², 1-80Hz)								
Residences	Daytime	0.010	0.0071	0.020	0.014				
	Night-time	0.007	0.005	0.014	0.010				
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028				
Workshops	Day or night- time	0.04	0.029	0.080	0.058				
Impulsive vibration (weighted rms acceleration, m/s², 1-80Hz)									
Residences	Daytime	0.30	0.21	0.60	0.42				
	Night-time	0.10	0.071	0.20	0.14				

Vibration source &	Assessment	Preferred va	Preferred values		Maximum values	
receiver type	period*	z-axis	x & y axis	z-axis	x & y axis	
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92	
Workshops	Day or night-time	0.64	0.46	1.28	0.92	
Intermittent (acceptable vibration	dose values, m/s	s <sup>1.75</sup> , 1-80Hz)	Vibration	Preferred value	Maximum value	
Residences	Daytime			0.20	0.13	
	Night-time			0.40	0.26	
Offices, schools, educational	Daytime			0.40	0.40	
institutions and places of worship	Night-time			0.80	0.80	
Workshops	Daytime			0.80	0.80	
	Night-time			1.60	0.80	

<sup>\*</sup>Daytime is 7am to 10 and night-time is 10pm to 7am

There is currently no existing Australian Standard for assessment of structural building damage caused by vibration energy. As such, potential structural damage of buildings as a result of vibration is typically managed by ensuring vibration induced into the structure does not exceed certain limits and standards, such as British Standard 7385 Part 2 and German Standard DIN4150-3.

Different levels of structural damage are defined in British Standard 7385 Part 2 as:

- Cosmetic Formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick / concrete block construction
- Minor Formation of large cracks or loosening of plaster or drywall surfaces, or cracks through bricks/concrete blocks
- Major Damage to structural elements of the building, cracks in supporting columns, loosening of joints, splaying of masonry cracks, etc.

In German Standard DIN4150-3, damage is defined as "any permanent effect of vibration that reduces the serviceability of a structure or one of its components".

Table 6-5 shows the recommended limits for vibration to minimise risk of cosmetic damage to buildings as set out in BS7385 as well as the safe vibration limits for short-term building vibration in relation to structure damage as outlined in German DIN 4150.

Table 6-5: Structure damage criteria

Type of structure	Damage level	Velocity* (m	m/s)	
BS 7385 Structural Damage Criteria	4 to 15Hz	15 to 40Hz	40Hz & above	
Reinforced or framed structures	Cosmetic	-	50	-
Industrial and heavy commercial buildings	Minor	-	100	-
	Major	-	200	-
Un-reinforced or light framed	Cosmetic	15 to 20	20 to 50	50
structures Residential or light commercial type buildings	Minor	30 to 40	40 to 100	100
	Major	60 to 80	80 to 200	200
DIN 4150 Structural Damage Criteria	At foundatio	Plane of floor uppermost storey		
	1 to 10Hz	10 to 50Hz	50 to 100Hz	All frequencies
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15

<sup>\*</sup> BS 7385 maximum Peak particle velocity in any one direction (x, y, z) as measured by a tri-axial vibration transducer; DIN 4150 vibration velocity

#### 6.1.4 Road Traffic Noise Criteria

The EPA's 'Road Noise Policy' (RNP) sets out criteria to be applied to particular types of road and land uses. These noise criteria are to be applied when assessing noise impact and determining mitigation measures for developments that are potentially affected by road traffic noise, with the aim of preserving the amenity appropriate to the land use.

The upgrade of Parramatta Road and the Shaftesbury Road intersection involves upgrading the existing intersection to have an additional new eastbound lane for turning right from Parramatta Road onto Shaftesbury Road to improve safety and reduce congestion. Therefore, the project is not specifically assessed against the RNP since p5 of the RNP states that;

"Some works that are either minor or required to improve safety are not covered by this RNP."

The RMS's 'Noise Criteria Guideline' (NCG) further states that;

"Some works may be primarily to improve safety. This may include minor straightening of curves, installing traffic control devices, intersection widening and turning bay extensions or making minor road realignments.

These works are not considered redeveloped or new as they are not intended to increase the traffic carrying capacity of the overall road or accommodate a significant increase in heavy vehicle traffic"

In accordance with the above statement from the NCG, the project is considered to be minor works. For minor works, the NCG states the following regarding noise level targets:

"Roads and Maritime applies the existing road criteria (RNP Table 8) where the minor works increase noise levels by more than 2.0dBA relative to the existing noise levels at the worst affected receiver."

Therefore, Table 8 of Section 4.4 of the RNP has the following target noise abatement levels for existing roads not subject to redevelopment:

- L<sub>Aeq,15hr</sub> 60dB(A) Day
- L<sub>Aeq,9hr</sub> 55dB(A) Night

Further to the above existing road criteria, RMS's 'Noise Mitigation Guideline' (NMG) states the following:

"For minor works Roads and Maritime applies the criteria from the NCG if noise levels increase by more than 2.0dBA at the worst affected receiver.

When this is demonstrated, all sensitive receivers must be assessed where noise levels exceed the controlling criterion within the minor works study area (NCG). Where the total noise level for the 'build' year exceeds the criterion and there is an increase of more than 2.0dBA (ie 2.1dBA), relative to the 'no-build' year, then the receiver qualifies for consideration of noised mitigation. This includes the situation where the 'no-build' noise level is below the criterion value(s)."

Based on the NMG, affected receivers qualify for noise mitigation treatment, where reasonable and feasible, only if traffic noise levels predicted for the 'build' year (ie. the year the upgrade is completed and opened) exceed the existing road criteria (Table 8 of RNP) and the increase in traffic noise between the 'build' and 'no-build' years is greater than 2.0dB(A).

# 6.1.5 Potential impacts Construction noise

A list of plant and equipment typical of this type of intersection upgrade and associated sound power levels are presented in the Construction and Operational Noise and Vibration Assessment provided in Appendix L.

Noise levels at any receiver locations resulting from construction works would depend on the location of the receiver with respect to the area of construction, shielding from intervening topography and structures, and the type and duration of construction being undertaken (including combination of plant and equipment). Furthermore, noise levels at receivers would vary significantly over the total construction program due to the transient nature and large range of plant and equipment that could be used.

Noise levels likely to be experienced at the nearby affected residential receivers were calculated based on construction activities and plant and equipment associated with the proposed intersection upgrade. Noise levels were calculated taking into consideration attenuation due to distance between the construction works and the receiver locations and any intervening structures.

Construction work is anticipated to be carried out during standard daytime hours whenever practicable; however, it is more than likely that periods of evening and night time works would occur.

Construction noise impacts were predicted for the locations identified in Figure 6-1 and Figure 6-2. Noise emissions were determined by modelling the noise sources, receiver locations and operating activities.

Table 6-6 presents a summary of the predicted  $L_{Aeq(15min)}$  noise levels assessed for seven key construction scenarios at the intersection site including:

- Preliminary Works
- Utility Relocation
- Re-linemarking and barriers
- Stormwater drainage
- Road widening
- Paving / Asphalting
- Landscaping

For each scenario, the relevant noise management levels for each receiver are presented, along with a prediction of the extent to which the noise management level is exceeded for each relevant time period, measured as LAeq(15minute), which is the 'energy average noise level' evaluated over a 15 minute period. Any exceedance is presented as a range, with the lower number representing the least noise intensive scenario and the higher number representing the most noise intensive scenario.

Table 6-6 – Predicted LAeq(15min) Construction Noise Levels, dB(A)

Receiver	Noise	Managemer	nt Level			Predict	ed Construction Noise Levels for S	tage:		
Receiver	Day	Evening	Night	1.1 Preliminary works	1.2 - Utility Relocation	1.3 - Re-linemarking and Barriers	2.1 - Stormwater Drainage	2.2 - Road Widening	3 - Paving/asphalting	4 Landscaping
R1	59	52	46	34-81	34-72	35-70	39-72	39-75	36-78	36-70
R2				26-79	26-70	27-68	31-70	31-73	28-76	28-68
R3	60	55	48	28-89	28-80	29-79	33-81	33-84	30-86	30-78
R4				30-96	30-87	31-86	35-88	35-91	32-94	32-86
R5				27- <mark>97</mark>	27-88	28-87	32-89	32-92	29-94	29-86
R6				27-88	27 <del>-79</del>	28-78	32-80	32-83	29-86	29-78
R7				21-63	21-54	22-53	<b>26-</b> 55	26-58	23-61	23-53
R8				21-65	21-56	22-54	<b>26-</b> 56	26-59	23-62	23-54
R9				36-100	36- <mark>91</mark>	37-89	41-91	41-94	38-97	38- <mark>89</mark>
R10	7	0 (when in us	se)	33-101	33-92	34-90	38-92	38- <mark>95</mark>	35-98	35- <mark>90</mark>
R11				28-88	28-79	29-78	33-80	33-83	30-86	30-78
R12				31-83	31-74	32-73	36-75	36-78	33-81	33-73
R13				26-86	26-77	27-76	31-78	31-81	28-83	28-75
R14				29-82	29-73	30-72	34-74	34-77	31-80	31-72
R15				27-70	27-61	28-59	32-61	32-64	29-67	29-59
R16				28-83	28-74	29-72	33-74	33-77	30-80	30-72
R17				19-87	19-78	20-77	24-79	24-82	21-84	21-77
R18				19-83	19-74	20-73	24-75	24-78	21-80	21-73
R19	6	5 (when in us	se)	23-70	23-61	24-59	28-61	28-64	25-67	25-59

Notes: 1. Predicted level exceeding the highly affected noise objective of 75dB(A) are in red font

<sup>2.</sup> Predicted level exceeding the Day, Evening and Night Noise Management Levels are in blue font

<sup>3.</sup> Predicted level exceeding the Evening and Night Noise Management Levels are in green font

<sup>4.</sup> Predicted level exceeding only the Night Noise Management Level are in pink font

Based on these predicted construction noise levels, the daytime construction noise management levels would be exceeded at all receiver locations. Furthermore, Receivers R1, R3, R4, R5, R6, R9, R10, R11, R12, R13, R14, R16, R17 AND R18 have been predicted to be impacted by construction noise levels above the highly affected level (>75dB(A)).

For out of hours works during the evening period (6pm to 10pm), the evening construction noise management level would be exceeded at all residential receivers.

Construction noise impact areas surrounding the intersection works are visually represented in Figure 6-3 below.



Notes:

- 1. Predicted level exceeding the highly affected noise objective of 75dB(A) are highlighted in red
- 2. Predicted level exceeding the Day, Evening and Night Noise Management Levels are highlighted in blue
- Predicted level exceeding the Evening and Night Noise Management Levels are highlighted in green
- 4. Predicted level exceeding only the Night Noise Management Level are highlighted in pink

Figure 6-3 Noise impact areas

An assessment for the establishment of the site compound was also conducted to assess impacts of compound setup and operation to sensitive receivers during construction. Predicted noise levels for each plant item associated with the site compound establishment can be found in Appendix L. As demonstrated in Table 6-7, it can be seen that predicted LAmax noise levels would generally exceed the upper limit of 65dB(A) at Receivers R2C, R3C, R4C and R5C during night time works.

Table 6-7- Predicted Construction noise levels for site compound establishment night works dB(A)

Receive		Slean Districtions House Limite	Predicted Construction Noise Levels
r		Sleep Disturbance Upper Limits	Site Compound Establishment
R1C		65	50-63
R2C		65	55-68
R3C		65	58-71
R4C		65	47-87
R5C		65	47-88
R6C		65	47-60
R7C		65	48-61
R8C		65	48-61
R9C		65	50-63
Notes:	1.	Sleep disturbance assessment is applicable for residential receivers on	ly.
	2.	Predicted L <sub>Amax</sub> noise levels exceeding the Sleep Disturbance Upper Lin	mit are in red font

#### **Construction Vibration**

Predicted vibration impacts to residential, commercial and industrial receivers are presented in Table 6-8, including whether or not vibration monitoring is considered warranted.

Table 6-8- Potential vibration impacts for residential, commercial and industrial properties

	Approx. distance	Type of nearest	Assessment on potential vibration impacts				
Receiver Location	to nearest buildings from works	sensitive buildings	Structural damage risk	Human disturbance	Vibration monitoring		
R1	53m	Residential	Very low risk of structural damage from construction works.	Low risk of adverse comment as a result of construction works	Vibration monitoring not required.		
R2	20m	Residential	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered.		
R3	5m	Residential	High to Medium risk of structural damage from construction works.	High risk of adverse comment as a result of construction works.	Vibration monitoring shall be conducted.		
R4	6m	Residential	High to Medium risk of structural damage from construction works.	High risk of adverse comment as a result of construction works.	Vibration monitoring shall be conducted.		
R5	5m	Residential	High to Medium risk of structural damage from construction works.	High risk of adverse comment as a result of construction works.	Vibration monitoring shall be conducted.		

			_		
Receiver	Approx. distance to nearest	Type of nearest	Assessment on potential vibration impacts		
Location	buildings from works	sensitive buildings	Structural damage risk	Human disturbance	Vibration monitoring
R6	9m	Residential	High to Medium risk of structural damage from construction works.	High risk of adverse comment as a result of construction works.	Vibration monitoring shall be conducted.
R7	88m	Residential	Very low risk of structural damage from construction works.	Low risk of adverse comment as a result of construction works	Vibration monitoring not required.
R8	68m	Residential	Very low risk of structural damage from construction works.	Low risk of adverse comment as a result of construction works	Vibration monitoring not required.
R9	3m	Commercial	Medium risk of structural damage from construction works.	High risk of adverse comment as a result of construction works.	Vibration monitoring should be conducted when works occur in close proximity.
R10	3m	Commercial	Medium risk of structural damage from construction works.	High risk of adverse comment as a result of construction works.	Vibration monitoring should be conducted when works occur in close proximity.
R11	10m	Commercial	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered when works occur in close proximity.
R12	21m	Commercial	Very low risk of structural damage from construction works.	Low risk of adverse comment as a result of construction works	Vibration monitoring not required.
R13	18m	Commercial	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered when works occur in close proximity.
R14	21m	Commercial	Very low risk of structural damage from construction works.	Low risk of adverse comment as a result of construction works	Vibration monitoring not required.
R15	70m	Commercial	Very low risk of structural damage from construction works.	Low risk of adverse comment as a result of construction works	Vibration monitoring not required.
R16	19m	Commercial	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered when works occur in close proximity.
R17	12m	Commercial	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered when works occur in close proximity.
R18	13m	Commercial	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered when works occur in close proximity.
R19	16m	Commercial (Concord Oval toilet building)	Low risk of structural damage from construction works.	Low to medium risk of adverse comment as a result of construction works.	Vibration monitoring would be considered when works occur in close proximity.

Recommendations for reduction potential vibration impacts, including minimum working distances for construction plant are provided in Section 5.3.1 below.

Recommendations to minimise the likelihood of cosmetic damage to buildings and disturbance or annoyance to humans have been developed for high vibration generating plant and can be found in Table 6-9. They are considered conservative to allow the commencement of works however, vibration monitoring would need to be undertaken to establish appropriate site-specific working limits.

Table 6-9- Recommended minimum working distances for vibration intensive plant

Diame in	Dating Advantation	Minimum working distance			
Plant item	Rating / description	Cosmetic damage	Human response		
Vibratory Roller <sup>1</sup>	< 50 kN (Typically 1-2 tonnes)	5 m	15m – 20 m		
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m		
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m		
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m		
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m		
	> 300 kN (Typically > 18 tonnes)	25 m	100 m		
Bobcat/Excavators <sup>2</sup>	< 30 Tonne (travelling/ digging)	10 m	15 m		
Jackhammer <sup>2</sup>	Hand held	1 m (nominal)	Avoid contact with structure		
Truck Movements <sup>2</sup>	-	-	10 m		

Notes:

- 1. TCA Construction Noise Strategy (Rail Projects) November 2011
- 2. Renzo Tonin & Associates project files, databases & library

#### Sleep disturbance

Table 6-10below presents a summary of the predicted noise levels at residential receivers during night time works.

Predicted external  $L_{Amax}$  noise levels from the majority of items of plant and equipment would exceed the upper limit of 65dB(A) at Receivers R1, R2, R3, R4, R5, R6, R7 and R8 during night time works at the intersection site.

Table 6-10 – Predicted  $L_{AMAX}$  Construction Noise Levels for Night Works at intersection dB(A)

Receiver Sl	Sleep Disturbance	Predicted Construction Noise Levels for Stage:						
	Upper Limits	1.1 Preliminary works	1.2 - Utility Relocation	1.3 - Re-linemarking and Barriers	2.1 - Stormwater Drainage	2.2 - Road Widening	3 - Paving/ asphalting	4 Landscaping
R1	65	37-84	37-75	38-72	44-76	44-84	39-78	39-75
R2	65	29-82	29-73	30-70	36-74	36-82	31-76	31-73
R3	65	31-92	31-83	32-80	38-84	38-92	33-86	33-83
R4	65	33-100	33-91	34-88	40-92	40-100	35-94	35-91
R5	65	30-100	30-91	31-88	37-92	37-100	32-94	32-91
R6	65	30-92	30-83	31-80	37-84	37-92	32-86	32-83
R7	65	24-67	24-58	25-55	31-59	31-67	26-61	26-58
R8	65	24-68	24-59	25-56	31-60	31-68	26-62	26-59

Notes: 1. Sleep disturbance assessment is applicable for residential receivers only.

2. Predicted L<sub>Amax</sub> noise levels exceeding the Sleep Disturbance Upper Limit are in red font

Predicted external  $L_{Amax}$  noise levels would exceed the upper limit of 65dB(A) at Receivers R2C, R3C, R4C and R5C during night time works at the compound site (Table 6-11).

Table 6-11– Predicted L<sub>AMAX</sub> Construction Noise Levels for Site Compound Establishment Night works dB(A)

Receive		Slean Distrutures Hannel Imite	Predicted Construction Noise Levels
r		Sleep Disturbance Upper Limits	Site Compound Establishment
R1C		65	50-63
R2C		65	55-68
R3C		65	58-71
R4C		65	47-87
R5C		65	47-88
R6C		65	47-60
R7C		65	48-61
R8C		65	48-61
R9C		65	50-63
Notes:	1.	Sleep disturbance assessment is applicable for residential rec	ceivers only.
	2.	Predicted L <sub>Amas</sub> noise levels exceeding the Sleep Disturbance	Upper Limit are in red font

In accordance with the ICNG, the sleep disturbance assessment is only applicable where construction works are planned to extend over more than two consecutive nights.

#### 6.1.6 Operational noise

Noise modelling was completed at residential assessment locations potentially worst affected by the proposed upgrade. These locations typically represent residences within the first row of properties where Parramatta Road or Shaftesbury Road has moved closer (ie. residences on the northern side of Parramatta Road and residences on the western side of Shaftesbury Road). The predicted traffic noise levels for the 2017 "build" and "no build" scenarios are presented in Table 6-12 below.

Table 6-12- Predicted Change in 2017 Traffic Noise Levels with Upgrade, dB(A)

		Distance closer to	L <sub>Aeq(15 hour)</sub>	Daytime No	ise Level	L <sub>Aeq(9 hour)</sub> N	ight Time No	oise Level
Receiver	Floor	road with upgrade	Build	No Build	Difference	Build	No Build	Difference
R1 – 2-4 Burton St	Ground	0m	58.3	58.3	0	56.2	56.8	-0.6
	First	0m	60	60	0	57.8	58.5	-0.7
R2 – 1 Loftus St	Ground	0m	62.8	62.8	0	60.6	61.1	-0.5
R3-1 Shaftesbury Rd	Ground	3m	69.4	68.7	0.7	65.1	64.8	0.3
R4 – 3 Shaftesbury Rd	Ground	2.5m	68	67.4	0.6	63.4	63	0.4
R5 – 5 Shaftesbury Rd	Ground	2m	68.4	67.9	0.5	63.7	63.4	0.3
R6 – 7 Shaftesbury Rd	Ground	1m	67.4	67.1	0.3	62.7	62.5	0.2

The predicted noise levels presented in Table 6-12 show a minor increase of up to 0.7dB(A) for the worst affected residential receivers when the intersection is upgraded compared to if it wasn't upgraded. This is below the 2dB(A) increase allowance presented in the ENMM and therefore there is no requirement to investigate further and feasible and reasonable noise mitigation measures are not triggered.

# 6.1.7 Safeguards and management measures

Impact	Environmental safeguards	Responsibili ty	Timing	Standard / additional safeguard
Noise and Vibration	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and identify:  • all potential high noise and vibration generating activities associated with the activity  • A map indicating the locations of sensitive receivers including residential properties.  • A quantitative noise assessment in accordance with the EPA Interim Construction Noise Guidelines (DECCW, 2009)  • feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014).  • A process for assessing the performance of the implemented mitigation measures.  • A monitoring program to assess performance against relevant noise and vibration criteria  • Arrangements for consultation with affected neighbours and sensitive receivers	Contractor	Pre construction	Core standard safeguard NV1  Section 4.6 of QA G36 Environment Protection
	<ul> <li>A process for documenting and resolving issues and complaints</li> <li>A process for updating the plan when activities affecting construction noise and vibration change.</li> <li>Identify in toolbox talks where noise and vibration management is required</li> </ul>			

Impact	Environmental safeguards	Responsibili ty	Timing	Standard / additional safeguard
Complaints	A management procedure will be put in place to deal with noise complaints that may arise from the construction works. Each complaint would need to be investigated and potential noise mitigation measures reviewed.	Contractor	Pre construction	Additional Safeguard
Constructio n Noise	Where feasible and reasonable, construction should be carried out during the standard daytime working hours.  Work generating high noise levels such as rock breaking and concrete cutting should be scheduled not to be done after 12am.	Contractor	Construction	Additional Safeguard
Constructio n Noise	Use quieter and less noise emitting construction methods where feasible and reasonable.	Contractor	Construction	Additional Safeguard
Constructio n Noise	All plant and equipment to be appropriately maintained to ensure optimum running conditions, with periodic monitoring.	Contractor	Construction	Additional Safeguard
Constructio n Noise	The noise levels of plant and equipment items are to be considered and are not to be used on site unless compliant with the noise criteria	Contractor	Construction	Additional Safeguard
Constructio n Noise	The offset distance between stationary noisy plant and adjacent sensitive receivers is to be maximised where practicable.  Plant used intermittently to be throttled down or shut down when not in use  Noise-emitting plant to be directed away from sensitive receivers where possible.	Contractor	Construction	Additional Safeguard
Constructio n Noise	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.	Contractor	Construction	Additional Safeguard
Constructio	Non-tonal reversing beepers (or an	Contractor	Construction	Additional

Impact	Environmental safeguards	Responsibili ty	Timing	Standard / additional safeguard
n Noise	equivalent mechanism) should be fitted and used on all construction vehicles and mobile plant regularly used on site for periods of over two months			Safeguard
Constructio n Noise	Investigate the use of structures to shield residential receivers from noise such as:  • site shed placement;  • temporary or mobile noise screens (where practicable)  • enclosures to shield fixed noise sources such as pumps, compressors, fans etc. (where practicable); and  • consideration of site topography when situating stationary plant.  Include the investigation and any potential use of screening within the NVMP.	Contractor	Construction	Additional Safeguard

#### 6.2 Traffic and access

#### **6.2.1 Existing environment**

#### Existing road network

In 2012, a corridor study was completed for Parramatta Road between the Leicester Avenue / Concord Road intersection in Strathfield to the west and Catherine Street / Phillip Street intersection in Petersham to the east (SKM 2012). This is a length of 7km which carries a large volume of traffic (over 55,000 – 85,000 vehicles per day along the corridor) including heavy vehicles in both directions as it provides a strategic transport link between Sydney, the western suburbs and beyond to the Blue Mountains. The corridor study included traffic modelling (paramics model) across morning and afternoon peak periods to determine potential improvements to traffic efficiency both at specific intersections and to the corridor. The study identified problem intersections along the Parramatta Road corridor and proposed improvements including extending turning bays and/or creating additional turning lanes. Parramatta Road and Shaftesbury Road intersection was one of five intersections identified for treatment to achieve traffic efficiency improvements.

Parramatta Road traffic volumes at this location in the day peak at 2362 vehicles an hour and reduce to 1794 vehicles an hour at night.

The M4 Western Motorway is located about 1.3 kilometres west of the proposal area. Shaftesbury Road provides access from Parramatta Road to Burwood which includes

high density residential and commercial area. Lane configurations for both roads are described in section 2.2.

#### Pedestrian and cyclist facilities

There are formalised pedestrian footpaths along both sides of Parramatta Road and Shaftesbury Road. There are no cycling lanes or shared paths within the proposal area.

#### Parking

Road side parking is available on the eastern side of Shaftesbury Road. The parking is unrestricted between about 60 metres and 110 metres south of the intersection. One hour restrictions apply 8:30 am to 6 pm weekdays and 8:30 am to 12:30 pm on Saturday from about 110 metres south of the intersection southwards.

Road side parking is also available along Loftus Street on both sides of the road. Half an hour parking restriction apply 8:30 am to 6 pm weekdays and 8:30 am to 12:30 pm on Saturday for a length of about 25 metres north of the intersection with Parramatta Road on the western side of Loftus Street.

There is no road side parking provision available on Parramatta Road. Clearway restrictions apply 6 am to 7 pm on weekdays and 8 am to 8 pm on weekends.

#### Public transport

There is one bus stop within the proposal area (northern side of Parramatta Road near Burwood Bus Depot). Bus routes passing through the intersection of Parramatta Road and Shaftesbury Road are:

407 - Burwood to Strathfield

415 - Campsie to Chiswick via Strathfield and Burwood

461 - Burwood to the Domain via Parramatta Road and the City

N70 – City to Penrith (NightRide)

N71 – City to Richmond (NightRide)

N80 - City to Hornsby via Strathfield (NightRide)

#### Access

Properties with direct access onto the roads within the proposal area are provided in Table 6-13 and indicated in Figure 6-4.

Table 6-13 Properties accessed within the proposal site

Address	Property use
1A Shaftesbury Road	7-Eleven Service Station Burwood
1 Shaftesbury Road	Residence
3 Shaftesbury Road	Residence
5 Shaftesbury Road	Residence
5A Shaftesbury Road	Residence
7 Shaftesbury Road	Residence
1 Parramatta Road	Midas Service Centre Concord
3 Parramatta Road	Reece Plumbing
282 Parramatta Road	STA Bus Depot
310 Parramatta Road	Burwood Towing
312 Parramatta Road	Dan Murphy's Burwood
318 Parramatta Road	Cleveland Prestige
320 Parramatta Road	Dr. Car Wash

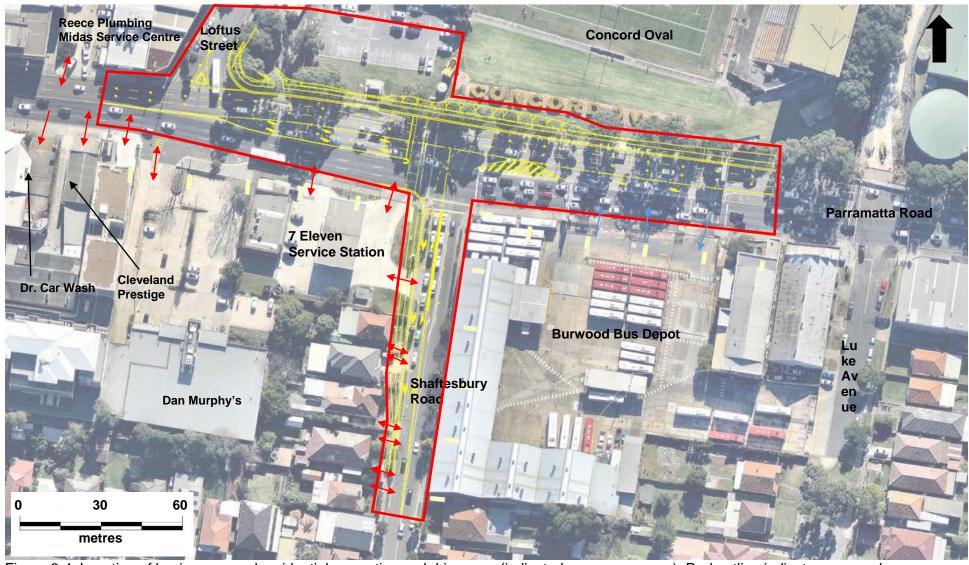


Figure 6-4: Location of businesses and residential properties and driveways (indicated as green arrows). Red outline indicates proposal area

#### **6.2.2 Potential impacts**

#### **Construction – traffic impacts**

The majority of the works would require a lane closure and a speed reduction to 40 km/hour. No detours or alternative routes would be required. The majority of the widening works on Parramatta Road would be completed at night under 1 of 2 and 2 of 3 lane closures on Parramatta Road eastbound. The majority of the widening works on Shaftesbury Road would be completed at night under 1 of 2 lane closure on Shaftesbury Road northbound. Concrete barriers would be placed along the kerb to enable some day works to be completed safely.

Temporary lane closures and speed reductions are required to ensure the work crew have sufficient working space and a safe clearance from live traffic. Consequently, the majority of works would be completed as night works to minimise traffic delays locally and to the wider road network.

It is recognised that the proposed works would cause traffic delays during the construction period, including potentially impacting bus travel times. Any works that might impact traffic would be undertaken under an approved Traffic Management Plan and require a Road Occupancy Licence (ROL) approved by the Traffic Management Centre (TMC).

Construction traffic would be associated with a number of work activities including:

- Delivery of construction materials
- Spoil removal
- Delivery and removal of construction equipment and machinery

It is estimated that the proposal would require minimum 10 heavy vehicle movements per shift. These heavy vehicle movements are likely to be required for the duration of the project. Potential cumulative traffic impacts are addressed in section 6.12.

Access to the nominated construction compound site may require access from Henley Marine Drive. Potential noise impacts from the compound site have been considered in section 6.1.

Any sporting or other events held at the facilities of the Concord Oval Precinct have the potential to increase the demand for parking spaces and increase traffic congestion in the local area the day of the event. Careful planning would be required to ensure traffic and parking impacts are managed during these specific times. TMC would take into consideration any events at Concord Oval which may increase traffic volumes at certain times and will issue the ROL accordingly.

#### Construction – access and parking impacts

Access to residential and business properties would be maintained throughout construction except where driveways to be upgraded need to be temporarily closed to be adjusted (1A, 1, 3 and 5 Shaftesbury Road). This would be undertaken in consultation with affected property owners.

The bus stop on the northern side of Parramatta Road, opposite the bus depot would be relocated slightly to the north as part of the proposal and remain accessible to users throughout construction.

#### **Construction – pedestrian and cyclist impacts**

Footpaths along Shaftesbury Road (western side) and Parramatta Road (northern side) within the proposal area would be temporarily closed to pedestrians while the widening works take place. Pedestrian movements would be managed under appropriate traffic controls.

#### Operation

The proposal would remove about 40 metres of unrestricted road side parking (around seven road side parking spaces) along the eastern side of Shaftesbury Road to allow for a merge lane. Further investigations are underway regarding parking in the area.

All footpaths would be reinstated on completion of the proposed works.

The right turn lane access to the bus depot for buses would be retained but reduced in length to accommodate the altered intersection layout.

Modelling for this intersection from the 2012 Parramatta Road corridor study demonstrated that the proposal would improve eastbound traffic flows on Parramatta Road during the morning and afternoon peak. Additional network modelling (EMME) completed in 2016 demonstrated that demand for right hand turn movement at Parramatta Road into Shaftesbury Road intersection was still high and continued to increase even once WestConnex is fully operational (model year of 2026). This reflected traffic movement to new developments and through to Burwood commercial area.

The proposal increases the capacity for the turning movement at the intersection, which results in less impedance and greater throughput of traffic travelling on Parramatta Road. The proposal also reduces potential for accidents caused by vehicles queuing beyond the right turn bay into the through lane.

Based on the concept design the following impacts would occur due to property adjustment along Shaftesbury Road:

- number 1 Shaftesbury Road will have decreased driveway area which would reduce the capacity for parking.
- number 3 Shaftesbury will have decreased driveway area which would reduce the capacity for parking and impacts one parking spot in front of the property.
- number 5 & 5A Shaftesbury Road will have minimal impacts to frontage which should not impact parking.

However, the extent of the frontage loss will be determined during detailed design phase and adequate consultation will be maintained with property owners.

## 6.2.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the RMS Traffic Control at Work Sites Manual and the worksite manual RMS Specification G10. The TMP will include:  • confirmation of haulage routes including investigation of alternate routes to minimise use of local roads  • measures to maintain access to local roads and properties  • site specific traffic control measures (including signage) to manage and regulate traffic movement  • measures to maintain pedestrian and cyclist access  • access to construction sites including entry and exit locations  • consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic.	Contractor	Detailed design / Preconstruction	Core standard safeguard TT1  Section 4.8 of QA G36 Environment Protection
Traffic and transport	The traffic management plan would include measures to minimise construction vehicle usage on local roads. Where practicable, deliveries of plant and materials would be carried out outside of peak traffic periods.	Contractor	Detailed design / Pre- construction	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Access	Access to businesses and residences must be maintained where possible	Contractor	Construction	Additional safeguard
	Safe pedestrian access around the work site would be provided by the construction contractor and captured within the traffic management plan.			
	Signage outlining pedestrian and cyclist diversion routes would be displayed during construction (where required).			
	The parking of light construction vehicles (eg staff vehicles) would be restricted to designated areas			
Bus services	Bus services are to be notified in advance of the proposed construction works, including timing.	Roads and Maritime	Pre- construction	Additional safeguard

### 6.3 **Biodiversity**

#### 6.3.1 Methodology

Background searches of existing information were carried out in order to identify potential biodiversity constraints along the proposal area (refer to Appendix H). This included a search of relevant databases, including but not limited to:

- Searches of Commonwealth and State databases to determine whether any
  threatened flora and fauna species, populations, ecological communities,
  migratory species and critical habitats as detailed in State and Commonwealth
  legislation occur or are likely to occur within a 10km radius of the proposal area.
  Specifically, a search of the Office of Environment and Heritage (OEH) Bionet
  database and the Department of the Environment Protected Matters database
  were undertaken in November 2015
- A search of the Department of Primary Industries noxious weed declarations carried out in November 2015.

A site walkover was undertaken by an ecologist in November 2015 during the day to identify the vegetation and potential fauna habitat within the proposal area.

#### **6.3.2 Existing environment**

#### Flora

The proposal area consists of planted roadside vegetation and roadside verges and gardens as described below.

The vegetation along the frontage of Concord Oval includes 27 mature planted street trees within the proposal area. and landscaped ornamental shrubs.

An arborist report was completed to identify the trees and assess their health. The surveyed trees and tree reference numbers are shown within Figure 6-3. The arborist report is provided in Appendix K. The trees along Concord Oval frontage have been identified as *Lophostemon confertus* (Brush Box) trees 1, 2, 6, 8-14, 22, 23, 25-27, *Eucalyptus microcorys* (Tallowwood) trees 4, 5, 7, 16, 20, 21, 24, *Casuarina cunninghamiana* (She Oak) trees 3, 15, *Melaleuca quinquenervia* (Broad Leafed Paperbark) trees 18, 19 and *Eucalyptus robusta* (Swamp Mahogany) tree 17. Refer to 6.3 for the location of the surveyed trees.

Five fig trees at the entrance of St Luke's Park entrance on Loftus Street are listed as locally significant on the City of Canada Bay LEP. These trees are located outside of the proposal footprint and would not be impacted by the proposal.

The landscaped hedge which spells out 'Concord Oval' is also located outside the proposal footprint and will not be impacted by the proposal.

The vegetation along Shaftesbury Road within the proposal footprint includes planted street trees with groundcover vegetation (southbound) and roadside verges and gardens (northbound).

The trees have been identified as Leptospermum species (Tea Tree) trees 28 and 29. Refer to Figure 6-4 for the location of the surveyed trees.



Figure 6-5 Location of trees identified within the proposal area. Note – Trees #26 and #27 are to be retained

Database searches identified a total of 15 threatened flora species previously recorded within a 10 kilometre radius of the proposal area listed under the TSC Act, and eight threatened flora and five Endangered Ecological Communities listed under the EPBC Act (refer to Appendix H). There are no threatened species within close vicinity of the proposal. There have been 464 records of *Acacia pubescens* (Downy Wattle), which is listed as vulnerable (TSC Act 1995), within 10 kilometres of the proposal area.

#### **Fauna**

A search of the OEH Bionet Atlas found 35 threatened species listed on the TSC Act recorded within 10 kilometres of the proposal area (refer to Appendix H). They included two frog, 26 bird and seven mammal species. A search of the EPBC Protected Matters Search tool found 22 threatened species listed on the EPBC Act as having potential habitat within 10 kilometres of the proposal area (refer to Appendix H). They included 15 bird, two frog, four mammals and one reptile species. Additionally, eight migratory terrestrial bird species and 22 migratory wetland bird species were included. There are no threatened species within close vicinity of the proposal. The nearest recorded threatened species is Pandion cristatus (Eastern Osprey), listed as vulnerable (TSC Act 1995) and observed in Bicentennial Park, about 3.3 kilometres north-west of the proposal site. There have been 11,764 records of Litoria aurea (Green and Golden Bell Frog), which is listed as endangered (TSC Act 1995), within 10 kilometres of the proposal area. However, there is not habitat present for this species in the proposal area. The draft Concord Oval Precinct Plan of Management identified the Pteropus poliocephalus (Grey-Headed Flying-fox) using the trees in the precinct for temporary foraging habitat. The Grey-Headed Flying-fox is listed as Vulnerable under the TSC Act. It is also listed as Vulnerable under Commonwealth (EPBC Act) legislation.

The vegetation only provides minor disturbed foraging habitat for fauna which are tolerant of disturbances (e.g. common bird species). No hollow-bearing trees were recorded.

#### 6.3.3 Potential impacts

#### Flora

The proposed works would require removal of native and exotic planted vegetation on the northern side of Parramatta Road along the Concord Oval boundary and the western side of Shaftesbury Road to allow for the road widening, including:

- Removal of 27 mature trees. The arborist report identified that two trees (#26 and #27) on the frontage of Concord Oval can be retained which reduces the tree removal along Concord Oval from 27 to 25. Two trees on the western side of Shaftesbury Road would also require removal.
- About seven Grevillea and other shrubs
- Hedges to the north east of intersection of Loftus Street and Parramatta Road where the historical plaque is located
- The landscaped hedge which spells out 'Concord Oval' would not be impacted as it is outside of the proposal area however it is immediately adjacent to the relocated boundary fence and would need to be protected from any indirect impacts.

There were no threatened flora species within the proposal area. The removal of this vegetation is not considered to have a substantial impact on flora species in the context of the locality. A draft landscape plan (Appendix D) has been developed in consultation with Canada Bay and Burwood Councils to mitigate the potential

amenity impacts of the proposal. This is assessed in more detail in the visual impacts assessment section (refer section 6.4).

There is potential for works to result in the spread of weeds including the Class 2 Noxious weed species *Asparagus aethiopicus* (Asparagus Fern) during excavation works and vegetation removal along the northern side of Parramatta Road.

#### **Fauna**

The proposal would remove street plantings which have the potential to be used as foraging habitat by avian fauna and the Grey-headed Flying-fox. However, impacts to fauna species are considered to be minor as only a small portion of street trees would be removed in the context of the locality and other foraging habitat trees for the Grey-headed Flying-fox are located in the Concord Oval precinct. A seven part test was completed to assess the potential impact of the vegetation removal on Grey-headed Flying-fox (Appendix H). The assessment concluded that the proposal is not considered likely to impact on roosting or breeding habitat for the species, and the impact to foraging habitat is not considered likely to significantly impact the species such that a population of the species would not remain viable within the locality. As such, a Species Impact Statement is not considered necessary to further assess impacts to the species. No hollow-bearing trees were identified within the proposal area.

#### **Conclusion on significance of impacts**

The proposal is not likely to significantly impact 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 not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*.

#### 6.3.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	Contactor	Detailed design / pre- construction	Core standard safeguard B2
Vegetation impacts	Avoid stockpiling materials and equipment and parking vehicles and machinery within the dripline of any tree.	Contractor	Construction	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Vegetation removal	Prior to the start of any clearing a physical clearing boundary is to be demarcated and implemented.	Contractor	Pre- construction	Additional safeguard
Vegetation removal	<ul> <li>Where trees are to be retained, place an exclusion zone fencing outside the tree protection zone</li> <li>Erect signs to inform personnel of the purpose of the fencing. Signs should be clearly visible and be general in nature, such as 'Exclusion zone' or 'Environmental Protection zone'.</li> </ul>	Contractor	Construction	Additional safeguard
Noxious weeds	Declared noxious weeds (ie. Asparagus aethiopicus) will be managed according to the requirements stipulated by the Noxious Weeds Act 1993, and any weed removal activities will follow Guide 6 (Weed Management) in the Biodiversity Guidelines (RTA 2011).	Contractor	Pre- construction	Additional safeguard
Vegetation removal	A Vegetation Management Plan would be prepared and would include:  • Identification (marking) of the clearing boundary and trees to be cleared  • A detailed clearing process in accordance with RMS Biodiversity Guidelines (2011) including requirements of Guide 1,2, 4 & 9  • measures to protect the hedge at Concord Oval and place an exclusion zone fencing.  • Measures to protection of trees #26 and #27 as outlined in Arborist Report.	Contractor	Pre-construction	Standard safeguard

#### 6.4 Visual and landscape character

#### 6.4.1 Methodology

The assessment was carried out in accordance with the *Guideline for Landscape Character and Visual Impact Assessment* (Roads and Maritime, 2013).

The method to measure landscape character and visual impact is based on the combination of the sensitivity of the existing area or view to change and the magnitude (scale, character, distance) of the proposal on that area or view.

Sensitivity refers to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed change. For example, a pristine natural environment will be more sensitive to change than a built up industrial area.

Magnitude refers to the nature of the project. For example, a large interchange would have a very different impact on landscape character than a localised road widening in the same area.

The combination of sensitivity and magnitude will provide the visual impact for viewpoints (refer to Table 6-14 for grading values).

Magnitude High Moderate Low Negligible High High Impact High-Moderate Moderate Negligible Moderate High-Moderate Moderate Moderate-Low Negligible Low Moderate Moderate-Low Low Negligible Sensitivity Negligible Negligible Negligible Negligible Negligible

Table 6-14 Impact grading matrix (Roads and Maritime 2013)

#### **6.4.2 Existing environment**

#### Landscape character

The study area (visual envelope) includes residential, commercial, pedestrian, vehicle and public recreational properties. A number of landscape character zones have been identified and are summarised in Table 6-15 and illustrated in Figure 6-6. These landscape character zones are areas that have relatively consistent characteristics in terms of natural resources, built form, landform, land use and vegetation patterns.

A number of government strategies apply to Parramatta Road. These include:

- Draft Parramatta Road Urban Transformation Strategy (UrbanGrowth 2015)
- Parramatta Road Urban Amenity Improvement Plan (UrbanGrowth 2015a)
- Draft Parramatta Road Urban Renewal Strategy (UrbanGrowth 2015)

The various documents describe the existing condition of the Parramatta Road corridor and actions to be implemented to improve these, including urban design. The various strategies describe Parramatta Road as *unattractive in parts, derelict in others and not attracting investment.* Furthermore, the streetscape of Parramatta Road within the Burwood Precinct is considered *degraded and hostile. This contrasts to the streetscape only one block back from Parramatta Road where footpaths are well maintained and there is a level of greenery along the streets.* 

The strategies include a number of actions to be implemented to improve the amenity of the Burwood precinct, including public domain improvements to Parramatta Road including new street planting and public domain improvements from Shaftesbury Road to Broughton Street.

Table 6-15 Landscape character zones

Landscape character zone	Description
Loftus Street residential zone	This zone includes freestanding homes with well-maintained front gardens and lawns on Loftus
	Street
Shaftesbury Road residential zone	This zone includes freestanding homes with well-maintained front gardens and lawns along a local
	road.
Parramatta Road commercial and	Parramatta Road is bordered by commercial business and is zoned as an enterprise corridor.
residential zone	Businesses include a bus depot, service station, liquor store and other small businesses. A
	multistorey apartment building is also located within this zone.
Concord Oval precinct	Concord Oval is located to the north of the proposal area. Concord Oval includes a rectangular playing field bordered by grandstands on the eastern and western sides. A hockey field is also located within the Concord Oval precinct. Concord Oval is one of the City's premier sporting venues and was developed to hold 20,000 spectators.
	The Concord Oval precinct is bordered by a continuous row of mature trees and maintained gardens. The draft precinct plan of management identifies a number of values of the community land in the City of Canada Bay LGA and within the Concord Oval Precinct including aesthetic values and ecological values which are relevant to this assessment. These as well as the future roles of the Concord Oval precinct are discussed in further detail in Table 6-10. The plan of management also includes a masterplan with actions to be implemented to ensure the values of the precinct are maintained or improved and management objectives are met.
Parramatta Road corridor	Parramatta Road is a key transport corridor for motorists, freight and public transport and connects Sydney CBD with Parramatta. Parramatta Road includes a total of 6 lanes of generally congested traffic. Road side trees are generally absent except along the southern boundary of Concord Oval.

Table 6-16 Values of the community land in Canada Bay and of the Concord Oval Precinct

Value	Community land	Concord Oval Precinct	Future roles of Concord Oval Precinct	Management objectives
Aesthetics	The community values community land as attractive places to visit and view, providing a sense of place, and character for nearby neighbourhoods.	The open space and plantings of Concord Oval Precinct pleasantly contrasts with the houses, buildings and traffic associated with the adjoining urban environment.  Trees, shrubs, grass and landscaping are appreciated because they create a visually pleasing environment, provide shade, and screen buildings and development.  The grandstands are visual features and landmarks from Parramatta Road.	an increasingly urbanised suburb. Open space, green, visual link between Parramatta Road and St Luke's and Cintra Parks. Landscaped buffer between residences and businesses on Taylor Street and the hockey field. Natural and planted	green visual character of the precinct. Provide shade for park visitors.
Ecology	The community values the natural environment, and there is a strong desire to rehabilitate natural areas. Trees are highly valued, and there is a general view that more trees be planted, but not at the expense of local views.	Valued ecological features of the Precinct are mature trees and water harvesting and recycling initiatives.	Model for stormwater harvesting and reuse and	Manage and maintain the precinct in an ecologically sustainable manner. Ensure the principles of ecologically sustainable development are considered in every area of improvement to the precinct. Encourage the use of ecologically sustainable development, water

Value	Community land	Concord Oval Precinct	Future roles of Concord Oval Precinct	Management objectives
				sensitive urban design, and other management approaches to minimise the use of non-renewable resources.  Plant appropriate vegetation and ensure they are healthy.  Manage trees, vegetation and landscaping.



Figure 6-6 - Landscape character zones and photo locations

#### Visual sensitivity

The key existing viewpoints in the area would be from commercial businesses, residential properties, road users (pedestrian and vehicles) and public users of Concord Oval. Views to the proposal area is generally confined to the immediate surrounding zones due to the built up nature of the environment. Existing views and aspects of each viewpoint are presented in Appendix I.

Key viewpoints were used to assess the potential visual impact of the proposal and are described in Table 6-17.

Table 6-17 Key view points of the proposal

Location ID	Viewpoint Viewpoint	Description
1	Residential receiver at 316 Parramatta Road	316 Parramatta Road is a multi storey apartment complex that is constructed to have views north and east. The apartments have negligible views to the west. The apartments have views of Parramatta Road and Concord Oval as well as surrounding urban areas.
1, 2, 3, 6, 7, 8, 9, 10, 11, 12,13, 14, 15, 16, 20	Parramatta Road commercial receivers	Businesses along Parramatta Road have direct views of Parramatta Road, the mature trees along the southern boundary of Concord Oval and filtered views of Concord Oval.
	Parramatta Road users (pedestrians and vehicles)	Road users have direct views of Parramatta Road, the mature trees along the southern boundary of Concord Oval and filtered views of Concord Oval.
4, 5, 6	Loftus Street residential receivers	The residential receivers have views north east to the south east across Loftus Street towards Concord Oval. They also have filtered views of Parramatta Road
	Loftus Street users (pedestrians and vehicles)	Road users have direct views of Loftus Street, Parramatta Road, the mature trees along the southern boundary of Concord Oval and filtered views of Concord Oval.
17, 18, 19	Shaftesbury Road residential receivers	Views from these properties to the north towards Parramatta Road and Concord Oval are generally obstructed by the bus depot and service station and the general orientation of the properties (east-west).  The residential receivers have direct views of Shaftesbury Road.
	Shaftesbury Road Road users (pedestrians and vehicles)	Road users have direct views of Shaftesbury Road, Parramatta Road, the mature trees along the southern boundary of Concord Oval and filtered views of Concord Oval.
NA*	Concord Oval	The users of Concord Oval have filtered views of Parramatta Road.

<sup>\*</sup>Access to Concord Oval was not available at the time of the assessment.

#### **6.4.2 Potential Impacts**

#### Landscape character

The potential impacts to the landscape character zones are presented in Table 6-12. The table includes an assessment of the proposed works on each landscape character zone with and without implementation of the proposed landscape plan. This shows the contribution of the landscape plan in mitigating the potential impacts.

The highest impacts would occur on the Concord Oval Precinct. The precinct was assigned a high sensitivity ranking taking into account the high community value assigned to ecology and amenity as captured in the Council plan of management for Concord Oval (Table 6-9). The Moderate to High impact is due to the removal of the trees along the boundary of the oval as the areas around the boundary of the oval have been identified as being of aesthetic value and provide a clear boundary of the precinct. The implementation of the landscape plan, which would include the planting of trees would mitigate this impact which would only be moderate.

The next highest impact would occur on the Shaftesbury Road residential zone as a result of the road corridor being brought closer to the residential properties (Moderate impact).

The impact of the proposal on the other character zones would be moderate-low to low without the implementation of the landscape plan and low with the implementation of the landscape plan. These character zone are highly disturbed in nature and the proposal would have minimal impact on the character of these zones.

#### Visual sensitivity

The potential impact on sensitive receivers from the key viewpoints is assessed in Table 6-13. The table includes and assessment of the proposed works on each key viewpoint with and without implementation of the proposed landscape plan. This shows the contribution of the landscape plan in mitigating the potential impacts.

The highest impact would occur at:

- Residential receivers along Shaftesbury Road where impacts would be moderate during construction and High-moderate once works are completed. This is a result of the close proximity of the viewpoint and the road that will be brought closer to the properties.
- Loftus Street residential receivers would be moderately impacted during construction due to construction traffic travelling along this road and the compound site being located across the road.
- Concord Oval users where impacts would be moderate during construction and high-moderate following completion of the works. The impact would be reduced to moderate following completion of the landscape plan.
- Residential receiver at 316 Parramatta Road where impacts would be moderate during construction and moderate following completion of works. The impact would be reduced to moderate following completion of the landscape plan. This is a result of the close proximity of the viewpoint and the sensitivity of the residential receiver.
- Parramatta Road commercial properties would be moderately impacted following completion of works which would be reduced to a low impact following implementation of the landscape plan.

The impact of the proposal on the other key viewpoints would be low to moderate-low during construction and/or operation.

Table 6-18 Impact to landscape character zone

Landscape character zone	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)
Loftus Street commercial and residential zone	Low	Low	Low	Low	Low
Shaftsbury Road residential zone	Moderate	Moderate	Moderate	Moderate	Moderate
Parramatta Road commercial and residential zone	Low	Low	Low	Low	Low
Concord Oval precinct	High	Moderate	Moderate- High	Low	Moderate
Parramatta Road corridor	Low	Moderate	Moderate- Low	Low	Low

Table 6-19 Visual impact of key viewpoints

Viewpoint	Phase	Impact of the proposal	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)	Comment
Residential receiver at 316 Parramatta Road	Construction	View of construction work along Parramatta Road and the site compound. Potential light spill from lights for night work	Moderate	Moderate	Moderate	NA		The construction activities including compound site would have a moderate impact on visual amenity due to short distance of receiver from the works.
	Operation	View of completed widening of Parramatta Road and removed mature trees along the northern side of Parramatta Road.	Moderate	Moderate	Moderate	Low	Low	The trees along the northern side of Parramatta Road provide some visual amenity to this receiver. Their removal would have a moderate impact. The removal of vegetation is unlikely to create privacy impacts for any of the receivers. The implementation of the landscape plan would compensate this impact as the row of trees removed would be partially offset by trees and landscaping at the corner of Loftus St and Parramatta Rd.
Parramatta Road commercial receivers	Construction	View of construction work along Parramatta Road and the site compound. Potential light spill from lights	Low	Moderate	Low- Moderate	NA	,	Night works would limit the impact on some businesses though the compound site would still be visible during the day.

Viewpoint	Phase	Impact of the proposal	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)	Comment
		for night work						
	Operation	View of completed widening of Parramatta Road and removed mature trees along the northern side of Parramatta Road.	Moderate	Moderate	Moderate	Low	Low	The trees along the northern side of Parramatta Road provide some visual amenity to these receivers. Their removal would have a moderate impact. The implementation of the landscape plan would compensate this impact as the row of trees removed would be partially offset by trees and landscaping at the corner of Loftus St and Parramatta Rd
Parramatta Road users (pedestrians and vehicles)	Construction	View of construction work along Parramatta Road and the site compound. Potential light spill from lights for night work	Low	Low	Low	NA		Road users would be travelling through the proposal area within a highly urbanised environment. Road works and other construction activities are common features in the locality and wider region.

Viewpoint	Phase	Impact of the proposal	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)	Comment
	Operation	View of completed widening of Parramatta Road and removed mature trees along the northern side of Parramatta Road.	Low	Moderate	Low- Moderate	Low	Low	The trees along the northern side of Parramatta Road provide some visual amenity to road users. Their removal would have a low-moderate impact. The implementation of the landscape plan would compensate this impact as the row of trees removed would be partially offset by trees and landscaping at the corner of Loftus St and Parramatta Rd.
Loftus Street residential receivers	Construction	Construction traffic to and from compound site Filtered views of compound site Marginal views of construction works at intersection	Moderate	Moderate	Moderate	NA		Construction traffic and the compound site would have the highest impact. Light spill from night work at site compound has the potential to impact residents. The residents have limited views of the intersection considering the distance and orientation of the properties.
	Operation	Views of removed trees along northern side of Parramatta Road	Low	Low	Low	Low	Low	The removal of mature trees along the northern side of Parramatta Road would have a low impact on these receivers. The trees along Loftus Street would be maintained which provide visual amenity and some screening to the works. The

Viewpoint	Phase	Impact of the proposal	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)	Comment
								residents have limited views of the intersection considering the distance and orientation of the properties.
Loftus Street users (pedestrians and vehicles)	Construction	Construction traffic to and from compound site Filtered views of compound site Marginal views of construction works at intersection	Low	Low	Low	NA		Road users would be travelling through the proposal area within a highly urbanised environment. Road works and other construction activities are common features in the locality and wider region.
	Operation	Filtered views of removed trees along northern side of Parramatta Road	Low	Low	Low	Low	Low	The removal of mature trees along the northern side of Parramatta Road would have a low impact on these receivers. The trees along Loftus Street would be maintained which provide visual amenity and some screening to the works.
Shaftesbury Road residential receivers	Construction	Views of construction work along Shaftesbury Road	Moderate	Moderate	Moderate	NA		Construction activities will be very close (within 10 metres) of the properties. Light spill from night work has the potential to impact residents.
	Operation	Proposal would move road closer	Moderate	High	Moderate- High	Moderate to High	Moderate	The widening of the western side of Shaftesbury Road

Viewpoint	Phase	Impact of the proposal	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)	Comment
		to residences Property adjustment works						would bring the road closer to residences. Overhead electrical asset would be relocated underground in the proposed footway. The frontage of the residential buildings is currently about 10 metres from the road edge with the proposal bringing the road edge about 3 metres closer to the properties.
Shaftesbury Road users	Construction	Views of construction work along Shaftesbury Road Vegetation removal along Parramatta Road	Low	Low	Low	NA		Road users would be travelling through the proposal area within a highly urbanised environment. Road works and other construction activities are common features in the locality and wider region.
(pedestrians and vehicles)	Operation	Upgraded intersection	Low	Moderate	Low- moderate	Low	Low	The removal of the trees along Parramatta Road would mean road users travelling north would have direct views of Concord Oval. The implementation of the landscape plan would mitigate this impact in the long term.
Concord Oval	Construction	Views of construction work including	Moderate	Moderate	Moderate	NA		Concord Oval users would have views of the construction work.

Viewpoint	Phase	Impact of the proposal	Sensitivity	Magnitude (without landscape plan)	Impact (without landscape plan)	Magnitude (with landscape plan)	Impact (with landscape plan)	Comment
		compound site						
	Operation	Unfiltered views of Parramatta Road as a result of the removal of the trees along the northern side of Parramatta Road	High	Moderate	High- Moderate	Low	Moderate	The trees along the northern side of Parramatta Road provide some visual amenity to users of the oval and they filter the views to Parramatta Road. Their removal would have a high-moderate impact. The implementation of the landscape plan would mitigate this impact.

#### 6.4.2 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Rehabilitation	A Landscape Plan would be prepared in accordance with the Roads and Maritime Beyond the Pavement urban design policy, process and principles (Roads and Maritime, 2014) and Landscape Guideline (RTA, 2008) and approved by the councils. The landscape plan must take into consideration the values identified in the Concord Oval Precinct plan of management (refer Appendix D).	Contractor	Pre-construction	Additional safeguard
Light spills	Ensure all lights are directed away from residential properties.	Contractor	Construction	Additional safeguard

### 6.5 Land use and socioeconomic

### **6.5.1 Existing environment**

The area surrounding the proposal site is commercial, residential and recreational (Refer to Figure 6-1). There are no schools located in the vicinity of the proposal.

Concord Oval Precinct located adjacent and to the north of the proposal area is one of the city's premier sporting, leisure and training venues. It comprises around 6.6 hectares of land including Concord Oval and the Concord Hockey Complex. It is currently the head office and training venue for the Wests Tigers NRL team, and the home ground of the West Harbour Rugby Football Club and is used by Inter Lions Soccer Club. The hockey complex provides facilities for Briars Hockey.

There is a historic plaque commemorating colonial history located along the footpath on the north eastern corner of Parramatta Road and Loftus Street, within the proposal area (Figure 6-7). The Concord Oval Plan of Management includes commitment to retain and enhance the plaque and surrounding area due to its significance.



Figure 6-7 - Historical plaque and landscape area on the north eastern corner of Parramatta Road and Loftus Street commemorating colonial history

Businesses in the vicinity of the proposal are shown in Figure 6-4 and include:

- South side of Parramatta Road
  - STA Bus Depot
  - o 7-Eleven Burwood
  - o Dan Murphy's Burwood
  - o Cleveland Prestige Motor Body Repairs
  - o Doctor Car Wash
- North side of Parramatta Road
  - o Midas Service Centre Concord
  - Reece Plumbing

### Utilities located in the proposal area include:

- Street lighting
- Electricity (overhead and underground)
- Gas
- Sydney Water
- Telecommunications (underground)
- Traffic Control Signals
- Variable Message Signs

### A number of government strategies apply to Parramatta Road. These include:

- Draft Parramatta Road Urban Transformation Strategy (UrbanGrowth 2015)
- Parramatta Road Urban Amenity Improvement Plan (UrbanGrowth 2015a)
- Draft Parramatta Road Urban Renewal Strategy (UrbanGrowth 2015)

The various documents describe the existing condition of the Parramatta Road corridor and actions to be implemented to improve these, including urban design. The various strategies describe Parramatta Road as *unattractive in parts, derelict in others and not attracting investment.* Furthermore, the streetscape of Parramatta Road within the Burwood Precinct is considered degraded and hostile. This contrasts to the streetscape only one block back from Parramatta Road where footpaths are well maintained and there is a level of greenery along the streets.

The strategies include a number of actions to be implemented to improve the amenity of the Burwood precinct, including public domain improvements to Parramatta Road including new street planting and public domain improvements from Shaftesbury Road to Broughton Street.

### 6.5.2 Potential impacts

#### Construction

The proposed works would require major relocation of utilities and heavy multi-utility coordination would be required as described in section 3.5. All utilities within the proposal footprint, with the exception of the two Variable Message Signs along Parramatta Road are expected to be impacted. All utility authorities and asset owners have been contacted and would need to certify and approve the relevant utility relocation design currently being developed. Some temporary disruptions to services may occur during construction. However, VBAJV would work in accordance with asset owner requirements to minimise interruptions to services.

The proposal would impact the historical plaque on the north eastern corner of Parramatta Road and Loftus Street commemorating colonial history. The plaque would be relocated about 1.6m north as result of the road widening works proposed at this location. The draft Concord Oval Precinct Plan of Management identifies the plaque as an item that should be retained and enhanced in any improvements to the south west garden of the oval. The plaque would be retained with only a minor relocation 1.6 metres to the north which has been approved by the Council. The relocation would be undertaken in accordance with a council approved landscape plan (provided in Appendix D).

The proposal would also impact the local community through:

- Construction noise (section 6.1)
- Traffic and access, including impacts when events are being held within the Concord Oval Precinct (section 6.2)
- Visual impacts (Section 6.4)
- Air quality (Section 6.8)

#### Operation

Partial acquisition would be required from three residential properties and one commercial property (service station) on Shaftesbury Road west, strip acquisition would also be required along the frontage of Concord Oval (made up of multiple separate lots) as detailed in Section 3.6. The property adjustments would be undertaken in consultation with the land owners.

The proposal would also impact the local community through:

- Traffic and access (Section 6.2) Land acquisition along nature strip may also potentially reduce parking capacity at the frontage of properties along Shaftesbury Road (western side).
- Visual impacts (Section 6.4).

# **6.5.3 Safeguards and management measures**

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Property acquisition	All property acquisition will be carried out in accordance with the Land Acquisition Information Guide (Roads and Maritime, 2012) and the Land Acquisition (Just Terms Compensation) Act 1991.	Roads and Maritime project manager	Pre- construction and construction	Core standard safeguard PL1
Socio-economic	A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum):  • mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions  • contact name and number for complaints.  The CP will be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).	Contactor	Detailed design / pre-construction	Core standard safeguard SE1
Complaints	Construction related complaints received must be recorded and attended to promptly in accordance with the Roads and Maritime's Community Involvement Practice Notes and Resource Manual.	Contractor	Construction	Additional safeguard
Historical plaque	<ul> <li>The relocation of the plaque must be undertaken in the context of a landscape plan developed in consultation with City of Canada Bay Council.</li> <li>Care must be undertaken</li> </ul>	Roads and Maritime	Pre- construction/ construction	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	during the relocation of the plaque to ensure it is not damaged.			

### 6.6 Soil, water quality and hydrology

### **6.6.1 Existing environment**

#### **Topography**

The proposal area is generally flat, with a slight slope down to the east.

#### Geology and soil

The proposal is located on disturbed terrain. Potential limitations are dependent on the nature of the fill but may include mass movement hazard, unconsolidated low wet strength materials, impermeable soil, and poor drainage. The surrounding area is underlain by Blacktown soil landscape, a residual landscape consisting of gently undulating rises on Wianamatta Group shales (OEH, 2015). Soils are shallow to moderately deep, with limitations including moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage.

#### **Acid Sulfate soil**

The proposal is located on class 5 Acid Sulfate Soils (ASS), with class 2 ASS soils occurring about 50 metres north-east of the site (refer to Figure 6-8). The DP&E ASS maps recognise five classes of works based on the level of risk associated with the particular works and the probable distribution of ASS. ASS are not typically found in class 5 areas.



Figure 6-8: Acid sulfate soils in vicinity of the proposal. Red line indicates the proposal area. peach shading indicates class 5 ASS; bright pink shading indicates class 2 ASS (Source: DP&E planning viewer 2015)

#### Salinity

The proposal area is not identified as saline land (DP&E, 2015).

#### **Contaminated lands**

A stage 1 desktop environmental site assessment (contamination) for the proposal was undertaken. A search of the EPA Contaminated Land Record was completed as part of the assessment. A summary of the search result ae outlined below;

- There were no notices for the proposal site under Section 58 of the *Contaminated Land Management Act 1997*. However, the Burwood bus depot has no current but three former notices. Including a site audit statement.
- The proposal area is not listed on the NSW EPA register. However, the Burwood bus depot is listed.
- There were no notices for the proposal area on the POEO register. However, the Burwood bus depot has two previous notices:
  - o POEO licence, number 7309 (No longer in force 11 August 2000)
  - o S.58 licence, number 1044434 (issued 23 February 2005).

t A Site Audit Statement has been prepared for the Bus Depot on 29 October 2009 by Kylie Lloyd of WSP Environmental. Listed in the overall comments "the potential for the migration of the total petroleum hydrocarbon (TPH) plume off-site is being monitored through the implementation of an Environmental Management Plan (EMP) and contingency plans".

Based on a review of the proposal area through a site walkover and a review of site history the following areas of potential environmental concerns have been identified:

- Fill Material entire area. The site appears to have been historically filled from unknown origins to achieve existing levels.
- Off-Site Commercial Use. The areas to the immediate east and west (service station and bus depot) of the proposal area have been used for the storage of fuel in underground storage tank/s and above ground storage tank/s. The service station was recently upgraded where all existing structures containing hazardous material were upgraded to higher standards.

The assessment identified a low risk of potential contamination considering the recent upgrade of the service station; the bus depot's implementation of the environmental management plan and the proposal scope of works.

#### Water

The closest surface water body is Canada Bay located approximately one kilometre to the northeast of the site. The site is well drained by the urban storm water system with numerous drains located along both Parramatta Road and Shaftesbury Road. The closest known storm water canal runs along the eastern boundary of Concord Oval and into Canada Bay.

A desktop assessment of groundwater bore records available on the NSW Government Water Information database was undertaken during concept phase. One bore was located around 25 meters to the west of the proposal area however the registered purpose of this bore is unknown. The next closest bore by distance was a monitoring well located around 68 meters to the east of the site. Another monitoring well was located around 405 meters to the north-west of the site. These bores are not registered for beneficial use and hence not considered to be potential receptors.

A review of the regional geology and groundwater bore information indicates that the subsurface condition at the site is expected to consist of residual soils overlying relatively shallow bedrock. The occurrence of groundwater that could be utilised as a resource for beneficial use is considered to be relatively low under such conditions. A perched aquifer in the subsurface may be present.

The proposal area is not identified as a flood prone area (DP&E, 2015).

### 6.6.2 Potential impacts

#### Construction

Earthworks, tree removal and relocation of utilities would be required to widen Parramatta and Shaftesbury roads. Excavations works are likely to extend up to around 800mm. These have the potential to create erosion and sedimentation risks of the urban storm water system.

There is potential for chemical and fuel spills to occur during construction resulting in pollution of soils and the urban storm water system.

ASS are unlikely to be encountered and therefore be impacted.

No works would be undertaken within the bus depot and only minor adjustments to the service station property boundary would be required. Therefore, the proposal is unlikely to impact subsurface infrastructure such as underground storage tanks.

#### Operation

The kerbs and gutters and stormwater drainage system would be reinstated as part of construction works which would ensure the system functions appropriately. Soils, water quality and hydrology are unlikely to be adversely impacted once the works have been completed.

## **6.6.3 Safeguards and management measures**

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Erosion and sedimentation	A site specific Erosion and Sediment Control Plan (ESCP) will be prepared and implemented as part of the CEMP.  The ESCP would include the following:  Separation of on-site and off-site water  The direction of run-off and drainage points during each stage of construction  Direction of flow of on-site and off-site water  The locations of other erosion and sediment control measures  A process for reviewing and updating the plan on a fortnightly basis and/or when works alter.  Nominated concrete wash out areas	Contractor	Detailed design / Preconstruction	Core standard safeguard SW2  Section 2.2 of QA G38 Soil and Water Managemen t
Accidental spills	The CEMP is to include a site specific emergency spill plan in accordance with RMS Incident Classification and Reporting Procedure.	Contractor	Detailed design / Pre- construction	Core standard safeguard C3 Section 4.3 of QA G36 Environment Protection
Contaminated land	A Contaminated Land Management Plan will be prepared and implemented as part of the CEMP for any areas of existing contaminated land or to address land contamination likely to be caused by the activity.	Contractor	Detailed design / Pre- construction	Core standard safeguard C1 Section 4.2 of QA G36 Environment Protection

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. This may include but not be limited to: - diversion of surface runoff - capture of any contaminated runoff - temporary capping.	Contractor	Detailed design / Pre- construction	Core standard safeguard C2 Section 4.2 of QA G36 Environment Protection

## 6.7 Non-Aboriginal heritage

### **6.7.1 Existing environment**

The following databases were searched on 3 November 2015:

- State Heritage Inventory (search area: Burwood and City of Canada Bay LGAs) which includes listings on the State Heritage Register, council LEPs and state government agency heritage registers (section 170).
- Australian Heritage Database (search area: Burwood and City of Canada Bay LGAs)

The nearest listed item is 'St Luke's Park gateway/entrance—gates and trees only' which is listed as local significant item on the City of Canada Bay LEP. The trees referred to in the listing correspond to the 5 fig trees at the entrance on Loftus Street (Figure 6-9).



Figure 6-9 Location of 'St Luke's Park gateway/entrance—gates and trees only' heritage item curtilage shown in red

The historical plaque on the north eastern corner of Parramatta Road and Loftus Street commemorates colonial history but is not listed as a heritage item.

A review of aerial photographs dating from 1943 did not identify old road alignments or other historical features which could indicate a potential for uncovering these during the works. However, considering the history of Sydney, the potential to uncover relics or other features with heritage potential cannot be excluded.

#### 6.7.2 Potential impacts

The proposal would involve upgrading an existing intersection on Parramatta and Shaftesbury Roads. The works are not within the vicinity of any listed heritage items. There is low potential for impacting heritage items due to previous construction works and current land uses.

The heritage item 'St Luke's Park gateway/entrance—gates and trees only' is outside of the proposal area and would not be impacted by the proposal

The proposal would impact the historical plaque on the north eastern corner of Parramatta Road and Loftus Street. The plaque would be relocated about 1.6m north as result of the road widening works proposed at this location. The draft Concord Oval Precinct Plan of Management identifies the plaque as an item that should be retained and enhanced in any improvements to the south west garden of the oval. The plaque would be retained with only a minor relocation 1.6 metres to the north which would be undertaken in consultation with the City of Canada Bay Council and in accordance with a council approved landscape plan (provided in Appendix D).

#### 6.7.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Impact on unknown heritage items	Should any remains of unexpected historic heritage be encountered all work must cease in that location and the procedures in the Roads and Maritime's Standard Management Procedure: Unexpected Archaeological Finds (Roads and Maritime, 2012) must be followed.	Contractor	Construction	Core standard safeguard H2 Section 4.10 of QA G36 Environment Protection

# 6.8 Air quality

#### **6.8.1 Existing environment**

Air quality for Burwood is assessed using readings from the NSW Office of Environment and Heritage's Chullora monitoring station, located about five kilometres south-west of the proposal site. Monitoring results are compared to National Environment Protection Measure (NEPM) standards. In the year from 5 November 2014 to 5 November 2015, nine exceedances were recorded at the Chullora monitoring station, one for particles less than 10 micrometres in diameter, one for particles less than 2.5 micrometres in diameter and seven for suspended fine particles as measured by a nephelometer.

A search of the National Pollution Inventory undertaken in April 2016 found that there are no registered facilities in the Burwood or Canada Bay LGAs.

Air quality at the proposal site would mostly be impacted by exhaust fumes from motorists.

### 6.8.2 Potential impacts

Air pollution can cause a wide range of health symptoms, from coughing, wheezing and shortness of breath, to more serious impacts for those with pre-existing respiratory and cardiac conditions.

#### **Construction impacts**

The proposed works have the potential for a localised and temporary deterioration in air quality due to:

- Emissions from machinery and vehicles. This could include exhaust fumes and/or from potential spills (hydrocarbon spills)
- Dust and particulates generated from disturbed surfaces, in particular during earthworks and vegetation clearing
- Uncovered loads being transported to and from the proposal area are also a potential source of dust
- Other odours from specific construction activities (e.g. painting of lanes and medians, excavation of contaminated soils if these occur).

The works would be located in close proximity to residents (10 metres away) and recreational users (10 metres away) and dust emissions and other odours have the potential to cause disturbances (e.g. coat windows, cars etc.) and affect human health.

Traffic disruptions during construction works have the potential to increase vehicle emissions in the local area.

#### Operational impacts

The improved traffic flow may have a minor positive impact on air quality in the local area.

#### 6.8.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Vehicle emissions	<ul> <li>Plant and machinery must be maintained in accordance with manufacturer's specification.</li> <li>Smoky emissions must be kept within the standards and regulations under the Protection of the Environment Operations Act 1997 that no vehicle shall have continuous smoky emissions for more than 10 seconds.</li> <li>Vehicles must not be left running when idle.</li> </ul>	Contractor	Construction	Additional safeguard
Dust generation	Any material transported in trucks must be appropriately covered to reduce dust generation.	Contractor	Construction	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Dust emissions	<ul> <li>Measures including watering or covering exposed areas must be used to minimise or prevent dust generation.</li> <li>Visual surveillance for dust generation must occur at all times. Work must cease when high levels of airborne dust cannot be controlled.</li> </ul>	Contractor	Construction	Additional safeguard
Smoke emissions	Vegetation or other materials are not to be burnt on site.	Contractor	Construction	Additional safeguard

### 6.9 Climate Change

#### 6.9.1 Policy setting

The NSW 2021: A plan to make NSW number one (NSW Government 2011), outlines priority actions to assist local government, business and the community build resilience to future extreme events and hazards by helping them understand and prepare for the impacts of climate change. As part of this strategy, the NSW Government has commenced assessing regional vulnerabilities to extreme weather events. This will assist in delivering locally based adaptation programs where required. Actions to deliver on this target include:

- Complete fine scale climate change projections for NSW and make available to local councils and the public by 2014.
- Work with government agencies and universities to deliver improved climate projections for NSW and the ACT.

Other NSW 2021 goals and targets that will help tackle climate change include:

- Twenty per cent renewable energy by 2020
- Assist business and households to realise annual energy savings of 16,000 Gigawatt hours (GWh) by 2020 compared to 'business as usual' trends
- Support 220,000 low income households to reduce energy use by up to 20 per cent by June 2014
- Increase the share of commuter trips made by public transport (including increasing the proportion of total journeys to work by public transport in the Sydney Metropolitan Region to 28 per cent by 2016)
- Targets to increase walking and cycling
- Planning policy to encourage job growth in centres close to where people live and to provide access by public transport.

Roads and Maritime has also developed a Climate Change Plan to respond to impacts posed by climate change, including reducing greenhouse gas emissions and planning for physical consequences. Roads and Maritime includes actions to:

- Reduce the Roads and Maritime carbon footprint
- Help reduce the carbon footprint of NSW road transport

- Adapt the Roads and Maritime road transport system to the impacts of climate change
- Manage the Roads and Maritime transition to a low carbon economy.

#### 6.9.2 Background

Climate change refers to the warming temperatures and altered climate conditions associated with the increased concentration of greenhouse gases in the atmosphere.

It is now generally accepted that the release of certain gases collectively referred to as 'greenhouse gases' contribute to global climate change.

The climate of NSW is changing. Average temperatures in New South Wales have been steadily rising since the 1960s. The period from 2000-2010 was the state's hottest decade on record. The NSW Climate Impact Profile (DECCW, 2010) suggests that projected climate change for the Sydney Region is likely to be significant, including:

- Average annual temperatures to increase by up to two degrees Celsius and extreme temperatures to increase significantly by 2050
- Changes in seasonal rainfall, including increases in summer rainfall and a decrease in winter rainfall by 2050
- Increased frequency and intensity of annual extreme rainfall events (both frequency and intensity) could increase by up to 20 per cent by 2050.

This could lead to the following potential impacts:

- Changes in rainfall are likely to increase sediment shedding, potentially causing changes to stream channels including bank erosion
- The frequency, intensity and extent of flooding are likely to increase increasing the number of properties likely to be impacted
- Floodwaters are likely to rise more rapidly, potentially increasing the danger of these local floods to the community.

The following six greenhouse gases are covered under international climate change agreements:

- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Sulphur hexafluoride (SF6)
- Hydro fluorocarbons (HFCs)
- Perfluorocarbons (PFCs).

Each greenhouse gas behaves differently in the atmosphere with respect to its ability to trap outgoing radiation and its residence time in the atmosphere. To achieve a common unit of measurement, each greenhouse gas has been compared to the warming potential of carbon dioxide over a 100-year period. This provides a global warming potential for each greenhouse gas, which can be applied to the project's estimated emissions. The resulting aggregated emissions are referred to in terms of carbon dioxide-equivalent emissions (or CO2-e).

### 6.9.3 Potential impacts

The relevance of climate change to this proposal is in regards to the construction phase as the operational phase would not change the mix of traffic or traffic numbers.

The main sources of GHG emissions during construction would be:

- Use of concrete which is a considerable emissions source
- Fuel use from site vehicles and other construction plant

• Use of electricity from compound sites

Opportunities exist to reduce the greenhouse gas emissions for the proposal through investigating alternative, lower embodied carbon options for construction. These are listed in section 6.9.4 below.

- Biofuels (biodiesel, ethanol, or blends such as E10 or B80) which can dramatically reduce the greenhouse gas emissions of a piece of construction equipment
- Lower embodied energy concrete for lower-strength applications containing less Portland cement which can be replaced with fly-ash

### 6.9.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibilit y	Timing	Standard / additional safeguard
Climate Change	Consider the use of renewable energy to power the site compounds (e.g. solar panels) or the contribution to green energy programs. Any contribution must cover the full power usage during construction.	Contractor	Constructio n	Additional safeguard
Climate Change	Where feasible and reasonable, procure recycled content road construction materials.	Contractor	Constructio n	Additional safeguard
Climate Change	<ul> <li>Maintain all plant and vehicles regularly to maintain fuel efficiency.</li> <li>Procure locally produced goods and services where feasible, reasonable and cost effective to reduce transport fuel emissions.</li> <li>Alternative fuel and power sources (such as biodiesels and ethanol blends) will be used wherever practicable.</li> </ul>	Contractor	Constructio n	Additional safeguard

# 6.10 Waste and resource management

### 6.10.1 Policy setting

Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001*. The objectives of this Act that are applicable to the proposal are:

(a) to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development,

- (b) to ensure that resource management options are considered against a hierarchy of the following order:
  - (i) avoidance of unnecessary resource consumption,
  - (ii) resource recovery (including reuse, reprocessing, recycling and energy recovery),
  - (iii) disposal,
- (c) to provide for the continual reduction in waste generation,
- (d) to minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste,
- (e) to assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.

#### 6.10.2 Waste sources

The proposed works would generate waste from the following sources:

- Construction and demolition waste from removal of guttering and road surface (concrete, asphalt)
- Soil from any excavated material that is not needed for reuse on the site
- Waste from removal of utilities
- Packaging waste from materials brought on site for installation
- Green waste (grass, tree removal)
- General waste (timber, plastic, etc.)
- Potential contaminated waste (refer to section 6.6).

Resources would also be needed to complete the works including but not limited to (refer to section 3.3 for details):

- Concrete
- Asphalt
- Landscaping material
- Fuel
- Water

#### 6.10.3 Potential impacts

The quantities of waste generated during construction are not likely to be substantial that they would require licences or approvals. As discussed in section 6.6, contaminated land may occur at the proposal site which would require specific management measures to be adopted. All material would be either stockpiled at the site compound or taken directly off site to a licenced waste facility.

The resources needed for the proposal are common and unlikely to become in short supply in the short of long term.

### 6.10.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Waste	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP.  The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets.	Contractor	Detailed design / pre-construction	Core standard safeguard W1  Section 4.2 of QA G36 Environment Protection
Burning of waste	Waste must not be burnt on site.	Contractor	Construction	Additional safeguard
Waste on site	Waste material must not be left on site once the works have been completed.	Contractor	Construction	Additional safeguard
	Working areas must be maintained, kept free of rubbish and cleaned up at the end of each working day.	Contractor	Construction	Additional safeguard

## 6.11 Aboriginal heritage

#### **6.11.1 Existing environment**

A search of the AHIMS database was carried out on 17 November 2016 for the proposal area (minus compound) with a 200 metre buffer. A separate AHIMS search was completed for the nominated Great North Road compound area on 17 November 2016 with 50 metre buffer. There were no registered Aboriginal heritage sites or places within either search area. A PACHCI clearance letter was issued on 17th November for this proposal including the nominated Great North Road compound site. The clearance letter and AHIMS searches are provided in Appendix E.

#### **6.11.2 Potential impacts**

The listing for the heritage item 'St Luke's Park gateway/entrance—gates and trees only' states the item has potential for Aboriginal archaeological heritage. This item would not be impacted as part of the proposed works.

The proposal site is highly disturbed due to previous construction works and current land uses. The potential for impacting Aboriginal heritage items is low.

### 6.11.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Impact on unknown heritage items	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the regional environment officer and Roads and Maritime's Aboriginal cultural heritage advisor contacted immediately. Steps in the Roads and Maritime Standard Management Procedure: Unexpected Archaeological Finds (Roads and Maritime 2012) must be followed.	Contractor	Construction	Core standard safeguard AH2  Section 4.9 of QA G36 Environment Protection

## 6.12 Cumulative impacts

### **6.12.1 Existing environment**

Cumulative environmental impacts of the proposed works include the combined effect of individual impacts associated with the proposal in addition to the impacts of other activities in the area.

The proposal is part of a larger broader program of works to improve traffic flow along Parramatta Road corridor between Strathfield and Five Dock. As part of this program, Roads and Maritime would be upgrading the intersection of Parramatta Rd and Great North Road at Five Dock. The objective of the project is to duplicate the right turning lane from Parramatta Road westbound into Great North Road. This would increase the storage capacity and eliminate traffic overflowing onto the Parramatta Road straight through lanes. The project is expected to start construction in April 2018 subject to property acquisition and therefore may occur concurrently with the proposal.

The NSW Government's WestConnex project involves constructing an underground tunnel near Parramatta Road with above ground construction sites at Northcote Street and Wattle Street. Subject to planning approval, WestConnex construction is expected to start mid-2016, with completion planned for early 2019, and therefore may occur concurrently with the Proposal.

The proposal's site compound at the intersection of Parramatta Road and Great North Road at Five Dock will also be utilised for the Parramatta Road and Great North Road intersection upgrade project.

#### 6.12.2 Potential impacts

If construction is carried out concurrently with WestConnex and the Parramatta Road/Great North Road project, cumulative impacts are likely to occur, particularly in relation to traffic, noise and amenity. Travel times may temporarily be affected and some sensitive receivers may be impacted over a greater length of time.

It is also anticipated that construction traffic, dust and noise emission on Henley Marine Dr will increase as a result of the site compound area being utilised for both the Parramatta Road intersection upgrade projects.

## **6.12.3 Safeguards and management measures**

Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
Cumulative Impacts	The traffic management plan including Road Occupancy Licenses would be prepared in consultation with the Transport Management Centre taking into consideration the traffic cumulative impact of projects on the Sydney road network.	Project Manager and Contractor	Construction & preconstruction	Additional safeguard
Cumulative Impacts	Undertake regular meetings with WestConnex to discuss co- ordination of the construction works and provision of respite for night works.	Project Manager and Contractor	Construction & pre- construction	Additional safeguard
Cumulative Impacts	The construction environmental management plan (CEMP) would be revised to consider potential cumulative impacts from surrounding development activities as they become known.	Project Manager and Contractor	Construction & pre- construction	Additional safeguard

# 7 Environmental management

### 7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in the REF 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 safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by the VBA Environmental Advisor and Roads and Maritime Environment Officer, Sydney Region, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System).

## 7.2 Summary of safeguards and management measures

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

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity.  As a minimum, the CEMP will address the following:  • 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.  The endorsed CEMP will be implemented during the undertaking of the activity.	Contractor / Roads and Maritime project manager	Pre-construction / detailed design	Core standard safeguard GEN1
GEN2	General -	All businesses, residential properties and other key stakeholders (eg schools,	Contractor /	Pre-	Core

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	notification	local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Roads and Maritime project manager	construction	standard safeguard GEN2
GEN3	General – environmental awareness	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.  Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include:  areas of non- Aboriginal heritage sensitivity  adjoining residential areas requiring particular noise management measures	Contractor / Roads and Maritime project manager	Pre- construction / detailed design	Core standard safeguard GEN3
NV1	Noise and Vibration	<ul> <li>A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the <i>Interim Construction Noise Guideline</i> (ICNG) (DECC, 2009) and identify:</li> <li>all potential high noise and vibration generating activities associated with the activity</li> <li>A map indicating the locations of sensitive receivers including residential properties.</li> <li>A quantitative noise assessment in accordance with the EPA Interim Construction Noise Guidelines (DECCW, 2009)</li> <li>feasible and reasonable mitigation measures to be implemented, taking into account <i>Beyond the Pavement: urban design policy, process and principles</i> (Roads and Maritime, 2014).</li> <li>A process for assessing the performance of the implemented mitigation measures.</li> <li>A monitoring program to assess performance against relevant noise and vibration criteria</li> </ul>	Contractor	Pre construction	Core standard safeguard NV1 Section 4.6 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		Arrangements for consultation with affected neighbours and sensitive receivers			
NV2	Noise and Vibration	<ul> <li>A process for documenting and resolving issues and complaints</li> <li>A process for updating the plan when activities affecting construction noise and vibration change.</li> <li>Identify in toolbox talks where noise and vibration management is required</li> </ul>			
NV3	Complaints	A management procedure will be put in place to deal with noise complaints that may arise from the construction works. Each complaint would need to be investigated and potential noise mitigation measures reviewed.	Contractor	Pre construction	Additional Safeguard
NV4	Construction Noise	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise levels such as rock breaking and concrete cutting should be scheduled not to be done after 12am.	Contractor	Constructio n	Additional Safeguard
NV5	Construction Noise	Use quieter and less noise emitting construction methods where feasible and reasonable.	Contractor	Constructio n	Additional Safeguard
NV6	Construction Noise	All plant and equipment to be appropriately maintained to ensure optimum running conditions, with periodic monitoring.	Contractor	Constructio n	Additional Safeguard
NV7	Construction Noise	The noise levels of plant and equipment items are to be considered and are not to be used on site unless compliant with the noise criteria	Contractor	Constructio n	Additional Safeguard
NV8	Construction Noise	The offset distance between stationary noisy plant and adjacent sensitive receivers is to be maximised where practicable.  Plant used intermittently to be throttled down or shut down when not in use Noise-emitting plant to be directed away from sensitive receivers where possible.	Contractor	Constructio n	Additional Safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
NV9	Construction Noise	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.	Contractor	Constructio n	Additional Safeguard
NV10	Construction Noise	Non-tonal reversing beepers (or an equivalent mechanism) should be fitted and used on all construction vehicles and mobile plant regularly used on site for periods of over two months	Contractor	Constructio n	Additional Safeguard
NV11	Construction Noise	Investigate the use of structures to shield residential receivers from noise such as:  • site shed placement;  • temporary or mobile noise screens (where practicable)  • enclosures to shield fixed noise sources such as pumps, compressors, fans etc (where practicable); and  • consideration of site topography when situating stationary plant. Include the investigation and any potential use of screening within the NVMP.	Contractor	Constructio n	Additional Safeguard
TT1	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the RMS Traffic Control at Work Sites Manual and the worksite manual RMS Specification G10. The TMP will include:  • confirmation of haulage routes including investigation of alternate routes to minimise use of local roads  • measures to maintain access to local roads and properties  • site specific traffic control measures (including signage) to manage and regulate traffic movement  • measures to maintain pedestrian and cyclist access  • access to construction sites including entry and exit locations	Contractor	Detailed design / Pre- construction	Core standard safeguard TT1  Section 4.8 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic.			
TT2	Traffic and transport	The traffic management plan would include measures to minimise construction vehicle usage on local roads. Where practicable, deliveries of plant and materials would be carried out outside of peak traffic periods.	Contractor	Detailed design / Pre- construction	Additional safeguard
ТТ3	Access	<ul> <li>Access to businesses and residences must be maintained where possible</li> <li>Safe pedestrian access around the work site would be provided by the construction contractor and captured within the traffic management plan.</li> <li>Signage outlining pedestrian and cyclist diversion routes would be displayed during construction (where required).</li> <li>The parking of light construction vehicles (eg staff vehicles) would be restricted to designated areas</li> </ul>	Contractor	Constructio n	Additional safeguard
TT4	Bus services	Bus services are to be notified in advance of the proposed construction works, including timing.	Roads and Maritime	Pre- construction	Additional safeguard
B1	Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	Contactor	Detailed design / pre- construction	Core standard safeguard B2
B2	Vegetation impacts	Avoid stockpiling materials and equipment and parking vehicles and machinery within the dripline of any tree.	Contractor	Constructio n	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
В3	Vegetation removal	Prior to the start of any clearing a physical clearing boundary is to be demarcated and implemented.	Contractor	Pre- construction	Additional safeguard
B4	Vegetation removal	<ul> <li>Where trees are to be retained, place an exclusion zone fencing outside the tree protection zone</li> <li>Erect signs to inform personnel of the purpose of the fencing. Signs should be clearly visible and be general in nature, such as 'Exclusion zone' or 'Environmental Protection zone'.</li> </ul>	Contractor	Constructio n	Additional safeguard
B5	Noxious weeds	Declared noxious weeds (ie. Asparagus aethiopicus) will be managed according to the requirements stipulated by the Noxious Weeds Act 1993, and any weed removal activities will follow Guide 6 (Weed Management) in the Biodiversity Guidelines (RTA 2011).	Contractor	Pre- construction	Additional safeguard
B6	Vegetation removal	<ul> <li>A Vegetation Management Plan would be prepared and would include:</li> <li>Identification (marking) of the clearing boundary and trees to be cleared</li> <li>A detailed clearing process in accordance with RMS Biodiversity Guidelines (2011) including requirements of Guide 1,2, 4 &amp; 9</li> <li>measures to protect the hedge at Concord Oval and place an exclusion zone fencing.</li> <li>Measures to protection of trees #26 and #27 as outlined in Arborist Report.</li> </ul>	Contractor	Pre- construction	Standard safeguard
LV1	Rehabilitation	A Landscape Plan would be prepared in accordance with the Roads and Maritime Beyond the Pavement urban design policy, process and principles (Roads and Maritime, 2014) and Landscape Guideline (RTA, 2008) and approved by the councils. The landscape plan must take into consideration the values identified in the Concord Oval Precinct plan of management (refer Appendix D).	Contractor	Pre- construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
LV2	Light spills	Ensure all lights are directed away from residential properties.	Contractor	Constructio n	Additional safeguard
SW1	Erosion and sedimentation	A site specific Erosion and Sediment Control Plan (ESCP) will be prepared and implemented as part of the CEMP.  The ESCP would include the following:  Separation of on-site and off-site water  The direction of run-off and drainage points during each stage of construction  Direction of flow of on-site and off-site water  The locations of other erosion and sediment control measures  A process for reviewing and updating the plan on a fortnightly basis and/or when works alter.  Nominated concrete wash out areas	Contractor	Detailed design / Pre- construction	Core standard safeguard SW2  Section 2.2 of QA G38 Soil and Water Managemen t
SW2	Accidental spills	The CEMP is to include a site specific emergency spill plan in accordance with RMS Incident Classification and Reporting Procedure.	Contractor	Detailed design / Pre- construction	Core standard safeguard C3 Section 4.3 of QA G36 Environment Protection
SW3	Contaminated land	A Contaminated Land Management Plan will be prepared and implemented as part of the CEMP for any areas of existing contaminated land or to address land contamination likely to be caused by the activity.	Contractor	Detailed design / Pre- construction	Core standard safeguard C1 Section 4.2

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
					of QA G36 Environment Protection
SW4	Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. This may include but not be limited to: - diversion of surface runoff - capture of any contaminated runoff - temporary capping.	Contractor	Detailed design / Pre- construction	Core standard safeguard C2 Section 4.2 of QA G36 Environment Protection
HH1	Impact on unknown heritage items	Should any remains of unexpected historic heritage be encountered all work must cease in that location and the procedures in the Roads and Maritime's Standard Management Procedure: Unexpected Archaeological Finds (Roads and Maritime, 2012) must be followed.	Contractor	Constructio n	Core standard safeguard H2 Section 4.10 of QA G36 Environment Protection
AQ1	Vehicle emissions	<ul> <li>Plant and machinery must be maintained in accordance with manufacturer's specification.</li> <li>Smoky emissions must be kept within the standards and regulations under the <i>Protection of the Environment Operations Act 1997</i> that no vehicle shall have continuous smoky emissions for more than 10 seconds.</li> <li>Vehicles must not be left running when idle.</li> </ul>	Contractor	Constructio n	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
AQ2	Dust generation	Any material transported in trucks must be appropriately covered to reduce dust generation.	Contractor	Constructio n	Additional safeguard
AQ3	Dust emissions	<ul> <li>Measures including watering or covering exposed areas must be used to minimise or prevent dust generation.</li> <li>Visual surveillance for dust generation must occur at all times. Work must cease when high levels of airborne dust cannot be controlled.</li> </ul>	Contractor	Constructio n	Additional safeguard
AQ4	Smoke emissions	Vegetation or other materials are not to be burnt on site.	Contractor	Constructio n	Additional safeguard
CC1	Climate Change	Consider the use of renewable energy to power the site compounds (e.g. solar panels) or the contribution to green energy programs. Any contribution must cover the full power usage during construction.	Contractor	Constructio n	Additional safeguard
CC2	Climate Change	Where feasible and reasonable, procure recycled content road construction materials.	Contractor	Constructio n	Additional safeguard
CC3	Climate Change	<ul> <li>Maintain all plant and vehicles regularly to maintain fuel efficiency.</li> <li>Procure locally produced goods and services where feasible, reasonable and cost effective to reduce transport fuel emissions.</li> <li>Alternative fuel and power sources (such as biodiesels and ethanol blends) will be used wherever practicable.</li> </ul>	Contractor	Constructio n	Additional safeguard
W1	Waste	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP.  The WMP will be prepared taking into account the <i>Environmental Procedure - Management of Wastes on Roads and Maritime Services Land</i> (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets.	Contractor	Detailed design / pre- construction	Core standard safeguard W1 Section 4.2 of QA G36

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
					Environment Protection
W2	Burning of waste	Waste must not be burnt on site.	Contractor	Constructio n	Additional safeguard
W3	Waste on site	Waste material must not be left on site once the works have been completed.	Contractor	Constructio n	Additional safeguard
W4	Waste on site	Working areas must be maintained, kept free of rubbish and cleaned up at the end of each working day.	Contractor	Constructio n	Additional safeguard
AH1	Impact on unknown heritage items	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the regional environment officer and Roads and Maritime's Aboriginal cultural heritage advisor contacted immediately. Steps in the Roads and Maritime Standard Management Procedure: Unexpected Archaeological Finds (Roads and Maritime 2012) must be followed.	Contractor	Constructio n	Core standard safeguard AH2 Section 4.9 of QA G36 Environment Protection
C1	Cumulative Impacts	The traffic management plan including Road Occupancy Licenses would be prepared in consultation with the Transport Management Centre taking into consideration the traffic cumulative impact of projects on the Sydney road network.	Project Manager and Contractor	Construction N & preconstruction	Additional safeguard
C2	Cumulative	Undertake regular meetings with WestConnex to discuss co-ordination of the	Project Manager	Constructio	Additional

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	Impacts	construction works and provision of respite for night works.	and Contractor	n & pre- construction	safeguard
C3	Cumulative Impacts	The construction environmental management plan (CEMP) would be revised to consider potential cumulative impacts from surrounding development activities as they become known.		Construction & preconstruction	Additional safeguard

# 7.3 Licensing and approvals

As the proposal is being assessed under Part 5 of the EP&A Act, Roads and Maritime is both the proponent and determining authority. Additional licensing and approvals required for the proposal is summarised in Table 7-2.

Table 7-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
Roads Act 1993	Approval under Section 138 from the appropriate road authority prior to works on roads	Prior to works on roads
Land Acquisition (Just Terms Compensation) Act 1991	would be negotiated in accordance with the Act	Prior to land acquisition

## 8 Conclusion

### 8.1 Justification

The proposed road widening and construction of right turn lanes at the intersection of Parramatta and Shaftesbury roads, Concord would result in a number of environmental impacts including:

- Construction noise impacts including exceedance of the highly affected noise criteria
- Traffic impacts for the duration of construction
- Long term visual impact through the removal of road side trees
- Partial property acquisitions
- Impact to street and private property parking
- Cumulative noise and traffic impacts with other nearby road projects
- Relocation of the Historical plague at the corner of Parramatta Rd and Loftus Street

The proposal increases the capacity for the turning movement at the intersection. Modelling has also shown this to improve the throughput of traffic travelling on Parramatta Road. The proposal also reduces potential for accidents caused by vehicles queuing beyond the right turn bay into the through lane. The REF has determined that the benefits of the proposal would outweigh the potential environmental impacts and that the proposal is therefore justified.

## 8.2 Objects of the EP&A Act

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 proposed would improve travel times within the locality for the benefit of the community.
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.	Utilities would be relocated as part of the proposed works.
5(a)(iv) To encourage the provision of land for public purposes.	Not relevant to the proposal.
5(a)(v) To encourage the provision and coordination of community services and facilities.	Not relevant to the proposal.
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 result in the removal of planted road side trees, some of which provide marginal foraging habitat for the threatened Grey-headed Flying Fox. This is required for the proposal to be implemented. A seven part test concluded that the impact would not be significant.

Object	Comment		
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.	The proposed concept and landscape plan have been prepared in consultation with the local councils.		
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	The local community and councils were provided an opportunity to provide feedback on the preferred concept design and their feedback has been taken into consideration in the preparation of this REF. The REF will also be made available to the public for comment and any feedback taken into consideration in the development of the detailed design (refer to Chapter 5).		

## 8.2.1 The precautionary principle

The precautionary principle has been adopted during the preparation of the REF. The proposal has been designed to ensure that no serious or irreversible environmental damage would arise from the proposed activities. Where the potential for environmental impacts for certain issues was unclear due to lack of information at the time of writing, a worst case scenario was assessed to ensure the safeguards that would be implemented to minimise or mitigate any potential impacts provide a high degree of certainty the proposal would not result in significant impacts. No safeguards are postponed as a result of lack of scientific certainty.

#### 8.2.2 Intergenerational equity

The proposal would not adversely impact on the environment such that it would compromise the health, diversity or productivity of the environment to unsustainable levels that would subsequently impact on the present and future generations. The proposal would improve travel times and road safety in the locality. The removal of vegetation along Parramatta Road would be partially offset by the implementation of a landscape plan as part of the proposal.

#### 8.2.3 Conservation of biological diversity and ecological integrity

The proposed work would require the removal of native vegetation (roadside planted trees) none of which is threatened. The vegetation only provides marginal foraging habitat for fauna and a seven part test concluded that this impact would not be significant.

#### 8.2.4 Improved valuation, pricing and incentive mechanisms

Improved valuation, pricing and incentive mechanisms provide that costs to the environment should be factored into the economic costs of a proposal.

The REF has examined the environmental consequences of the proposal and identified mitigation measures for areas which have the potential to experience adverse impacts. Requirements imposed in terms of implementation of these mitigation measures would result in an economic cost to Roads and Maritime. The implementation of mitigation measures would increase both the capital and operating costs of the proposal. This signifies that environmental resources were given appropriate valuation. The concept design has been developed with an objective of minimizing

potential impacts on the surrounding environment. This indicates that the concept design has been developed with an environmental objective in mind.

#### 8.3 Conclusion

The proposed intersection upgrade at Parramatta Road and Shaftesbury Roads, Concord/Burwood, 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 (where relevant) 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. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

The proposal as described in the REF best meets the project objectives but would still result in some temporary noise and vibration impacts and traffic impacts, property acquisitions and impacts on visual amenity. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also improve road safety and reduce traffic congestion. On balance the proposal is considered justified and the following conclusions are made.

#### Significance of impact under NSW legislation

The proposal would be unlikely to cause a significant impact on the environment. Therefore it is not necessary 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. A Species Impact Statement is not required. The proposal is subject to assessment under Part 5 of the EP&A Act. Consent from Council is not required.

#### Significance of impact under Australian legislation

The proposal is not likely to have a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of the Environment is not required.

### 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.

Natascha Arens

Director

NGH Environmental

Date: 23/11/2016

I have examined this review of environmental factors and accept it on behalf of Roads and Maritime Services.

Date: 2-9/11/2016

### 10 References

DE&C (2009) *Interim Construction Noise Guideline*. Department of Environment & Climate Change NSW, Sydney.

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DUAP (1995) Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979 (Is an EIS required? guidelines) (DUAP, 1995/1996),

EPA (1999) *Environmental Criteria for Road Traffic Noise*. NSW Environment Protection Authority, Sydney.

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Infrastructure NSW (2011) NSW State Infrastructure Strategy 2012-2032, Infrastructure NSW, Sydney NSW.

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Stone, Y., Ahern C.R. and Blunden B. (1998) *Acid Sulfate Soils Manual*. Acid Sulfate Soils Management Advisory Committee, Wollongbar.

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Transport for NSW, (2013) Sydney's Bus Future, Transport for NSW, Sydney

## **Appendix A**

Concept design

### **Appendix B**

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 (DUAP 1995/1996) and the *Roads and Related Facilities EIS Guideline* (DUAP 1996) 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
a. Any environmental impact on a community?  There would be temporary noise, vibration and traffic impacts during construction, and operational visual impacts. In the long term, the proposed works would improve road safety and travel times through the proposal site. Property acquisitions would also be required.	Long-term positive and negative  Short-term negative
b. Any transformation of a locality? The road would be widened and street trees removed, however the locality would remain a trafficked road corridor. Potential amenity impacts would be minimised with the implementation of the safeguards given in section 7 of this REF including proposed landscaping.	Nil
c. Any environmental impact on the ecosystems of the locality? The proposed works would require removal of up to 27 planted street trees (25 on Parramatta Road and 2 trees on Shaftesbury Road) and shrubs. The impact would be minimal as the vegetation is not threatened and only provides foraging habitat for common disturbance tolerant fauna. Potential environmental impacts on the ecosystems of the locality would be minimised with the implementation of the safeguards given in section 7 of this REF.	Nil
<ul> <li>d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</li> <li>The proposal would have a visual impact at the proposal site through the removal of road side trees on the northern side of Parramatta Road. Potential impacts would be minimised with the implementation of the safeguards given in section 7 of this REF.</li> </ul>	Long Term Negative
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?  There would be no impact on the locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations. The trees on Parramatta Road are potential foraging species for Grey-headed Flying-fox (Vulnerable listing). A 7 part test concluded that the removal of potential foraging habitat would not have a significant impact on the Grey-headed Flying-fox.	Nil

Factor	Impact
f. Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i> )?  There would be limited impact on habitat of protected fauna within the meaning of the <i>National Parks and Wildlife Act 1974</i> as a result of the removal of road side trees.	NII
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?  No species would be endangered by the proposal.	Nil
h. Any long-term effects on the environment? The proposed works would have positive long-term effects on the environment due to improved travel times and safety for road users. The proposal would have a long term visual impact as a result of the removal of road side trees. Property acquisitions would also be required.	Long term positive
i. Any degradation of the quality of the environment? The proposal has the potential to result in erosion of exposed soil, including low risk of encountering contaminated soils. The safeguards outlined in section 7 would mitigate this risk.	Short term negative
j. Any risk to the safety of the environment?  During operation, the proposal would have a positive impact on road user safety.	Long term positive
k. Any reduction in the range of beneficial uses of the environment? The proposal is not expected to reduce the beneficial uses of the environment.	NII
I. Any pollution of the environment? The proposal has the potential to result in water and soil pollution as a result of construction related pollutants. The safeguards summarised in Section 7 would mitigate this risk.	Short term negative
m. Any environmental problems associated with the disposal of waste? Contaminated land may be present at the proposal site (low risk) and would need to be managed in accordance with relevant guidelines. Construction waste would be disposed of at appropriately licensed facilities.	Short term negative
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?  The proposal is not expected to increase the demand on resources that are, or are likely to become, in short supply.	Nil

Factor	Impact
o. Any cumulative environmental effect with other existing or likely future activities?  The proposal has the potential to have a cumulative impact with other developments in the area. This could increase temporary traffic impacts and noise. The proposal in conjunction with other similar works in the locality would improve travel times and road safety.	Short term negative
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?  There would be no impact on coastal processes and coastal hazards, including those under projected climate change conditions.	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.

A referral is not required for proposed actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. Impacts on these matters are still assessed as part of the REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
a. Any impact on a World Heritage property?	Nil
b. Any impact on a National Heritage place?	Nil
c. Any impact on a wetland of international importance?	Nil
d. Any impact on a listed threatened species or communities?	Nil
e. Any impacts on listed migratory species?	Nil
f. Any impact on a Commonwealth marine area?	Nil
g. Does the proposal involve a nuclear action (including uranium mining)?	Nil
Additionally, any impact (direct or indirect) on Commonwealth land?	Nil

## **Appendix C**

Community engagement plan

# **Appendix D**

Draft landscape plan

## **Appendix E**

PACHCI clearance letter

## **Appendix F**

Statutory consultation checklists

### **Infrastructure SEPP**

### Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a substantial 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 substantial 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 substantial 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?	No		ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Yes	City of Canada Bay and Burwood councils	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	No		ISEPP cl.14

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
	inconsequential?			

### Flood liable land

Issue	Potential impact		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 National Parks and Wildlife Act 1974?	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 Sydney Harbour Foreshore Authority Act 1998?	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	Rural Fire Service	ISEPP cl.16(2)(f)

## **Appendix G**

Government and stakeholder consultation

### **Appendix H**

Database search results & assessment of significance (Grey Headed Flying Fox)

## **Appendix I**

Key viewpoints

## **Appendix J**

Phase 1 contamination assessment

## **Appendix K**

**Arborist Assessment** 

## **Appendix L**

Noise and Vibration Assessment