Roads and Maritime Services

Pedestrian Bridge on Beecroft Road, Beecroft

Review of environmental factors

September 2015

Prepared by Jacobs
Executive summary

The proposal

Roads and Maritime Services (Roads and Maritime) propose to construct a pedestrian bridge over Beecroft Road about 50 m south of the Beecroft Road and Copeland Road intersection in Beecroft to improve pedestrian safety and traffic flow. The proposed pedestrian bridge would consist of steel arch structure and would include lifts and stairs on both sides of Beecroft Road.

Other features of the proposal would include pedestrian fences to prevent unsafe crossings of Beecroft Road as well as the removal of the existing at-grade signalised pedestrian crossing on the southern side of the Beecroft Road and Copeland Road intersection. The existing signalised pedestrian crossing on the north side of the intersection would be maintained, providing an alternate crossing of Beecroft Road for pedestrians.

Need for the proposal

The NSW Government’s Active Transport initiative aims to create safer, more convenient and more enjoyable walking and cycling routes within major centres. As part of the Active Transport initiative, a Pedestrian Bridge Program has been developed that aims to improve safety and access around schools where children have to cross busy arterial roads.

Roads and Maritime has proposed a new pedestrian bridge over Beecroft Road near the Beecroft Public School. The proposed bridge would be a safe alternative route for pedestrians crossing Beecroft Road from the Beecroft Public School to the Beecroft Village Green, Beecroft train station and surrounds.

Options considered

Three options were considered for the proposal; the ‘Do Nothing’ option, which would leave Beecroft Road and pedestrian facilities in their current condition; the option to construct a new concrete super-T girder bridge with concrete ramps; and the third option to construct a new steel arch bridge with lifts and stairs.

The first option does not satisfy the proposal objectives to provide a safe pedestrian crossing of Beecroft Road and improve traffic flow through the Copeland Road intersection. The second option meets the functional proposal objectives; however it would result in an unacceptable impact on the local environment through the removal of vegetation and high visual impacts through the establishment of large concrete ramps. The third and preferred option provides for the construction of a new pedestrian bridge that best meets the proposal objectives and minimises the clearing of vegetation both in Beecroft Village Green and Beecroft Public School. In addition, Option 3 would also result in a less significant visual change to the local area.

Statutory and planning framework

Pursuant to clause 94 of the ISEPP, development for the purpose of a road or road infrastructure facilities on behalf of a public authority may be carried out without consent. As the proposal is a road infrastructure facility and is to be carried out on behalf of Roads and Maritime, it can be assessed under Part 5 of the EP&A Act.
Community and stakeholder consultation

A community consultation and stakeholder engagement plan was developed and implemented to guide consultation activities for the proposal. The community consultation and stakeholder engagement plan identifies key objectives and outcomes of consultation activities with the community, stakeholders and government agencies.

To date, consultation has been carried out through community notification letters and stakeholder meetings. Information about the proposal has also been made available through media releases and through the Roads and Maritime website. The community have been invited to provide comments and feedback on the proposal, with all issues raised being considered and addressed within a Community Consultation Report and summarised within Section 5 of this REF.

Environmental impacts

The proposal would result in the removal of a total of up to 19 trees within Beecroft Public School and Beecroft Village Green. The removed vegetation is considered to be of low to moderate value and is not part of any endangered ecological community listing. There would be no removal of trees that are mapped as part of the Turpentine–Ironbark Forest community. However one remnant Red Stringybark tree that forms part of the Sydney Turpentine–Ironbark Forest within Beecroft Village Green would be trimmed. Overall, the impacts to biodiversity as a result of the proposal are considered low.

The proposal would not result in a substantial change in the overall landscape character of the local area in which the pedestrian bridge is proposed. The proposal would result in an overall low to moderate visual impact on the landscape character. The proposal’s location within a major arterial road corridor ensures the overall character of the road environment is maintained. The proposed bridge design has carefully considered the local landscape character in regards to its external appearance and any proposed landscaping.

The proposal is not anticipated to significantly alter the existing local heritage setting of the Beecroft-Cheltenham Heritage Conservation Area in which it is located. A range of mitigation measures have been proposed including limiting the removal of existing vegetation and reinstating disturbed areas to a level similar to their current condition. In addition the location of the bridge south of the Beecroft Community Centre was selected to reduce the visual impact of the bridge. Other temporary construction impacts include potential traffic delays, noise and some air quality impacts. Due to the temporary nature of these impacts and proposed mitigation measures, these impacts are considered to be low.

Justification and conclusion

The proposal has been designed to provide a safe, grade-separated pedestrian crossing over Beecroft Road. The proposal would provide a number of benefits to pedestrians in terms of improved access and safety while also providing an improvement to traffic flow along Beecroft Road.

This 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. A number of potential environmental impacts have been avoided or reduced during the development of the proposal. The proposal as described in this REF best meets the proposal objectives.

The proposal would still result in some impacts, including visual impacts, impacts to non-Aboriginal heritage, noise and vibration impacts, temporary disruptions to traffic...
flow and access as well as other socio-economic impacts during construction. A range of measures have been developed to minimise and mitigate the potential adverse impacts of the proposal, as summarised in Section 7.2 of the REF.

This REF concludes that the adverse impacts of the proposal would be outweighed by the longer term beneficial impacts of providing a safe grade-separated crossing for pedestrians. On balance, the proposal is therefore considered justified.
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Appendix E  Biodiversity Report

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Appendix G  Consultation Report
1 Introduction

1.1 Proposal identification

Roads and Maritime Services (Roads and Maritime) propose to construct a pedestrian bridge (the ‘proposal’) over Beecroft Road about 50 m south of the Beecroft Road and Copeland Road intersection to improve pedestrian safety and traffic flow.

The proposal is located within the Hornsby Shire Local Government Area (LGA) in an urbanised area within the suburb of Beecroft. Beecroft Public School, businesses and residential buildings are all located on the western side of Beecroft Road within close proximity to the proposal. Beecroft Community Centre, Beecroft Village Green, Beecroft town centre, Beecroft fire station, Beecroft train station and car park are all located on the eastern side of Beecroft Road in close proximity to the proposal. Figure 1-1 provides an overview of the proposal area and its surrounds.

The proposed bridge comprises a 20 m long single span steel arch structure and includes lifts and stairs on both sides of Beecroft Road (refer to Figure 1-2). Other features of the proposal include; pedestrian fences extending from the Copeland Road intersection to about 75 m south of the proposal to prevent unsafe pedestrian crossings of Beecroft Road, and the establishment of redirective barrier kerb on the approach to the bridge to separate the bridge lifts from the road carriageway. The existing signalised pedestrian crossing on the north side of Copeland Road would be maintained, providing an additional safe pedestrian crossing of Beecroft Road. The existing signalised pedestrian crossing at the Beecroft Road/Copeland Road intersection would be removed after construction of the proposal.
Figure 1-1 Overview of the proposal area
Figure 1-2 Photomontage of proposed pedestrian bridge looking north along Beecroft Road
1.2 Purpose of the report

This Review of Environmental Factors (REF) has been prepared by Jacobs on behalf of Roads and Maritime Sydney region. For the purposes of the proposal, Roads and Maritime is the proponent and 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 proposal and associated environmental impacts have been carried out in consideration of clause 228 of the Environmental Planning and Assessment Regulation 2000, the Threatened Species Conservation Act 1995 (TSC Act), the Fisheries Management Act 1994 (FM Act), and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The REF helps to fulfil the requirements of section 111 of the EP&A Act, that Roads and Maritime Services examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment (as a result of the proposed 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 and Environment 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 potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and therefore the need to make a referral to the Australian Government Department of the Environment for a decision by the Federal 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

The NSW Government’s Active Transport initiative aims to create safer, more convenient and more enjoyable walking and cycling routes within major centres. The initiative aims to improve pedestrian and cycling accessibility within areas where most short trips occur, freeing up capacity on busy arterial roads.

The Active Transport initiative has been developed in line with the NSW Long Term Transport Master Plan (Transport for NSW (TfNSW), 2012), Sydney’s Walking Future (TfNSW, 2013), Sydney’s Cycling Future (TfNSW, 2013) and the Regional Transport Plans being progressively released by TfNSW.

As part of the Active Transport initiative, a Pedestrian Bridge Program has been developed that aims to improve safety and access around schools where children have to cross busy arterial roads.

As part of this TfNSW program, Roads and Maritime is to deliver a new pedestrian bridge over Beecroft Road near Beecroft Public School. This area is close to Beecroft Public School, Beecroft Village Green, Beecroft town centre, Beecroft train station, local businesses and community facilities. A high number of pedestrians use the Beecroft Road and Copeland Road intersection including school children and people with limited mobility.

2.2 Operational need for the proposal

The intersection of Beecroft Road and Copeland Road in Beecroft is a busy area. A pedestrian movement study carried out in October 2014 over three consecutive week days found that, on average, 60 to 80 people per hour cross this intersection during the morning and afternoon peak periods. These numbers are represented by a high number of school students crossing at the intersection.

Beecroft Road is one of the major arterial routes through Sydney’s northern suburbs, connecting Epping to Pennant Hills. On average, about 31,000 vehicles travel along Beecroft Road near the proposal site each day.

The proposed pedestrian bridge and removal of the existing signalised pedestrian crossing at this intersection would improve pedestrian safety and improve traffic flow by limiting the amount of time vehicles spend waiting for pedestrians to cross. The bridge would cater for pedestrians crossing Beecroft Road and would be accessible for persons with limited mobility through the provision of lifts.

2.3 Existing road and infrastructure

Where the proposal is located, Beecroft Road has two carriageways separated by painted double lines and with each carriageway comprising two travel lanes. A pedestrian fence is located along the western side of the road south of the Beecroft Road and Copeland Road intersection. There is a 60km/h speed limit through the Beecroft town centre outside of school zone hours. No stopping zones are located on the southern approach to the signalised Copeland Road intersection. There is a dedicated right turn lane from Beecroft Road into Copeland Road East. At-grade signalised pedestrian crossings exist on all four legs of the Beecroft Road and Copeland Road intersection.

The proposal area contains standard 1.2 m wide pedestrian footpaths on both sides of the road corridor to match existing footpaths. No formal cyclist facilities are located within the road corridor immediately surrounding the proposal.
Two bus stops are located along Beecroft Road between Mary Street and Copeland Road which are located around 30 m south of the proposal and 75 m south of the proposal on the western and eastern sides of the road respectively.

The proposal area does not contain any significant drainage infrastructure. Runoff from the surrounding area flows into the existing road guttering and into the underground stormwater system.

2.4 Proposal objectives

The different land uses and facilities in the vicinity of the proposal attract pedestrians of all ages and mobility through the area, many of which require safe pedestrian passage across Beecroft Road.

As a result, the objectives of the proposal are to:

- Enable safer crossing of Beecroft Road for school students, commuters, residents and local shoppers
- Improve traffic flow on this busy road by limiting the amount of time vehicles spend waiting for pedestrians to cross.

2.5 Alternatives and options considered

2.5.1 Methodology for selection of preferred option

The selection of the preferred option was based on the proposal being able to best meet the proposal objectives and additional relevant criteria, including:

- Minimising environment and heritage impacts: the proposal area is constrained by Beecroft Public School in the west and Beecroft Village Green in the east. A number of native planted Water Gum (Tristaniopsis laurina) trees within Beecroft Village Green would be potentially impacted by the proposed bridge. Trees representative of Turpentine-Ironbark Forest (listed as critically endangered under the TSC Act) were also identified within Beecroft Village Green. The Beecroft Public School, Beecroft Village Green and Community Centre are all places of local heritage value. The selection of the proposal footprint required consideration of the potential impacts to the heritage values of these buildings, in particular the location of the bridge with respect to the Beecroft Community Centre curtilage. The overall design of the bridge was also carefully considered regarding the heritage values placed on the local area as a heritage conservation area. Consideration was given to a range of other potential environmental impacts relating to the development of a proposed pedestrian bridge, including visual and construction noise impacts.

- Functionality: the location of the bridge and its connectivity to the existing pedestrian routes within the area are important to the public’s use of the proposed bridge. The existing pedestrian crossings at Copeland Road have pedestrian waiting times of between 100-120 seconds during the AM and PM peak hours.

- Constructability: consideration into the constructability of various connecting structures such as ramps, stairs and lifts has been made as each requires a considerably different construction method and equipment type.

- Maintenance and security: consideration to ongoing maintenance of the structural elements and the provision for passive and active security measures such as CCTV and lighting.

- Cost: a strategic cost assessment considered each of the potential options.

As part of the options analysis, each option was reviewed against the above criteria,
the strategic need identified in Section 2.1 and the proposal objectives outlined in Section 2.3.

2.5.2 Identified options

Three main options were considered in relation to the proposal objectives and strategic need. These options are described below.

Option 1 – Do nothing

The do-nothing option would result in the existing Beecroft Road pedestrian crossings at Copeland Road remaining as per their current arrangement. Pedestrians would continue to use the at-grade crossings provided at this intersection and traffic would continue to stop for all pedestrian movements at this crossing.

Option 2 – Concrete super-T girder with precast concrete ramps

This option includes concrete ramps that would cross into Beecroft Village Green before stairs down into the park are provided. There would be no lifts in this option, instead ramps and stairs would be provided at both ends of the bridge. Around 75 m of ramp would be located on the eastern side of the road while a further 50 m of ramp would be located on the western side of Beecroft Road. Ramps on each side of the bridge would tie into the existing pedestrian footpaths within the road corridor. For Option 2, entry to the bridge ramps would be located around 70 m from the Beecroft Road and Copeland Road intersection to provide enough space for the ramps on either side of Beecroft Road. Figure 2-1 to Figure 2-3 provide a visual representation of Option 2 within the existing site context. Figure 2-4 provides an overview of the concept design and proposal footprint of Option 2.

Figure 2-1 Photomontage looking south towards Option 2
Figure 2-2  Photomontage looking north towards Option 2

Figure 2-3  Photomontage of Option 2 behind Beecroft Community Centre
Figure 2-4 Option 2 bridge design and footprint
Option 3 – Steel arch structure with lifts and stairs

Option 3 includes a steel truss pedestrian bridge with stairs and lifts at both ends. There would be no ramps in this option. Lifts would be provided at the southern side of the bridge at both ends. Access to the stairs and lifts would tie into the existing pedestrian footpaths within the road corridor. Option 3 would be located around 50 m south of the Copeland Road intersection. In the event that the lifts fail, pedestrians would still be able to cross Beecroft Road using the existing signalised pedestrian crossing on the northern side of the Beecroft Road and Copeland Road intersection.

Figure 2-5 and Figure 2-6 provide a visual representation of Option 3 within the existing site context. Figure 2-7 provides an overview of the concept design and proposed footprint for Option 3.
Figure 2-7 Option 3 bridge design and footprint
2.5.3 Analysis of options

The do-nothing option would have no visual impact nor would it impact on local businesses and assets. There would be no construction or environmental impacts and no construction costs would be incurred. However, it would not meet the proposal objectives and would not provide an effective, safe, reliable solution for the community. This option was therefore not considered any further.

Table 2-1 provides a summary of the analysis of the two bridge options in respect to the proposal selection criteria.

<table>
<thead>
<tr>
<th>Option assessment criteria</th>
<th>Option 2 – Concrete super-T girder with precast concrete ramps</th>
<th>Option 3 – Steel arch structure with lifts and stairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>A total of 25 trees would require removal under Option 2. This includes the removal of 8 planted trees and one Sydney Red Gum in Beecroft Village Green and around 16 trees in Beecroft Public School. The overall ecological significance of these trees is low.</td>
<td>A total of 19 trees would require removal under Option 3. This includes the removal of up to six trees in Beecroft Village Green and 13 trees in Beecroft Public School. The overall ecological significance of these trees is low.</td>
</tr>
<tr>
<td>Functionality</td>
<td>The bridge structure would be located around 70 m south of the Copeland Road intersection. However entry ramps would be located around 20 m and 40 m south of the Copeland Road intersection on Beecroft Road. There are no lifts, which removes the potential for mechanical breakdowns. The bridge would remain in operation and provide access for mobility impaired persons at all times.</td>
<td>The bridge would be located around 50 m south of the Copeland Road intersection. Option 3 provides both stairs and lifts as access to the bridge. If lifts break down, this option would not provide a grade-separated crossing at the bridge location for persons with limited mobility and prams. Instead, in the event of a lift breakdown pedestrians with limited mobility would be required to use the at-grade signalised crossings at the Copeland Road intersection.</td>
</tr>
<tr>
<td>Constructability</td>
<td>All bridge options face similar construction constraints such as the limited space next to the bridge between Beecroft Road and Beecroft Public School and Beecroft Village Green. The construction of Option 2 involving precast concrete girder and precast concrete ramps and stairs is a relatively straight forward form of construction. The biggest challenge lies in the accuracy of the manufacture of the precast elements and their assembly on site.</td>
<td>All bridge options face similar construction constraints such as the limited space next to the bridge between Beecroft Road and Beecroft Public School and Beecroft Village Green. The steel arch and lifts used in Option 3 has a smaller construction footprint than Option 2 which provides some spatial benefit on such a constrained site for construction areas. The construction of the lift shaft and the lift itself adds complexity to the construction that is not present in Option 2.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>No regular maintenance of any mechanical services. Routine maintenance of landscaped</td>
<td>This option comprises two lifts. Lift maintenance results in ongoing costs and results in emergency call-outs</td>
</tr>
<tr>
<td>Option assessment criteria</td>
<td>Option 2 – Concrete super-T girder with precast concrete ramps</td>
<td>Option 3 – Steel arch structure with lifts and stairs</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Cost</td>
<td>Strategic cost estimates indicate a project cost of around $3.6 million (estimated).</td>
<td>Strategic cost estimates indicate a project cost of around $5.5 million (estimated).</td>
</tr>
</tbody>
</table>

Option 2 and 3 would both meet the proposal objectives of providing safer crossing of Beecroft Road for pedestrians and improve traffic flow through a combination of ramps, stairs or lifts for access.

Option 2 would have a higher visual impact, particularly on the eastern side of Beecroft Road through the establishment of a series of pedestrian ramps through Beecroft Village Green. The increased visual prominence of the ramps in Option 2 would also result in a greater impact on the local heritage conservation area. The Beecroft, Cheltenham Heritage Conservation Area listing aims to preserve the cultural and environmental heritage of the local community and its built heritage. Establishing a series of large concrete ramps through the Beecroft Village Green and next to Beecroft Public School and Beecroft Community Centre would significantly alter the visual setting of these heritage places. Overall, a series of large concrete ramps would visually conflict with the existing Beecroft, Cheltenham Heritage Conservation Area.

A key environmental and community concern has been the impact to native vegetation and tree clearing. Option 2 would require more tree removal in Beecroft Village Green and in Beecroft Public School due to the larger construction footprint taken up by the pedestrian ramps. A number of the additional trees that would be removed from Beecroft Public School in Option 2 are large gums that are visually prominent. Removing these trees would further emphasise the bridge and magnify the visual impact of the proposed bridge in Option 2.

### 2.6 Preferred option

Option 3 was selected as the preferred option for the proposal. Option 3 meets the proposal objectives of providing a safe grade separated pedestrian crossing of Beecroft Road, while also allowing for improved traffic flow at the Copeland Road intersection.

Option 3 would also provide the best outcome in terms of minimising impacts to vegetation within Beecroft Public School and Beecroft Village Green which is considered to be a key community concern.

The preferred option would also result in more acceptable visual amenity impacts in comparison with Option 2. Although the steel arch structure of Option 3 would be visually prominent within the road corridor, the inclusion of lifts instead of ramps reduces the footprint and visual profile of the bridge in the adjacent heritage areas compared to Option 2.
3 Description of the proposal

This section describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

The proposal involves the establishment of a pedestrian bridge over Beecroft Road about 50 m south of the Copeland Road and Beecroft Road intersection in Beecroft. The proposed pedestrian bridge would have the following key features:

- Stairs and lifts at both ends of the bridge. These would be located on the:
  - Eastern side of the road, within Beecroft Village Green, next to the existing pedestrian footpath that is within the Beecroft Road corridor
  - Western side of the road, within the existing Beecroft Public School boundary, next to the existing pedestrian footpath and safety fence that are within the Beecroft Road corridor

- A tied arch bridge deck spanning the highway with overhead cover.

Additional components of the proposal would include:

- Installation of redirective barrier kerb to replace and extend beyond the existing southbound crash barrier next to the Community Centre by about 30 m, and the addition of a new 30 m long redirective barrier kerb on the western side of Beecroft Road on the approach to the western lift shaft

- Installation of new pedestrian fencing along the eastern side of Beecroft Road from Copeland Road to around 75 m south of the proposal and upgrading of the existing pedestrian fencing on the western side of Beecroft Road

- Some modifications to existing pedestrian footpaths to tie into the proposed bridge stairs and lift access on both sides of Beecroft Road

- Relocation of an overhead low voltage power line on the eastern side of Beecroft Road, next to the proposed lift and stair location

- Property acquisition (refer to Section 3.6 for details)

- Landscaping and vegetation planting of areas surrounding the bridge stairs and lifts.

Figure 3-1 provides an aerial overview of the main features of the proposal.
Figure 3-1 Proposal features

- Pedestrian crossing would be removed
- Existing pedestrian fencing to be upgraded
- Proposed pedestrian fencing
- Proposed redirective barrier kerb
- Adjustment to Beecroft Public School fence
- New fence
- Existing G4 safety barrier (to be removed)
- Proposed redirective barrier kerb
- School entry gates
- Removal of pedestrian crossing

Beecroft Public School
Beecroft Village Green
Community Centre
To station
To Beecroft Town Centre and Pennant Hills Road
Mary Street
Copeland Road
Chatswood
Epping
Sydney

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3.2 Design

3.2.1 Design criteria
The concept design for the proposed pedestrian bridge is provided in Appendix B. The following provides a description of the bridge’s design features:

- Lifts: Capacity for up to 17 people
- Cast in situ stairs
- Bridge span dimensions: about 20 m long and 2.3 m wide
- Bridge clearance to Beecroft Road: 5.5 m
- Pedestrian fences next to Beecroft Road: 1.2 to 1.4 m high.

3.2.2 Engineering constraints
A series of engineering constraints were identified during the development of the concept design, including the construction and operational phases of the proposal. The main constraints associated with the proposal include:

- Minimising the removal of vegetation on both sides of Beecroft Road
- Minimising property acquisition on both sides of Beecroft Road
- The presence of existing utilities within the footway including electricity, telecommunications infrastructure and water services
- Access for maintenance of road assets during and after construction.

3.2.3 Major design features

Bridge foundations
As part of the proposal’s construction, bridge foundations would be established at both the eastern and western sides of Beecroft Road. The bridge arch structure would be supported on the lift shafts that would in turn be supported on bridge foundations. The foundations would consist of four 750 mm diameter concrete piles (on each side of the road) spaced at intervals of 2.45 m by 2.0 m (centre to centre). These piles would be cast onsite in their required location and socketed into rock. These structures would be capable of resisting potential vehicle collision impacts, in line with the appropriate design standard, as the lift shafts would be located in close proximity to the roadway.

Connecting each of the piles would be a 3.65 m by 3.20 m, 1.00 m deep pile cap below ground level. This pile would act to transfer all forces on the superstructure down to the foundations.

Bridge lift shafts
The proposal has been designed with two lift shafts that also function as the supports of the steel arch bridge. Each lift shaft would consist of 400 mm thick reinforced concrete side walls parallel to the roadway and 250 mm thick front and rear walls with openings for the lift doors. The outside dimensions of the shaft would be 3.35 m by 2.9 m with a 2.55 m by 2.4 m internal void.

The lift shafts would be cast in situ and oriented with the longest side perpendicular to Beecroft Road to provide adequate structural capacity as the bridge is cantilevered off the shafts. The lift roof would consist of a cast in situ 250 mm to 350 mm thick reinforced concrete slab. This would increase rigidity and provide lateral bracing for the shafts which act as the bridge’s structural piers.

Along with supporting the bridge superstructure, the lift shafts and roof have been...
designed to support the lift with a capacity of up to 17 people.

**Bridge span**

The main bridge span over Beecroft Road would be 19.85 m in length and would be 2.3 m wide between the handrails. The overall external width of the structure is around 3.6 m while the minimum vertical clearance from the roadway would be 5.5 m.

**Lifts**

The lifts would be capable of carrying 17 people. The lifts would be designed in line with RMS QA Specification B381 Design, Supply and Installation of Pedestrian Bridge Lifts. The lift shaft dimensions and power supply requirements would be suitable for a number of leading lift systems, however these would be confirmed before construction.

The lift cars and landings would have 1.1 m wide glass doors which provide adequate opening allowance in line with AS1428.1 Design for Access and Mobility.

**Stairs**

The stairs on both ends of the bridge would extend off the cantilevered bridge support slab from the lift shaft. To minimise the construction footprint and the potential for disturbance to natural vegetation, the stairs would wrap around each other and tie in with the existing footpath.

The stairs would be 2.2 m wide and consist of two intermediate landings with two main flights of 15 and 17 stairs as well as a short flight of two stairs between the lower lift entrance level and the first of the intermediate landings.

The main flights of stairs would run parallel to the road with the smaller flights of four stairs running perpendicular to the road between the landings. Both sets of stairs and landings have been designed in line with AS1428.2 Design for Access and Mobility.

**Protection screen**

The bridge would include a 2.6 m high protection screens to reduce the risk of people throwing objects onto the road or into the school grounds from the bridge. The protection screens would enclose the bridge along with the curved 10 mm thick translucent bridge roof.

**Redirective barrier kerb**

The existing G4 guardrail next to Beecroft Community Centre on the eastern side of Beecroft Road would be removed and replaced with redirective barrier kerb known as ELSHOLZ kerb. Redirective barrier kerb would extend from the intersection at Copeland Road down the hill towards the proposal on the eastern side of the road and would extend from the Beecroft Public School driveway access to the bridge structure on the western side of the road. The redirective barrier kerb would provide protection to the lift shaft and pedestrians from potential vehicle collisions.

**Pedestrian fencing**

Pedestrian fencing would be provided to deter pedestrians from crossing Beecroft Road in unsafe locations and encourage the use of the bridge.

There is currently an existing pedestrian fence on the Beecroft Public School side extending from the school drive way up to Copeland Road. This fence would be extended to the pedestrian crossing at Copeland Road. In locations where redirective barrier kerb is installed, pedestrian fencing would be installed on top of the new redirective barrier kerb.
3.3 Construction activities

3.3.1 Work methodology

The construction methodology would be refined during the detailed design. It is anticipated that construction would be staged to complete the construction of the stairs and lift shafts on both sides of the highway before installing the tied arch bridge deck. These would be pre-constructed offsite and assembled on site.

Construction would involve the following activities:

- Site establishment including establishing compound site(s), access and erosion and sedimentation controls
- Relocation of utilities
- Removal of vegetation, including up to six trees in Beecroft Village Green and 13 trees in Beecroft Public School to accommodate the staircase and lift shaft
- Piling and excavation for the foundation of the lift shafts and stair supports. A total of ten 750 mm diameter bored cast in place piles would be installed. It is anticipated that piling activities would take around three days on each side of the proposed bridge. Excavation in the area of the lift shafts and piles would be required to a depth of 2.7 m for the construction of the lift pile cap and lift pit. In total it is expected that it would take around three weeks to construct the lift shaft to ground level, however, may take longer depending on ground conditions and staging requirements
- Construction of lift shafts to roof level
- Construction of pile caps and columns for the stair supports
- Construction of stairs and landings
- Placement of the steel tied arch bridge superstructure with precast concrete bridge desk and prefixed safety screens
- Installation of stair balustrades
- Installation of lighting
- Construction of redirective barrier kerb to replace and extend beyond the existing G4 crash barrier
- Installation of pedestrian fences and road signage
- Installation of road signage
- Removal of southern pedestrian leg at Copeland Road and Beecroft Road intersection
- Site clean-up and landscaping.

3.3.2 Construction hours and duration

Construction of the proposal would take about eight months to complete.

The majority of construction would be carried out during the following periods:

- Monday to Friday, 7.00am to 6.00pm
- Saturday, 7.00am to 1.00pm.

The majority of the work would be carried out outside of peak hour traffic periods. Night work would also be required (including weekends) for certain construction activities and deliveries, including, but not limited to:
• Utility adjustments (Section 3.5)
• Delivery of materials such as formwork, steel reinforcement and concrete
• Concrete pours
• The installation of the bridge superstructure. It is anticipated this would be delivered to site on a Friday night and lifted into place on the Saturday night, subject to a road occupancy licence
• Finishing work on the bridge and installation of the pedestrian fence and traffic barriers.

Intermittent night work would be carried out between the hours of 8pm and 5am, excluding Saturdays and public holidays, in accordance with procedures contained within the Office of Environment and Heritage (OEH) Interim Construction Noise Guideline (DECC 2009) and Roads and Maritime’s Environmental Noise Management Manual Practice Note vii – Road Work Outside Normal Working Hours (RTA, 2001).

3.3.3 Plant and equipment

The following is a list of plant and equipment that are anticipated to be used during construction:
• Cherry picker
• Chainsaw
• Excavator
• Plate compactor
• Piling rig
• Concrete delivery trucks
• Concrete pumps
• Vibrators
• Elevated work platforms
• Cranes
• Generator
• Compressor
• Drills
• Welding equipment
• Lighting towers
• Trucks for deliveries and removal of spoil.

3.3.4 Earthwork

Excavation would be required for the foundations of the lift shafts and stairs on both sides of Beecroft Road. It is anticipated around 120 m³ or 220 tonnes of material would be excavated during construction of the lift shafts and stair wells.

3.3.5 Source and quantity of materials

Materials used in the construction of the proposed pedestrian bridge would be sourced from local suppliers where possible. Estimates of material usage include around:
• 220 m³ or 500 tonnes of concrete
• 25 tonnes of steel
• 350 m² of steelwork
• 50 L of paint
• 40 m² of security mesh
• 60 m² of protection screen mesh
• 95 m² of stainless steel balustrade mesh
• 85 m² of Ampelite polycarbonate roof sheeting.

3.3.6 Traffic management and access
Due to site access requirements, large deliveries and concrete pours would require lane closures on Beecroft Road. The site team would work with the Transport Management Centre and work in line with the approved road occupancy licence (ROL).

During the main span lift, Beecroft Road would be completely closed and appropriate detours put in place. This work would be carried out during a single night closure to limit the impact to road users.

3.4 Ancillary facilities
Construction site compounds would provide support to the main construction sites. As the proposal is located within a highly urbanised area, the availability of potential construction compound areas is limited. A number of potential construction compounds have been considered and assessed within this REF based on construction requirements, existing land uses and environmental sensitivities surrounding the proposal. Figure 3-2 provides an overview of these potential construction compound options. These are listed below:

• Compound site 1: north of Beecroft Community Centre, access from Copeland Road East, around 260 m² in area
• Compound site 2: west of the proposed western bridge stairs and lift within Beecroft Public School, accessed from Beecroft Road, around 430 m² in area
• Compound site 3: south of Beecroft Community Centre within Beecroft Village Green, accessed from Beecroft Road, around 320 m² in area
• Compound site 4: west of Beecroft Public School within the Beecroft Bowling Club car park, accessed from Copeland Road, around 180 m² in area
• Compound site 5: immediately west of Beecroft Road within the road corridor, to the south of the proposal area next to Vintage Cellars, accessed from Beecroft Road, around 190 m² in area
• Compound site 6: vacant lot at 1b Mary Street, Lot 2 DP 1168541, accessed from Mary Street, around 480 m² in area.

The above sites are considered potential options for construction compound sites only. Discussions with landowners are ongoing and the final size and location of any potential compound site would be determined before the start of construction. At this stage each of the above proposed compound sites is being investigated. It is anticipated that a number of compound sites would be used during construction. The final compound sites would be used for a range of ancillary activities that would be dependent on the characteristics of each site.

Collectively, construction compound sites that are used for the development of the
The proposal would comprise:

- An area of hardstand at one of the potential compound locations, as required for material or vehicle storage or activity
- Temporary buildings such as a site office, amenities and storage
- Parking areas
- Material laydown and storage areas
- Perimeter fencing (all sites).

In addition, the proposed construction footprint of the bridge stairs and lifts would be fenced off from public access during construction on both sides of Beecroft Road. These areas would also be used for the temporary storage of small items of plant, equipment or materials.

### 3.4.1 Assessment of ancillary construction facilities

The potential environmental impacts of the ancillary construction compound sites proposed as part of the project are assessed in Table 3-1. This table also identifies proposed management measures for the ancillary compound sites as currently proposed.

**Table 3-1  Potential impacts of proposed ancillary construction facilities**

<table>
<thead>
<tr>
<th>Potential impact</th>
<th>Proposed management measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traffic and access:</strong></td>
<td></td>
</tr>
<tr>
<td>Traffic congestion on surrounding roads</td>
<td>• Provide dedicated access points into construction compounds</td>
</tr>
<tr>
<td>Restricted access to neighbouring properties</td>
<td>• Access would only be permitted to and from compound sites as indicated in Figure 3-2</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.1 and 7.2</td>
</tr>
<tr>
<td><strong>Noise and vibration:</strong></td>
<td></td>
</tr>
<tr>
<td>Additional vehicle and equipment noise</td>
<td>• Limit exceedances of “highly impacted” noise criteria</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.2 and 7.2</td>
</tr>
<tr>
<td><strong>Landscape character and visual:</strong></td>
<td></td>
</tr>
<tr>
<td>Impact to existing views</td>
<td>• Compounds would be fenced off with mesh or boarded fencing to limit views into compounds</td>
</tr>
<tr>
<td>Change to existing landscape character</td>
<td>• Once the proposal is complete compounds must be reinstated to their pre-existing condition or as agreed with the landowner</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.3 and 7.2.</td>
</tr>
<tr>
<td><strong>Biodiversity:</strong></td>
<td></td>
</tr>
<tr>
<td>Clearing of vegetation and trees</td>
<td>• Only tree clearing specified in Section 6.4 is required. No other tree clearing is required.</td>
</tr>
<tr>
<td></td>
<td>• Some minor clearing of small shrub-like vegetation may occur at locations other than compound sites 2 and 3. Should this be required these areas would be reinstated to their pre-existing condition</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.4 and 7.2.</td>
</tr>
<tr>
<td><strong>Non-Aboriginal heritage:</strong></td>
<td></td>
</tr>
<tr>
<td>Impacts to heritage listed items</td>
<td>• Establish buffer protection zone or screen between compound sites and any heritage items such as the Beecroft Community Centre, to the extent possible</td>
</tr>
<tr>
<td>Undiscovered heritage items</td>
<td>• Should unidentified heritage items be discovered on compound sites, work would immediately stop and Roads and Maritime would be notified in line with Roads</td>
</tr>
<tr>
<td>Potential impact</td>
<td>Proposed management measure</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td>and Maritime Unexpected Finds Procedure</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.6 and 7.2.</td>
</tr>
<tr>
<td><strong>Soil and water:</strong></td>
<td></td>
</tr>
<tr>
<td>Soil erosion</td>
<td>• Minimise area of disturbance to ground surface and topsoil removal</td>
</tr>
<tr>
<td>Discharge of sediment</td>
<td>• Treat runoff from fuel storage areas and vehicle wash down area before discharge, if required</td>
</tr>
<tr>
<td>Spills and leaks</td>
<td>• Promptly clean up and remove material spills</td>
</tr>
<tr>
<td></td>
<td>• Ensure erosion and sediment controls are established at compound sites before carrying out stockpile storage or ground disturbing activities</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.8 and 7.2.</td>
</tr>
<tr>
<td><strong>Air quality:</strong></td>
<td></td>
</tr>
<tr>
<td>Dust generation</td>
<td>• Implement dust management measures including protection of erodible material stockpiles</td>
</tr>
<tr>
<td></td>
<td>• Maintain and operate all plant and equipment to a proper and efficient condition</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.9 and 7.2.</td>
</tr>
<tr>
<td><strong>Waste and resource management:</strong></td>
<td></td>
</tr>
<tr>
<td>Waste generation</td>
<td>• Minimise waste generation</td>
</tr>
<tr>
<td></td>
<td>• Comply with safeguards and management measures in Section 6.10 and 7.2.</td>
</tr>
</tbody>
</table>
Figure 3-2 Overview of potential construction compounds
3.5 Public utility adjustment

As part of the concept design, a Dial-Before-You-Dig search was carried out to identify underground utilities within the study area within and next to the proposal. No underground utilities were found to be within the proposal footprint and so the proposal would not require the relocation of any underground utilities.

An above-ground low voltage electrical power line runs parallel with Beecroft Road on eastern side of the road reserve. This power line would require relocation underground due to conflicts with the proposed bridge and lift shaft location. The power line would be relocated underground between the existing power poles either side of the proposed bridge. The new underground low voltage power line would extend for a length of around 40 m and would be located within the footpath.

Figure 3-3 below provides an aerial view of the relocation of the power line.
Figure 3-3 Utility adjustment

- Light green: Installation of new underground low voltage cable
- Blue: Removal of existing low voltage overhead cable
3.6 Property acquisition

The proposal footprint extends into land that is currently occupied by Beecroft Public School (owned by the NSW Department of Education and Communities) and Beecroft Village Green (located on Crown Land). Partial acquisitions would be required from both authorities.

Roads and Maritime will discuss the proposed partial acquisitions with the NSW Department of Education and Communities (about 140 m²) and The Crown (about 150 m²).

As part of the proposal's development, several construction compound locations have been considered as described in Section 3.4. Roads and Maritime are currently in discussions with each landowner about their potential use as compound sites. Subject to finalisation of the detailed design and agreement with landowners, it is anticipated around three of these potential sites would be selected for use during construction. Arrangements would be made for Roads and Maritime to lease the areas of land required for each of the nominated compound locations.
4 Statutory and planning framework

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

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

Clause 94 of the ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for road infrastructure facilities and is to be carried out on behalf of Roads and Maritime, it can be assessed under Part 5 of the EP&A Act. Development consent from Hornsby Shire 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 before the start of certain types of development. Consultation, including consultation as required by the ISEPP (where applicable), is discussed in Chapter 5 of this REF.

4.2 Local Environmental Plans

4.2.1 Hornsby Local Environmental Plan 2013

The proposal would be situated in the zones and pursuant to the controls identified in Table 4-1. Figure 4-1 shows an overview of the LEP land zoning surrounding the proposal.

**Table 4-1** Hornsby Local Environmental Plan (LEP) 2013 zoning, objectives and controls

<table>
<thead>
<tr>
<th>Zone</th>
<th>Objectives of the zone</th>
<th>Proposal component</th>
<th>Controls</th>
</tr>
</thead>
</table>
| 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 protect and maintain areas of bushland that has ecological value. | Western end of proposed bridge including stairs and lift. Potential compound and storage location three, refer to Figure 3-2. | Development for the purpose of roads / bridges is allowed with consent |
| RE2 – Private recreation | • To enable land to be used for private open space or recreational purposes  
                          • To provide a range of | Potential compound and storage location four, refer to Figure 3-2. | Development for the purpose of roads is                                  |
The proposal would comprise:

- An area of hardstand at one of the potential compound locations, as required for material or vehicle storage or activity
- Temporary buildings such as a site office, amenities and storage
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| Restricted access to neighbouring properties |                                                                                                           |
| **Noise and vibration:**              |                                                                                                                                                              |
| Additional vehicle and equipment noise | • Limit exceedances of “highly impacted” noise criteria  
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| **Landscape character and visual:**   |                                                                                                                                                              |
| Impact to existing views              | • Compounds would be fenced off with mesh or boarded fencing to limit views into compounds  
                                          • Once the proposal is complete compounds must be reinstated to their pre-existing condition or as agreed with the landowner  
                                          • Comply with safeguards and management measures in Section 6.3 and 7.2 |
| Change to existing landscape character |                                                                                                                                                              |
| **Biodiversity:**                     |                                                                                                                                                              |
| Clearing of vegetation and trees      | • Only tree clearing specified in Section 6.4 is required. No other tree clearing is required.  
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| **Non-Aboriginal heritage:**          |                                                                                                                                                              |
| Impacts to heritage listed items      | • Establish buffer protection zone or screen between compound sites and any heritage items such as the Beecroft Community Centre, to the extent possible  
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| Undiscovered heritage items           |                                                                                                                                                              |
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<td>Western end of proposed bridge including stairs and lift. Potential compound and storage location three, refer to Figure 3-2.</td>
<td>Development for the purpose of roads / bridges is allowed with consent</td>
</tr>
<tr>
<td>RE2 – Private recreation</td>
<td>• To enable land to be used for private open space or recreational purposes &lt;br&gt; • To provide a range of</td>
<td>Potential compound and storage location four, refer to Figure 3-2.</td>
<td>Development for the purpose of roads is</td>
</tr>
<tr>
<td>Zone</td>
<td>Objectives of the zone</td>
<td>Proposal component</td>
<td>Controls</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
</tbody>
</table>
|                                 | recreational settings and activities and compatible land uses  
|                                 | • To protect and enhance the natural environment for recreational purposes.                                                                                                                                              | Sections of the proposed bridge foundations including the stairs and lift and fencing.  
|                                 |                                                                                                           | Potential compound and storage location five, refer to Figure 3-2.                    | allowed with consent                          |
| 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.                                                                                                      | Eastern end of proposed bridge including stairs and lift to be located in Beecroft Public School property owned by the NSW Department of Education.  
|                                 |                                                                                                           | Potential compound and storage locations one, two and six, refer to Figure 3-2.       | Development for the purpose of roads is allowed with consent |
| 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.                                                                                                               |                                                                                       |                                               |
Figure 4-1 Land zoning

Hornsby Shire Council LEP 2013 land zoning

- **B2** Local Centre
- **R2** Low Density Residential
- **R4** High Density Residential
- **RE1** Public Recreation
- **RE2** Private Recreation
- **SP2** Infrastructure
4.3 Other relevant legislation

4.3.1 Environmental Planning and Assessment Act 1979

Under Part 5 of the EP&A Act (section 111 and section 112), all proposals must include an assessment of threatened flora and fauna and their habitats that are likely to occur within the area of the activity or that may be indirectly affected by the construction and operation of an activity. The assessment must address whether the proposed activity is likely to have a significant effect on the threatened biodiversity identified, and a decision made on whether an Environmental Impact Statement (EIS) or Species Impact Statement (SIS) is required. To make this decision, a determining authority must consider the effect of an activity on:

- Threatened species, populations and ecological communities, and their habitats (listed under the TSC Act or FM Act and whether there is likely to be a significant effect on these (as determined in Section 5A of the EP&A Act)
- Critical habitat (listed under the TSC Act or FM Act)

Any other protected fauna or protected native plants within the meaning of the National Parks and Wildlife Act 1974 (NPW Act).

4.3.2 Threatened Species Conservation Act, 1995

The TSC Act protects threatened species, populations and ecological communities and their habitat in NSW. If threatened species, populations, ecological communities or their habitat could be impacted by the proposal, an assessment of significance must be completed to determine the significance of the impact, in line with Section 5A of the EP&A Act.

A significance assessment was carried out for one threatened ecological community, the Sydney Turpentine-Ironbark Forest. Ecological investigations have considered the requirements of Section 5A of the EP&A Act and concluded that the proposal would be unlikely to result in a significant impact on threatened species, populations, ecological communities or their habitat. Potential biodiversity impacts of the proposal are discussed further in Section 6.4.4.

The TSC Act also lists Key Threatening Processes, which comprise matters that threaten the survival or evolutionary development of a species, population or ecological community.

4.3.3 Heritage Act 1977

The Heritage Act 1977 (Heritage Act) provides for the conservation of buildings, work, relics and places that are of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance to the State. Matters protected under the Act include items subject to an Interim Heritage Order and items listed on the State Heritage Register, the heritage schedules of local council LEPs, and the heritage and conservation registers established under section 170 of the Act by NSW state government agencies (section 170 Registers). The Act also provides for the protection of archaeological ‘relics’, being any deposit, object or material evidence that relates to the non-Aboriginal settlement of NSW and is of State or local heritage significance.

Approval under section 60 of the Act is required for any action that would adversely affect an item that is subject to an Interim Heritage Order or a listing on the State Heritage Register. An excavation permit under section 139 of the Act is required for activities that would result in or are likely to result in the disturbance or excavation of a ‘relic’.
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 Department of the Environment for proposed ‘actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix A and Section 6 of the REF.

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.

4.5 Confirmation of statutory position

The proposal has been assessed as permissible without consent under the relevant environmental planning instruments. That position is established by reference to clause 94 of the ISEPP.

The proposal is within the activity definition set by section 110 of the EP&A Act and is being proposed by a public authority; assessment under Part 5 of the EP&A Act is therefore required. Roads and Maritime is both the proponent and the determining authority for the purposes of Part 5 of the EP&A Act.

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

This proposal does not trigger referral to the Commonwealth and referral of the proposal as an action under the EPBC Act is not required.
5  Stakeholder and community consultation

5.1  Consultation strategy

A community consultation and stakeholder engagement plan (communications plan) was developed and implemented to guide consultation activities for the proposal. The communications plan identifies key objectives and outcomes of consultation activities with the community, stakeholders and government agencies.

The objectives for carrying out community and stakeholder consultation on the proposal have been to:

- Seek comment, feedback, ideas and suggestions for Roads and Maritime to consider when developing the proposal
- Build a database of interested community members who Roads and Maritime could continue to engage during the proposal's development.

The following sections outline the consultation that has been carried out as part of the proposal's development.

5.2  Community involvement

5.2.1  Consultation activities

A ‘Have Your Say’ letter was issued to the local community seeking feedback on the proposal. Consultation was open from Monday 16 February 2015 to Monday 2 March 2015, and then extended to Friday 10 April 2015 due to the community interest in the proposal. Community members were encouraged to provide feedback via mail, email or phone.

After refinement of the concept design for the project, Roads and Maritime sought feedback on tree removal, bridge colour and work hours from Monday 20 July to Monday 3 August 2015.

Members of the local community and key stakeholders were contacted using a range of methods as outlined in Table 5-1.

Table 5-1  Community consultation methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder meetings</td>
<td>Various meetings have been held with Beecroft Public School and Hornsby Shire Council staff since February 2015 both in the office and at the proposed site to discuss the proposal. Representatives attended a Beecroft-Cheltenham Civic Trust meeting in April 2015 and met with the Save Beecroft &amp; Cheltenham Alliance in May 2015, to discuss the proposal. Representatives also met with Hornsby Shire Councillors on Wednesday 27 May.</td>
</tr>
<tr>
<td>Project update February 2015</td>
<td>About 1600 project updates were delivered to residents. Electronic copies were emailed to government agencies, schools, and community groups in the local area.</td>
</tr>
<tr>
<td>Letter – extended consultation</td>
<td>About 1600 letters were delivered to residents. Electronic copies were emailed to government agencies, schools,</td>
</tr>
</tbody>
</table>
5.2.2 Consultation feedback

Throughout the consultation period, community members and stakeholders were invited to provide feedback on the proposal. A range of responses were received. Table 5-2 provides an overview of the key issues raised during community consultation to date and Roads and Maritime’s proposed response. The Consultation Report is provided in Appendix G.
### Table 5-2  Overview of key issues raised during community consultation and Roads and Maritime responses

<table>
<thead>
<tr>
<th>Category</th>
<th>Issue raised</th>
<th>Roads and Maritime response</th>
</tr>
</thead>
</table>
| Environment | Beecroft has lost too many trees lately with all the projects in the area, tree removal should be avoided or at least replaced on a one to one basis.                                                                 | We understand that there are a number of infrastructure projects happening in the area and are committed to minimising the impact of this proposal on the environment and the community.  

The concept design has been developed to minimise the impact on mature trees as much as possible, however we believe we will need to remove some vegetation including trees, bushes and shrubs from Beecroft Village Green and Beecroft Public School to allow us to construct the bridge. The location was chosen to minimise the impact on mature native trees in the Beecroft Village Green and Beecroft Public School grounds.  

Roads and Maritime will prepare a Review of Environmental Factors to assess the environmental impacts of the proposal. We are still developing the design to fully understand the impacts so we can prepare the Review of Environmental Factors. This will outline the possible impacts and the steps we need to take to reduce them.  

We will plant some semi-mature trees in the Village Green in response to the comments received from the public to replace the trees we remove. Roads and Maritime will finalise the exact location and species in consultation with our Landscape Designers and Council. |
| Heritage | The bridge design is not sympathetic with the heritage aesthetics of the federation suburb.                                                                                                                  | Roads and Maritime has developed a technical direction for the design of pedestrian bridges. This proposal is based on urban design standards from this technical direction.  

We will prepare a Review of Environmental Factors to assess the environmental impacts of the proposal, including heritage impacts. We are still developing the design to fully understand the impacts so we can prepare the Review of Environmental Factors. Heritage aspects such as character of the local area will be considered in the environmental assessment. |
<p>| Location | The proposed bridge location is not convenient for the majority of pedestrians crossing at the Beecroft and Copeland Road Intersection.                                                                         | The proposed pedestrian bridge has been designed to provide a safe and efficient crossing for Beecroft Public School students. While the pedestrian movements of the community have been considered in the development of the proposal, the key priority for the proposed bridge is to ensure a safe crossing of Beecroft Road for school students. |</p>
<table>
<thead>
<tr>
<th>Category</th>
<th>Issue raised</th>
<th>Roads and Maritime response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>A pedestrian bridge located north of the proposed location, such as at the intersection of Hannah Street and Beecroft Roads, would be of more benefit to pedestrians in Beecroft.</td>
<td>A pedestrian bridge would not be viable at the intersection of Beecroft Road and Hannah Street due to the limited space which would require potential acquisition of private property.</td>
</tr>
<tr>
<td>Ramps</td>
<td>A ramp design would better facilitate cyclists and would not require maintenance or breakdown like lifts. Ramps could be constructed to reach the corner of Beecroft Road and Copeland Road on the western side, and to come around behind the community centre on the eastern side.</td>
<td>The proposal aims to reduce the environmental impact to the area. A ramp design would produce a much larger footprint resulting in greater environmental impacts, including vegetation removal from the Beecroft Village Green and Beecroft Public School grounds. On this basis a ramp design would not be suitable for the proposed pedestrian bridge.</td>
</tr>
<tr>
<td>Advertising</td>
<td>The amenity of Beecroft will be damaged if advertising is allowed on the bridge.</td>
<td>Roads and Maritime acknowledges the community’s concerns about heritage and amenity in the local area and would not include advertising on the proposed pedestrian bridge.</td>
</tr>
<tr>
<td>Access</td>
<td>The lifts will require maintenance and may not cope with the volume of pedestrians seeking to use them, risking breakdowns. A warning system on either side of the road to advise pedestrians at the Copeland Road intersection when the lifts not working is needed.</td>
<td>Roads and Maritime has a strict maintenance protocol for lifts including regular cleaning and routine maintenance, call outs for breakdowns and emergency response for lift entrapment. A 24-hour phone number for the public to report issues with the lifts such as offensive graffiti or breakdowns will be provided outside the lift door and inside the lift. We acknowledge the request for a warning system at Copeland Road to advise pedestrians the lifts are not working and will investigate this option as we develop the proposal.</td>
</tr>
<tr>
<td>Funding</td>
<td>The bridge seems like a use of funds that could be better spent for the community in other areas.</td>
<td>The proposed pedestrian bridge is part of the NSW Long Term Transport Master Plan. The project was announced in the “Sydney’s Walking Future, September 2013” document and is one of the shortlisted bridges to be delivered in the short term.</td>
</tr>
<tr>
<td>Bridge colour</td>
<td>The bridge colours should be chosen to blend into the local environment. The colours</td>
<td>Roads and Maritime has consulted with Hornsby Shire Council in selecting the proposed colour scheme for the bridge over Beecroft Road.</td>
</tr>
<tr>
<td>Category</td>
<td>Issue raised</td>
<td>Roads and Maritime response</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>chosen are standard colours used for similar bridges around Sydney. Consider the use of green colours similar to the trees to help blend the bridge in with the local landscape.</td>
<td>Urban designers believe that the use of green would make the bridge stand out more than the proposed colours. The colours that have been selected would help to blend the bridge into the surrounding tree shadows in the Village Green. The use of two different colours on the lift shafts help to break up the mass of the structure.</td>
</tr>
</tbody>
</table>
5.3 Aboriginal community involvement

The proposal has been considered against the requirements of the Procedure for Aboriginal Heritage Consultation and Investigation (PACHCI) (Roads and Maritime 2011). This procedure involves the following:

- **Stage 1** – an internal Roads and Maritime assessment to determine whether a proposal is likely to affect Aboriginal cultural heritage
- **Stage 2** – a preliminary external assessment with limited stakeholder consultation to determine whether a proposal requires Part 6 approval from the NSW Office of Environment and Heritage under the National Parks and Wildlife Act 1974
- **Stage 3** – if approval is required, Aboriginal community consultation and investigation
- **Stage 4** – implementation of the assessment process.

Aboriginal cultural heritage impacts are not anticipated as a result of the proposal (refer to Section 6.7).

The Aboriginal Cultural Heritage Officer for Roads and Maritime Sydney Region has considered the documentation referred to above and provided a response dated 6 March 2015 (refer to Appendix F for details). Roads and Maritime agreed there is no requirement to proceed to Stage 2 of the PACHCI. An Aboriginal Heritage Impact Permit under the *National Parks and Wildlife Act 1974* is not required.

5.4 ISEPP consultation

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities before the start of certain development. Specifically, consultation with the local council is required under the following clauses of the ISEPP:

- **Clause 13**: the proposal would have the potential to impact on council provided infrastructure or services, such as traffic on local roads in the LGA and if road and footpath excavations are required
- **Clause 14**: the proposal would have the potential to cause more than minor or inconsequential impact to a local heritage item (for example, Beecroft Community Centre and Beecroft Public School).

In line with the requirements of Part 2 Division 1 of the ISEPP, Hornsby Shire Council was notified in writing of the proposal on 27 February 2015, with particular reference to potential impacts on council infrastructure and local heritage. No formal ISEPP letter response has been received. Consultation with Hornsby Shire Council has been ongoing as part of the proposal’s development and has been considered in the development of the bridge design and REF, where practicable.

5.5 Government agency and stakeholder involvement

The key stakeholders for the proposal are Hornsby Shire Council and Beecroft Public School. Roads and Maritime has had a number of site meetings with these stakeholders since January 2015 to discuss the proposal and identify key issues to be addressed in design and construction.

Consultation with the stakeholders would continue throughout the detailed design and construction phase.

Meetings were held in April and May 2015 with resident groups including Beecroft-Cheltenham Civic Trust to discuss the proposal and allow members to have their queries addressed by the project team.
5.5.1 Hornsby Shire Council

The following points provide a summary of the feedback and input that has been provided by Hornsby Shire Council during the development of the proposal:

- Consideration should be given to a proposal option that would connect to Beecroft Village Green and the path behind Beecroft Community Centre via a series of pedestrian ramps.

- The proposal should provide some type of connection to Beecroft Village Green.

- Pedestrian safety through the narrow footpath between Beecroft Road and Beecroft Community Centre would need to be considered should this be a key connecting pathway to the bridge.

- Beecroft Village Green is a significant heritage area.

- Potential impacts to local heritage and tree clearing should be considered during the detailed design and environmental assessment. In particular consideration to be given to the environmentally significant trees within the park and protection of retained trees during construction.

- How will vehicles be controlled in the park while retaining safe pedestrian access within the park.

- The final bridge design should not be too close to Beecroft Community Centre to avoid impacting on the routine and special event requirements of the centre.

- Council is looking to construct a car park on the northern side of the Community Centre. The use of this area as a potential compound site could be timed to allow for the construction of the car park after the construction of the bridge.

The feedback received from Hornsby Shire Council has been carefully considered during the detailed design and development of this REF, in particular this feedback was influential in selecting the final location of the bridge, the bridge appearance as well as a number of construction details such as access and compound site locations.

5.6 Ongoing or future consultation

Community consultation will continue throughout the development of the detailed design and during construction. Consultation activities will include:

- Proposal information provided through the proposal website:

- Continuation of consultation with Hornsby Shire Council would be ongoing, particularly regarding the proposal's impact on heritage, landscape and public open space in Beecroft Village Green.

- Bus providers, including Hillsbus and Transdev-Shorelink, would be consulted prior to commencement of construction activities and informed of changes to bus stop access and traffic on Beecroft Road.
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 the factors specified in the guidelines *Is an EIS required?* (DUAP 1999) and *Roads and Related Facilities* (DUAP 1996) as required under clause 228(1)(b) of the *Environmental Planning and Assessment Regulation 2000*. The factors specified in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* are also considered in Appendix A. Site-specific safeguards are provided to mitigate the identified potential impacts and these are listed in Section 7 of this REF.

6.1 Traffic and transport

6.1.1 Existing environment

Beecroft Road is a two lane dual directional road next to the proposed bridge (the proposal area). Along each side of the kerb are concrete pedestrian footpaths. On the western footpath, a pedestrian safety fence separates the footpath from the road. There is a 60 km/h speed limit through the proposal area. No parking or stopping is permitted on either side of the road. There is a dedicated right turn lane from Beecroft Road into Copeland Road east. The intersection of Beecroft Road and Copeland Road to the north of the proposal contains at-grade signalised pedestrian crossings on all legs of the intersection.

Driveway access to Beecroft Public School off Beecroft Road is located within the proposal area. This access is used infrequently for special deliveries and maintenance purposes.

Photo 6-1 and Photo 6-2 below show the existing road environment within the proposal area along Beecroft Road.

Photo 6-1  Existing road environment on Beecroft Road looking south towards the proposed bridge location
Vehicle traffic

Beecroft Road is a major arterial route that extends from Epping north towards Pennant Hills in Sydney’s northern suburbs. About 1.3 km to the south east of the proposal, at the intersection of Beecroft Road and The Boulevard, an average of 31,524 vehicles were recorded using Beecroft Road each day (Roads and Maritime, 2014).

A number of crashes have been recorded along Beecroft Road between Pennant Hills Road and the M2 Motorway. Between July 2003 and June 2013, there were around 200 crashes recorded, equal to an average of one crash every 18 days. At least 28% of these crashes occurred in locations with road characteristics similar to the proposal area. These include near or at intersections, on straight roads or involving collisions with pedestrians or off road objects (Roads and Maritime, 2014).

Pedestrian traffic

Pedestrian movement surveys were carried out on between 22 to 24 October 2014 at the Beecroft Road and Copeland Road intersection and surrounds. The greatest number of pedestrian movements through the proposal area generally occurs during the morning and afternoon week day peak travel periods. The majority of pedestrian movements during these periods were associated with people travelling to and from the areas surrounding Beecroft train station and Beecroft Public School.

At the time of surveys, an average of around 250 pedestrians travelled through the southern signalised pedestrian crossing at the Beecroft Road and Copeland Road intersection in the morning peak. While in the afternoon peak period the average use of this intersection was even higher with around 326 pedestrians crossing the intersection on the southern signalised crossing. Significantly fewer pedestrians were recorded travelling between Beecroft Public School and Beecroft train station via the north eastern corner of the intersection.
6.1.2 Potential impacts

Construction

Construction activities next to Beecroft Road would temporarily impact pedestrian and vehicle traffic movements through the area as noted below.

Pedestrian traffic

Piling work and the installation of the lifts and stairs on the eastern side of Beecroft Road would temporarily impact pedestrian movements along the pedestrian footpath. During this work, access to Beecroft Community Centre and Beecroft Village Green from some directions may be impacted as a result of temporary diversions. Pedestrian detour signs would be established to direct pedestrians to alternative walking routes around the Community Centre and through Beecroft Village Green.

Similarly, pedestrian access along the western side of Beecroft Road would experience temporary impacts during construction, along the footpath next to Beecroft Public School. Temporary hoarding over the existing footpath will be used to retain pedestrian movements where possible.

Vehicle traffic

Traffic along Beecroft Road would be impacted during the installation of the bridge main span. Temporary detours would be established when the full closure of Beecroft Road is required. Closures would be carried out over the course of one night to minimise potential traffic impacts. A Variable Message Sign (VMS) would be installed on site to notify drivers before road closures.

Lane closures would be required on Beecroft Road to facilitate site deliveries such as steel reinforcement and formwork and during concrete pours. Where possible, this work would be carried out outside peak hours to minimise traffic impacts. The community would be notified before lane closures with VMS signs being installed to notify drivers in advance.

Operation

Due to the removal of the southern signalised crossing, the use of the pedestrian bridge would add about 130 m to a pedestrian's journey for those walking along Copeland Road and wishing to cross Beecroft Road. However, pedestrians would also be able to use the pedestrian crossing on the northern side of the intersection as an alternative. The proposed pedestrian fences would be located to restrict pedestrians crossing Beecroft Road unsafely and encourage the use of the bridge. To use the bridge, existing pedestrian behaviour will need to be modified to improve the safety of the crossing. School access from Beecroft Road would be maintained.

Figure 6-1 shows the anticipated pedestrian movements across the proposed pedestrian bridge in the context of local journeys around the Beecroft Town Centre, Beecroft Village Green and Beecroft Public School.
Existing pedestrian crossings to remain

Main pedestrian movement across proposed bridge

Pedestrian crossing to be removed

Figure 6-1 Proposed pedestrian movements through proposal area
6.1.3 Safeguards and management measures

An overview of traffic and transport related safeguards and management measures for the proposal are provided in Table 6-1 below.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency access</td>
<td>Consultation with emergency service authorities would be carried out during development of the detailed design including NSW Rural Fire Service and Fire Rescue.</td>
<td>Downermouchel</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>Access</td>
<td>Vehicular property access would be maintained during construction, especially for Beecroft Public School.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>
| Pedestrian and cyclists | • Pedestrian access is to be maintained along Beecroft Road and through Beecroft Village Green throughout construction  
  • Pedestrian detours from existing footpaths may be required during some construction activities  
  • Provision of signage such as Variable Message Signs (VMS) outlining pedestrian and cyclist diversion routes would be displayed during construction  
  • There will be advance notification of any construction work that affects pedestrians and cyclists. | Construction contractor | Pre-construction, construction |
| Public transport  | Access to bus stops along Beecroft Road would be maintained during construction.         | Construction contractor | Construction             |

6.2 Noise and vibration

6.2.1 Existing environment

The proposal area is surrounded by a mix of residential, commercial, community and educational land uses. The nearest residential receivers are around 60 m to the north of the proposed bridge location at the intersection of Copeland Road, with additional residential receivers around 110 m to the east across the rail corridor. Table 6-2 shows a summary of the closest sensitive receivers surrounding the proposal.

<table>
<thead>
<tr>
<th>Item number</th>
<th>Address</th>
<th>Receiver type</th>
<th>Distance from proposed bridge (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beecroft Public School</td>
<td>School</td>
<td>Adjacent</td>
</tr>
<tr>
<td>2</td>
<td>Beecroft Community Centre</td>
<td>Varies*</td>
<td>Adjacent</td>
</tr>
<tr>
<td>3</td>
<td>Beecroft Village Green</td>
<td>Active/passive recreation</td>
<td>30 m</td>
</tr>
<tr>
<td>4</td>
<td>88 Beecroft Road</td>
<td>House</td>
<td>60 m</td>
</tr>
<tr>
<td>Item number</td>
<td>Address</td>
<td>Receiver type</td>
<td>Distance from proposed bridge (approx.)</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------</td>
<td>-------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>5</td>
<td>Beecroft Fire Station</td>
<td>Commercial</td>
<td>80 m</td>
</tr>
<tr>
<td>6</td>
<td>137 Copeland Road East</td>
<td>Residential</td>
<td>150 m</td>
</tr>
<tr>
<td>7</td>
<td>136 Copeland Road East</td>
<td>Residential</td>
<td>140 m</td>
</tr>
<tr>
<td>8</td>
<td>100 Beecroft Road (Vintage Cellars)</td>
<td>Commercial</td>
<td>150 m</td>
</tr>
</tbody>
</table>

*Community hall hired for mixed use (e.g. seminars, functions, dances).

Within the proposal area, noise levels are largely influenced by traffic on Beecroft Road and Copeland Road. Unattended noise monitoring was carried at a single sensitive receiver location at 129 Copeland Road over one week during February 2015. This is considered representative of the typical receivers located within the surrounding traffic-influenced noise environment.

Table 6-3 provides a summary of the daily noise measurement profile at the noise monitoring location. The rating background level (RBL) in the table is the median of the $10^{th}$ percentile background ($L_{A90}$) noise levels and is used to establish the construction noise management level (NML). The $L_{A1}$ and $L_{Aeq}$ levels provide additional information on the existing noise environment.

Background noise levels reduce during the evening into the night reflecting the intermittent traffic flows at this time.

**Table 6-3 Summary of monitoring results – environmental noise descriptors (dB(A))**

<table>
<thead>
<tr>
<th>Description</th>
<th>Day $L_{A1}$</th>
<th>Day $L_{Aeq}$</th>
<th>Day RBL</th>
<th>Evening $L_{A1}$</th>
<th>Evening $L_{Aeq}$</th>
<th>Evening RBL</th>
<th>Night $L_{A1}$</th>
<th>Night $L_{Aeq}$</th>
<th>Night RBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>129 Copeland Road</td>
<td>77</td>
<td>62</td>
<td>50</td>
<td>72</td>
<td>60</td>
<td>45</td>
<td>75</td>
<td>57</td>
<td>33</td>
</tr>
</tbody>
</table>

Figure 6-2 provides an overview of noise sensitive receivers and the noise monitoring location within the proposal area.
Figure 6-2 Noise monitoring location and nearby sensitive receivers
6.2.2 Criteria

The NSW Environment Protection Authority’s (EPA) *Interim Construction Noise Guidelines* (ICNG) provides recommendations on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving specific noise levels.

Table 6-4 sets out NMLs that would apply at a residential property boundary most exposed to construction noise, at a height of 1.5 m above ground level. However, noise levels may be higher at the upper floors of the noise affected residence.

Where out of hours work extends into the night time period, consideration of sleep disturbance for residential receivers is necessary. The potential for sleep disturbance can be assessed by considering the maximum noise emissions from nearby construction activities against the existing background noise levels at a given location. The general assessment criterion for sleep disturbance for the proposal is:

- \( L_{A_{\text{max}, \text{construction}}} = RBL + 15 \text{ dB(A)} \)

### Table 6-4 Construction noise management levels at residential properties (NMLs)

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Management level ( L_{A_{\text{eq}} (15 \text{ min})} )</th>
<th>How to apply construction noise management levels at a residential property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended standard hours</td>
<td>Noise affected ( RBL + 10 \text{ dB} )</td>
<td>The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured ( L_{A_{\text{eq}} (15 \text{ min})} ) is greater than the noise affected level, Downermouchel should apply all feasible and reasonable work practices to meet the noise affected level. Downermouchel should inform all potentially impacted residents of the nature of the work to be carried out, the expected noise levels and the duration, as well as providing contact details in case of complaint.</td>
</tr>
</tbody>
</table>
| Monday to Friday 7 am to 6 pm                    | Highly noise affected \( 75 \text{ dB(A)} \)             | The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:
1. Times identified by the community when they are less sensitive to noise (such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences
2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times. |
| Saturday 8 am to 1 pm                            |                                                          |                                                                              |
| No work on Sundays or public holidays            | Noise affected \( RBL + 5 \text{ dB} \)                 | A strong justification would typically be required for work outside the recommended standard hours. Downermouchel should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise level. |
| Outside recommended standard hours               |                                                          |                                                                              |
### Time of day

<table>
<thead>
<tr>
<th>Management level $L_{A_{eq}}$ (15 min)</th>
<th>How to apply construction noise management levels at a residential property</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>affected level. Downermouchel should further consult with the community.</td>
</tr>
</tbody>
</table>

Table 6-5 sets out NMLs that would apply at a non-residential property boundary most exposed to construction noise, at a height of 1.5 m above ground level. Noise levels may be higher at the upper floors of a noise affected residence.

**Table 6-5  Noise at sensitive land uses (non-residents)**

<table>
<thead>
<tr>
<th>Land use</th>
<th>Noise assessment location</th>
<th>Noise management level $L_{A_{eq.15min}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classrooms at schools and other educational institutions</td>
<td>Internal</td>
<td>45</td>
</tr>
<tr>
<td>Hospitals and operating theatres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Places of worship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active recreation areas</td>
<td>External</td>
<td>65</td>
</tr>
<tr>
<td>Passive recreation areas</td>
<td>External</td>
<td>60</td>
</tr>
<tr>
<td>Community centres</td>
<td>Dependent on intended use</td>
<td>Maximum internal levels recommended in AS2107 for specific use</td>
</tr>
<tr>
<td>Industrial premises</td>
<td>External</td>
<td>75</td>
</tr>
<tr>
<td>Office, retail outlets</td>
<td>External</td>
<td>70</td>
</tr>
<tr>
<td>Other noise sensitive businesses</td>
<td>Investigation to determine suitable noise levels on project-by-project basis</td>
<td></td>
</tr>
</tbody>
</table>

### 6.2.3 Potential impacts

**Construction**

Construction noise impacts are unavoidable due to the nature of the work required to construct the proposed bridge. Table 6-6 and Table 6-7 show a summary of predicted noise levels at surrounding receivers during construction.

Beecroft Public School and Beecroft Community Centre are expected to experience noise levels in excess of the NML, due to their close proximity to the work. Clearing, earthwork and piling activities would generate the most construction noise.

The risk of adverse impacts on other receivers, including nearby residences on Copeland Road and Beecroft Road is expected to be lower due to the distance of these locations from the works, with predicted noise levels lower than the daytime NMLs for these locations.

Night work is expected to exceed the night NML at several nearby receivers. Noise predications for work at night should be interpreted having regard to the existing noise environment at those receiver locations. Measured noise on Beecroft Road and Copeland Road resulted in $L_{A1}$ levels of 75 dB(A). This is higher than the predicted construction noise level. Hence, while consideration should be given to potential night time noise impacts during construction, the risk of noise disturbance from night time work is considered low as residential receivers are currently exposed to significant road noise during the night.
Night work would be intermittent with no more than two nights in a row or six nights of work in a month, as such works could be carried out in accordance with Practice Note VII.
### Table 6-6  Predicted $L_{Aeq(15 \text{ minute})}$ noise levels at representative receivers

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Address</th>
<th>Receiver type</th>
<th>Noise management level</th>
<th>Noise level - $L_{Aeq(15 \text{ minute})}$</th>
<th>Predicted level by activity</th>
<th>Compound (Area 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day</td>
<td>Evening</td>
<td>Night</td>
<td>Clearing</td>
</tr>
<tr>
<td>1</td>
<td>Beecroft Public School</td>
<td>School</td>
<td>65*</td>
<td>N/A</td>
<td>N/A</td>
<td>78</td>
</tr>
<tr>
<td>2</td>
<td>Beecroft Community Centre</td>
<td>Varies</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>73</td>
</tr>
<tr>
<td>3</td>
<td>88 Beecroft Road Residential</td>
<td></td>
<td>60</td>
<td>50</td>
<td>38</td>
<td>56</td>
</tr>
<tr>
<td>4</td>
<td>Beecroft Fire Station</td>
<td>Commercial</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>57</td>
</tr>
<tr>
<td>5</td>
<td>137 Copeland Road Residential</td>
<td></td>
<td>60</td>
<td>50</td>
<td>38</td>
<td>54</td>
</tr>
<tr>
<td>6</td>
<td>136 Copeland Road Residential</td>
<td></td>
<td>60</td>
<td>50</td>
<td>38</td>
<td>55</td>
</tr>
<tr>
<td>7</td>
<td>Beecroft Village Green</td>
<td>Active/passive recreation</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>8</td>
<td>100 Beecroft Road (Vintage Cellars)</td>
<td>Commercial</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>52</td>
</tr>
</tbody>
</table>


*Bold italicised* results indicate night work.
Table 6-7 Predicted $L_{A1}(1 \text{ minute})$ noise levels at representative residential receivers

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Address</th>
<th>Receiver type</th>
<th>Noise level – $L_{A1}(1 \text{ minute})$</th>
<th>Predicted level by activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sleep disturbance screening criterion</td>
<td>Night</td>
<td>Clearing</td>
</tr>
<tr>
<td>3</td>
<td>88 Beecroft Road</td>
<td>Residential</td>
<td>48</td>
<td>61</td>
</tr>
<tr>
<td>5</td>
<td>137 Copeland Road</td>
<td>Residential</td>
<td>59</td>
<td>58</td>
</tr>
<tr>
<td>6</td>
<td>136 Copeland Road</td>
<td>Residential</td>
<td>60</td>
<td>59</td>
</tr>
</tbody>
</table>

*Bold italicised* results indicate night work
Vibration

The proposed work has limited potential to cause vibration impacts at nearby residential receivers. This is due to the scale of vibration intensive equipment and the distance between the work site and the nearest residential receivers. A small amount of vibration would be generated by the bored piling rig. Predicted safe working distances for this equipment are summarised in Table 6-8.

It is unlikely that human comfort criteria would be exceeded at the nearest residential receivers at night. However, vibration monitoring is recommended during piling due to the close proximity of Beecroft Public School and Beecroft Community Centre to the construction site.

Table 6-8 Approximate generated vibration levels for a jackhammer

<table>
<thead>
<tr>
<th>Plant item</th>
<th>Rating/description</th>
<th>Safe working distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cosmetic damage (British Std 7385)</td>
</tr>
<tr>
<td>Vibratory roller</td>
<td>&lt;50 kN (typically 1-2 t)</td>
<td>5 m</td>
</tr>
<tr>
<td></td>
<td>&lt;100 kN (typically 2-4 t)</td>
<td>6 m</td>
</tr>
<tr>
<td></td>
<td>&lt;200 kN (typically 4-6 t)</td>
<td>12 m</td>
</tr>
<tr>
<td></td>
<td>&lt;300 kN (typically 7-13 t)</td>
<td>15 m</td>
</tr>
<tr>
<td></td>
<td>&gt;300 kN (typically 13-18 t)</td>
<td>20 m</td>
</tr>
<tr>
<td></td>
<td>&gt;300 kN (&gt; 18 t)</td>
<td>25 m</td>
</tr>
<tr>
<td>Small hydraulic hammer</td>
<td>300 kg – 5 to 12 t excavator</td>
<td>2 m</td>
</tr>
<tr>
<td>Pile boring</td>
<td>≤800 mm</td>
<td>2 m</td>
</tr>
<tr>
<td>Jackhammer</td>
<td>Hand held</td>
<td>1 m</td>
</tr>
</tbody>
</table>

Operation

There would be no discernible change to existing operational traffic noise levels as a result of the project.

6.2.4 Safeguards and management measures

Table 6-9 sets out noise and vibration safeguards and management measures for the proposal.

Table 6-9 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Noise  | A Construction Noise and Vibration Management Plan (CNVMP) would be prepared as part of the Construction Environmental Management Plan (CEMP). This plan would include but not be limited to:  
  • 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). | Downermouchel, Jacobs | Pre-construction |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Management measures to minimise the potential noise impacts from the quantitative noise assessment and for potential work outside of standard working hours (including implementation of <em>EPA Interim Construction Noise Guidelines (DECCW, 2009)</em>).&lt;br&gt;• A risk assessment to determine potential risk for activities likely to affect receivers (for activities carried out during and outside of standard working hours).&lt;br&gt;• Mitigation measures to avoid noise and vibration impacts during construction activities including those associated with truck movements.&lt;br&gt;• A process for assessing the performance of the implemented mitigation measures.&lt;br&gt;• A process for documenting and resolving issues and complaints.&lt;br&gt;• A construction staging program incorporating a program of noise and vibration monitoring for sensitive receivers.&lt;br&gt;• A process for updating the plan when activities affecting construction noise and vibration change.&lt;br&gt;• Identify in toolbox talks where noise and vibration management is required.</td>
<td>Downermouchel</td>
<td>Construction</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>Locate compressors, generators, pumps and any other fixed plant as far from residences as possible and behind site structures.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Noise</td>
<td>Alternatives to reversing alarms would be considered for site equipment subject to WHS compliance requirements and risk assessments.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Noise</td>
<td>Vehicle delivery times would be scheduled where feasible to the recommended construction hours to minimise noise impacts. However, due to the high number of vehicles using Beecroft Road, most large deliveries would be out of standard construction hours to minimise the impact to traffic and work within approved ROL’s.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Noise</td>
<td>Any out of hours work would comply with G36M community notification requirements and the mitigation measures specified within the Roads and Maritime Noise Management Manual – Practice Note VII.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Noise</td>
<td>During work hours, a community liaison phone number and site contact would be provided to enable complaints to be received and responded to.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Noise</td>
<td>Training provided to all project personnel, including relevant sub-contractors, on noise and vibration requirements through inductions and toolbox talks.</td>
<td>Downermouchel</td>
<td>Pre-construction, construction</td>
</tr>
<tr>
<td>Noise</td>
<td>Consider installing temporary noise screens around work site when noisy work are next to Beecroft Public School.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Vibration</td>
<td>Building condition surveys would be carried out for buildings identified in the CNVMP, notably Beecroft Community Centre and Beecroft Public School. A copy of the report would be sent to the landholder.</td>
<td>Downermouchel</td>
<td>Construction</td>
</tr>
<tr>
<td>Vibration</td>
<td>Vibration monitoring to be carried out during piling and where complaints about vibration received.</td>
<td>Downermouchel, Jacobs</td>
<td>Construction</td>
</tr>
<tr>
<td>Vibration</td>
<td>Where human comfort vibration guidelines are exceeded, the management measures are to be reviewed and are to consider alternate equipment and construction methodologies.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Vibration</td>
<td>Where vibration criteria specific to structural damage are exceeded during monitoring, work would cease immediately and alternative construction methods would be used.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Community</td>
<td>Potentially noise affected receivers should be notified at least five days before any site work begins. Information provided would include:</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>• The types of activities to be carried out.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The timing of activities including expected start and finish.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Details of the community information line and how to make an inquiry and/or complaint.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6.3 Landscape character and urban design

A Landscape Character and Visual Impact Assessment was prepared for the proposal by Tract Consultants. A copy of this assessment is provided in Appendix D and a summary is provided below.

#### 6.3.1 Methodology

The assessment methodology has included both a landscape character assessment of the proposal area and surrounds and a visual impact assessment of relevant...
viewpoints.

The proposal has been assessed in terms of its impacts on the existing landscape character zones and the impact ranked in terms of its sensitivity to change. Landscape character assessment differs from a visual assessment in that it assesses the overall impact of a proposal on an area’s character and sense of place.

The landscape character assessment involved:

- Categorising the local landscape into landscape character zones of similar spatial or visual character properties
- Analysing the anticipated changes to these zones as a result of the proposal
- Quantifying these impacts in terms of sensitivity to change and the magnitude of the proposals impact using the assessment matrix show in Figure 6-3 and landscape character zones are shown in Figure 6-4.

Visual impact assessment helps define the day to day visual effects of a proposal on people’s views. The visual impact assessment involved:

- Defining the scale of the proposal including reviewing land use, vegetation and topography within the surrounding area
- Identification of key visual envelopes, viewpoints and groups of viewpoints from which the proposal is visible (refer to Figure 6-5)
- Assessment of the level of impact on the proposed viewpoints from the proposal in terms of its sensitivity to change and the magnitude of the proposal’s impact using the assessment matrix show in Figure 6-3.

An urban design concept and mitigation strategy was developed which discusses how the impacts of the proposal would be managed, refer to Section 6.3.4.

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Negligible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High Impact</td>
</tr>
<tr>
<td></td>
<td>High - Moderate</td>
</tr>
<tr>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Moderate - Low</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Moderate - Low</td>
</tr>
<tr>
<td>Negligible</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

**Figure 6-3** Landscape character and visual impact assessment matrix
6.3.2 Existing environment

North

To the north of Copeland Road lies the primary commercial precinct of the Beecroft town centre and adjoins Beecroft train station. This area forms a community hub and is a focus for local community activity. Development in this zone is varied and the built form is broken up by car parking areas. Future redevelopment of this zone is guided by the Hornsby Development Control Plan (DCP) 2013. This area is currently zoned B2 – Local Centre under the Hornsby LEP 2013.

To the north of the proposal at the intersection of Beecroft Road and Copeland Road lies the local heritage listed Beecroft Community Centre, which dates back 1904, (formerly the School of Arts), and dominates the view of the reserve from the north.

East and south

East of the proposal is Beecroft Village Green, a community park zoned RE1 – Public Recreation in the Hornsby LEP 2013. This area is characterised by tall native trees including mature Eucalypts with a grass understorey. At the southern end of the reserve a playground and tennis court complex provides a more open character. Also set within Beecroft Village Green, along the Copeland Road frontage is the War Memorial commemorating David John Willis’ involvement in the Boer War.

West

To the west of the proposal is mainly land zoned as R2 – Low Density Residential in the Hornsby LEP 2013. Much of the existing development within this zoning comprises large residential properties, mainly single storey, and set within leafy gardens.

Beecroft Public School is located immediately west of the proposal and is typically composed of two storey brick buildings dating from the 1960’s and 1970’s along the Beecroft Road frontage with the original 1897 school building set back beyond.

Landscape character

To assess the potential impacts to the existing landscape character surrounding the proposal, it is necessary to first understand the existing landscape character of that area. Five distinct landscape character zones have been identified within the area surrounding the proposal, these include:

- Zone 1 – Beecroft town centre
- Zone 2 – Northern residential precinct
- Zone 3 – Beecroft Public School
- Zone 4 – Southern residential precinct
- Zone 5 – Beecroft Village Green.

Figure 6-4 provides an overview of the landscape character zones surrounding the proposal.
Figure 6-4 Landscape character zones
Character Zone 1 – Beecroft town centre

This zone is located next to Beecroft train station, running from north of Hannah Street and bounded by Wongala Crescent and Beecroft Road. This is the commercial hub of Beecroft. Several at-grade car parking areas have been provided which break up the mass and distribution of this built up area. A cohesive character along Hannah Street is achieved in the streetscape through use of ornamental pear trees as street tree planting. Beecroft Road also provides a commercial frontage along its eastern edge with some commercial and retail premises present.

Character Zone 2 – Northern residential precinct

Located north of Copeland Road, west of Beecroft Road this precinct consists of two distinct characters:

- Beecroft Road has seen a degree of development occur. The built form consists of a mix of heritage homes (a number of listed properties are located near the intersection of Copeland Road and Beecroft Road), a church, and several unit developments from the 1970’s to 1990’s. All development has a common setback to allow for the establishment of a vegetated buffer.

- Copeland Road has a more traditional suburban scale of development which is mainly influenced by stands of vegetation. Copeland Gardens Nursing home is located west of the Beecroft Road intersection and introduces a modern two storey frontage to the otherwise period street.

Character Zone 3 – Beecroft Public School

Beecroft Public School is next to Beecroft Road with access primarily off Copeland Road or Mary Street. The school buildings along this frontage are a mix of two storey brick buildings from the 1960’s and 1970’s. Along Mary Street a more residential character is presented with the original heritage school buildings and an established tree canopy. To the west of these buildings is a playing field which provides a green buffer to the adjoining residential dwellings.

Character Zone 4 – Southern residential precinct

Located south of Mary Street, this residential precinct comprises the southernmost part of the study area. Similar to the northern residential precinct, there is a mix of heritage and modern residential buildings. The landscape set back of these properties plays an important role in establishing the leafy character of the suburb.

Character Zone 5 – Beecroft Village Green

Beecroft Village Green is located south of Copeland Road. Next to Beecroft Village Green are the rail corridor, Beecroft Road, The Crescent and the proposal. This zone includes the Beecroft Community Centre which provides a connection to other built infrastructure in adjacent zones. The zone provides a strong green edge along Beecroft Road, which reinforces the vegetated nature of the suburb.

6.3.3 Potential impacts

Landscape character

The outcomes of the landscape character assessment are presented in Table 6-10 below. The proposal would not result in a substantial change in the overall landscape character of the local area in which the pedestrian bridge is proposed. The proposal would result in an overall landscape character impact of low – moderate.

Beecroft Road is the primary feature that influences the character of the surrounding landscape. The nearby Beecroft Village Green and Beecroft Public School either side of Beecroft Road provide a visual balance next to the busy road corridor. While the
construction of a new bridge structure would be noticeable, its location within a major arterial road corridor ensures the overall character of the road environment is maintained. The proposed bridge design has carefully considered the local landscape character environment in regards to its external appearance and any proposed landscaping. A range of mitigation measures are discussed further in Section 6.3.4.
### Table 6-10 Summary of landscape character assessment

<table>
<thead>
<tr>
<th>Character zone</th>
<th>Sensitivity</th>
<th>Effect on Beecroft town centre</th>
<th>Magnitude</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1 – Beecroft town centre</td>
<td>Low</td>
<td>The relatively incoherent character of this zone and its use as a commercial precinct gives the Beecroft town centre a low sensitivity to change. The mix of several built forms and materials used within the precinct further reinforces this conclusion. This character zone is also largely removed from the proposed bridge location.</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Zone 2 – Northern residential precinct</td>
<td>High</td>
<td>As a residential precinct, sensitivity is considered high. In this instance, those properties closest to the proposal are in part also heritage listed, which has been considered in its high sensitivity listing.</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Zone 3 – Beecroft Public School</td>
<td>Moderate</td>
<td>Vegetation surrounding the school provides a sense of separation from the busy Beecroft Road. Provided this buffer is retained the sensitivity of the school to the proposed change created by the new bridge would be reduced. The proposal requires some acquisition of school lands and some vegetation removal. The sensitivity is considered moderate.</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Zone 4 – Southern residential precinct</td>
<td>Low</td>
<td>The distance from the southern residential precinct to the proposal and the limited exposure of much of this zone means this precinct has a low sensitivity to</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

The distance of the proposal varies from 100 to 300 m to the northern residential precinct. Several of the sites are screened by vegetation or landscaped setbacks located behind a wall which is commonplace along Beecroft Road. The scale of the proposal in relation to these attributes is considered to have a low impact.

The distance of the proposal varies from 100 to 300 m to the northern residential precinct. Several of the sites are screened by vegetation or landscaped setbacks located behind a wall which is commonplace along Beecroft Road. The scale of the proposal in relation to these attributes is considered to have a low impact.

The southern residential precinct is located a minimum 150 m from the proposal’s location and would have limited visual connectivity with the...
<table>
<thead>
<tr>
<th>Character zone</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 5 – Beecroft Village Green</td>
<td>High</td>
<td>Low – Moderate&lt;br&gt;Beecroft Village Green contributes significantly to the character of the road and the suburb as a whole. It is considered as highly sensitive to any development along its frontage.</td>
<td>Moderate – High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>proposal. The magnitude of its impact is considered low.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Visual impacts

Generally the proposal would result in low to moderate visual impacts. The proposal’s scale and the enclosure of the proposal area by existing and proposed landscaping indicate that visual impacts are relatively contained or absorbed within the surrounding landscape. This reflects the nature of the corridor, within a heritage precinct, adjoining a mix of commercial, residential, educational and recreational facilities and the corridor’s relative ability to absorb change. Table 6-11 summarises the findings from the visual impact assessment for each viewpoint.

Figure 6-5 provides an overview of the visual envelope and key viewpoints surrounding the proposal.
Figure 6-5   Visual envelope and viewpoints
### Visual impact assessment summary

<table>
<thead>
<tr>
<th>View point</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewpoint 1</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Viewpoint 1 looks down Beecroft Road towards Beecroft Village Green from the frontages of commercial/retail properties north of the proposal. The proposal occurs in the mid ground some 150 m from the viewer with a backdrop of vegetation. The furniture and the activity of the road dominate the foreground and consequently the view.

- **Sensitivity**: Low
  - Sensitivity has been assessed as low due to the distance to the proposal, the activity within the corridor and the proposal not impinging on the skyline.
- **Magnitude**: Low
  - The magnitude of the proposal on the view is low.
Viewpoint 2

Viewpoint 2 looks down Beecroft Road towards the proposal from the intersection of Beecroft Road and Copeland Road. This view captures what is experienced by a road user or pedestrian passing through the intersection north of the proposal, including the Beecroft Community Centre. The margins of the road are flanked by trees with the bridge structure to be set within the trees. This restricts views of the stairs and lift shafts.

**Moderate**

Sensitivity is low due to the distance to the proposal, the activity within the corridor and the proposal not impinging on the skyline.

**Moderate**

The magnitude of the proposal on the view is moderate as a distinct change is visible within the view field. The nature of the structure has maintained a transparency to the structure, to reduce its dominance.
Viewpoint 3 looks down Beecroft Road towards Beecroft Village Green from the intersection of Beecroft Road and Copeland Road. The margins of the road are flanked by trees with the bridge structure to be set within the trees. This restricts views of the stairs and lift shafts. Views from this location also include the Beecroft Community Centre.

**Moderate**
Sensitivity has been assessed as moderate due to the relative close proximity of the proposal, the activity within Beecroft Road and the proposal not impinging on the skyline.

**Moderate**
The magnitude of the proposal on the view is moderate as it creates a distinct change to the view. The nature of this change while visible is not a substantial change in character or scale.
<table>
<thead>
<tr>
<th><strong>Viewpoint 4</strong></th>
<th><strong>Moderate</strong></th>
<th><strong>Moderate</strong></th>
<th><strong>Moderate</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewpoint 4 is located out the front of the school looking north towards the Beecroft Road and Copeland Road intersection. The view captures the experience of a road user or pedestrian heading north about 50 m from the proposal. Vegetation lines both sides of the corridor and provides a backdrop to the road infrastructure and associated furniture including light poles, fencing etc.</td>
<td>Sensitivity has been assessed as moderate. However, the vegetation within the corridor has the ability to conceal or act as a backdrop to the proposed structure. The presence of the local heritage listed Community Centre within the background increases the sensitivity of this viewpoint.</td>
<td>The magnitude of the proposal on the view is moderate as a distinct change is visible within the view field.</td>
<td></td>
</tr>
</tbody>
</table>

Pedestrian Bridge on Beecroft Road, Beecroft
Review of Environmental Factors
**Viewpoint 5**

Viewpoint 5 looks up Beecroft Road towards Beecroft Public School from the intersection of Welham Street and Beecroft Road. The view provided is that of a road user, pedestrian, or adjoining resident and is located some 200 m from the proposal. The vegetated corridor provides a level of resilience with the corridor to accommodate changes.

<table>
<thead>
<tr>
<th><strong>Low</strong></th>
<th>Sensitivity has been assessed as low due being 200 m away from the proposal, the activity within the corridor and the proposal not impinging on the skyline.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong></td>
<td>The magnitude of the proposal on the view is low. This is due to the distance from the proposal, the relatively small scale of the proposed bridge within the landscape and the general composition of the bridge itself, which is relatively transparent. These factors all combine to reduce its dominance.</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td></td>
</tr>
</tbody>
</table>
**Viewpoint 6**

Viewpoint 6 represents the view from within Beecroft Village Green looking north towards Beecroft Road. This is from the pedestrian link which runs through the park parallel to the rail corridor. Vegetation cover and the topography of the park minimise views to Beecroft Road and dominate the foreground.

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Moderation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**High**

Sensitivity has been assessed as high – due to Beecroft Village Green's primary use for passive recreation and the importance of the vegetation community.

**Low**

The magnitude of the proposal on the view is low. The tree canopy provides a relatively dense screen from within Beecroft Village Green. The structure itself is relatively transparent with the exception of the lift shaft and stairs. Despite the solidity of these elements, the intervening vegetation restricts the views.
### Viewpoint 7

Viewpoint 7 looks up Beecroft Road towards Beecroft Public School and the Copeland Street intersection from the eastern side of Beecroft Road. The view is that of a pedestrian, or park user, heading north, and is 100 m from the proposal. The view illustrates the tree-lined nature of the corridor and the dominance of the road within this landscape.

<table>
<thead>
<tr>
<th><strong>Moderate</strong></th>
<th><strong>Moderate</strong></th>
<th><strong>Moderate</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity has been assessed as moderate. The view is defined by vegetation, which has the capacity to absorb potential changes. A relatively clear view of the sky is available over Beecroft Road from this viewpoint.</td>
<td>The proposal's magnitude on the view is moderate as a distinct change is visible. The bridge would be clearly visible within the mid-ground of the photo. Its impact is moderate due to the relatively transparent nature of the proposed structure.</td>
<td></td>
</tr>
</tbody>
</table>
Viewpoint 8

Viewpoint 8 differs from all other views in that it relates to the relative proximity of the proposed structure to that of the heritage listed Beecroft Community Centre. The view looks west towards Beecroft Road and Beecroft Public School from the rear of the Community Centre. The view is that of a pedestrian, or park user located around 30 m from the proposal. Vegetation dominates the view and filters views to Beecroft Road.

* Viewpoints shown in Figure 6-5
6.3.4 Safeguards and management measures

Table 6-12 sets out mitigation measures and safeguards for the proposal relating to landscape character and visual amenity.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape character and visual impact</td>
<td>When creating site access an arborist would assess any proposal to trim trees to enhance access to ensure form is not interrupted and stability is maintained.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Landscape character and visual impact</td>
<td>Limit vegetation removal, to the absolute minimum required to construct the bridge.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Landscape character and visual impact</td>
<td>Reinstate any disturbed area to the level of finish before construction.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Landscape character and visual impact</td>
<td>The work site would be left in a tidy manner at the end of each work day.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>

6.4 Biodiversity

6.4.1 Methodology

An ecological field investigation was carried out on 22 September 2014 to determine the flora and fauna values, and constraints of the proposal area. Vegetation within the proposal area was surveyed using the random meander technique (Cropper 1993). A review of background information, relevant reports and legislation was carried out as part of the biodiversity assessment (refer to Appendix E).

6.4.2 Policy setting

The potential impacts of the proposal were considered in terms of the following legislation:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Threatened Species Conservation Act 1995* (TSC Act)
- *Native Vegetation Act 2003* (NV Act)

6.4.3 Existing environment

Vegetation within the proposal area includes three broad categories: Sydney Turpentine-Ironbark Forest, planted natives and exotics and exotic grasses.

**Sydney Turpentine-Ironbark Forest**

Within the study area surrounding the proposal, the Sydney Turpentine-Ironbark Forest comprises remnant native trees of a forest structure over mown and maintained grassland. The community is characterised by a canopy of Turpentine, Grey Gum, Grey Ironbark and Sydney Red Gum and scattered remnant Blackbutt
trees. Beneath the remnant trees the understorey comprises mainly exotic grasses and herbaceous weeds including Buffalo Grass, Kikuyu, Fleabane, Catsear and Panic Veldtgrass. Due to the landscape’s location, remnant tree species composition, average rainfall, and soil strata, the community was identified as TSC Act listed endangered ecological community Sydney Turpentine-Ironbark Forest.

**Planted natives and exotics**

The planted natives and exotics within the proposal area and its surrounds are located within the boundary of Beecroft Public School, Beecroft Village Green and Beecroft Community Centre. Species within Beecroft Public School include Magnolia, Jacaranda, Illawarra Flame Tree, Lemon-scented Tea Tree and Lemon-scented Gum. Within Beecroft Village Green and Beecroft Community Centre, species include Water Gum, Turpentine, Tallowood, Sydney Blue Gum and Lilly Pilly.

**Exotic grasses**

The grassed area around Beecroft Community Centre comprises mainly exotic grasses and weeds such as Buffalo Grass, Kikuyu, Fleabane, Catsear and Panic Veldtgrass. This community is highly modified.

**Flora**

No TSC Act or EPBC Act listed threatened flora species were identified within the proposal area and its surrounds during the field investigation, nor is the proposal area considered to provide habitat for any threatened flora previously recorded within a five kilometre search area.

**Fauna**

No TSC Act or EPBC Act listed threatened fauna were identified within the proposal area and its surrounds. The following species were considered moderately likely to opportunistically use resources within the proposal area and its surrounds:

- Glossy black-cockatoo (Vulnerable, TSC Act)
- Swift Parrot (Endangered, TSC Act and EPBC Act)
- Eastern Bentwing-bat (Vulnerable, TSC Act)
- Powerful Owl (Vulnerable, TSC Act)
- Grey-headed Flying Fox (Vulnerable, TSC Act and EPBC Act).

**Weeds**

During the site survey, two NSW Department of Primary Industries listed noxious weeds (Class 4) were identified within the proposal area and its surrounds. The management requirements for each noxious weed species are summarised in Table 6-13.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name</th>
<th>Class</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cinnamomum camphora</strong></td>
<td>Camphor Laurel</td>
<td>4</td>
<td>The growth of the plant must be managed in a manner that reduces its numbers spread and incidence. Management measures must continuously inhibit its reproduction and the plant must not be sold propagated or knowingly distributed.</td>
</tr>
<tr>
<td><strong>Ligustrum lucidum</strong></td>
<td>Small-leaf Privet</td>
<td>4</td>
<td>The growth of the plant must be managed in a manner that reduces its numbers spread and incidence. Management measures must</td>
</tr>
</tbody>
</table>
### Potential impacts

The Sydney Turpentine-Ironbark Forest was considered to meet the TSC Act listing status of an endangered ecological community (EEC). This is based on the landscape’s location, associated soils and canopy type. No indicative species were recorded within the midstorey and understorey strata. For this reason, the Sydney Turpentine-Ironbark Forest was not considered to be representative of an EPBC Act critically endangered ecological community (CEEC).

To consider the significance of impacts to the TSC Act-listed Sydney Turpentine-Ironbark Forest, an assessment of significance was carried out (refer Section 5A of the EP&A Act). The proposal’s potential impacts on the Sydney Turpentine-Ironbark Forest are not significant. As a result, a Species Impact Statement is not required.

Construction of the proposal would only require trimming to one Red Stringybark tree that is part of the Sydney Turpentine-Ironbark Forest within Beecroft Village Green. No other clearing, trimming or potential root zone impacts to canopy species within the mapped Sydney Turpentine-Ironbark Forest would be carried out.

### Construction

Direct impacts would include the removal of vegetation within the planted native, exotics and exotic grasses area. In addition to some exotic grasses the proposal’s construction would require the removal of up to 19 trees, including:

- Five Water Gums within Beecroft Village Green
- One Turpentine within Beecroft Village Green
- Six Lemon-scented Tea Trees within Beecroft Public School
- Two White Cedars within Beecroft Public School
- Two Jacarandas within Beecroft Public School
- One Bottlebrush within Beecroft Public School
- One Lemon-scented Gum Tree within Beecroft Public School
- One Chinese Elm Tree within Beecroft Public School.

In addition to the removal of the above 19 trees, one Red Stringybark tree within the Beecroft Village Green’s Sydney Turpentine-Ironbark Forest area would require trimming to allow for construction activities and construction access into the proposal area on the eastern side of Beecroft Road. Figure 6-6 below provides an overview of the locations of the trees that would be removed as part of the proposal as well as the location of the Red Stringybark tree that would require trimming.
Figure 6-6 Overview of vegetation and ecological communities within the surrounding area
Operation and maintenance

Operation and maintenance of the proposal would not require further tree removal or introduce additional biodiversity impacts beyond those identified for construction. It is possible some potential vegetation trimming may be required to trim overhanging branches in the vicinity of the lift shafts and stairs during the bridge’s lifetime.

6.4.5 Safeguards and management measures

Biodiversity safeguards and management measures are provided in Table 6-14.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity</td>
<td>Biodiversity mitigation measures are to be included within the CEMP. The CEMP is to include (but not be limited to) the following:</td>
<td>Downermouchel, Jacobs</td>
<td>Pre- construction</td>
</tr>
<tr>
<td></td>
<td>• A site walkover with appropriate site personnel including Roads and Maritime representatives to confirm clearing boundaries and sensitive locations before the start of work</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Identification (marking) of the clearing boundary and identification (marking) of habitat features to be protected. Eg. – use of flagging tape</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A map which clearly shows vegetation clearing boundaries and sensitive areas/no go zones</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Incorporation of management measures identified as a result of the pre-clearing walk, completed by Roads and Maritime representatives and the contractor. This should include details of measures to be implemented to protect clearing limits and no go areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A detailed clearing process in accordance with Roads and Maritime Biodiversity Guidelines (2011) including requirements of Guide 1, 2, 4 &amp; 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Identify in toolbox talks where biodiversity would be included such as vegetation clearing or work in or next to sensitive locations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Identify control/mitigations measures to prevent impacts on sensitive locations or no go zones</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A stop work procedure in the event of identification of unidentified species, habitats or populations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Roads and Maritime will provide replacement planting of semi-mature trees in the Village Green to replace the trees which require removal to accommodate the new bridge. Roads and Maritime will finalise the exact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------</td>
<td>----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Weed management</td>
<td>Weed management measures would be developed in accordance with Roads and Maritime Biodiversity Guidelines (Guide 6) and incorporated into the CEMP to manage Camphor Laurel and Small Leaf-Privet.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>Work near the Sydney Turpentine-Ironbark Forest</td>
<td>Where appropriate, exclusion zones (to define temporary access route) and tree protection zones would be implemented to prevent accidental damage to canopy species within the identified Sydney Turpentine-Ironbark Forest. These should be installed with reference to Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects: Guide 2 – Exclusion Zones (RMS 2011).</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Stockpiling spread</td>
<td>Any required stockpiling of materials would be located within the low constraint class area, away from trees and appropriate sediment controls should be put in place to avoid stockpile spread.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>

6.5 Socio-economic

6.5.1 Existing environment

The proposal is located in the suburb of Beecroft north-west of Sydney in the Hornsby Shire LGA. The land use surrounding the proposal mainly comprises residential, educational, public recreation and other local community uses.

Table 6-15 provides a summary of the main demographic characteristics of Beecroft. These are from the Australian Bureau of Statistics 2011 Census data (ABS, 2011).
### Table 6-15  ABS demographic characteristics from 2011 Census

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Beecroft</th>
<th>Greater Sydney</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population (2011)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total population</td>
<td>8,836</td>
<td>4,391,674</td>
<td>6,917,658</td>
</tr>
<tr>
<td>Median age (years)</td>
<td>43</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>Aged 14 years or below</td>
<td>18.5%</td>
<td>19.2%</td>
<td>19.2%</td>
</tr>
<tr>
<td>Aged 65 years or over</td>
<td>14.7%</td>
<td>12.9%</td>
<td>10.2%</td>
</tr>
<tr>
<td><strong>Households and families (2011)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total families</td>
<td>2,483</td>
<td>1,152,548</td>
<td>1,829,552</td>
</tr>
<tr>
<td>Couple families with children</td>
<td>58.3%</td>
<td>48.9%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Couple families without children</td>
<td>31.9%</td>
<td>33.5%</td>
<td>36.6</td>
</tr>
<tr>
<td>One parent families</td>
<td>8.6%</td>
<td>15.7%</td>
<td>16.3</td>
</tr>
<tr>
<td><strong>Income and employment (2011)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median household income ($ per week)</td>
<td>$2,523</td>
<td>$1,447</td>
<td>$1,237</td>
</tr>
<tr>
<td>Labour force participation</td>
<td>51.7%</td>
<td>49.8%</td>
<td>48.2%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>4.1%</td>
<td>5.7%</td>
<td>5.9%</td>
</tr>
<tr>
<td><strong>Travel to work (2011)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car – as driver</td>
<td>53.0%</td>
<td>53.7%</td>
<td>57.6%</td>
</tr>
<tr>
<td>Car – as passenger</td>
<td>2.9%</td>
<td>4.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Public transport</td>
<td>15.0%</td>
<td>20.0%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Walked only</td>
<td>1.8%</td>
<td>4.1%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Average motor vehicles per dwelling</td>
<td>2</td>
<td>1.6</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Analysis of the information in Table 6-15 shows that a large number of the population in the Beecroft area are of an older age group than the median age in Greater Sydney. It is likely that the area contains a higher percentage of retirees and families where children have left home. The use of public transport and walking to work is lower in Beecroft than in Greater Sydney and in NSW overall, with the majority of journeys made in private motor vehicles. The area also has a higher average vehicle ownership.

### Social infrastructure

There are a number of facilities within the proposal area and its surrounds that serve the day-to-day needs of local residents. Local businesses and community facilities to the north of Copeland Road comprise a diverse range of commercial provisions and public services. Beecroft Public school is a primary education facility located to the immediate west of the proposal.

Beecroft Village Green is a community parkland located on the eastern boundary of the proposal. The grassed parkland comprises a variety of trees including remnant natives identified as Sydney Turpentine-Ironbark Forest. There are items of heritage significance scattered throughout the parkland, and facilities that contribute to the
amenity of the parkland, including play equipment, covered seating and toilets.

Beecroft Community Centre is located immediately north of the proposal on the eastern side of Beecroft Road. The building currently serves as a social venue hosting community events. It contributes to the streetscape along Beecroft Road and the character of the area due its federation era architecture.

There is a bus stop located about 30 m to the south west of the proposal, which primarily services Beecroft Public School on the western side of the road corridor. A second bus stop is located on the eastern side of the road corridor about 75 m south of the proposal. Beecroft Railway Station is located about 250 m to the north east.

There are designated pedestrian paths on both the eastern and western side of Beecroft Road. There are no dedicated bike lanes in the vicinity.

**Local facilities and businesses**

The businesses and community facilities listed in Table 6-16 are located within 150 m of the proposal.

**Table 6-16  Businesses and community facilities near the proposal**

<table>
<thead>
<tr>
<th>Facility name</th>
<th>Address</th>
<th>Distance (approximate)</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Beecroft Village Plaza</td>
<td>1A Wongala Crescent</td>
<td>140 m</td>
<td>North</td>
</tr>
<tr>
<td>Vintage Cellars</td>
<td>100 Beecroft Road</td>
<td>150 m</td>
<td>South</td>
</tr>
<tr>
<td>The Beecroft Club</td>
<td>128 Copeland Road</td>
<td>150 m</td>
<td>West</td>
</tr>
<tr>
<td><strong>Community facilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beecroft Community Centre</td>
<td>90-96 Beecroft Road</td>
<td>Adjacent</td>
<td>North</td>
</tr>
<tr>
<td>Beecroft Village Green</td>
<td>90-96 Beecroft Road</td>
<td>Adjacent</td>
<td>South-East</td>
</tr>
<tr>
<td>Beecroft Public School</td>
<td>98 Beecroft Road</td>
<td>Adjacent</td>
<td>West</td>
</tr>
<tr>
<td>Beecroft Fire Station</td>
<td>109-111 Beecroft Road</td>
<td>90 m</td>
<td>North</td>
</tr>
<tr>
<td>Beecroft Uniting Church</td>
<td>82 Beecroft Road</td>
<td>140 m</td>
<td>North</td>
</tr>
</tbody>
</table>

*indicates group of commercial businesses

Some of the businesses listed in Table 6-16 are accessed directly off Beecroft Road and may depend primarily on local patronage from customers travelling by car and foot.

**Local residences**

A large number of private residences use Beecroft Road or Copeland Road for access to their properties. Within 500 m of the proposal around 63 private residences rely on Beecroft Road for access while around 54 private residences rely on Copeland Road for property access.

**6.5.2 Potential impacts**

The proposal has the potential to provide improved road safety and traffic flow along part of Beecroft Road. The proposal would also result in some impacts and changes to the existing socio-economic environment for nearby communities and businesses.
Construction

Potential socio-economic impacts during construction are summarised below.

Access and Connectivity

These include:

- Potential for temporary changes to access for pedestrians and users of Beecroft Community Centre, Beecroft Village Green and Beecroft Public School
- Temporary interruption to the operation of two bus stops along Beecroft Road south of the proposal (next to Beecroft Village Green and Beecroft Public School) and bus route schedules from possible traffic delays during construction. Existing bus stop operation would be maintained during construction
- Potential for temporary traffic congestion and travel delays during lane closures required over the construction period.

The impacts described above would be managed during the indicative eight month construction period. The construction of the proposal would not result in any impacts to driveways to residential properties.

Amenity

The proposal would affect the visual character of the immediate area particularly during construction. The most sensitive receivers in the proposal area are Beecroft Village Green, Beecroft Public School and Beecroft Community Centre. These areas are considered sensitive due to their use as passive recreation areas and as a local heritage-listed community centre. The presence of remnant native vegetation within Beecroft Village Green including Sydney Turpentine-Ironbark Forest emphasises the amenity value this area has in the community.

During construction the visual amenity of both sides of Beecroft Road would be affected by the presence of construction plant, equipment, materials and activities. Due to the temporary nature of construction, these impacts are considered minor. Signage would be provided during construction outlining the program of work and the safety and potential traffic flow benefits. This information would help in providing a justification for the work to interested stakeholders.

Refer to Section 6.3 for discussion on the overall impacts to visual amenity.

Construction may result in potential amenity impacts for local residents and community members located close to Beecroft Road. In particular, construction noise and vibration and minor air quality impacts may result from some temporary construction activities. In addition to site controls, a community notification process would be put in place to advise the local community about the type, timing and potential impact of the bridge work.

Refer to Section 6.2.3 for further discussion on potential noise and vibration impacts.

Operation

Construction of the proposed bridge would be carried out mainly within the existing road reserve noted as ‘SP2 Infrastructure’ in addition to land zoned as ‘RE1 Public Recreation’ and ‘R2 Low Density Residential’ in the Hornsby LEP, 2013.

Construction of the proposed bridge would not introduce any land use change, although some minor property acquisition would be required to enable development to take place outside the existing road reserve.

Access and Connectivity

The proposal would restrict pedestrian movement across Beecroft Road (south of the
Beecroft Road and Copeland Road intersection) through the closure of an existing pedestrian crossing and the installation of pedestrian fences. The proposal would change pedestrian movements and travel times, as the lift and stair crossing point is around 50 m south of the existing at-grade signalised intersection.

**Visual amenity**

The existing visual amenity of the area would by permanently altered by the introduction of a pedestrian bridge across Beecroft Road, including lift shafts, stair wells and roof. Construction of the main bridge elements on the eastern and western sides of Beecroft Road would also require the removal of up to 19 trees from within Beecroft Village Green and Beecroft Public School.

The existing trees within Beecroft Public School add to the scenic quality of the school grounds and provide a visual screen between the school and road. The removal of some of this intervening vegetation would result in a minor visual change for passing road users. Some level of change would also be experienced by school users looking towards Beecroft Road from windows along the eastern façade of the main building. Several trees within the school grounds in close proximity to the proposal would be retained. The retention of these trees and proposed landscaping activities would soften the visual impact of the proposal along the western side of Beecroft Road.

The impact of removing up to six trees within Beecroft Village Green would generally be absorbed by the overlapping canopy of adjoining trees. The assessment in Section 6.3.3 indicates visual amenity impacts within Beecroft Village Green are likely to be moderate, which takes account of the new structural elements and requirement for some tree removal.

In summary, the proposal may affect the amenity of the area for local businesses and residents during the eight month construction period. There would be low to moderate visual changes to the existing road reserve and streetscape. There would also be changes in views along Beecroft Road as a result of the removal of some limited areas of vegetation and due to the construction of new bridge related elements. Once constructed, there would be no perceivable noise impacts for residents. No long term socio-economic effects are anticipated once the pedestrian bridge is operational.

6.5.3 Safeguards and management measures

The proposed safeguards and management measures for socio-economic impacts are listed in Table 6-17. Refer to Section 6.2.4 for noise and vibration management measures and Section 6.3.4 for visual impact management measures.
### Table 6-17 Socio-economic safeguards and mitigation measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Local amenity and social infrastructure | A communication plan would be prepared and included in the CEMP. The communication plan would include:  
  - Requirements to provide details and timing of proposed construction activities to affected residents as well as:  
    - Local businesses  
    - Sydney Buses  
    - Sydney Trains  
    - Beecroft Public School  
    - Beecroft Community Centre  
    - Beecroft and Cheltenham Civic Trust  
    - Hornsby Shire Council.  
  - Contact name and number for complaints  
  - Procedure to notify nearby land users for changed conditions during the construction period such as traffic, pedestrian or driveway access.  
  The communications plan would be prepared in accordance with G36M requirements and Roads and Maritime Community Engagement and Communications Manual (2012).  
  The communications plan would include a complaint handling procedure and register and maintained for the duration of the proposal. | Downermouchel, Jacobs | Pre-construction and construction |
| Access                                | Road users, pedestrians and cyclists would be informed of changed road conditions, including likely disruptions to access during construction. | Construction contractor | Construction                 |
| Utilities                              | Notification to affected businesses and residents would be required in advance of any utility disruptions. | Construction contractor | Construction                 |
| Visual amenity                         | Where appropriate, fencing with material attached (eg hoarding) would be provided around the construction compounds and other areas to screen views of the construction compounds and reduce noise impacts. | Construction contractor | Construction                 |
6.6 Non-aboriginal heritage

6.6.1 Existing Environment

The following searches of heritage databases were carried out on 10 February 2015:

- NSW Heritage online database which includes heritage items listed under the State Heritage Register, s.170 register and LEPs. The search was carried out for the Hornsby Shire Council LGA.
- Schedule 5 (Environmental Heritage) of the Hornsby Local Environmental Plan 2013 (LEP)
- The Australian Heritage database. A search was carried out for the Hornsby Shire Council LGA.

The result of the above searches found there are no listed sites of State Heritage or National Heritage significance within 100 m of the proposal.

The proposal is located within an area listed as the Beecroft, Cheltenham Heritage Conservation Area in the Hornsby LEP, 2013 (Heritage Conservation Area). The aims of the conservation area are to preserve the cultural and environmental heritage of the community.

There are a number of items which are listed for heritage conservation within Schedule 5 of the Hornsby LEP 2013. Table 6-18 provides a summary of these heritage listings. Figure 6-7 provides an overview of all local heritage listings surrounding the proposal.

Table 6-18  Items of non-aboriginal heritage near the proposal

<table>
<thead>
<tr>
<th>Item number</th>
<th>Description</th>
<th>Address</th>
<th>Distance from proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>Beecroft Village Green, Boer War Memorial, World War I and II Memorials</td>
<td>111X Beecroft Road</td>
<td>Nil.</td>
</tr>
<tr>
<td>49</td>
<td>Beecroft Public School (excluding grounds)</td>
<td>90-96 Beecroft Road</td>
<td>Beecroft Road</td>
</tr>
<tr>
<td>53</td>
<td>Beecroft Community Centre</td>
<td>111 Beecroft Road</td>
<td>~20 m (north)</td>
</tr>
<tr>
<td>142</td>
<td>Beecroft Railway Station and Garden</td>
<td>Wongala Crescent</td>
<td>~100 m (north east)</td>
</tr>
<tr>
<td>48</td>
<td>House</td>
<td>86 Beecroft Road</td>
<td>~100 m (north)</td>
</tr>
<tr>
<td>47</td>
<td>House 'Waveney'</td>
<td>84 Beecroft Road</td>
<td>~120 m (north)</td>
</tr>
<tr>
<td>50</td>
<td>“Vintage Cellars” building</td>
<td>100 Beecroft Road</td>
<td>~140 m (south)</td>
</tr>
<tr>
<td>127</td>
<td>Presbyterian Church</td>
<td>1 Mary Street</td>
<td>~180 m (south west)</td>
</tr>
<tr>
<td>128</td>
<td>House and Garden</td>
<td>3 Mary Street</td>
<td>~200 m (south west)</td>
</tr>
</tbody>
</table>
Figure 6-7 Non-Aboriginal heritage areas and places

Hornsby Shire Council LEP 2013 local heritage

- Conservation Area - Beecroft, Cheltenham Heritage Conservation Area
- Item - General
- Item - Landscape

Note: Beecroft Community Centre curtilage boundary modified to follow surveyed property boundaries
6.6.2 Potential impacts

Construction

Consideration has been given to the scale, design and location of the proposed pedestrian bridge so that potential impacts to local non-Aboriginal heritage items are reduced.

Overall the proposal would not significantly affect the existing local heritage setting of the Heritage Conservation Area in which it is located. To the extent possible, the proposal would sufficiently integrate with its surrounding landscape and visual setting, so that the heritage values of the area are not greatly diminished.

The proposal would not impact upon any items or areas of State or Commonwealth heritage significance.

The proposal is located close to or immediately next to a number of areas or local heritage significance, including Beecroft Community Centre and Beecroft Village Green and associated war memorials as discussed in Section 6.6.1. As the proposal would not extend into the curtilage of Beecroft Community Centre, no direct impacts are anticipated. However, given the very close proximity of this local heritage building to the construction area and potential construction compound a range of mitigation measures are proposed to minimise impacts.

The proposal would extend into the boundary of Beecroft Village Green. The Boer War Memorial, World War I and World War II Memorials including within the local heritage listing of Beecroft Village Green would not be impacted by the proposal. These memorials are located outside of the proposed construction area.

Beecroft Village Green is listed as an area of local heritage value. This is due to the remnant native forest trees within Beecroft Village Green linking the area back to its pre-colonisation landform as a native bush land (OEH, 2015). The park is located in a prominent location along Beecroft Road and is valued by local residents for its role as a public community park.

The proposal’s construction would result in the removal of up to six planted trees within Beecroft Village Green. While this impact would slightly change the visual characteristics of the park for some passing motorists, it would not significantly alter the heritage value of Beecroft Village Green. A range of heritage mitigation measures are included in Section 6.6.3.

Operation

Once the proposal has been constructed, there would be no further changes to the area as a result of the operation of the pedestrian bridge. Therefore, no operational non-Aboriginal heritage impacts are likely.

6.6.3 Safeguards and management measures

Table 6-19 sets out control measures for the proposal relating to non-Aboriginal heritage.

Table 6-19 Non-Aboriginal heritage safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Aboriginal heritage</td>
<td>A condition survey would be carried out before the start of work by a qualified contractor and a building condition report prepared for nearby heritage structures, notably Beecroft Public School and</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Beecroft Community Centre.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Aboriginal heritage</td>
<td>Vibration management procedures would be developed and implemented where work results in vibration levels being experienced within the vicinity of identified heritage structures, notably Beecroft Public School and Beecroft Community Centre.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>Non-Aboriginal heritage</td>
<td>A condition survey would be undertaken before the start of work by a qualified contractor and a building condition report prepared for nearby local heritage structures including Beecroft Community Centre and areas of Beecroft Public School.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>Non-Aboriginal heritage</td>
<td>If archaeological remains are uncovered during the work, all work must cease in the vicinity of the material/find and the Roads and Maritime Senior Regional Environmental Officer contacted immediately.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Non-Aboriginal heritage</td>
<td>If any items defined as relics under the NSW Heritage Act 1977 are uncovered during the work, all work must cease in the vicinity of the find and the Roads and Maritime Senior Regional Environmental Officer contacted immediately.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>

6.7 Aboriginal heritage

6.7.1 Existing Environment

A search of the OEH Aboriginal Heritage Information Management System (AHIMS) was carried out on the 10 February 2015. A 200 m study area centred on the proposal area was used. The search did not reveal any listed Aboriginal heritage items or land claims in the search area.

6.7.2 Potential impacts

A desktop assessment of Aboriginal heritage was carried out in line with Stage 1 of the Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI). The Aboriginal Cultural Heritage Officer for Roads and Maritime Sydney provided a response dated 6 March 2015, (refer to Appendix F for details). The Stage 1 PACHCI process concluded that:

- The proposal is unlikely to harm known Aboriginal objects or places
- The AHIMS search did not indicate any aboriginal objects or places in the study area
- The proposal area does not contain landscape features that indicate the presence of Aboriginal objects
- The cultural heritage potential of the study area appears to be reduced due to past disturbance
• The removal of trees as part of the proposal would not harm Aboriginal heritage as they have do not have any culturally significant Aboriginal markings or modifications.

Roads and Maritime have determined that there is no requirement to proceed to Stage 2 of the PACHCI. An Aboriginal Heritage Impact Permit under the National Parks and Wildlife Act 1974 is not required.

As a result, no impacts to Aboriginal cultural heritage are anticipated from construction and operation of the proposal.

6.7.3 Safeguards and management measures

Table 6-20 sets out control measures for the proposal relating to Aboriginal heritage.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal heritage</td>
<td>If Aboriginal heritage items are uncovered during the work, all work in the vicinity of the find must cease and the Roads and Maritime Aboriginal Cultural Heritage Officer and the Senior Regional Environmental Officer contacted immediately in accordance with the Roads and Maritime Unexpected Finds Procedure. Work in the vicinity of the find must not re-start until clearance has been received from those Roads and Maritime officers and the Office of Environment and Heritage.</td>
<td>Construction contractor</td>
<td>During construction</td>
</tr>
</tbody>
</table>

6.8 Soil and water

6.8.1 Existing environment

There are no known occurrences of acid sulphate soils within the proposal area according to the Hornsby Shire LEP acid sulphate soils map.

A search of the EPA Contaminated Land Register on 13 January 2015 for the Hornsby Shire LGA did not reveal any previous contaminated land records within the suburb of Beecroft.

A search of the NSW OEH eSPADE soil mapping system was carried out on 4 May 2015.

The Sydney 1:100 000 geological series sheet indicates the geology of the proposal area is Ashfield Shale (Rwa) which overlies Hawkesbury Sandstone (Rh), both of which belong to the Wianamatta Group of Triassic Age. The Ashfield Shale comprises black to dark grey shale and laminite whilst the Hawkesbury Sandstone comprises medium to coarse grained quartz sandstone, very minor shale and laminite lenses. Both of these geological formations weather to form clays of medium to high plasticity.

Initial geotechnical investigations indicate that a soil profile around two metres in depth lies above these geological layers within the proposal area. Surface soils within the proposal area are generally uncontrolled, moderately compacted, low to medium plasticity clay, sandy clay and gravelly clay and contain trace fine to coarse gravel and rootlets. Deeper into this soil profile soils were found to be firm to very stiff,
brown, orange brown and grey, low to high plastic clay, with some silt and the presence of fine to medium sized gravel.

There are no natural watercourses within 100 m of the proposal. Runoff is managed by kerbside drains and inlets. The proposal is not located on flood prone land.

6.8.2 Potential impacts

Construction

Disturbance to soils and substrates would occur during construction activities such as initial clearing, excavation works for foundations and the installation of underground utilities. This soil disturbance and exposure of bare areas has the potential to create erosion hazards and subsequent sedimentation of any runoff through the proposal area. If left uncontrolled, runoff could enter the stormwater system via kerbside inlets and drains, which could impact downstream waterways.

Accidental chemical spills during construction, including during concreting work, have the potential to impact soils and water quality.

Operation

No impacts to existing drainage infrastructure would occur during operation.

6.8.3 Safeguards and management measures

Table 6-21 sets out a range of soils and water quality safeguards and management measures for the proposal.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Soil and water quality | Erosion and sediment control measures are to be implemented and maintained in accordance with an erosion and sedimentation control plan to:  
- Prevent sediment moving offsite and sediment laden water entering any drain inlets  
- Minimise the amount of material transported from site to surrounding road surfaces  
(In accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book).) | Construction contractor | Construction |
| Soil and water quality | Stockpiles would be managed in accordance with Roads and Maritime’s stockpile management guidelines (RMS 2011).                                                                                                           | Construction contractor | Construction |
| Soil and water quality | Water quality control measures are to be used to prevent any materials (eg. concrete, grout, sediment etc) entering drain inlets.                                                                                         | Construction contractor | Construction |
| Soil and water quality | Erosion and sediment control measures are not to be removed until the work are complete or areas are stabilised.                                                                                                         | Construction contractor | Construction |
| Soil and water quality | Refuelling of construction plant would be                                                                                                                                         | Construction contractor | Construction |
### 6.9 Air quality

#### 6.9.1 Existing environment

In the Hornsby LGA, the main influence on air quality comes from the use of motor vehicles. Information from the Bureau of Transport Statistics on Hornsby Shire shows a high level of car dependence in comparison with the Sydney metropolitan area as a whole (Bureau of Transport Statistics 2011).

A search of the National Pollutant Inventory carried out on the 16 February 2015 did not identify any facilities which need to report on their emissions within the suburb of Beecroft.

#### 6.9.2 Criteria

The Protection of the Environment Operations Act 1997 (POEO Act) requires that no construction vehicle shall have continuous smoky emissions for more than 10 seconds.

The OEH ‘Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW’ (DEC 2005) sets out criteria for dust deposition rates. When no baseline data exists a criterion of maximum 4mg/m²/month of deposited dust levels is set.

#### 6.9.3 Potential impacts

**Construction**

Construction has the potential to temporarily alter local air quality within the proposal area and immediate surrounds through:

- Construction plant exhaust emissions
- Dust emissions from excavation activities.

Construction would be carried out along a busy road in a highly urbanised environment already influenced by road traffic. Given the limited extent of excavation required, the potential for dust emissions to be generated is very low.

Given the scale and short to medium term nature of construction, potential air quality impacts through emissions and dust would be minimal and temporary in nature. A number of safeguards and management measures are summarised in Section 6.9.4 below.

**Operation**

The proposal would not alter the existing traffic regime within the local area and would not result in any change to the local air quality once constructed.

#### 6.9.4 Safeguards and management measures

Table 6-22 sets out a range of air quality mitigation measures that would be implemented to minimise potential air quality impacts.

---

**Table 6-22: Air Quality Mitigation Measures**

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>water quality</td>
<td>carried out in an impervious bunded area off site with a hardstand area.</td>
<td>contractor</td>
<td></td>
</tr>
<tr>
<td>Soil and water quality</td>
<td>An emergency spill kit is to be kept on site at all times. All staff are to be made aware of the location of the spill kit and trained in its use.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>

---

Pedestrian Bridge on Beecroft Road, Beecroft

Review of Environmental Factors
Table 6-22  Air quality safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td>The CEMP for the proposal should include:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Measures including watering or covering exposed areas would be used to minimise or prevent air pollution and dust</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A map identifying locations of sensitive receivers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Identification of potential risks/impacts due to the work/activities as dust generation activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A process for monitoring dust on site and adverse weather conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Management measures to minimise risk including a progressive stabilisation plan.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Downermouchel, Jacobs</td>
<td></td>
<td>Construction</td>
</tr>
<tr>
<td>Air quality</td>
<td>Work would cease when winds reach a level where dust cannot be controlled.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Air quality</td>
<td>All vehicle loads would be covered.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Air quality</td>
<td>• Work (including the spraying of paint and other materials) will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>• Plant, vehicles and equipment would be maintained in good condition and in accordance with manufacturer’s specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plant and machinery would be turned off when not in use.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.10 Resource management

6.10.1 Policy setting

The NSW Government has released the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (WARR Strategy) to minimise waste generated across all government sectors and improve the efficient use of resources. This reflects the community's view that waste should be treated as a resource. The WARR Strategy identifies the following waste avoidance and resource recovery goals and targets:

- Avoid waste generation
- Increase recycling
- Divert more waste from landfill
- Manage problem wastes better
- Reduce litter
- Reduce illegal dumping.
Roads and Maritime is dedicated to the minimisation of waste and the use of recycled products where possible. Roads and Maritime contractors are required to propose recycled-content materials where they are cost and performance competitive.

By adopting the principles of the WARR Strategy, Roads and Maritime seeks to ensure the most efficient use of resources and reduce cost and environmental harm in accordance with the principles of ecologically sustainable development, as outlined in Section 8.2 of this REF.

6.10.2 Existing environment

The existing road network within the proposal area currently generates minimal waste. Waste sources are currently limited to roadside litter and some waste material from clearing roadside drainage facilities.

6.10.3 Potential impacts

Construction of the proposal would generate waste streams typical of road construction work, including:

- Green waste from cleared vegetation
- Waste road infrastructure materials (signposts and fencing)
- Oil, grease and other liquid wastes from the maintenance of construction plant and equipment
- General wastes and sewage from site compounds and offices
- Packaging materials from items delivered to site, such as pallets, crates, cartons, plastics and wrapping materials
- Potential contaminated material unearthed during construction.

In addition, spoil would be generated during the construction of the bridge and lift foundations on either side of Beecroft Road. Earthwork requirements are identified in Section 3.3.4.

6.10.4 Safeguards and management measures

The proposed safeguards and management measures for resource management are listed in Table 6-23.

Table 6-23 Resource management safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource management</td>
<td>Resource management hierarchy principals are to be followed:</td>
<td>Construction contractor</td>
<td>During construction</td>
</tr>
<tr>
<td></td>
<td>• Avoid unnecessary resource consumption as a priority</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disposal is carried out as a last resort (In accordance with the Waste Avoidance &amp; Resource Recovery Act 2001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ensure waste removed from site is disposed of correctly (refer hazardous materials report) and in</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pedestrian Bridge on Beecroft Road, Beecroft
Review of Environmental Factors
### Environmental safeguards

#### Resource management

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>compliance with Waste Classification Guidelines (DECCW, 2009).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource management</td>
<td>Waste material, other than vegetation and tree mulch, is not to be left on site once the work have been completed.</td>
<td>Construction contractor</td>
<td>During construction</td>
</tr>
<tr>
<td>Resource management</td>
<td>Working areas are to be maintained, kept free of rubbish and cleaned at the end of each working day.</td>
<td>Construction contractor</td>
<td>During construction</td>
</tr>
<tr>
<td>Resource management</td>
<td>Vegetation and other waste is not to be burnt on site.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Resource management</td>
<td>Procurement would endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.</td>
<td>Construction contractor</td>
<td>Pre-construction and construction</td>
</tr>
<tr>
<td>Resource management</td>
<td>All wastes would be managed in accordance with the Protection of the Environment Operations Act 1997.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>

### 6.11 Summary of beneficial effects

Beneficial effects of the proposal on completion include:

- Improved pedestrian safety for pedestrians travelling across Beecroft Road between Beecroft Public School and surrounds and Beecroft Village Green and Beecroft railway station and surrounds
- Improved pedestrian connectivity throughout Beecroft, encouraging walking as an alternative to driving for short local trips
- Reduced pedestrian waiting times at the existing at-grade signalised pedestrian crossing at the Beecroft Road and Copeland Road intersection
- Improved traffic flow along Beecroft Road by limiting the amount of time vehicles spend waiting for pedestrians to cross.

### 6.12 Summary of adverse effects

Adverse effects of the proposal may include:

- Temporary construction impacts including disruptions to pedestrian and road traffic, noise and vibration, dust generation, and increased risk of spills and contamination and the occurrence of erosion and sedimentation
- Partial property acquisition of around 140 m$^2$ of land within Beecroft Public School and around 145 m$^2$ of land within Beecroft Village Green for the construction of the bridge stairs and lifts
- Changes to the local visual environment through the removal of some trees and the establishment of a large piece of road infrastructure
- Removal of up to 19 trees within Beecroft Village Green and Beecroft Public School, with additional trimming required to one remnant Red Stringybark tree in Beecroft Village Green.
7 Environmental management

7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified to minimise potentially adverse environmental and socio-economic impacts, which could potentially result from the construction and operation of the proposal. Should the proposal be developed, these management measures would be considered during the detailed design process and during construction and operation of the proposal.

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

The CEMP would be prepared before the start of any on-site work. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in line with the specifications set out in the: QA Specification G36M – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan) and the QA Specification G40 – Clearing and Grubbing.

7.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be considered and implemented during the proposal's detailed design, construction and operation. These safeguards would minimise potentially adverse impacts on the surrounding environment and are summarised in Table 7-1.
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General</td>
<td>All environmental safeguards must be incorporated within the following:</td>
<td>Downermouchel</td>
<td>Pre-construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Project Environmental Management Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Detailed design stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Contract specifications for the proposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Contractor’s Environmental Management Plan.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>General</td>
<td>• A risk assessment must be carried out on the Proposal in accordance with the Roads and</td>
<td>Design project manager and regional</td>
<td>Pre-construction, after first</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maritime Project Pack and PMS risk assessment procedures to determine an audit and</td>
<td>environmental staff</td>
<td>audit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inspection program for the work. The recommendations of the risk assessment are to be</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>implemented</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A review of the risk assessment must be carried out after the initial audit or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>inspection to evaluate whether the level of risk chosen for the project is appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Any work resulting from the proposal and as covered by the REF may be subject to</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>environmental audit(s) and/or inspection(s) at any time during their duration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>General</td>
<td>• The environmental contract specification for the Beecroft Pedestrian Bridge proposal</td>
<td>Design project manager</td>
<td>Pre-construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>must be forwarded to the Roads and Maritime Senior Environmental Officer for review at</td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>least 10 working days before the tender stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A contractual hold point must be maintained until the CEMP is reviewed by the Roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and Maritime Senior Environmental Officer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>General</td>
<td>• The Downermouchel Project Manager must notify the Roads and Maritime Environmental</td>
<td>Project manager</td>
<td>Pre-construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Officer [Sydney region] at least five days before work commencing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>General</td>
<td>• All businesses and residences likely to be affected by the proposed work must be</td>
<td>Project manager</td>
<td>Pre-construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>notified at least five working days before the start of the proposed activities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>General</td>
<td>• Environmental awareness training must be provided, by the contractor,</td>
<td>Construction contractor</td>
<td>Pre-construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>7</td>
<td>General</td>
<td>to all field personnel and subcontractors.</td>
<td>Roads and Maritime</td>
<td>Detailed design, pre-construction</td>
</tr>
<tr>
<td>8</td>
<td>General</td>
<td>• Land would be acquired under the terms of the <em>Roads Act 1993</em> and in accordance with the provisions of the <em>Land Acquisition (Just Terms Compensation) Act 1991</em> and the RMS’ Land Acquisition Policy.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>9</td>
<td>General</td>
<td>The Environmental component of the site induction is to include (as a minimum):</td>
<td>Construction contractor</td>
<td>Construction</td>
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<tr>
<td></td>
<td></td>
<td>• Environmentally sensitive locations and/or no go zones</td>
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<td></td>
<td></td>
<td>• Requirement to report and the process for reporting environmental issues on site</td>
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<tr>
<td></td>
<td></td>
<td>• Requirement to report and the process for reporting damaged environmental controls</td>
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<tr>
<td></td>
<td></td>
<td>• Incident management process.</td>
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<tr>
<td>10</td>
<td>General</td>
<td>Toolbox talks are to include environmental issues and controls when work start in a new area, a new activity and/or when environmental issues arise on site.</td>
<td>Construction contractor</td>
<td>Pre-construction, construction</td>
</tr>
<tr>
<td>11</td>
<td>Traffic and transport</td>
<td>• Consultation with emergency service authorities would be carried out during development of the detailed design including NSW Rural Fire Service and Fire Rescue.</td>
<td>Downermouchel</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>12</td>
<td>Traffic and transport</td>
<td>• Vehicular property access would be maintained including Beecroft Public School.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
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<td>No.</td>
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</tbody>
</table>
| 13  | Traffic and transport         | • Pedestrian access is to be maintained along Beecroft Road and through Beecroft Village Green throughout construction  
• Provision of signage outlining pedestrian and cyclist diversion routes would be displayed during construction  
• There will be advance notification of any construction work that affect pedestrians and cyclists.                                                                 | Construction contractor | Pre-construction, construction |
| 14  | **Traffic and transport**     | • Access to bus stops along Beecroft Road would be maintained during construction in consultation with bus operators.                                                                                                   | Construction contractor | Construction                 |
| 15  | Noise and vibration           | A Construction Noise and Vibration Management Plan (CNVMP) would be prepared as part of the CEMP. This plan would include but not be limited to:  
• 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)  
• Management measures to minimise the potential noise impacts from the quantitative noise assessment and for potential work outside of standard working hours (including implementation of EPA Interim Construction Noise Guidelines (DECCW, 2009)  
• A risk assessment to determine potential risk for activities likely to affect receivers (for activities carried out during and outside of standard working hours)  
• Mitigation measures to avoid noise and vibration impacts during construction activities including those associated with truck movements  
• A process for assessing the performance of the implemented mitigation measures  
• A process for documenting and resolving issues and complaints.  
• A construction staging program incorporating a program of noise and vibration monitoring for sensitive receivers                                          | Downermouchel, Jacobs | Pre-construction             |
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| 16  | Noise and vibration    | • A process for updating the plan when activities affecting construction noise and vibration change  
• Identify in toolbox talks where noise and vibration management is required. | Construction contractor  | Construction   |
<p>| 17  | Noise and vibration    | • Locate compressors, generators, pumps and any other fixed plant as far from residences as possible and behind site structures. | Construction contractor  | Construction   |
| 18  | Noise and vibration    | • Alternatives to reversing alarms will be considered for site equipment subject to WHS compliance requirements and risk assessments. | Construction contractor  | Construction   |
| 19  | Noise and vibration    | • Vehicle delivery times will be scheduled where feasible to the recommended construction hours to minimise noise impacts from heavy vehicle movements and deliveries. | Construction contractor  | Construction   |
| 20  | Noise and vibration    | • Any out of hours work would comply with G36 community notification requirements and the mitigation measures specified within the Roads and Maritime Services Noise Management Manual – Practice Note VII. | Construction contractor  | Construction   |
| 21  | Noise and vibration    | • During work hours, a community liaison phone number and site contact would be provided to enable complaints to be received and responded to. | Construction contractor  | Construction   |
| 22  | Noise and vibration    | • Training provided to all project personnel, including relevant sub-contractors, on noise and vibration requirements through inductions and toolbox talks. | Downermouchel            | Pre- construction, construction |
| 23  | Noise and vibration    | • Consider installing temporary noise screens around piling rig when close to community centre and school. | Construction contractor  | Construction   |
| 24  | Noise and vibration    | • Building condition surveys would be carried out for buildings identified in the NVMP, notably Beecroft Community Centre and Beecroft Public School. A copy of the report would be sent to the landholder. | Downermouchel            | Construction   |
|     | Noise and vibration    | • Vibration monitoring carried out during piling and where complaints about vibration received. | Downermouchel, Jacobs    | Construction   |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>Noise and vibration</td>
<td>• Where human comfort vibration guidelines are exceeded, the management measures are to be reviewed and are to consider alternate equipment and construction methodologies.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>26</td>
<td>Noise and vibration</td>
<td>• Where vibration criteria specific to structural damage are exceeded during monitoring, work would cease immediately and alternative construction methods would be used.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>27</td>
<td>Noise and vibration</td>
<td>Potentially noise affected receivers should be notified at least five days before any site work begins. Information provided would include: • The types of activities to be carried out • The timing of activities including expected start and finish • Details of the community information line and how to make an inquiry and/or complaint.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>28</td>
<td>Landscape character and visual impact</td>
<td>• When creating site access an arborist would assess any proposal to trim trees to enhance access to ensure form is not interrupted and stability is maintained.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>29</td>
<td>Landscape character and visual impact</td>
<td>• Limit vegetation removal, to the absolute minimum required to construct the bridge.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>30</td>
<td>Landscape character and visual impact</td>
<td>• Reinstate any disturbed area to the level of finish before construction.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>31</td>
<td>Landscape character and visual impact</td>
<td>• The work site would be left in a tidy manner at the end of each work day.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>32</td>
<td>Biodiversity</td>
<td>Biodiversity mitigation measures are to be developed and included within the CEMP. The CEMP is to include (but not be limited to) the following: • A site walkover with appropriate site personnel including Roads and Downermouchel, Jacobs</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>No.</td>
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<td></td>
<td></td>
<td>Maritime representatives to confirm clearing boundaries and sensitive locations before the start of work</td>
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<td></td>
<td></td>
<td>- Identification (marking) of the clearing boundary and identification (marking) of habitat features to be protected. Eg. – use of flagging tape</td>
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<td></td>
<td></td>
<td>- A map which clearly shows vegetation clearing boundaries and sensitive areas/no go zones.</td>
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<td></td>
<td></td>
<td>- Incorporation of management measures identified as a result of the pre-clearing walk completed by Roads and Maritime representatives and the contractor. This should include details of measures to be implemented to protect clearing limits and no go areas</td>
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<td></td>
<td></td>
<td>- A detailed clearing process in accordance with Roads and Maritime Biodiversity Guidelines (2011) including requirements of Guide 1, 2, 4 &amp; 9</td>
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<td></td>
<td></td>
<td>- Identify in toolbox talks where biodiversity would be included such as vegetation clearing or work in or next to sensitive locations</td>
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<td></td>
<td></td>
<td>- Identify control/mitigations measures to prevent impacts on sensitive locations or no go zones</td>
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<td></td>
<td>- A stop work procedure in the event of identification of unidentified species, habitats or populations.</td>
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<td></td>
<td></td>
<td>- Roads and Maritime will provide replacement planting of semi-mature trees in the Village Green to replace the trees which require removal to accommodate the new bridge. Roads and Maritime will finalise the exact location and species in consultation with the project team’s Landscape Designers and Hornsby Shire Council.</td>
<td></td>
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</tr>
<tr>
<td>33</td>
<td>Biodiversity</td>
<td>Weed management measures would be developed in accordance with Roads and Maritime Biodiversity Guidelines (Guide 6) and incorporated into the CEMP to manage Camphor Laurel and Small Leaf-Privet.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>34</td>
<td>Biodiversity</td>
<td>Where appropriate, exclusion zones (to define temporary access route) and tree protection zones would be implemented to prevent accidental damage to canopy species within the identified Sydney Turpentine-Ironbark Forest. These should be installed with reference to</td>
<td>Construction contractor</td>
<td>Construction</td>
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<td>No.</td>
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<td>Environmental safeguards</td>
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<tr>
<td>35</td>
<td>Biodiversity</td>
<td>Any required stockpiling of materials would be located within the low constraint class area, away from trees and appropriate sediment controls should be put in place to avoid stockpile spread.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>36</td>
<td>Socio-economic</td>
<td>A communication plan would be prepared and included in the CEMP. The communication plan would include:</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction and construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Requirements to provide details and timing of proposed construction activities to affected residents as well as:</td>
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<td></td>
<td></td>
<td>- Local businesses</td>
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<td></td>
<td></td>
<td>- Sydney Buses</td>
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<td>- Sydney Trains</td>
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<td>- Beecroft Public School</td>
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<td>- Beecroft Community Centre</td>
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<td></td>
<td></td>
<td>- Beecroft and Cheltenham Civic Trust</td>
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<td>- Hornsby Shire Council.</td>
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<tr>
<td></td>
<td></td>
<td>• Contact name and number for complaints</td>
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<td></td>
<td></td>
<td>• Procedure to notify nearby land users for changed conditions during the construction period such as traffic, pedestrian or driveway access.</td>
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<td></td>
<td></td>
<td>The communications plan would be prepared in accordance with G36 requirements and Roads and Maritime Community Engagement and Communications Manual (2012).</td>
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<td></td>
<td></td>
<td>The communications plan would include a complaint handling procedure and register and maintained for the duration of the proposal.</td>
<td></td>
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</tr>
<tr>
<td>37</td>
<td>Socio-economic</td>
<td>Road users, pedestrians and cyclists would be informed of changed road conditions, including likely disruptions to access during construction.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>38</td>
<td>Socio-economic</td>
<td>Notification to affected businesses and residents would be required in</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>No.</td>
<td>Impact</td>
<td>Environmental safeguards</td>
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<tr>
<td>39</td>
<td>Socio-economic</td>
<td>• Where appropriate, fencing with material attached (eg shade cloth) would be provided around the construction compounds and other areas to screen views of the construction compounds from adjoining properties.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>40</td>
<td>Non-Aboriginal heritage</td>
<td>• A condition survey would be carried out before the start of work by a qualified contractor and a building condition report prepared for nearby heritage structures, notably Beecroft Public School and Beecroft Community Centre.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>41</td>
<td>Non-Aboriginal heritage</td>
<td>• Vibration management procedures would be developed and implemented where work result in vibration levels being experienced within the vicinity of identified heritage items, notably Beecroft Public School and Beecroft Community Centre.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>42</td>
<td>Non-Aboriginal heritage</td>
<td>• A condition survey would be undertaken before the start of work by a qualified contractor and a building condition report prepared for nearby local heritage structures including Beecroft Community Centre and areas of Beecroft Public School.</td>
<td>Downermouchel, Jacobs</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>43</td>
<td>Non-Aboriginal heritage</td>
<td>• If archaeological remains are uncovered during the work, all work must cease in the vicinity of the material/find and the Roads and Maritime Senior Regional Environmental Officer contacted immediately.</td>
<td>Downermouchel, Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>44</td>
<td>Non-Aboriginal heritage</td>
<td>• If any items defined as relics under the Heritage Act tare uncovered during the work, all work must cease in the vicinity of the find and the Roads and Maritime Senior Regional Environmental Officer contacted immediately.</td>
<td>Downermouchel, Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>45</td>
<td>Aboriginal heritage</td>
<td>• If Aboriginal heritage items are uncovered during the work, all work in the vicinity of the find must cease and the Roads and Maritime Aboriginal Cultural Heritage Officer and the Senior Regional Environmental Officer contacted immediately in accordance with the Roads and Maritime Unexpected finds procedure. Work in the vicinity of the find must no re-start until clearance has been received from</td>
<td>Downermouchel, Construction contractor</td>
<td>During construction</td>
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<td></td>
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<td>those Roads and Maritime officers and OEH.</td>
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<tr>
<td>46</td>
<td>Soil and water quality</td>
<td>Erosion and sediment control measures are to be implemented and maintained in accordance with an erosion and sedimentation control plan to: • Prevent sediment moving offsite and sediment laden water entering any drain inlets • Minimise the amount of material transported from site to surrounding road surfaces (In accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book).</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>46</td>
<td>Soil and water quality</td>
<td>Stockpiles would be managed in accordance with Roads and Maritime stockpile management guidelines (RMS 2011).</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>48</td>
<td>Soil and water quality</td>
<td>Water quality control measures are to be used to prevent any materials (eg. concrete, grout, sediment etc) entering drain inlets.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>49</td>
<td>Soil and water quality</td>
<td>Erosion and sediment control measures are not to be removed until the work are complete or areas are stabilised.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>50</td>
<td>Soil and water quality</td>
<td>Refuelling of construction plant would be carried out in an impervious bunded area off site with a hardstand area.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>51</td>
<td>Soil and water quality</td>
<td>An emergency spill kit is to be kept on site at all times. All staff are to be made aware of the location of the spill kit and trained in its use.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>52</td>
<td>Air quality</td>
<td>The CEMP for the proposal should include: • Measures including watering or covering exposed areas would be used to minimise or prevent air pollution and dust • A map identifying locations of sensitive receivers • Identification of potential risks/impacts due to the work/activities as dust</td>
<td>Downermouchel, Jacobs</td>
<td>Construction</td>
</tr>
<tr>
<td>No.</td>
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<td>Environmental safeguards</td>
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<td></td>
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<td>generation activities</td>
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<tr>
<td></td>
<td></td>
<td>• A process for monitoring dust on site and adverse weather conditions</td>
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<td></td>
<td>• Management measures to minimise risk including a progressive stabilisation plan.</td>
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</tr>
<tr>
<td>53</td>
<td>Air quality</td>
<td>• Work would cease when winds reach a level where dust cannot be controlled.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>54</td>
<td>Air quality</td>
<td>• All vehicle loads would be covered.</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>
| 55  | Air quality    | • Work (including the spraying of paint and other materials) will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely  
  • Plant, vehicles and equipment will be maintained in good condition and in accordance with manufacturer’s specifications  
  • Plant and machinery will be turned off when not in use.                                                                                                                                  | Construction contractor | Construction   |
| 56  | Resource management | Resource management hierarchy principals are to be followed:  
  • Avoid unnecessary resource consumption as a priority  
  • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery)  
  • Disposal is carried out as a last resort (In accordance with the Waste Avoidance & Resource Recovery Act 2001).                                                                 | Construction contractor | During construction |
<p>| 57  | Resource management | • Waste material, other than vegetation and tree mulch, is not to be left on site once the work have been completed.                                                                                                                                                                          | Construction contractor | During construction |
| 58  | Resource management | • Working areas are to be maintained, kept free of rubbish and cleaned at the end of each working day.                                                                                                                                                                                         | Construction contractor | During construction |
| 59  | Resource management | • Vegetation and other waste is not to be burnt on site.                                                                                                                                                                                                                                         | Construction contractor | Construction   |</p>
<table>
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<th>No.</th>
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<tbody>
<tr>
<td>60</td>
<td>Resource management</td>
<td>• Procurement will endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.</td>
<td>Construction contractor</td>
<td>Pre-construction and construction</td>
</tr>
<tr>
<td>61</td>
<td>Resource management</td>
<td>• All wastes will be managed in accordance with the <em>Protection of the Environment Operations Act 1997.</em></td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>62</td>
<td>Resource management</td>
<td>• Ensure waste removed from site is disposed of correctly (refer hazardous materials report) and in compliance with Waste Classification Guidelines (DECCW, 2009).</td>
<td>Construction contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>
7.3 Licensing and approvals

The licences and approvals required for the proposal are listed in Table 7-2.

Table 7-2 Summary of licensing and approval required

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Timing</th>
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<tbody>
<tr>
<td>Road Occupancy Licence (ROL)</td>
<td>Applications for ROLs would be submitted to Roads and Maritime’s regional traffic management officer at least 14 days before the proposed occupancy of Beecroft Road.</td>
</tr>
</tbody>
</table>
8 Conclusion

This section provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

8.1 Justification

Beecroft Road is an important arterial road for motorists traveling through northern Sydney. The areas next to Beecroft Road contain a number of local community facilities such as Beecroft Public School, Community Centre, Village Green, railway station and town centre. During peak hour periods a high number of pedestrian utilise the existing at-grade signalised crossings at the Beecroft Road and Copeland Road intersection. This often leads to long pedestrian waiting times and impacts on traffic flow, inhibiting traffic efficiency along Beecroft Road.

The proposal has been designed to provide a safe, separated pedestrian crossing over Beecroft Road. The proposal would provide a number of benefits to pedestrians in terms of improved access and safety while also improving traffic flow on Beecroft Road.

This 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. A number of potential environmental impacts have been avoided or reduced during the development of the proposal. The proposal as described in this REF best meets the proposal objectives. The proposal would still result in some impacts including visual impacts, Non-Aboriginal heritage, noise and vibration impacts, temporary disruptions to traffic flow and access as well as other socio-economic impacts during construction. A range of measures have been developed to minimise and mitigate the potential adverse impacts of the proposal, as summarised in Section 7.2 of the REF.

Adverse impacts of the proposal would be outweighed by the longer term beneficial impacts of delivering improved pedestrian facilities and safety within Beecroft, while also improving traffic flow along Beecroft Road. The proposal is consistent with the aims of a number of key NSW Government strategic transport plans such as the NSW Long Term Transport Master Plan (TfNSW, 2012), Sydney’s Walking Future (TfNSW, 2013) and Sydney’s Cycling Future (TfNSW, 2013).

8.2 Objects of the EP&A Act

<table>
<thead>
<tr>
<th>Object</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>The proposal design, impact mitigation and management measures detailed in this REF allow for the proper management, development and conservation of natural and artificial resources. The main objectives of the proposal are to improve pedestrian safety and transport efficiency along Beecroft Road.</td>
</tr>
</tbody>
</table>
Where possible throughout the design of the proposal, management and conservation of natural resources has been incorporated. This has included optimising the pedestrian bridge design to reduce the number of tree clearing as far as possible.

<table>
<thead>
<tr>
<th>5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.</th>
<th>The proposal would form a pedestrian link between existing established community facilities and infrastructure. The proposal does not direct contribute to the further development of the area. However improved pedestrian access in the Beecroft area may have a positive influence on business development within the town centre.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.</td>
<td>Utilities affected by the proposal would be relocated (as discussed in Chapter 3).</td>
</tr>
<tr>
<td>5(a)(iv) To encourage the provision of land for public purposes.</td>
<td>The proposal would be used for public purposes.</td>
</tr>
<tr>
<td>5(a)(v) To encourage the provision and co-ordination of community services and facilities.</td>
<td>The proposal would improve the safety and access by the local community to Beecroft Public School, public transport and other local services and facilities.</td>
</tr>
<tr>
<td>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.</td>
<td>The proposal has been designed to minimise impacts on the environment, including threatened species, populations and ecological communities and their habitats.</td>
</tr>
<tr>
<td>5(a)(vii) To encourage ecologically sustainable development.</td>
<td>Ecologically sustainable development is considered in Sections 8.2.1 – 8.2.5 below.</td>
</tr>
<tr>
<td>5(a)(viii) To encourage the provision and maintenance of affordable housing.</td>
<td>Not relevant to the project.</td>
</tr>
<tr>
<td>5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.</td>
<td>Not relevant to the project.</td>
</tr>
<tr>
<td>5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.</td>
<td>The proposal has been developed simultaneously with a range of stakeholder and community consultation activities that have allowed the public to provide input into the planning and assessment process.</td>
</tr>
</tbody>
</table>

### 8.2.1 Ecologically sustainable development

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

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

8.2.2 The precautionary principle

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

Alternative design options were considered and assessed to reduce the risk of serious and irreversible impacts on the environment, including avoiding significant environmental impacts such as clearing of TSC Act listed Turpentine-Ironbark Forest.

The threat of serious or irreversible environmental damage is one of the essential preconditions to the engagement of the precautionary principle. In this case impact mitigating safeguards have been adopted even when the impacts are not certain to occur.

8.2.3 Intergenerational equity

Intergenerational equity provides that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The proposal would provide improved road infrastructure for future generations of motorists, cyclists and pedestrians. Should the proposal not proceed, the principle of intergenerational equity may be compromised as future generations would inherit a road environment with significant pedestrian delays and lower traffic efficiency.

The proposal would also benefit future generations by ensuring that pedestrian safety is improved, with this being a positive benefit for all road users.

8.2.4 Conservation of biological diversity and ecological integrity

The conservation of biological diversity and ecological integrity properties that the diversity of genes, species, populations and communities, as well as the ecosystems and habitats to which they belong, must be maintained and improved to ensure their survival.

An assessment of the existing local environment has been carried out to identify and manage any potential impact of the proposal on local biodiversity. The potential impacts of the proposal on biodiversity would be limited to the removal of up to 19 trees during the construction phase which do not represent significant biological value.

The proposal would not significantly fragment or isolate any existing large patches of vegetation and would not compromise biological diversity or ecological integrity. No significant impacts to flora and fauna species were identified.

8.2.5 Improved valuation, pricing and incentive mechanisms

Improved valuation, pricing and incentive mechanisms provide that cost to the environment should be factored into the economic costs of a proposal. This 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 have been given appropriate valuation.

8.3 Conclusion

The proposed pedestrian bridge over Beecroft Road at Beecroft is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of conservation agreements and plans of management under the NPW Act, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some impacts on visual impacts, non-Aboriginal local heritage, air quality and socio-economic factors particularly during construction. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would also provide a safe and efficient pedestrian crossing of Beecroft Road that is independent of vehicular traffic and improve traffic flow along Beecroft Road. On balance, the proposal is considered justified.

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

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

Alastair Hammond
Senior Environmental Planner
Jacobs
Date: 18 August 2015

I have examined this review of environmental factors and the certification by Alastair Hammond from Jacobs and accept the review of environmental factors on behalf of Roads and Maritime Services.

Michael Collins
Project Manager
Jacobs
Date: 08 September 2015
References


Commonwealth Department of Environment, National Pollutant Inventory 2015.


Department of Urban Affairs and Planning, 1999, Is an EIS required?

Department of Urban Affairs and Planning, 1996, Roads and Related Facilities.


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NSW Office of Environment and Heritage (OEH) 2005, Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW.


Transport for New South Wales (TfNSW) 2012, NSW Long Term Transport Master Plan, Sydney.


Transport for New South Wales (TfNSW) 2013, Sydney’s Cycling Future, Sydney.


Transport for NSW Bureau of Transport Statistics 2013, Household Travel Survey.
## Terms and acronyms used in this REF

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEMP</td>
<td>Construction environmental management plan</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental impact assessment</td>
</tr>
<tr>
<td>EP&amp;A Act</td>
<td>Environmental Planning and Assessment Act 1979 (NSW). Provides the legislative framework for land use planning and development assessment in NSW.</td>
</tr>
<tr>
<td>ESD</td>
<td>Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.</td>
</tr>
<tr>
<td>FM Act</td>
<td>Fisheries Management Act 1994 (NSW)</td>
</tr>
<tr>
<td>Heritage Act</td>
<td>Heritage Act 1977 (NSW)</td>
</tr>
<tr>
<td>ISEPP</td>
<td>State Environmental Planning Policy (Infrastructure) 2007</td>
</tr>
<tr>
<td>LALC</td>
<td>Local Aboriginal Land Council</td>
</tr>
<tr>
<td>LEP</td>
<td>Local Environmental Plan</td>
</tr>
<tr>
<td>LoS</td>
<td>Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.</td>
</tr>
<tr>
<td>Noxious Weeds Act</td>
<td>Noxious Weeds Act 1993 (NSW)</td>
</tr>
<tr>
<td>NPW Act</td>
<td>National Parks and Wildlife Act 1974 (NSW)</td>
</tr>
<tr>
<td>SEPP 14</td>
<td>State Environmental Planning Policy No.14 – Coastal Wetlands</td>
</tr>
<tr>
<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995 (NSW)</td>
</tr>
<tr>
<td>QA Specifications</td>
<td>Specifications developed by Roads and Maritime Services for use with roadwork and bridgework contracts let by Roads and Maritime Services.</td>
</tr>
</tbody>
</table>
Appendix A

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

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

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Any environmental impact on a community?</td>
<td>Construction of the proposal would result in some short-term negative impacts, such as visual amenity impacts, potential non-Aboriginal heritage impacts, tree clearing, traffic and access disruptions, in addition to potential noise and air emissions impacts. These issues could impact negatively on the local community as described in Section 6 this REF. These impacts are likely to occur during part of the eight month construction period and would be controlled and mitigated through a range of measures described in Section 7.2 of this REF.</td>
</tr>
<tr>
<td>b. Any transformation of a locality?</td>
<td>Construction of the proposal would temporarily impact the existing locality, predominantly through negative visual amenity impacts associated with the placement and movement of construction plant and equipment. Once constructed, the proposal would form a permanent feature of the local area. The proposed bridge has been designed to minimise its impact on the local Heritage Conservation Area in which it occurs. The location of the proposal within a busy road corridor, the presence of large trees either side and its visually sensitive design all play a part in reducing the proposal’s overall visual impact on the local area. However, in the long term the proposal would also help encourage increased pedestrian trips in and around the Beecroft town centre. This would encourage people to choose cycling and walking over driving when taking short trips in the area.</td>
</tr>
</tbody>
</table>
### Factor | Impact
---|---
c. Any environmental impact on the ecosystems of the locality? | Short-term, minor, negative  
The proposal would involve the clearing of up to 19 trees within Beecroft Public School and Beecroft Village Green, as discussed in Section 6.4.4. However, this would not have any significant impact on the ecosystems of the locality, as the proposal would not impact upon the nearby TSC-Act listed endangered ecological community (Sydney Turpentine-Ironbark Forest) or the viability of any species, including any threatened flora or fauna species.
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? | Short-term, minor, negative  
Long-term, minor, positive  
During construction, the proposal would have the potential to create a reduction in the overall aesthetic quality of the proposal area due to the equipment associated with the construction worksite, dust and noise generation as well as traffic and access disruption. However, these impacts would be minimised as far as practicable through the implementation of the safeguards outlined in Section 7.2.  
Once operational, the proposal would improve the pedestrian access and facilities within the local area, therefore resulting in an improvement in recreational quality.
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? | Long-term, minor, negative  
The proposal occurs within the Beecroft-Cheltenham Heritage Conservation Area and occurs next to and within a number of local non-Aboriginal heritage items such as Beecroft Public School and Beecroft Community Centre.  
The proposal would result in a change in the visual environment of one section of Beecroft Road. However, the proposal would not impact upon any buildings or items of heritage significance. The proposal has been designed to be as un-intrusive as possible in consideration of the heritage nature of its surrounds.
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? | Nil  
The proposal would not impact habitat of protected fauna.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.</td>
<td></td>
</tr>
<tr>
<td>h. Any long-term effects on the environment?</td>
<td>Nil</td>
</tr>
<tr>
<td>Long-term negative effects on the environment are not expected. Benefits would be realised in terms of reduced congestion and improvements to pedestrian connectivity and safety.</td>
<td></td>
</tr>
<tr>
<td>i. Any degradation of the quality of the environment?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal has the potential to degrade the quality of the environment through the spread of weeds/pathogens, accidental spills and uncontrolled releases of sediment laden water off-site during construction. Management measures outlined in Section 7.2 would be implemented to mitigate these potential impacts.</td>
<td></td>
</tr>
<tr>
<td>j. Any risk to the safety of the environment?</td>
<td>Short-term, minor, negative</td>
</tr>
<tr>
<td>Construction of the proposal has the potential to temporarily decrease safety in the vicinity of the proposal due to the movement of construction plant. These risks are anticipated to be manageable through the application of standard mitigation measures.</td>
<td></td>
</tr>
<tr>
<td>k. Any reduction in the range of beneficial uses of the environment?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not result in a significant reduction in the range of beneficial uses of the environment.</td>
<td></td>
</tr>
<tr>
<td>l. Any pollution of the environment?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would potentially cause pollution of the environment (accidental spills, air quality and noise amenity), however the potential impacts would be minimised with the implementation of safeguards outlined in section 7.2 of this REF.</td>
<td></td>
</tr>
<tr>
<td>m. Any environmental problems associated with the disposal of waste?</td>
<td>Nil</td>
</tr>
<tr>
<td>No environmental problems associated with the disposal of waste are expected as a result of the proposal.</td>
<td></td>
</tr>
<tr>
<td>Factor</td>
<td>Impact</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would require resources such as concrete and steel, which are common construction materials. The proposal would not create any significant demand on these resources. All other required resources for the proposal are considered to be readily available.</td>
<td></td>
</tr>
<tr>
<td>o. Any cumulative environmental effect with other existing or likely future activities?</td>
<td>Nil</td>
</tr>
<tr>
<td>There are no identified major construction projects proposed in the surrounding area during the proposal’s construction. Therefore, it is unlikely that any construction associated impacts from other projects would result in cumulative impacts.</td>
<td></td>
</tr>
<tr>
<td>p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal is not located within a coastal area and would not result in any impact on coastal processes and coastal hazards.</td>
<td></td>
</tr>
</tbody>
</table>
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 help in determining whether the proposal should be referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Any impact on a World Heritage property?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not have an impact on a World Heritage property.</td>
<td></td>
</tr>
<tr>
<td>b. Any impact on a National Heritage place?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not have any impact on a National Heritage place.</td>
<td></td>
</tr>
<tr>
<td>c. Any impact on a wetland of international importance?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not have any impact on a wetland of international importance.</td>
<td></td>
</tr>
<tr>
<td>d. Any impact on a listed threatened species or communities?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not impact any listed threatened species or communities.</td>
<td></td>
</tr>
<tr>
<td>e. Any impacts on listed migratory species?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not impact any listed migratory species.</td>
<td></td>
</tr>
<tr>
<td>f. Any impact on a Commonwealth marine area?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not have an impact on a Commonwealth marine area.</td>
<td></td>
</tr>
<tr>
<td>g. Does the proposal involve a nuclear action (including uranium mining)?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal does not involve a nuclear action.</td>
<td></td>
</tr>
<tr>
<td>Additionally, any impact (direct or indirect) on Commonwealth land?</td>
<td>Nil</td>
</tr>
<tr>
<td>The proposal would not have a direct or indirect impact on Commonwealth land.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B Concept design
ROADS AND MARITIME SERVICES

BEECROFT ROAD
MAIN ROAD No. MR139

PEDESTRIAN BRIDGE
OVER BEECROFT ROAD
AT BEECROFT

THE BRIDGE SITE IS APPROXIMATELY 22KM BY ROAD FROM SYDNEY.

NEW BRIDGE - 2015
BRIDGE No. BS7403

DESIGN FILE: SF2014095491
DESIGN STANDARD: AS 5100-BRIDGE DESIGN
PEDESTRIAN LIVE LOAD: 5kPa
LIFT SHAFTS DESIGNED FOR FULL ROAD TRAFFIC COLLISION LOAD TO AS5102 CLAUSE 10.2
EARTHQUAKE LOADING
BRIDGE CLASSIFICATION: TYPE I
IMPORTANCE FACTOR: 1.0
ACCELERATION COEFFICIENT: 0.24
SITE FACTOR: C37
DESIGN CATEGORY: BRDCD-1

WIND LOADING
WIND TERRAIN CATEGORY: 3
REGIONAL WIND SPEED U3: 9200 = 48 m/s
REGIONAL WIND SPEED U3 100 = 37 m/s
NET PRESSURE COEFFICIENTS IN ACCORDANCE WITH DS OF AS1170.2

REFERENCE REPORT:
BRIDGE DESIGN REPORT: N900042640/R-01-00134/02 DATED 23 JANUARY 2015
FACTURAL GEOTECHNICAL REPORT:

JACOBS

REGN. No. OF PLANS
DS 2015 / 000296
B27403

ISSUE STATUS: 100%

SHEET No. 1 NO. OF SHEETS 63 ISSUE 3
SCHEDULE OF DRAWINGS

1. COVER SHEET
2. SCHEDULE OF DRAWINGS
3. GENERAL ARRANGEMENT - SHEET A
4. GENERAL ARRANGEMENT - SHEET B
5. GENERAL ARRANGEMENT - SHEET C
6. PILES
7. PILECAP AND FOOTING SET-OUT - SHEET A
8. PILECAP AND FOOTING SET-OUT - SHEET B
9. PILECAP AND FOOTING REINFORCEMENT - SHEET A
10. PILECAP AND FOOTING REINFORCEMENT - SHEET B
11. LIFT SHAFT NUMBER 1 CONCRETE - SHEET A
12. LIFT SHAFT NUMBER 1 CONCRETE - SHEET B
13. LIFT SHAFT NUMBER 1 REINFORCEMENT - SHEET A
14. LIFT SHAFT NUMBER 1 REINFORCEMENT - SHEET B
15. LIFT SHAFT NUMBER 1 REINFORCEMENT - SHEET C
16. NOT USED
17. LIFT SHAFT NUMBER 2 CONCRETE - SHEET A
18. LIFT SHAFT NUMBER 2 CONCRETE - SHEET B
19. NOT USED
20. NOT USED
21. NOT USED
22. STAIR NUMBER 1 CONCRETE - SHEET A
23. STAIR NUMBER 1 CONCRETE - SHEET B
24. STAIR NUMBER 1 CONCRETE - SHEET C
25. STAIR NUMBER 1 CONCRETE - SHEET D
26. ANCHOR BOLT LAYOUT PLAN AND DETAILS
27. STAIR NUMBER 1 REINFORCEMENT - SHEET A
28. STAIR NUMBER 1 REINFORCEMENT - SHEET B
29. STAIR NUMBER 1 REINFORCEMENT - SHEET C
30. STAIR NUMBER 1 REINFORCEMENT - SHEET D
31. STAIR NUMBER 2 CONCRETE - SHEET A
32. STAIR NUMBER 2 CONCRETE - SHEET B
33. STAIR NUMBER 2 CONCRETE - SHEET C
34. STAIR NUMBER 2 CONCRETE - SHEET D
35. NOT USED
36. STAIR TIMBRE SUPPORT CORBEL
37. BRIDGE BEARINGS
38. ARCH - SHEET A
39. ARCH - SHEET B
40. ARCH - SHEET C
41. ARCH - SHEET D
42. WALKWAY - SHEET A
43. WALKWAY - SHEET B
44. WALKWAY - SHEET C
45. WALKWAY - SHEET D
46. WALKWAY - SHEET E
47. SAFETY SCREEN - SHEET A
48. SAFETY SCREEN - SHEET B
49. STAIR NUMBER 1 BARRIER PANEL LAYOUT PLAN
50. STAIR NUMBER 1 BARRIER PANEL ELEVATIONS - SHEET A
51. STAIR NUMBER 1 BARRIER PANEL ELEVATIONS - SHEET B
52. STAIR NUMBER 2 BARRIER PANEL LAYOUT PLAN
53. STAIR NUMBER 2 BARRIER PANEL ELEVATIONS - SHEET A
54. STAIR NUMBER 2 BARRIER PANEL ELEVATIONS - SHEET B
55. STAIR BARRIER RAILING DETAILS - SHEET A
56. STAIR BARRIER RAILING DETAILS - SHEET B
57. STAIR BARRIER RAILING DETAILS - SHEET C
58. STAIR BARRIER PANEL DETAILS - SHEET A
59. STAIR BARRIER PANEL DETAILS - SHEET B
60. STAIR BARRIER PANEL DETAILS - SHEET C
61. STAIR BARRIER PANEL DETAILS - SHEET D
62. STAIR BARRIER PANEL DETAILS - SHEET E
63. BAR SHAPES
CONSTRUCTION SEQUENCE

1. The pedestrian construction sequence should be adopted for the
   construction of the pedestrian bridge.

2. Install the false and full caps.

3. Construct lift shafts.

4. Construct cantilever and bridge support columns.

5. Construct cantilever and bridge support columns and lattice beam installation.

6. Install the bridge from the landing to the road level.

7. Install the railing and the steel beams for the top span.

8. Install the truss span complete with cladding.

9. Complete the installation of the balustrades.

10. Install the lighting.

11. Paint deck and guardrail and footpath.

12. Install new fence.

GENERAL NOTES

SCALE 1:100

FOR GENERAL NOTES REFER SHEET 3

JACOBS DOCUMENT No.

Tel: (02) 9928 2100
Fax: (02) 9928 2500

PREPARED

CHECKED

REGISTRATION NO. OF PLANS

DESIGN ..........................

DS 2015 / 000296

DRAWING ..........................

ISSUED

REGISTERED FOR INFORMATION

BEECROFT PRIMARY SCHOOL

NO. 100 Christie Street
St Leonards
NSW 2065 Australia

ROADS AND MARITIME SERVICES

MAIN ROAD No. MR139
HORNSBY SHIRE

OVER BEECROFT ROAD
AT BEECROFT

GENERAL ARRANGEMENT - SHEET B

NORTHERN ELEVATION ON PEDESTRIAN BRIDGE - CONTROL LINE MB EW
Appendix C Noise and vibration assessment
1. Introduction

DownerMouchel (DM) is carrying out road maintenance and upgrade projects on behalf of the Roads and Maritime Services (Roads and Maritime) as part of the Stewardship Maintenance Contract (SMC). As part of these works, a new pedestrian bridge is proposed to be constructed across Beecroft Road, in Beecroft, to provide a safe crossing for school children and other pedestrians and improve traffic flow.

The bridge would be constructed adjacent to the Beecroft Public School, as illustrated in Figure 2-1, around 50 metres south of Copeland Street and close to local businesses, Beecroft Village Green and community facilities.

The steel arch bridge over Beecroft Road would be around 20 metres in length and 2.3 metres wide, providing a vertical clearance of 5.5 metres. Two lift shafts will act as supports for the span and will be cast in situ and that will be supported on four 750 mm bored concrete piles. Stairs will tie in with ground level at either end of the bridge, as illustrated in Figure 1.1.

Figure 1.1 : Design of pedestrian bridge
The proposed construction of the Beecroft Road Pedestrian Bridge is set to commence in the third quarter of 2015 and predicted to last 30 weeks.

The proposed works will entail five broad construction stages:

- Pre-construction – removal of vegetation and clearing of trees, utilities checks, relocation of power lines.
- Sub-structure works - Minor excavation and piling (8 x bored piles for the lift shafts and 6 piles for stairs)
- Stairs and lift shafts – in situ casting of stair supports and landings and lift shafts
- Span – transportation and lifting of steel arch into place
- Finishing – installation of bridge deck, balustrading and protection screens, lighting and landscaping
- Compound – area for deliveries, worker amenities and maintenance. Proposed area immediately north of Beecroft Community Centre.

Some construction activities are anticipated to be undertaken at night, such as lifting the arch into place, to minimise the impact on traffic and reduce the safety hazard on DM staff and contractors. Hours for construction would comply with RMS’s Road Occupancy Licence.

With a 30 week construction period and expectation of night works, construction noise and vibration impacts on nearby sensitive receivers must be considered and managed appropriately.

This report outlines the assessment methodology and findings and provides key recommendations for mitigation and management of predicted impacts.

2. Existing environment

The proposal area contains a mix of residential, commercial, community and educational land uses. As shown in Figure 2.1 the Beecroft Public School is positioned immediately adjacent to the western end of the bridge and the Beecroft Community Centre is adjacent to the eastern end. The nearest residential receivers are around 60 metres to the north at the intersection of Copeland Road, with additional receivers around 110 metres to the east across the rail corridor. A summary of the nearest sensitive receivers is provided in Table 2.1.

Table 2.1 : Summary of representative receivers

<table>
<thead>
<tr>
<th>Receiver reference</th>
<th>Address</th>
<th>Receiver type</th>
<th>Distance from works</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beecroft public school</td>
<td>School</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Beecroft community centre</td>
<td>Varies*</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>88 Beecroft Road</td>
<td>Residential</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>Beecroft Fire Station</td>
<td>Commercial</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>137 Copeland Road</td>
<td>Residential</td>
<td>150</td>
</tr>
<tr>
<td>6</td>
<td>136 Copeland Road</td>
<td>Residential</td>
<td>140</td>
</tr>
<tr>
<td>7</td>
<td>Beecroft Village Green</td>
<td>Active / passive recreation</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>100 Beecroft Road (Vintage Cellars)</td>
<td>Commercial</td>
<td>150</td>
</tr>
</tbody>
</table>

* Community hall hired for mixed use eg seminars, recreation, functions, dances, meetings
Within the proposal area, noise levels are largely influenced by traffic on Beecroft and Copeland roads. Unattended monitoring was carried out specifically for this study at a single location on Copeland Road, suitably representative of all receivers within the traffic-influenced noise environment. This location, 129 Copeland Road, is indicated on Figure 2.1.

Table 2.2 provides a summary of daily noise measurement profile for the monitoring location. The rating background level (RBL) in the table is the median of the 10th percentile background (L_{A90}) noise levels and is used to establish the construction noise management level (NML). The L_{A1} and L_{Aeq} levels provide additional information on the existing noise environment.

Background noise levels reduce during the evening into the night reflecting the intermittent traffic flows at this time.

**Table 2.2 : Summary of monitoring results – environmental noise descriptors (dB(A))**

<table>
<thead>
<tr>
<th>Description</th>
<th>Day</th>
<th>Evening</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L_{A1}</td>
<td>L_{Aeq}</td>
<td>RBL</td>
</tr>
<tr>
<td>Copeland Road</td>
<td>77</td>
<td>62</td>
<td>50</td>
</tr>
</tbody>
</table>
Figure 2.1: Location of works and sensitive receivers
3. Construction noise

3.1 Noise assessment criteria

Construction noise impacts are unavoidable due to the nature of the proposed works, construction plant required and the proximity of the sensitive receivers. A reasonable and feasible approach towards noise management is required to reduce noise levels as much as practicable to manage the impact on sensitive receivers such as residences and schools.

The EPA’s *Interim Construction Noise Guidelines* (ICNG) provides guidelines on applying a range of work practices to minimise construction noise impacts rather than focusing on achieving numeric noise levels.

Table 3.1 sets out NMLs that would apply at a residential property boundary most exposed to construction noise, at a height of 1.5m above ground level. Noise levels may be higher at upper floors of the noise affected residence.

Other sensitive land uses, such as schools, typically find noise from construction to be disruptive when the properties are being used. Table 3.2 presents management levels for noise at other sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed. Consultation should be undertaken with noise sensitive land use occupants likely to be affected by noise from the works to schedule the project’s work hours to achieve a reasonable noise outcome.

Where out of hours work extends into the night time period, consideration of sleep disturbance for residential receivers is necessary. This is assessed by considering the maximum noise emissions from construction activities against the existing background noise levels for a given location. The general assessment criterion for sleep disturbance for the proposal is:

\[
L_{A_{max,\text{construction}}} = RBL + 15 \text{ dB(A)}
\]

Levels below these values are unlikely to cause an awakening. Predicted noise impacts from out of hours works and sleep disturbance are included in the construction noise assessment.

Practice note vii of Roads and Maritime’s *Environmental Noise Management Manual* (ENMM 2001) recommends that noise and vibration impacts should be minimised by applying stringent programming restrictions for work conducted outside normal working hours.

Where roadworks are likely to cause noise above the noise and vibration guideline levels, works should be programmed so that noise and vibration at night will not affect any single dwelling or group of dwellings, flats, units and other places of residence on more than two consecutive nights, or on more than a total of six nights over a period of a calendar month.
### Table 3.1: Construction noise management levels (NMLs)

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Management level</th>
<th>How to apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended standard hours</td>
<td>Noise affected (RBL + 10 dB)</td>
<td>The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and the duration, as well as contact details.</td>
</tr>
<tr>
<td>Monday to Friday 7 am to 6 pm</td>
<td>Highly noise affected (75 dB(A))</td>
<td>The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</td>
</tr>
<tr>
<td>Saturday 8 am to 1 pm</td>
<td>Noise affected (RBL + 5 dB)</td>
<td>A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</td>
</tr>
</tbody>
</table>

### Table 3.2: Noise at sensitive land uses (non-residents)

<table>
<thead>
<tr>
<th>Land use</th>
<th>Noise assessment location</th>
<th>Noise management level (LAeq,15 min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classrooms at schools and other educational institutions</td>
<td>Internal</td>
<td>45</td>
</tr>
<tr>
<td>Hospitals and operating theatres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Places of worship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active recreation areas</td>
<td>External</td>
<td>65</td>
</tr>
<tr>
<td>Passive recreation areas</td>
<td>External</td>
<td>60</td>
</tr>
<tr>
<td>Community centres</td>
<td>Dependent on intended use</td>
<td>Maximum internal levels recommended in AS2107 for specific use</td>
</tr>
<tr>
<td>Industrial premises</td>
<td>External</td>
<td>75</td>
</tr>
<tr>
<td>Office, retail outlets</td>
<td>External</td>
<td>70</td>
</tr>
<tr>
<td>Other noise sensitive businesses</td>
<td>Investigation to determine suitable noise levels on project-by-project basis</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Noise prediction

3.2.1 Equipment and program

Noise levels for each construction stage were predicted at the nearest sensitive receivers using SoundPlan, widely used noise modelling software. The model predicted noise levels based on the estimated noise source and propagating factors such as distance, air and ground absorption and structural screening/reflection from nearby buildings. The sound power levels (SWLs) used in the model are listed in Table 3.3. These emissions are based on previously measured noise levels, industry standards and Jacobs’ acoustic databases.

Table 3.3: Estimated sound power levels for each activity

<table>
<thead>
<tr>
<th>Construction phase</th>
<th>Activity</th>
<th>Equipment</th>
<th>Item SWL</th>
<th>Activity SWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-construction</td>
<td>Removal of vegetation and clearing of trees</td>
<td>Chainsaw</td>
<td>104</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chipper (mulcher)</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elevated work platform</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Sub-structure works</td>
<td>Minor excavation</td>
<td>Excavator (12 tonne)</td>
<td>100</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tipper truck</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bob cat</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Piling</td>
<td>Piling rig (large)</td>
<td>107</td>
<td>107</td>
</tr>
<tr>
<td>Stairs and lift shafts</td>
<td>In situ casting of stair supports, landings, lift shafts and bridge deck</td>
<td>Concrete agitator - discharging</td>
<td>99</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete Pump</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete Vibrator</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Span</td>
<td>Lifting of steel arch into place</td>
<td>300t crane</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low float / jinker trailer</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>Finishing</td>
<td>Finish bridge arch into place</td>
<td>Hand tools</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Landscaping</td>
<td>Light vehicle</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hand tools</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Compound</td>
<td>Deliveries and maintenance</td>
<td>Compressor</td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Generator</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Light vehicles</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hiab trucks</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forklift</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
3.2.2  Predicted noise levels

Predicted noise levels at each representative receiver are summarised in Table 3.4.

Beecroft Public School and the Community Centre are expected to experience noise levels in excess of the NML, due to their proximity to the works. Clearing, earthwork and piling represent the greatest risks to amenity.

The risk of adverse impacts on other receivers, including nearby residences in Copeland Road and Beecroft Road is expected to be lower, with predicted noise levels lower than the daytime NMLs for these locations.

Night work, however, including lifting the bridge span into place, is expected to exceed the night NML at several nearby receivers.

In considering night work, Table 3.5 summarises the predicted $L_{A_{1,1}}$ noise levels that may cause disturbance to sleep. Only predictions for residential receivers are displayed here and these show that most works, if conducted during the night period, would likely result in sleep disturbance based on the screening criteria. The most likely out of hour works is the span lift, which is expected to exceed the criterion in two locations.

Compound operations should be minimised at night where possible and/or the scale of activities reduced during operations. Compound work can be a source of impulsive noise (dropping metal, doors slamming, reverse beepers) that may result in complaint. Predictions indicate that a fully operational compound would exceed sleep disturbance criteria.

Noise predictions for works at night should be interpreted in the context of existing noise levels. Measured noise on Beecroft and Copeland Roads resulted in $L_{A_{1}}$ levels of 75 dB(A), which is higher than predicted noise from construction. Hence, while monitoring should be undertaken and additional consideration should be paid to noise impacts at night, the risk of disturbance is reduced since residents are currently exposed to significant noise during the period.

3.2.3  Cumulative impacts

Noise from each assessed construction activity is expected to occur in a sequential manner and has been assessed on an individual basis. Where these activities occur concurrently such as compound operations and construction work, cumulative noise impacts are possible that would result in exceedance of the NMLs. Scheduling and compound layout/location should be considered in a construction noise and vibration management plan for the works.

3.2.4  Compounds

It is possible a second or alternative compound site would be selected in the near vicinity for stockpiling and/or storage of the main span prior to installation. Noise from this location would be short-term and not likely to pose a high risk of impact. Once this site is confirmed, it would be included in the project CNVMP to make sure it is managed effectively.
Table 3.4: Predicted $L_{Aeq}(15\text{ minute})$ noise levels at representative receivers

<table>
<thead>
<tr>
<th>Receiver reference</th>
<th>Address</th>
<th>Receiver type</th>
<th>Noise level - $L_{Aeq}(15\text{ minute})$</th>
<th>Noise management level</th>
<th>Predicted level by activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day</td>
<td>Evening</td>
<td>Night</td>
</tr>
<tr>
<td>1</td>
<td>Beecroft public school</td>
<td>School</td>
<td>65*</td>
<td>N/a</td>
<td>N/a</td>
</tr>
<tr>
<td>2</td>
<td>Beecroft community centre</td>
<td>Varies</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>88 Beecroft Road</td>
<td>Residential</td>
<td>60</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>Beecroft Fire Station</td>
<td>Commercial</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>5</td>
<td>137 Copeland Road</td>
<td>Residential</td>
<td>60</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>136 Copeland Road</td>
<td>Residential</td>
<td>60</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>7</td>
<td>Beecroft Village Green</td>
<td>Recreational</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>8</td>
<td>100 Beecroft Road (Vintage Cellars)</td>
<td>Commercial</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>


Table 3.5: Predicted $L_{A1}(1\text{ minute})$ noise levels at representative residential receivers

<table>
<thead>
<tr>
<th>Receiver reference</th>
<th>Address</th>
<th>Receiver type</th>
<th>Noise level – $L_{A1}(1\text{ minute})$</th>
<th>Sleep disturbance screening criterion</th>
<th>Predicted level by activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day</td>
<td>Clearing</td>
<td>Earthwork</td>
</tr>
<tr>
<td>3</td>
<td>88 Beecroft Road</td>
<td>Residential</td>
<td>48</td>
<td>61</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>137 Copeland Road</td>
<td>Residential</td>
<td>59</td>
<td>59</td>
<td>58</td>
</tr>
<tr>
<td>6</td>
<td>136 Copeland Road</td>
<td>Residential</td>
<td>60</td>
<td>59</td>
<td>61</td>
</tr>
</tbody>
</table>
4. Vibration

Two types of vibration criteria are used to determine the potential for impacts: human comfort criteria are aimed at identifying the potential for disruption of day to day activities while criteria for buildings and structures consider the potential for physical damage to property.

Vibration from construction activities with regard to human comfort must comply with the NSW OEH Assessing Vibration Guideline, as summarised in Table 4.1 for residential receivers at night. The British Standards BS 7385 and BS 5228 provide vibration levels above which cosmetic, minor and major categories of damage may occur. These standards use a vibration velocity metric (peak particle velocity, PPV) which is the peak rate of change over time of a particle displacement.

The works have limited potential to cause vibration disturbances to residents considering there is no vibration intensive equipment proposed for use. A small amount of vibration would be generated by the bored piling rig, with predicted safe working distances for this equipment summarised in Table 4.1.

It is unlikely that human comfort criteria would be exceeded at residential receivers at night. With the close vicinity of the school and community centre buildings, it would be prudent to monitor vibration during piling.

Table 4.1: Approximate generated vibration levels for a jackhammer

<table>
<thead>
<tr>
<th>Plant item</th>
<th>Rating/description</th>
<th>Safe working distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cosmetic damage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(British Std 7385)</td>
</tr>
<tr>
<td>Vibratory roller</td>
<td>&lt;50 kN (typically 1-2 t)</td>
<td>5 m</td>
</tr>
<tr>
<td></td>
<td>&lt;100 kN (typically 2-4 t)</td>
<td>6 m</td>
</tr>
<tr>
<td></td>
<td>&lt;200 kN (typically 4-6 t)</td>
<td>12 m</td>
</tr>
<tr>
<td></td>
<td>&lt;300 kN (typically 7-13 t)</td>
<td>15 m</td>
</tr>
<tr>
<td></td>
<td>&gt;300 kN (typically 13-18 t)</td>
<td>20 m</td>
</tr>
<tr>
<td></td>
<td>&gt;300 kN (&gt; 18 t)</td>
<td>25 m</td>
</tr>
<tr>
<td>Small hydraulic hammer</td>
<td>300 kg – 5 to 12 t excavator</td>
<td>2 m</td>
</tr>
<tr>
<td>Medium hydraulic hammer</td>
<td>900 kg – 12 to 18t excavator</td>
<td>7 m</td>
</tr>
<tr>
<td>Large hydraulic hammer</td>
<td>1600 kg – 18 to 34 t excavator</td>
<td>22 m</td>
</tr>
<tr>
<td>Vibratory pile driver</td>
<td>Sheet piles</td>
<td>2 m to 20 m</td>
</tr>
<tr>
<td>Pile boring</td>
<td>≤800 mm</td>
<td>2 m</td>
</tr>
<tr>
<td>Jackhammer</td>
<td>Hand held</td>
<td>1 m</td>
</tr>
</tbody>
</table>
5. Control measures and safeguards

A range of environmental requirements and control measures are described in the ICNG, ENMM and RMS QA Specification G36. Specific measures to address impacts from noise and vibration should be included in a Construction Noise and Vibration Management Plan (CNVMP) for the works, considering the recommended actions outlined in Section 7 of this REF.
Appendix D Urban design report
RMS Stewardship Maintenance Contract

Beecroft Road Pedestrian Bridge

Prepared by Tract Consultants for Jacobs

0214 0308 LD - R01_02 29 April 2015
Executive Summary

The study area for the Beecroft Road Pedestrian Bridge is located in the suburban setting of Beecroft around 25 kilometres from Sydney CBD within the local government area (LGA) of Hornsby Shire Council. The project is being delivered as part of the Roads and Maritime Services' (Roads and Maritime) Stewardship Maintenance Contract - Sydney West region as a design and construct project.

Beecroft Road is a busy arterial road with four lanes running in both directions. Pedestrian movement at Copeland Road/ Beecroft Road/ Wongala Crescent intersection is high due to its location between Beecroft’s key activity hubs. The intersection connects Beecroft Public School, Beecroft Town Centre, Beecroft Village Green, Beecroft train station and community facilities. A new pedestrian bridge on Beecroft Road is proposed connecting Beecroft Public School, Beecroft Train station, Town Centre and Beecroft Village Green with its broader residential context.

The report provides an urban and landscape design framework to support and assist in the design development of the bridge so that the proposal is sympathetic with its context and responsive to it. The report has been structured to identify existing conditions and character, define urban design objectives and principles to inform the development, identify its landscape character and visual impacts, and then identify mitigation strategies which may be used to enhance the final outcome.

As part of this process five landscape character zones have been identified within the study area. These have been assessed in terms of the proposal and the changes it will have on these zones. Generally the change was determined to have a low to moderate impact with a visible change evident. This change in view however was not considered to be of a scale or nature that was inconsistent with the Beecroft Road corridor and was generally not considered to dominate the road.

Visual Impacts were generally assessed to be low to moderate. The proposals scale and the vegetated context contained and/or absorbed the impacts of the proposal minimising the visibility of the structure.

Mitigation strategies are considered to ensure the structure is well integrated with the existing conditions and its context. Strategies proposed address the following issues architectural form of the bridge, safety and security, ongoing maintenance, buildability, vegetation impacts and visual impact.
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INTRODUCTION

1.1 Background

The study area for the Beecroft Road Pedestrian Bridge is located in the suburban setting of Beecroft around 25 kilometres from Sydney CBD within the local government area (LGA) of Hornsby Shire Council. Refer Regional Context Map (Figure 1).

Beecroft Road is a busy arterial road and the proposed pedestrian bridge is located in an area close to Beecroft train station, Beecroft Town centre, Beecroft Public School, Beecroft Village Green, and community facilities. Pedestrians use the intersection of Beecroft Road and Copeland Road including school children and people with limited mobility.

The site has been identified as part of the NSW Government’s Active Transport Pedestrian Bridge Program which aims to improve safety and access around schools where children have to cross busy main roads. The project is being delivered as part of the Roads and Maritime Services’ (Roads and Maritime) Stewardship Maintenance Contract - Sydney West region as a design and construct project.

Figure 1 – Regional Context Plan (Source: Googlemaps, 2014)
1.2 Purpose of report

Tract Consultants Pty Ltd has been commissioned to provide urban and landscape design input into the development of the Beecroft Road Pedestrian Bridge.

Environmental Impact Assessment Practice Note: Landscape Character and Visual Impact Assessment (EIA No.4) defines when and the level of assessment required for the planning and development of Roads and Maritime projects. Based on this it has been determined that the proposal is of a smaller scale requiring a visual assessment only. Due to the urban nature and presence of a heritage conservation area the addition of a landscape character assessment has been included. An urban design concept and mitigation strategy has been developed which discusses how the impacts of the proposal would be addressed.

The landscape character and visual impact assessment fulfils two main functions, defined in the EIA No.4:

1. To inform the development of the preferred route and concept design so that the proposal can avoid and minimise impacts up front. It must be commenced early in the environmental impact assessment (EIA) process to achieve this goal and integrate with the design process.

2. To inform the RMS, other agencies and the community about the landscape character and visual impact of the proposal and what avoidance, management and mitigation strategies would be implemented.

In addressing the landscape character and visual assessment of the proposal, the guide differentiates between the two categories of assessment with them defined as follows:

“landscape character assessment - the impact on the aggregate of an area’s built, natural and cultural character or sense of place and visual assessment – the assessment of impact on views.

Landscape character and visual assessment are equally important. Landscape character assessment helps determine the overall impact of a project on an area’s character and sense of place. Visual impact assessment helps define the day to day visual effects of a project on people’s views.”

The report has been structured in such a way that it defines the context, character and visual impacts of the proposal to assist in the development of the design.

1.3 Project description

The new pedestrian bridge is proposed at Beecroft Road, Beecroft, around 50 metres south of the Intersection of Copeland Road with Beecroft Road. Refer Local Context Map (Figure 2). The proposed location joins the Beecroft Public School to the west with the Beecroft Village Green to the east and the Beecroft Station and town centre to the north.

The bridge design is based on the pedestrian bridge recently constructed by Roads and Maritime across the Princess Highway at Heathcote. This bridge is based on the Roads and Maritime standard for pedestrian bridges, which is being applied across the metropolitan region at locations that have limited space and are not suited to bridges with ramps.

The bridge comprises a 20 metre steel arch main span of 3.5 metres in width. The bridge would be serviced by lift and stairs on either side of Beecroft Road. The southern pedestrian leg of the Copeland Road, Beecroft Road intersection is to be removed.

1.4 Project objective

A new pedestrian bridge spanning Beecroft Road would:

- Provide a safe crossing for school children and other pedestrians
- Better connect the school and properties on the western side of Beecroft Road to the station, Community Centre and Beecroft Village Green
- Improve traffic flow along Beecroft Road by limiting the amount of time vehicles spend waiting for pedestrians to cross
- Include lifts on each side of Beecroft Road to ensure the bridge is accessible for people with limited mobility and prams.
Figure 2 – Local Context Map (Source: Googlemap, 2014)
2 PROJECT CONTEXT

2.1 Location

The area for the Beecroft Road Pedestrian Bridge is located in the suburban setting of Beecroft which is part of Hornsby Shire Council LGA. It lies between Hannah Street to the north and Welham Street to the south and is boarded to the east by the northern railway line. Refer Local Context Map (Figure 2).

2.2 Land use and built form

The land use surrounding the proposal consists of land mainly zoned as R2 – Low Density Residential, refer Figure 4. This usage includes all land west of Beecroft Road. Much of the existing development within this zoning comprises large residential properties, mainly single storey, and set within leafy gardens.

Beecroft Public School is located in this land use zone adjacent to the proposal site (located on Beecroft Road between Copeland Road and Mary Street). The school complex is typically composed of two storey brick buildings dating from the 1960’s and 1970’s along the Beecroft Road frontage with the original 1897 school building set back beyond. The site is listed as a Local Heritage item.

Figure 3 – Looking west towards Beecroft Public School at the corner of Beecroft Road and Mary Street
East of the proposal is Beecroft Village Green a green reserve zoned RE1 – Public Recreation. This reserve is characterised by native trees including mature Eucalypts with a grass understorey. At the southern end of the reserve a playground and tennis court complex provides a more open character.

The Beecroft Community Centre is located at the northern end on the corner of Copeland Road and Beecroft Road. This is a listed heritage building dating from 1904, (formerly the School of Arts), and dominates the view of the reserve from the north.

Also set within the Village Green, along the Copeland Road frontage is the War Memorial commemorating David John Willis’ involvement in the Boer War.

The village green is a community landscape of local significance.

To the north of Copeland Road the land is zoned B2 – Local Centre. This forms the commercial precinct of the Beecroft Town Centre and adjoins Beecroft Station. It forms a community hub and is a focus for community activity. Development in this zone is varied and the built form is broken up by car parking areas. Future redevelopment of this zone is anticipated as part of the Hornsby Development Control Plan (DCP) 2013.

Figure 4 – Looking east towards the Village Green

Figure 4 – Hornsby LEP, 2013
2.3 Heritage

The study area includes the Beecroft - Cheltenham Heritage Conservation Area. The heritage conservation area is part of a larger landscape of existing roads, houses and vegetation, and has been divided into five precincts under the Hornsby Development Control Plan (DCP) 2013. Refer Heritage Map (Figure 6).

In defining the Conservation Area the following statement of Significance has been made as part of the DCP -

“The Beecroft-Cheltenham Heritage Conservation Area is significant as an example of a government subdivision that was used to fund the development of a railway line. The area developed from 1893 as a township due to its proximity to Beecroft Station.

The Heritage Conservation Area demonstrates a multi-layered history of suburban subdivision, re-subdivision and development from the interim boom period of the Victorian crown land subdivision of 1887 to the 1960’s, and less noticeably into the present day.

The area contains a fine collection of buildings from the Victorian, Federation, Arts and Crafts, Inter-War, and Post-War eras. There have been comparatively few demolitions to interrupt the “development diary” resulting in generally intact early residential fabric and streetscapes.

The Beecroft Village Precinct contains an important public reserve and community buildings including the Beecroft School of Arts and the Beecroft War Memorial that represent the aspiration of a growing suburb. The continuing focus in the Beecroft village for day to day activities and community interaction, together with the community buildings, clubs and activities show an enduring sense of community cohesiveness”

(Hornsby Shire Council, 2013).

The proposal relates to two of the identified heritage precincts:

**Beecroft Cheltenham Plateau Precinct** – Part of the early release subdivision associated with transport corridors. Early development occurred near Beecroft station in the 1880’s. The main building periods are Federation, Edwardian and interwar with some in fill development. Buildings are mainly single storey and well-articulated.

**Beecroft Village Precinct** – Part of the land of the first crown subdivision. Development relates to the early 1900’s including the 1904 School of Arts Building (refer Figure 5b above). In combination with the Fire station and Village Green they create a strong gateway to Beecroft Town Centre.

As part of the DCP, redevelopment of the Village is anticipated including commercial/residential development with residential space provided above a commercial podium. The maximum height within this plan is five stories.
2.4 Connectivity

The proposed bridge is located in the pedestrian catchment of the Beecroft Town Centre, Train station and Beecroft Primary school within a zone that provides immediate access to these facilities from the nearby residential areas to their west. Refer Figure 7. The dominant pedestrian movements are along Copeland Road and Wongala Crescent with corresponding usage of the Beecroft Road/ Copeland Road intersection.

Cycle routes are shown in the Hornsby and Ryde Council Bike Maps. Key routes are along Copeland Road and Kirkham Street. The Ryde Council map shows an informal route along Wongala Avenue and through the Beecroft Village Green linking to The Crescent.
2.5 Landform and hydrology

Beecroft Road is located along the ridge line which runs between Devlins Creek to the west and Byles Creek to the east. It shares this position with the Northern Rail Line.

The alignment of Beecroft Road is gently rising. Between Welham Street and midway between Copeland and Mary Street the alignment is relatively level before transitioning to a small rise which continues to just beyond Hannah Street. The bridge is located within this section which slopes upward at a grade of around 1 vertical: 14 horizontal.
2.6 Vegetation

The vegetation along Beecroft Road and within the broader study area comprises a mixed plant community. A number of remnant vegetation species have been identified in the study area. Refer Vegetation Map (Figure 8).

Areas associated with the Village Green are characterised by a native canopy. This canopy has been identified as consistent with that of the Endangered Ecological Community - Sydney Turpentine-Ironbark Forest. The canopy is dominated by Turpentine (*Syncarpia glomulifera*), Grey Gum (*Eucalyptus punctata*), Grey Ironbark (*Eucalyptus paniculata*) and Sydney Red Gum (*Angophora costata*), with scattered remnant Blackbutt (*Eucalyptus pilularis*). Beneath the remnant trees the understorey comprises mainly exotic grasses and herbaceous weeds. The absence of a native mid and understorey layer means this community does not meet the requirements of the Environmental Protection and Biodiversity Conservation Act (EPBC Act) listed Critically Endangered Ecological Community (CEEC), Biosis 2014.

There are further plantings adjacent to the community hall within the Village Green. These include the following: Water Gum (*Tristainiopsis laurina*), Tallowood (*Eucalyptus microcorys*), Sydney Blue Gum (*Eucalyptus saligna*) and Lilly Pilly (*Acmenea smithii*).

Along the school frontage a landscape buffer of diverse planting reinforces the tree lined character of this section of Beecroft Road. Species within the school boundary include: Magnolia (*Magnolia grandiflora*), Jacaranda (*Jacaranda mimosifolia*), Illawarra Flame Tree (*Brachychiton acerifolius*), Lemon-scented Tea Tree (*Leptospermum petersonii*), Lemon-scented Gum (*Corymbia citriodora*) and White Cedar (*Amelia azederach*).
Figure 8 – Vegetation Map

- Biodiversity (Hornsby Local Environmental Plan, 2013)
- Sydney Turpentine Ironbark Forest (Ecological Constraints, Biosis, 2014)
3 URBAN DESIGN OBJECTIVES AND PRINCIPLES

3.1 Urban and landscape design objectives and principles

To address the impacts of the proposal, several key objectives were developed to define the landscape character and visual impact mitigation recommendations. These were developed to enable the bridge design to respond appropriately to its landscape and visual setting.

The objectives and guiding principles, considered below, are applicable to all design disciplines. The list below, was developed to inform the concept design, detailed design and construction of the bridge. The bridge design is required to consider the visual context of the surrounding area.

The urban design objectives are:

- Develop a concept that respects the heritage context of the site and its overall landscape character. Particular care is to be taken with the school, community centre and the Village Green
- Locate the structure so it can meet community needs. Optimise the location to ensure connectivity to adjacent land uses
- Provide a positive contribution to the local landscape environment of Beecroft
- Minimise the extent of established vegetation clearing in particular within Beecroft Village Green
- Ensure accessibility for all users
- Minimise the need for property acquisition
- Ensure a safe pedestrian environment through the adoption of Crime Prevention Through Environmental Design (CPTED) principals
- Provide a cost effective solution.

In addition to the broader urban design objectives outlined above, the bridge design has adopted a simple design approach. The specific design principles applicable to the bridge are outlined below:

- Use a consistent approach to engineering and architectural components to provide a unified design solution to enhance visual unity and clarity
- The design, form, materials and arrangement of all elements to be simple and refined
- The bridge is to be as visually unobtrusive and transparent as possible to allow the visual attributes of the area to be fully appreciated by road users
- The bridge is to “float” above the road with minimal depth of structure
- The bridge is to provide safe and manageable solutions for maintenance workers and bridge users
- The design should avoid unnecessary elements such as advertising which does not fit into the sensitive location and heritage context.
- The choice of colour is to be chosen to minimise visual impact and to blend with the surrounding environment. The colour is to be consistent with the Roads and Maritime pedestrian bridge colour palette.
- Lighting is to be developed to minimise spill from the bridge while providing sufficient lighting to provide a sense of safety for night time users of the bridge.
4 CONCEPT DESIGN

4.1 Introduction

The bridge design is guided by Roads and Maritimes’ publication, Bridge Aesthetics – Design Guidelines to improve the appearance of bridges in NSW.

The proposal has been developed considering several options in terms of bridge form and methods of access. Alternatives have included bridge options with ramps and stairs which increased the footprint of the proposal, and designs consisting of a main span girder below the deck. However, this increased the depth of the bridge’s superstructure, increased the height of the structure and increased the corresponding footprint of the stairs and ramps.

The selected bridge design, the Roads and Maritimes’ Standard Pedestrian Bridge - similar to that constructed at Heathcote over the Princes Highway (refer Figure 9), minimises the footprint and other design implications referred above by selecting an arch bridge structure with wrap around stairs and lift. This structural form minimises the depth below the deck and limits the structure’s height. Access has been provided via a combination of stairs and lifts, eliminating the need for ramps, which has reduced the proposal’s footprint and property acquisition requirements.

Figure 9 – Recently constructed Heathcote Pedestrian Bridge, Princes Highway
4.2 Siting considerations

An important consideration was reducing conflict with the school grounds and the Village Green, through appropriate siting and footprint minimisation. Several issues were considered in siting the bridge, including:

- Pedestrian movement patterns
- Access to the school - school users are likely to be one of the main user groups of the bridge
- Impacts on the Village Green and particularly remnant vegetation communities
- Impact on vegetation to the front of the school.

Pedestrian movement patterns, in particular the proximity of the bridge to the Copeland Road intersection has been a key consideration. This intersection has been identified as having the highest pedestrian movements and so proximity to this intersection is important in terms of encouraging usage. The structure’s location is 50 metres south of the intersection which has been influenced by constraints associated with the intersection itself, such as safety and being able to maintain a safe line of sight, and the location of the heritage listed community hall.

Access to the school at present is mainly from Copeland Road and Mary Street. Locating the bridge on the Beecroft Road frontage provides an opportunity to access a path connection to the rear of the school carpark. This would potentially enhance use by school users. Any such arrangement would need to be confirmed with the school before proceeding. As part of this agreement the planting of low and medium height shrubs around the proposed bridge would be undertaken.

Vegetation Impacts

Siting of the bridge has considered the significance of the remnant vegetation community and the significance of vegetation to the character of Beecroft Road. Within the Village Green, direct impacts on trees have been limited.

Within the school grounds the vegetation is varied and of mixed quality. The most significant trees within this landscape are the eucalypt trees to the north of the bridge itself and these are retained. A small number of shrubs and exotic tree species would be impacted either directly or by construction access.
4.3 The bridge design

A steel arch bridge is considered to provide the most appropriate solution in terms of architectural form, access issues, pedestrian sightlines, passive surveillance, safety and security concerns, and consideration of future connections.

The concept design includes:
• A steel tied arch in select paint finish with suspended concrete deck, safety balustrades and throw screen mesh
• A translucent roof structure to provide shade and weather protection across the bridge and at the lift entry points
• Reinforced concrete lift shaft with glazing to doors to improve safety
• Eastern, and western facades would be patterned and coloured to minimise their visual impact
• Lighting would be provided across the bridge where required, at the access stairs, lift entry points and along Beecroft Road.

The proposed design provides a contemporary character, through the adoption of a simple and refined solution. The design seeks to be subordinate to its setting which will be reinforced by the colour selection of its elements. Its simplicity underpins its subordinate role, whilst retaining an uncluttered character.

A key consideration in the bridges design has been the handling of access to the bridge. To minimise environmental impacts to the school ground and Village Green, access ramps have been rejected, and a lift proposed instead. This reduces the footprint of the structure and promotes an uncluttered character to the elevation. Figures 11 and 12 provide an artist's impression of the proposal.

The lift shaft forms both the bridge abutment and supports both the bridge and stairs. In minimising the structural elements, the profile of the bridge is simplified.

4.3.1 Western abutment
This lift shaft has been positioned directly adjacent to one of the school buildings to avoid/minimise views from windows. The proposed position avoids any conflicts with current parking within the school grounds, maximises the retention of existing buffer planting zones and mitigates visual impacts from within the classrooms.

A U-shape stair north of the abutment provides the primary access and is integrated with the lift shaft. The stair is located with Beecroft Road proximity in mind, is aligned along the school frontage, with the final leg of the stair perpendicular to Beecroft Road providing access directly to and from Beecroft Road. This arrangement enables the vestibule to be kept clear at ground level and open to the street.

4.3.2 Eastern Abutment
The eastern abutment within the Village Green follows the principles outlined for the western abutment. The abutment’s location has been selected to restrict construction impacts on vegetation to around three native amenity plantings. The design also sought to not affect the remnant canopy of the Village Green.

4.3.3 Landscape Strategy
Two key landscaping strategies are proposed:

1. The minimisation of impacts on existing vegetation, and
2. to create textural interest on the ground plane and to assist in visually mitigating the structure at key areas - i.e. where the structure meets the ground/bank/footpath/school grounds.

The first is achieved by siting and the latter is achieved through remedial planting as part of the proposal. This will incorporate a native plant palette developed in discussion with the Hornsby Shire Council and Beecroft Public School.
Figure 11 – Artist’s impression of pedestrian bridge looking north along Beecroft Road

Figure 12 – Artist’s impression of pedestrian bridge looking south along Beecroft Road
5 ASSESSMENT METHODOLOGY

This section of the report considers the visual impact and effect of the proposal on the landscape character of the study area.

The Roads and Maritime Visual Impact and Environmental Impact Assessment Guidance Note: Guidelines for landscape character and visual impact assessment, 2013 sets out the two main purposes of landscape character and visual impact assessment:

“To inform the development of the preferred route and concept design so that the proposal can avoid and minimise impacts upfront.

To inform the Roads and Maritimes managers, other agencies and the community about the landscape character and visual impact of the proposal and what mitigation strategies would be implemented.”

And defines visual impact assessment and landscape character assessment as follows:

“Landscape character assessment - the assessment of impact on the aggregate of an area’s built, natural and cultural character or sense of place are equally important and visual assessment - the impact on views.

Landscape Character and Visual assessment are equally important. Landscape character assessment helps determine the overall impact of a project on an area’s character and sense of place. Visual impact assessment helps define the day to day visual effects of a project on people’s view.

This dual assessment will help differentiate options, improve route alignment decisions and improve design outcomes.”

5.1 Landscape character and impact assessment

To assess landscape character the local context of the site is broken up into a number of units to assist in understanding the local context and the implications of the proposal. These include defining the landscape character zones (zones of similar spatial or character properties), and the analysis of changes to these zones as a result of the proposed bridge.

Landscape character is defined as:

“The combined quality of built, natural and cultural aspects that make up an area and provide its unique sense of place.”

(EIA No.4 Guidelines, 2013).

The proposal is assessed in terms of its impacts on these character zones and the impact ranked in terms of sensitivity to change. This assessment differs from a visual assessment in that it assesses the overall impact of a proposal on an area’s character and sense of place.
5.2 Visual impact assessment

Visibility

The view fields of a road corridor or object are composed of static receptors i.e. those that adjoin the corridor and mobile receptors include those that travel along the corridor. The impacts of the two groups are unique in that the time and frequency of the exposure differ. The extent to which views can be obtained is referred to as the view catchment.

Static Receptors

Static receptors occur within the visual catchment of the bridge i.e. they are points, which have a view of or can be viewed from the bridge. The visual envelope of the proposal is visually defined by both the topography and vegetation, which adjoins the proposal.

Mobile Receptors

Mobile receptors are the users of Beecroft Road and the adjoining streets and pathways; in this instance the vehicles which use Beecroft Road and pedestrians that travel either through the Village Green or along Beecroft Road. Their experience of the space is short term.

5.3 Landscape character and visual assessment matrix

Landscape character and visual assessment are equally important. Landscape character assessment helps determine the overall impact of a proposal on an area’s character and sense of place including all built, natural and cultural aspects, covering towns, countryside and all shades between. Visual impact assessment helps define the day to day visual effects of a proposal on people’s views.

To quantify these impacts it is important to assess two qualities in relation to landscape character or viewpoint. These are: Sensitivity and Magnitude

"Sensitivity refers to the qualities of an area, the type 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."

\[(EIA\ No.4\ Guidelines,\ 2013)\]

As part of the assessment, Roads and Maritime, has adopted a matrix which combines sensitivity rankings with magnitude to determine the proposal’s overall impact. This has been used to inform the Landscape Character and Visual Impact Assessment. Refer Table 1.

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<th>Magnitude</th>
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Table 1 – Landscape Character and Visual Impact Assessment Matrix

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<th>Sensitivity</th>
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<th>Moderate</th>
<th>Moderate - Low</th>
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6 LANDSCAPE CHARACTER AND VISUAL ASSESSMENT

6.1 Landscape Character Assessment

This section of the report reviews the physical attributes of the character zones and the proposal’s potential impacts. As part of the character assessment, five distinct zones have been identified, refer Figure 13. These are:

- Zone 1 Beecroft Town Centre
- Zone 2 Northern Residential
- Zone 3 Beecroft Public School
- Zone 4 Southern Residential
- Zone 5 Beecroft Village Green
Figure 13 – Landscape Character Map
6.1.1 Character Zone 1 – Beecroft Commercial Precinct
This zone is located adjacent to the Beecroft train station, running from north of Hannah Street and bounded by Wongala Crescent and Beecroft Road, refer Figure 14. Its built form is characterised by both old and new buildings, typically two storeys in height, although this ranges from single to four storeys.

Figure 14 – Commercial precinct to the west of Beecroft Station, view of Hannah Street/ Wongala Crescent intersection

This is the commercial hub of the suburb. Several at grade car parking areas have been provided which break up the mass and distribution of the built form, refer Figure 14. A cohesive character along Hannah Street is achieved in the streetscape through use of ornamental pear trees as street tree planting. Beecroft Road presents a commercial frontage along its eastern edge.

Sensitivity
Use as a commercial precinct limits the sensitivity of this precinct to change. Its relatively incoherent character further reinforces this assessment as there are several built forms and materials used within the precinct. This character zone is also largely removed from addressing the proposed bridge location with only properties within Beecroft Road or its intersection with Copeland Road exposed to it. The site is consequently assessed as of low sensitivity.

Magnitude
The distance of the Commercial Precinct from the proposal varies from 100 to 300 metres to the north. The scale of the proposal in relation to this distance is considered to have a moderate impact which is reduced further by the acute angle at which the proposal would be viewed. The magnitude is therefore considered to be low.

The overall impact on the landscape character of the Commercial Precinct is low.
6.1.2 Character Zone 2 – Northern Residential Precinct
Located north of Copeland Road, west of Beecroft Road this precinct consists of two distinct characters.

1. Beecroft Road has seen a degree of development occur. The built form consists of a mix of heritage homes (a number of listed properties occur near the intersection of Copeland Road and Beecroft Road), a church, and unit developments from the 1970’s to 1990’s. All development has a common setback to allow for the establishment of a vegetated buffer. Refer Figure 16 below.

2. Copeland Road has a more traditional suburban scale of development which is mainly influenced by stands of vegetation. Copeland Gardens Nursing home is located west of the Beecroft Road intersection and introduces a modern two storey frontage to the otherwise period street.
Sensitivity

As a residential precinct sensitivity is considered high. In this instance those properties closest to the proposal are in part also heritage listed which has been considered in its high listing.

Magnitude

The distance of the proposal varies from 100 to 300 metres to the Northern Residential Precinct. Several of the sites are screened by vegetation or landscaped setbacks located behind a wall which is commonplace along Beecroft Road. The scale of the proposal in relation to these attributes is considered to have a low impact.

The overall impact for the northern residential precinct is considered to be moderate. This considers the proximity of residential receivers to the proposal.
6.1.3 Character Zone 3 – Beecroft Public School

Beecroft Public School is adjacent to Beecroft Road with access primarily off Copeland Road or Mary Street. The school buildings along this frontage are a mix of two storey brick buildings from the 1960’s and 1970’s. With access from the side streets a vegetated buffer of around 5 metres has been established which is composed of a mix of exotic and native trees. This frontage helps to reinforce the tree lined character of the road through this zone. Refer to Figure 17.

The property boundary of the school is defined by an 1800mm high green palisade fence. The path in front is further defined by the presence of a 1200mm high pedestrian fence adjacent to the kerb to control pedestrian movements.

Along Mary Street a more residential character is presented with the original heritage school buildings and an established tree canopy. To the west of these buildings is a playing field which provides a green buffer to the adjoining residential dwellings.

Sensitivity

The green buffer surrounding the school provides a sense of separation from the busy Beecroft Road. Provided this buffer is retained the sensitivity of the school to the proposed change created by the new bridge would be reduced. The proposal requires some acquisition of school lands and some vegetation removal. The sensitivity is considered moderate.

Magnitude

The scale of the proposal in relation to the school buildings is similar. The bridge deck is at a level which relates to the ceiling level of the second storey of the adjoining building and is a similar overall height to its rooftop. By locating the bridge in relation to these similarly scaled elements it assists in integrating it with its surroundings. The magnitude of the impact is moderate.

The impact on the landscape character of the school zone is considered moderate. This reflects the proposal’s impacts on vegetation and the relative scale of the bridge to the school buildings.

Figure 17 – Beecroft Public School. Looking south west from Beecroft and Copeland Road intersection
6.1.4  Character Zone 4 – Residential Precinct South

Located south of Mary Street, this residential precinct comprises the southern part of the study area. Similar to the northern residential precinct, there is a mix of heritage and modern residential buildings. The maximum height of these is two storeys. The landscape set back of these properties plays an important role in establishing the leafy character of the district. This is reinforced by street tree planting. Along Beecroft Road a strong characteristic of this frontage includes hedges and a high level front fence or wall - (Figure 18).

At the corner of Mary Street is a commercial property – a bottle shop set within a heritage building. This building is listed as a Local Heritage Item and fronts directly onto the street without a setback. (Figure 19).

Sensitivity

The distance from this site and the limited exposure of much of this zone has seen the precinct assessed as having a low sensitivity.

Magnitude

The Residential South precinct is located a minimum 150 metres from the proposal. The magnitude of its impact is considered low.

The proposal’s overall impact on the residential precinct south is low. This reflects the distance to the proposal and the limited viewing opportunities from within the zone.

Figure 18 – Walls and Hedges front Beecroft Road in this precinct

Figure 19 – Bottle shop at the corner of Mary Street looking north along Beecroft Road
6.1.5 Character Zone 5 – The Village Green

The Village Green is located south of Copeland Road. Adjacent to the Village Green are the Railway, Beecroft Road, The Crescent and the proposal. It provides a strong green edge along Beecroft Road, which reinforces the vegetated nature of the suburb.

The tall established canopy of the native Sydney Turpentine Ironbark forest community plays a strong role in contributing to the character of Beecroft Road. The topography falls to the east towards the railway line placing greater emphasis on any structure along Beecroft Road as the viewer looks up to it. This is reduced when the structure is viewed from the Village Green as the canopy blocks the views.

At the southern end of the Village Green, the landscape begins to open up with several tennis courts providing a more open character. To the north, the sense of enclosure is maintained but framed by the historic Beecroft Community Hall which sits on the corner of Copeland Road and Beecroft Road. Refer to Figure 20.

Sensitivity

The Village Green contributes significantly to the character of the road and the suburb as a whole, reinforcing the sense of a green leafy suburb as road users and pedestrians pass along Beecroft Road. It is considered as highly sensitive to any development along its frontage.

Magnitude

The magnitude of the proposal has been kept to a localised point on the edge of the Village Green with minimal impact to vegetation. Its impact is considered to be low to moderate. This reflects the proposal’s proximity to the Beecroft Community Centre and the overall historic significance of the landscape.

The overall impact for the Village Green is moderate to high.
6.2 Landscape character impact assessment summary

The overall landscape character of the environment in which the proposed bridge is located is not going to change dramatically with the landscape character assessment revealing a low to moderate impact.

Beecroft Road forms the primary visual element within the landscape which is balanced by the Village Green and Beecroft Public School to either side. While the construction of a new bridge structure within the streetscape introduces a new element to the scene the overall character of the street is maintained. This is achieved through the careful consideration of bridge form, siting and its general transparency to ensure that minimal impact occurs.

The following summarises this change.

Table 2 – Summary of landscape character assessment

<table>
<thead>
<tr>
<th>Character Zone</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Zone 2</td>
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<tr>
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<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Zone 4</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Zone 5</td>
<td>High</td>
<td>Low to Moderate</td>
<td>Moderate to High</td>
</tr>
</tbody>
</table>
6.3 Visual impact assessment

The potential visual impact of the proposed pedestrian bridge has been assessed in relation to a number of key viewpoints and/or group of viewpoints. It is based on the existing land use pattern and development adjoining the proposals location.

The assessment method has comprised:

- Defining the scale of the proposal
- Identification of key visual envelopes, viewpoints and groups of viewpoints from which the proposal is visible
- Assessment of the level of impact on the proposed viewpoints from the proposal.

6.3.1 Visual envelop mapping

A detailed field and desktop assessment of the alignment was carried out to determine the area from where the proposal is visible as defined in the Visual Envelope Map, (Figure 23). The proposal’s visibility is influenced primarily by landuse, vegetation and topography. Site assessment of the pedestrian bridge proposal reveals this will primarily be visible from the Beecroft Road corridor itself.

6.3.2 Key viewpoints

Viewpoint 1 (VPT1) – Beecroft Road Commercial Precinct

Views: The view is looking down Beecroft Road towards the Village Green from the frontages of commercial/retail properties. The proposal occurs in the mid ground some 150 metres from the viewer with a backdrop of vegetation. The furniture and the activity of the road dominate the foreground and consequently the view. Refer to Figure 21 and 22.

Sensitivity: Sensitivity has been assessed as low – due to the distance to the site, the activity within the corridor and the fact the structure does not impinge on the skyline.

Magnitude: The magnitude of the proposal on the view is low.

Figure 21 – VPT1 – View from Beecroft Road Shops looking to Copeland Road Intersection.

Figure 22 – VPT1 – Diagrammatic representation of proposal from Beecroft Road Shops looking to Copeland Road Intersection.
Figure 23 – Visual Envelope Map
Viewpoint 2 (VPT2) – Intersection of Beecroft Road and Copeland Road

**Views:** The view is looking down Beecroft Road towards the Village Green from the intersection of Beecroft Road and Copeland Road. The view is that of a road user or pedestrian passing through the intersection some 75 metres from the proposal. The margins of the road are flanked by trees with the bridge structure to be set within the trees, which restricts views of the stairs and lift shafts. The Beecroft Community Centre is located in the mid-ground of the view (left of Figures 24 and 25). The bridge is located behind the centre minimising its impact on its context. The vegetation and housing to the south of the site terminate the view and will form the back drop to the proposal.

**Sensitivity:** Sensitivity has been assessed as moderate – due to the distance to the proposal, the activity within the corridor and the fact the structure does not impinge on the skyline. Its impact on the heritage community centre is limited by its placement beyond it and the scale of the proposed bridge being similar to that of the community centre.

**Magnitude:** The magnitude of the proposal on the view is considered to be moderate as a distinct change is visible within the view field. The nature of the structure has maintained a transparency to the structure, to reduce its dominance.

*Figure 24 – VPT2 – View from Beecroft Road Copeland Road Intersection*
Viewpoint 3 (VPT3) – Northern end of the Beecroft Public School frontage

**Views:** Viewpoint 3 looks down Beecroft Road towards the Village Green from the intersection of Beecroft Road and Copeland Road. Refer to Figures 26 and 27. This view is that of a road user or pedestrian passing through the intersection some 50 metres from the proposal. The margins of the road are flanked by trees with the bridge structure to be set within the trees, restricting views of the stairs and lift shafts. The vegetation and housing to the south of the site form the back drop to the proposal terminating the view.

**Sensitivity:** Sensitivity has been assessed as moderate – due to the relative close proximity of the proposed site, the activity within Beecroft Road and the fact the structure does not impinge on the skyline.

**Magnitude:** The magnitude of the proposal on the view is moderate as it creates a distinct change to the view. The nature of this change while visible is not a substantial change in character or scale.
Viewpoint 4 – Southern end of the Beecroft Public School frontage

Views: Viewpoint 4 is located out the front of the school looking north up Beecroft Road towards Copeland Road. Refer Figures to 28 and 29. The view is that of a road user or pedestrian heading north some 50 metres from the proposed bridge location.

Vegetation lines both sides of the corridor defining the corridor and providing a backdrop to the road infrastructure and associated furniture including light poles, fencing etc.

Sensitivity: Sensitivity has been assessed as moderate – vegetation within the corridor has the ability to conceal or act as a backdrop to any proposed structure. Whereas the presence of the local heritage listed Community Centre within the background increases the sensitivity of this view point.

Magnitude: The magnitude of the proposal on the view is moderate as a distinct change is visible within the view field. The critical issue in this view is the proposal’s proximity to the Community Centre. The visual dominance of the proposed structure is reduced by its relative transparency; the contexts ability to absorb change due to vegetation cover; and the distance from the viewer.
Viewpoint 5 – Welham Street looking north

**Views:** Viewpoint 5 looks up Beecroft Road towards the Beecroft Public School from the intersection of Welham Street and Beecroft Road. Refers to Figure 30 and 31. The view provided is that of a road user, pedestrian, or adjoining resident and is located some 200 metres from the proposal. Like the previous viewpoint the vegetated corridor provides a level of resilience with the corridor to accommodate changes.

**Sensitivity:** Sensitivity has been assessed as low—due to the distance from the proposed site, (some 200m), the activity within the corridor and the fact the structure does not impinge on the skyline.

**Magnitude:** The magnitude of the proposal on the view is considered to be low due to the distance from the proposal, the relatively small scale of the proposed bridge within the landscape and the general composition of the bridge itself, which is relatively transparent, which all combine to reduce its dominance.

![Figure 30 – VPT5 – View from corner of Welham Street and Beecroft Road looking north](image-url)
Viewpoint 6 – Village Green looking north

Views: Viewpoint 6 represents the view from within the Village Green looking north up towards Beecroft Road. This is from the pedestrian link which runs through the park parallel to the rail corridor. Refer to Figures 32 and 33. Vegetation cover and the topography of the park minimise views to Beecroft Road and dominate the foreground.

Sensitivity: Sensitivity has been assessed as high – due to the Villages Greens primary use for passive recreation and the importance of the vegetation community.

Magnitude: The magnitude of the proposal on the view is low.

The tree canopy provides a relatively dense screen from within the Village Green. The structures itself is relatively transparent with the exception of the lift shaft and stairs. Despite the solidity of these elements, the impact of the vegetation cover ensures that views are restricted.
Viewpoint 7 – View looking north along Beecroft Road

**Views:** The view is looking up Beecroft Road towards the Beecroft Public School and the Copeland Street intersection from the eastern side of Beecroft Road. The view is that of a pedestrian, or park user, heading north, and is located some 100 metres from the proposal. The view illustrates, refer Figures 34 and 35, the tree-lined nature of the corridor and the dominance of the road within this landscape.

**Sensitivity:** Sensitivity has been assessed as moderate – while the view is defined by vegetation, which has the capacity to absorb potential changes, a relatively clear view of the sky is provided over Beecroft Road. Any proposed structure over Beecroft Road would be clearly visible lifting the view’s sensitivity.

**Magnitude:** The proposal’s magnitude on the view is moderate as a distinct change is visible within the view field. The bridge would be clearly visible within the mid-ground of the photo, its impact is considered moderate due to the relatively transparent nature of the structure.
Figure 35 – VP7– Diagrammatic representation of proposal looking north along Beecroft Road
Viewpoint 8 – View looking west to Beecroft Road from path at back of Community Hall

Views: Viewpoint 8 differs from all other views in that it relates to the relative proximity of the proposed structure to that of the heritage listed community hall. The view looks up towards Beecroft Road and the Beecroft Public School beyond from the rear of the Community Hall. Refer to Figures 36 and 37. The view is that of a pedestrian, or park user and is located within 30 metres of the proposal. Vegetation plays a significant role within the view dominating mid-ground and filtering views to the road.

Sensitivity: Sensitivity has been assessed as moderate – due to the presence of the heritage listed community hall, the fact that the side of the hall consists of a blank brick façade, and the effect of the vegetation to filter views.

Magnitude: The magnitude of the proposal on the view is considered moderate. A distinct change is visible within the view field by the introduction of the proposed structure. The form of the structure, while views are partially filtered by the vegetation cover, would provide a distinct contrast with the form and character of the community hall as the lift shaft and stairs are exposed to the viewer.
6.4 Visual Impact Assessment Summary

Generally the proposal represents a low or moderate visual impact. The proposal’s scale and the vegetated context indicate the visual impacts are relatively contained or absorbed within the landscape context. This reflects the nature of the corridor, within a heritage precinct, adjoining a combination of commercial, residential, educational and recreational facilities and the corridor’s relative ability to absorb change. The accompanying table summarises these findings.

Table 3 – Visual impact assessment summary

<table>
<thead>
<tr>
<th>View point</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Impact</th>
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<tbody>
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<td>View point 1</td>
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<tr>
<td>View point 8</td>
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</tr>
</tbody>
</table>
MITIGATION STRATEGIES

The concept design process has considered the siting and form of the proposed pedestrian bridge, including the:

- Architectural form of the bridge
- Safety and security
- Ongoing maintenance
- Buildability
- Vegetation impacts, and
- Visual impact

The adoption of the Roads and Maritimes standard bridge form already provides a good design fit. Further refinements may be required during detail design to enable a considered, neat and integrated structure.

This includes management of:

- stormwater drainage and downpipes would be located so that bends, junctions, and changes in design are minimised
- the treatment of the corbel supporting the bridge structure can be reduced in scale opening up the front of the lift shaft
- lighting and its integration with the bridge form, designed to limit light spill, and
- stairs (supports designed as simple element) which supports the entire flight rather than using multiple supports.

Colour selection for the span would play a significant role in the visibility of the bridge. The final colour scheme would be selected based on the bridge’s ability to blend with its background. The proposed colour scheme would be finalised during detailed design and be consistent with Roads and Maritime colour standards.

7.1 Construction management

Construction management would play an important role in reducing potential landscape and visual impacts, as construction impacts can have long term impacts depending on the nature of the works. As part of the management of environmental impacts, a Construction Environmental Management Plan (CEMP) would define work areas and propose mitigation measures to be implemented by the selected contractor.
Bridge construction requires specified clearances to be maintained, to ensure safe work distances are provided for the operation of cranes. Trees in close proximity to the proposal could impede the effectiveness of the lift and accurate placement of the bridge span. The following strategies are proposed:

- Access for construction traffic from Beecroft Road and Copeland Road East
- An Arborist would assess any proposal to trim trees to enhance access to ensure form is not interrupted and stability is maintained
- Limit vegetation removal, to the absolute minimum required to construct the bridge
- Remove planted tree species only
- Minimise disruption to existing pedestrian movement and provide alternative direct paths of travel where impacted
- Reinstate any disturbed area to the level of finish prior to construction
- Replace any tree lost as part of the proposal with a new one in discussion with the impacted property owner.
CONCLUSION

The design of the proposed bridge has adopted the Roads and Maritime Service’s standard pedestrian bridge design to maintain identity, ensure minimal design standards are met, and provide efficiency in construction. The design has been modified to reflect the context and limitations of the Beecroft Road location and has incorporated both lift and stair components to alleviate the need for ramps and the corresponding increase in footprint.

An assessment of both the landscape character and visual impact of the proposal has been made. The landscape character assessment determined the bridge would generally have a low to moderate impact, with visible change evident. This change in view however was not considered to be of a scale or nature that was inconsistent with the Beecroft Road corridor and was generally not considered to dominate the road.

Visual impacts were generally assessed to be low to moderate. The proposal’s scale and the vegetated context contained and/or absorbed the impacts of the proposal minimising the visibility of the structure.

Views were assessed to be primarily from Beecroft Road and its adjoining landuse with the greatest impact occurring between Copeland Street and Mary Street and in particular the Beecroft Public School and Village Green.

In addressing the findings of the landscape character and visual assessment, a key aspect of the design has been its response to the landscape and visual setting of the Beecroft area. This has included taking account of the sensitivities of nearby heritage features including the Beecroft Public School, Village Green and the community centre. Integral to the design strategy has been the objective to minimise the bridge’s footprint, maximising the transparency of the structure including minimisation of structural depth and incorporation of a translucent roof covering and the selection of appropriate colouring to blend into the adjoining landscape and streetscape.

By adopting these initiatives, the proposal has been designed to integrate with its landscape and visual setting, and to respect the heritage fabric of the area. This has been achieved by providing a ‘clean’ design that is simple and uncluttered and that has a contemporary character, which includes design considerations from the recently constructed pedestrian bridge at Heathcote.
REFERENCES

Biosis (October 2014) Flora and Fauna Constraints Assessment, Pedestrian Bridge, Beecroft Road, Beecroft.


Roads and Maritime (2012) Bridge Aesthetics - Design Guidelines to improve the appearance of bridges in NSW


RTA Road Design Guidelines

Web Sites:

Local Environmental plans and mapping

Appendix E Biodiversity report
30 March 2015

Alastair Hammond
Jacobs
Senior Environmental Planner
NSW Environmental Planning and Management
100 Christie St, St Leonards, NSW, 2065, Australia

Dear Alastair,

Re: Biodiversity Assessment Pedestrian Bridge Beecroft Road Beecroft

Project no. 18917

Biosis Pty Ltd was engaged by Jacobs to conduct a flora and fauna assessment as part of the DownerMouchel Stewardship Maintenance Contract (SMC) for the Roads and Maritime Services (Roads and Maritime) Pedestrian Bridge project (the Proposal) located around 50 metres south of the Beecroft Road/Copeland Road intersection, Beecroft, within the Hornsby Shire Council area (study area, as shown in Figure 1).

It is understood Roads and Maritime are proposing to build a pedestrian bridge overpass on Beecroft Road between Mary Street and Copeland Road to provide safer crossing between Beecroft Primary School and the Beecroft Village Green. To facilitate construction, vehicles would access Beecroft Village Green and Beecroft Primary School via Beecroft Road and Copeland Road.

An initial constraints assessment was completed by Biosis (2014), the results of which were presented in a constraints memorandum (memo) to inform the design process and minimise impacts to biodiversity. Following the release of the preferred option drawings (Jacobs, 2014/2015) the potential impacts of the Proposal have been further assessed and the results are presented in this report.

This assessment outlines the findings of the constraints memo and determines the likely impacts of the Proposal on threatened flora, fauna or ecological communities (biota) identified in the constraints memo. This flora and fauna assessment has been prepared based on information provided by Jacobs (including the preferred option drawings (Jacobs 2014)), as well as a field investigation carried out on 22 September 2014 by Jane Murray and guided by Jacobs.

Site history and context

The study area for this flora and fauna assessment is defined as the impact area for the Pedestrian Bridge as well as the adjoining area to be potentially impacted by the Proposal. The study area includes: the roadside vegetation within the Beecroft Primary School boundary fence as well as the vegetation to the east, south and west of the Beecroft Community Centre within Beecroft Village Green. The study area is bisected by Beecroft Road and bounded by Copeland Road to the north, within the Hornsby Shire Council Local Government Area (LGA). Adjoining land use includes the railway line and Beecroft Train Station, Beecroft Primary school to the west, Beecroft Community Centre to the north, Beecroft shopping village, roads and residential areas (Figure 1).
Background research

Prior to completing the field investigation, documentation provided by Jacobs as well as other key information was reviewed, including:

- Relevant aerial imagery and vegetation mapping via Office of Environment and Heritage (OEH) Vegetation Information System (VIS) Mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer, including:
  - Sydney Metropolitan Catchment Management Area Mapping (2013)
  - Native Vegetation of the Cumberland Plain (NPWS 2002)
  - Native Vegetation Communities of Hornsby Shire (Smith & Smith 2008)
  - Native vegetation of south eastern NSW: a revised classification and map for the coast and eastern tablelands. (SCIVI) (Tozer et al. 2010)
- OEH BioNet Atlas of NSW Wildlife (OEH 2013a)
- Department of the Environment (DoE) Protected Matters Search Tool
- NSW Department of Primary Industries (DPI) Noxious Weed Declarations for Hornsby Shire Council LGA.

Relevant Legislation

The implications for the Proposal were assessed in relation to key biodiversity legislation and policy including:

- Environment Protection and Biodiversity Conservation Act 1999
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Threatened Species Conservation Act 1995
- Native Vegetation Act 2003 (NV Act)
- National Parks and Wildlife Act 1974
- Noxious Weeds Act 1993

Field investigation

Jane Murray, Principal Ecologist with the Biosis Sydney office, visited the study area (Figure 1) adjacent to Beecroft Road in Beecroft on 22 September 2014 to determine the flora and fauna values (constraints) of the study area and assess the potential impacts of the proposed pedestrian bridge overpass on those values. Vegetation within the study area was surveyed using the random meander technique (Cropper 1993). Jacobs provided guidance to ensure the assessment covered the proposed impact areas.

The field investigation completed by Biosis focussed on the study area, particularly the Beecroft Primary School boundary vegetation and vegetation and associated ecological attributes within Beecroft Village Green.
Findings

Prior to the field investigation, Biosis established that Beecroft Village Green has been previously mapped as Sydney Turpentine-Ironbark Forest (SMCMA 2013; Hornsby LGA 2008; SCIVI 2002). Sydney Turpentine-Ironbark Forest is listed as an EEC under the NSW TSC Act and equivalent to Turpentine-Ironbark Forest in the Sydney Basin Bioregion, a Critically Endangered Ecological Community (CEEC) listed under the EPBC Act. Vegetation within the study area was assessed against the OEH and DoE EEC/CEEC Final Determination (NSW Scientific Committee, 2005 and Threatened Species Scientific Committee, 2005) and listing advice for Sydney Turpentine-Ironbark Forest to establish the presence or absence.

Vegetation within the study area was divided into three broad communities, one with remnant native trees of a forest structure over a mown and maintained Council parkland within Beecroft Village Green. The second community comprised planted natives and exotics within Beecroft Village Green and within the School boundary and the final community including exotic grasses around the Beecroft Community Centre (Figure 1). The soils within the study area were found to be clayey and likely derived from Wianamatta Group Shales typical of the soil landscapes of the hills and crests of the Beecroft suburb area.

The first community, comprised of remnant native trees of a forest structure over mown and highly maintained parkland (Beecroft Village Green) was found to comprise TSC Act listed EEC, Sydney Turpentine-Ironbark Forest community (Figure 1 and Plate 1). The community was characterised by a canopy of; Turpentine Syncarpia glomulifera, Grey Gum Eucalyptus punctata, Grey Ironbark Eucalyptus paniculata and Sydney Red Gum Angophora costata, with scattered remnant Blackbutt Eucalyptus pilularis. Beneath the remnant trees the understorey comprised mainly exotic grasses and herbaceous weeds including; Buffalo Grass Stenotaphrum secundatum, Kikuyu Pennisetum clandestinum, Fleabane Conyza bonariensis, Catsear Hypochaeris radicata and Panic Veldtgrass Ehrharta erecta. Due to the landscape position, remnant tree species composition, average high rainfall (known in the Beecroft area) and soil strata, this community was determined to align with the TSC Act listed Sydney Turpentine-Ironbark Forest (OEH 2013, NSW Scientific Committee 2005). However this community was not found to meet the EPBC Act listed CEEC, despite the patch size being around one hectare with a crown cover equal to or exceeding 10%, as there are no diagnostic native midstorey/understorey species (DoE 2014).

The second community, Planted Natives and Exotics (Figure 1 and Plate 2 and 3), was located within the Beecroft Primary School boundary and was characterised by common native and exotic landscape species such as; Magnolia Magnolia grandiflora, Jacaranda Jacaranda mimosifolia, Illawarra Flame Tree Brachychiton acerifolius, Lemon-scented Tea Tree Leptospermum petersonii and Lemon-scented Gum Corymbia citriodora. This community was also present within Beecroft Village Green and contains tree species such as; Water Gum Tristainiopsis laurina, Tallowood Eucalyptus microcorys, Sydney Blue Gum Eucalyptus saligna and Lilly Pilly Acmenea smithii. This community has been mapped as moderate and low constraint depending on the species planted. Species suitable to the area (endemic) have been mapped as moderate constraint while species more broadly native to Australia, but not locally endemic, have been given a low constraint class (Figure 1).

The final vegetation community, occurring around the Beecroft Community Centre comprises Exotic Grasses (Figure 1 and Plate 4) with weeds such as; Buffalo Grass Bouteloua dactyloides, Kikuyu Pennisetum clandestinum, Fleabane Conyza bonariensis, Catsear Hypochaeris radicata and Panic Veldtgrass Ehrharta erecta. This community is highly modified, mown regularly and has been mapped as a low constraint class (Figure 1).

No TSC Act or EPBC Act listed threatened flora species were identified within the study area during the field investigation, nor is the study area considered to provide habitat for any threatened flora previously recorded within the five kilometre locality.
No TSC Act or EPBC Act listed threatened fauna was identified within the study area. The background research identified that a number of threatened species have been previously recorded within the five kilometre locality. The following species were considered moderately likely to opportunistically utilise resources (hollow-bearing trees and flowering eucalypts) within the Beecroft Village Green:

- Glossy black-cockatoo *Calyptorhynchus lathami* (Vulnerable, TSC Act)
- Swift Parrot *Lathamus discolor* (Endangered, TSC Act and EPBC Act)
- Eastern Bentwing-bat *Miniopterus schreibersii oceaneensis* (Vulnerable, TSC Act)
- Powerful Owl *Ninox strenua* (Vulnerable, TSC Act)
- Grey-headed Flying Fox *Pteropus poliocephalus* (Vulnerable, TSC Act and EPBC Act)

During the site visit, two DPI listed Class 4 noxious weeds within the Hornsby Shire Council LGA were identified within the study area, the details and requirements for each are outlined below in Table 1.

### Table 1: Noxious weeds identified within the study area

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Class</th>
<th>Legal Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cinnamomum camphora</em></td>
<td>Camphor Laurel</td>
<td>4</td>
<td>The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction and the plant must not be sold propagated or knowingly distributed.</td>
</tr>
<tr>
<td><em>Ligustrum lucidum</em></td>
<td>Smal-leaf Privet</td>
<td>4</td>
<td>The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction and the plant must not be sold propagated or knowingly distributed.</td>
</tr>
</tbody>
</table>

A full list of the flora and fauna species identified within the study area is provided in Appendix 2.

**Impacts**

**Direct impacts**

The design of the pedestrian overbridge was selected for optimal design reasons including engineering, constructability and safety considerations and to avoid and minimise impacts to ecological constraints identified in the Biosis (2014) constraints memo. The proposed alignment of the bridge would avoid the need for clearing of identified TSC Act listed Sydney Turpentine-Ironbark Forest EEC (Figure 1). Direct impacts would, instead, be restricted to the selective trimming of some branches of one Red Stringybark *Eucalyptus macrorhyncha* and removal of one juvenile Turpentine and Planted Natives and Exotics (up to five Water Gum's in the Beecroft Village Green as well as 12 trees in the Beecroft Primary school; one Water Gum, four Lemon-scented Teatrees, four White Cedar’s, two Jacarandas, one Chinese Elm and one Bottlebrush *Callistemon* sp.) and the Exotic Grasses communities, all considered to be of low ecological constraint. It should be noted that the four Lemon-scented Gums to the north of the bridge footprint, situated amongst the Lemon-scented Teatrees will be retained (Figure 1).

To facilitate access to the construction footprint for plant and personnel, machinery (e.g. cranes and piling rigs) would access the site through temporary road/lane closures (where required) and direct access via crane from Beecroft Road and Copeland Road via the school car park.

To adequately assess the significance of impacts to the TSC Act listed Sydney Turpentine-Ironbark Forest EEC, an Assessment of Significance (AoS) in accordance with Section 5A of the EP&A Act was completed.
In summary it was determined the potential impacts on the EEC will not be significant based on the proposed works and therefore a Species Impact Statement is not required.

**Indirect impacts**

As previously stated, direct impacts (clearing) would be restricted to the selective trimming of some branches of one Red Stringybark *Eucalyptus macrorhyncha* as well as removal of one juvenile Turpentine and Planted Natives and Exotics and Exotic Grasses communities. The constraints memo identified that the Sydney Turpentine-Ironbark Forest EEC and hollow-bearing trees recorded within the study area provide the greatest biodiversity value. There would be no direct impacts to either of these constraints, however potential indirect impacts to these values include:

- Inadvertent damage or clearing
- Erosion and/or sedimentation
- Increased sound and light pollution (temporary).

Given the urban setting of the study area, it is considered the proposed mitigation measures outlined below are adequate to minimise the potential for indirect impacts on biodiversity values.

**Concluding Advice and Recommendations**

The study area supports Sydney Turpentine-Ironbark Forest EEC, however no threatened flora or flora populations were recorded within the study area, nor is it considered likely to provide potential habitat for any previously recorded within five kilometres of the study area.

The study area does have the potential to support foraging and roosting threatened fauna such as; birds, owls and flying-fox, however, given that the Proposal does not require the removal of remnant native trees (flowering eucalypts) or hollow-bearing trees, the Proposal would not have any impact on such species.

The recommendations outlined below would ensure that indirect impacts are prevented during the construction phase (no operational impacts are anticipated as part of the Proposal):

- Tree removal to be limited to; one Turpentine and up to five Water Gums in the Beecroft Village Green as well as 13 trees/shrubs in the Beecroft Primary school; one Water Gum, three Lemon-scented Teatees, four White Cedar's, two Jacarandas, one Chinese Elm and one Bottlebrush.
- Selective trimming of some branches of one Red Stringybark *Eucalyptus macrorhyncha* are to be restricted where possible, and undertaken by an arborist to ensure branch cuts are not detrimental to tree health
- Where appropriate, exclusion zones and tree protection zones would be implemented to prevent accidental damage to canopy species within the identified Sydney Turpentine-Ironbark Forest. These should be installed with reference to *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects*: Guide 2 – Exclusion Zones (RMS 2011)
- The assessment of impacts associated with the Proposal, and the AoS completed for Sydney Turpentine-Ironbark Forest EEC (Appendix 4) is based on the layout and scope of works presented in Figure 1. If the design of the Proposal change and clearance of canopy species within the EEC is required, a revision of this assessment may be required to determine the significance of the proposed impacts
- Appropriate erosion and sediment control measures would be installed to minimise any potential indirect impacts to waterways and associated threatened biota
Reasonable and feasible precautions would be taken to minimise the spread of the two noxious weeds recorded within the study area, Camphor Laurel and Small-leaf Privet. It is recommended appropriate control measures outlined within the weed control handbook (NSW DPI, 2011) be employed to control these weeds.

Any required stockpiling of materials would be located within the low constraint class area, away from trees and appropriate sediment controls should be put in place to avoid stockpile spread.

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- Department of the Environment 2014. Protected Matters Search Tool
- Department of the Environment 2014. *Turpentine-Ironbark Forest in the Sydney Basin Bioregion* in Community and Species Profile and Threats Database, Department of the Environment, Canberra
- Keith 2004. *Ocean Shores to Desert Dunes. The Native Vegetation of New South Wales and the ACT*
- NPWS 2002. Native Vegetation of the Cumberland Plain
- NSW DPI 2013. *Noxious Weed Declarations: Hornsby Shire Council*
- NSW Scientific Committee 2005. *Sydney Turpentine-Ironbark Forest - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act* (accessed September 2014)
- OEH 2011. Sydney Turpentine-Ironbark Forest - Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act
- OEH 2013. Sydney Turpentine-Ironbark Forest - profile
- OEH 2014. Vegetation Information System (VIS) Mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer
- OEH 2015. Critical habitat register
- RMS 2011. Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects
- Threatened Species Scientific Committee 2014. Approved Conservation Advice for Turpentine-Ironbark Forest in the Sydney Basin Bioregion
Tozer et al. 2010. Native vegetation of South eastern NSW: a revised classification and map for the coast and eastern tablelands (SCIVI).

Yours sincerely,

Jane Murray
Principal Ecologist
Mob: 0421 013 061
Office: 02 9690 2777
Acknowledgements: Imagery (c) Nearmap 2014; Basemap (c) NSW LPI © Land and Property Information (a division of the Department of Finance and Services) 2012
## Appendix 2: Flora and Fauna

### Flora species recorded from the study area

**Flora species recorded by Biosis on 22/09/2014**

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<th>Status</th>
<th>Family</th>
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<th>Common Name</th>
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</table>

N4= Noxious Weed, Class 4 (Hornsby Council, NSW DPI, 2014)

Fauna species recorded from the study area

Fauna species recorded by Biosis on 22/09/2014

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<td>Cacatuidae</td>
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<td>Monarchidae</td>
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<tr>
<td>Meliphagidae</td>
<td>Anthoeca chrysoptera</td>
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Appendix 3: Plates

Plate 1: Sydney Turpentine-Ironbark Forest within Beecroft Village Green

Plate 2: Planted natives and exotics - Beecroft Village Green
Plate 3: Planted natives and exotics - Beecroft Primary School

Plate 4: Exotic grasses
Appendix 4: Assessment of Significance

Sydney Turpentine-Ironbark Forest

Sydney Turpentine-Ironbark Forest is an open forest characterised by a canopy of Turpentine, Grey Ironbark, Grey Gum and Thin-leaved Stringybark *Eucalyptus eugenioides* (OEH 2013). Blackbutt is a common associate species and Sydney Blue Gum can become co-dominant in areas of elevated rainfall, where the community grades into Blue Gum High Forest. As a wet sclerophyll forest (Keith 2004), the shrub strata is typically characterised by mesic species including Sweet Pittosporum and Elderberry *Panax Polyscios sambuccifolia*.

Sydney Turpentine-Ironbark Forest occurs within the Sydney Basin Bioregion, typically on transitional soils with varying levels of shale enrichment, or on shale caps over sandstone. It is estimated only 0.5 % of the original area of Sydney Turpentine-Ironbark Forest exists in the form of a number of remnants and as a community it is poorly represented in conservation reserves.

In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

N/A

In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

N/A

In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Around 82 hectares of highest condition class (>10% canopy) (NPWS 2002) Sydney Turpentine-Ironbark Forest has been previously mapped within five kilometres of the study area (the local area). The Proposal would not directly impact any Sydney Turpentine-Ironbark Forest, however there would be removal of one Turpentine and selective trimming of some branches of one Red Stringybark *Eucalyptus macrorhyncha* and temporary impacts to the mown exotic understorey with the potential for indirect impacts to the remainder of the extent within the study area. Therefore, it is considered unlikely that the extent of the Sydney Turpentine-Ironbark Forest would be reduced such that it is placed at risk of extinction by the Proposal.

The Sydney Turpentine-Ironbark Forest within the study area was identified as such based on the presence of key indicator species within the canopy. The Sydney Turpentine-Ironbark Forest within the study area was lacking key indicator species (and native species generally) within the shrub and understorey strata. Based on the current species composition and temporary and isolated nature of the works, it is unlikely that the Proposal would modify the composition of the Sydney Turpentine-Ironbark Forest such that its local occurrence is placed at risk of extinction.
In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which the habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Around 82 hectares of highest condition class (>10% canopy) (NPWS 2002) Sydney Turpentine-Ironbark Forest has been mapped within the local area. The Sydney Turpentine-Ironbark Forest within the study area is currently managed and is subject to an intensive mowing regime.

The proposed removal of one Turpentine and selective trimming of some branches of one Red Stringybark *Eucalyptus macrorhyncha* is unlikely to result in fragmentation of the patch of Sydney Turpentine-Ironbark Forest. Impacts from use of the existing shared user path on the community as a whole are considered to be small as the canopy would retain the existing level of connectivity and the understorey is currently disturbed. The potential implications of fragmentation within the study area are minimal.

As a highly cleared community, all intact remnants of Sydney Turpentine-Ironbark Forest are considered important for the survival of the community. The shrub and understorey strata of the Sydney Turpentine-Ironbark Forest within the study area have been highly modified by the intensive mowing regime that the community has been subject to. Although diversity in the canopy was relatively high, no key indicator species (and few native species) were recorded in the shrub and understorey strata. The Sydney Turpentine-Ironbark Forest within the study area is considered to be of low to moderate importance at a local scale, due to lack of diversity and small patch size.

**Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).**

Critical habitats are areas of land that are crucial to the survival of particular threatened species, populations or ecological communities. Under the TSC Act, the Director-General maintains a Register of Critical Habitat. To date, no critical habitat has been declared for Sydney Turpentine-Ironbark Forest (OEH 2015).

**Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.**

A recovery plan has not yet been prepared for Sydney Turpentine-Ironbark Forest and it is not specifically addressed in the Cumberland Plain Recovery Plan (DECCW 2011). Best practice guidelines have been produced for Sydney Turpentine-Ironbark Forest (DECC 2008) which outline a number of practical management activities to assist in the recovery of the EEC. Furthermore, the OEH lists a number of activities to assist this community (OEH 2013). Those relevant to the Proposal include:

- Protect habitat by minimising further clearing of the community. This requires recognition of the values of all remnants of the community
- Promote regrowth by avoiding unnecessary mowing
- Protect habitat by controlling run-off entering the site if it would change water, nutrient or sediment levels or cause erosion
- Control weeds
Based on the lack of native species in the shrub and understorey and that there is no requirement for clearing of canopy species within the patch of Sydney Turpentine-Ironbark Forest, the Proposal is unlikely to have a significant impact on the recovery of the EEC in the local area.

**Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

Key Threatening Processes are listed under Schedule 3 of the TSC Act. Those relevant to the Proposal include:

- **Invasion and establishment of exotic vines and scramblers**
- **Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat)**
- **Invasion of native plant communities by exotic perennial grasses**
- **Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.**

Given the presence of these exotic species within the study area, it is considered unlikely that the Proposal would exacerbate these Key Threatening Processes such that they could have a significant impact on Sydney Turpentine-Ironbark Forest in the local area.

**Conclusion**

The Proposal is considered unlikely to have a significant impact on Sydney Turpentine-Ironbark Forest given the small scale, temporary and localised nature of the impacts in addition to the existing structure and condition of the extent of the EEC within the study area. A Species Impact Statement is therefore not required.
Appendix F Aboriginal searches and Stage 1
PACHCI approval letter
Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat. Long From: -33.7528, 151.0634 - Lat. Long To: -33.7505, 151.0671 with a Buffer of 200 meters, conducted by Philip Kingsland on 10 February 2015.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

- 0 Aboriginal sites are recorded in or near the above location.
- 0 Aboriginal places have been declared in or near the above location. *
If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request.

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings;
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.
Dear Karina

Re: Preliminary assessment results for the New Pedestrian Bridge, Beecroft Road, Beecroft, based on Stage 1 of the Procedure for Aboriginal cultural heritage consultation and investigation (the procedure).

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

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate any known Aboriginal objects or places in the immediate study area.
- The study area does not contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage’s Due diligence Code of Practice for the Protection of Aboriginal objects in NSW and the Roads and Maritime Services’ procedure.
- The Aboriginal cultural heritage potential of the study area appears to be severely reduced due to past disturbance.
- No mature aged trees with Aboriginal cultural modification are present.

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

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

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

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

Yours sincerely

Mark Lester
Aboriginal Cultural Heritage Officer (ACHO) – Sydney Region
Appendix G Consultation Report
PROPOSED PEDESTRIAN BRIDGE ON BEECROFT ROAD, BEECROFT

Community Consultation Report

June 2015
Executive summary

Roads and Maritime Services is proposing to build a pedestrian bridge over Beecroft Road, Beecroft near the intersection of Copeland Road as part of the NSW Government's Active Transport Pedestrian Bridges Program.

The proposed bridge would:

- Provide a safe crossing for school children and other pedestrians
- Better connect Beecroft Public School and properties on the western side of Beecroft Road to the station, Community Centre and Beecroft Village Green
- Improve traffic flow along Beecroft Road by limiting the amount of time vehicles spend waiting for pedestrians to cross
- Include lifts on each side of Beecroft Road to ensure the bridge is accessible for people with limited mobility and prams.

Roads and Maritime invited the community and stakeholders to provide feedback on this proposal in February 2015. Some members of the community asked for more time to provide feedback, so we extended the closing date for consultation from Monday 2 March 2015 to Friday 10 April 2015.

Comments were received from 59 people and organisations. We have considered the feedback and have decided to continue developing the proposal.

Roads and Maritime is preparing a Review of Environmental Factors to outline the possible impact of the proposal and the steps we need to take to reduce them. This document will be made available to view on Roads and Maritime’s website in the coming months.

We would like to thank everyone who took the time to review the proposal and provide feedback. We will continue to keep the community and stakeholders updated as the project progresses.
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1.0 Introduction

1.1 Background

The intersection of Beecroft Road and Copeland Road, Beecroft is a busy area adjacent to Beecroft Public School and close to the railway station and local businesses. There have been a number of crashes involving pedestrians along Beecroft Road. There is a high volume of school students that cross the road at this intersection.

1.2 The proposal

To improve pedestrian safety, Roads and Maritime is proposing to build a pedestrian bridge over Beecroft Road near Beecroft Public School as part of the NSW Government’s Active Transport Pedestrian Bridges Program.

The proposed bridge would:

- Provide a safe crossing for school children and other pedestrians
- Better connect Beecroft Public school and properties on the western side of Beecroft Road to the station, Community Centre and Beecroft Village Green
- Improve traffic flow along Beecroft Road by limiting the amount of time vehicles spend waiting for pedestrians to cross
- Include lifts on each side of Beecroft Road to ensure the bridge is accessible for people with limited mobility and prams.

The proposed bridge would be located on Beecroft Road about 50 metres south of the Copeland Road intersection. This location was chosen to limit the impact on the Beecroft Community Centre and mature native trees in the Beecroft Village Green and in the Beecroft Public School grounds.

The proposed pedestrian bridge would be about 9.2 metres high and allow a clearance for heavy vehicles up to about 5.5 metres.

The features of the project include:

- Bridge footings that would not interfere with access to the school or community centre
- Removal of the existing pedestrian crossing on the southern side of the intersection to improve traffic efficiency and encourage pedestrians to use the bridge
- A new pedestrian fence on the eastern side of Beecroft Road to encourage the use of the pedestrian bridge and further improve pedestrian safety.

We would retain the pedestrian crossing on the northern side of the intersection for pedestrians to use in the event the lifts are broken.
2.0 Consultation approach

2.1 Consultation objectives

We consulted with the community and stakeholders on the proposal to:

- Seek comment, feedback, ideas and suggestions for Roads and Maritime to consider when developing the proposal
- Build a database of interested community members who Roads and Maritime could continue to engage during the development of the proposal.

2.2 How consultation was done

Consultation for the proposal was carried out from Monday 16 February to Monday 2 March 2015. The community and stakeholders were encouraged to provide feedback via mail, email or phone.

The close of consultation was extended to Friday 10 April 2015 following requests from members of the community.

The table below outlines the communication tools and activities used to inform the community about the proposal and invite feedback.

<table>
<thead>
<tr>
<th>Stakeholder meetings</th>
<th>Meetings were held with Beecroft Public School and Hornsby Shire Council staff on Wednesday 18 February 2015 to discuss the proposal. Additional meetings were held with Beecroft Public School during March to discuss details of the proposal. Representatives also met with Hornsby Shire Councillors on Wednesday 27 May. Representatives attended a Beecroft-Cheltenham Civic Trust meeting in April 2015 and met with the Save Beecroft &amp; Cheltenham Alliance in May 2015, to discuss the proposal.</th>
</tr>
</thead>
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<tr>
<td>Community update</td>
<td>About 1600 community updates were delivered to residents (see Appendix C for distribution area). Electronic copies were emailed to government agencies, schools, and community groups in the local area.</td>
</tr>
<tr>
<td>(Appendix A)</td>
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<tr>
<td>Letter - extended consultation (Appendix B)</td>
<td>About 1600 letters were delivered to residents (see Appendix C for distribution area). Electronic copies were emailed to government agencies, schools, and community groups in the local area.</td>
</tr>
</tbody>
</table>
3.0 Consultation summary

3.1 Overview

Roads and Maritime received feedback from 59 people and organisations raising 37 different matters. Comments from 35 people were supportive of the proposal. Overall people supported the proposal but suggested further improvements. Key matters raised included location, visual amenity, consultation process and heritage and environmental impacts.

3.2 Feedback summary and Roads and Maritime’s response

<table>
<thead>
<tr>
<th>Category</th>
<th>Comment</th>
<th>Roads and Maritime response</th>
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</thead>
<tbody>
<tr>
<td>Consultation</td>
<td>The consultation period of two weeks was too short. Further consultation with the community is needed.</td>
<td>Roads and Maritime invited feedback on the proposal from Monday 16 February to Monday 2 March 2015. We typically provide two weeks for the community to provide feedback on these types of proposals unless some of that period includes school or public holidays where additional time is provided. Key stakeholder groups including Beecroft Public School and Hornsby Shire Council were consulted separately. Following requests from some members of the community, the closing date for consultation was extended to Friday 10 April 2015. A letter was distributed to inform the community of the extension. This consultation period was for the concept design stage. We will continue developing the design and Review of Environmental Factors and will seek feedback soon as more information becomes available.</td>
</tr>
<tr>
<td>20 comments</td>
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<tr>
<td>The consultation process is inadequate. Not everyone that will be affected by the project has been consulted or given the chance to provide feedback. Residents in Cheltenham did not receive the community update.</td>
<td>We used a number of methods to inform the community and stakeholders about this proposal. • We met with key stakeholders including Beecroft Public School, Beecroft-Cheltenham Civic Trust and Hornsby Shire Council to discuss the proposal • We distributed 1600 community updates to residents and businesses in the local area (see Appendix C for</td>
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<td>This consultation period was for the concept design stage. We will continue developing the design and Review of Environmental Factors and will seek feedback soon as more information becomes available. We are happy to add members of the community to our stakeholder database to ensure they receive future updates about the project.</td>
</tr>
<tr>
<td>No advertisement was placed in the <em>Northern District Times</em> to advertise the proposal.</td>
<td>Roads and Maritime regularly places print advertisements for road work and consultation for major projects, however we do not typically advertise ‘have your say’ periods for these types of proposals.</td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Tree removal should be avoided or at least replaced on a one to one basis.</td>
<td>We understand that there are a number of infrastructure projects happening in the area and are committed to minimising the impact of this proposal on the environment and the community. The concept design has been developed to minimise the impact on mature trees as much as possible, however we believe we will need to remove some vegetation including trees, bushes and shrubs from Beecroft Village Green and Beecroft Public School to allow us to build the bridge. The location was chosen to minimise the impact on mature native trees in the Beecroft Village Green and Beecroft Public School grounds. Roads and Maritime is preparing a Review of Environmental Factors to assess the environmental impacts of the proposal. We are still developing the design to fully understand the impacts so we can prepare the Review of Environmental Factors. This will outline the possible impacts and the steps we...</td>
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<td>Heritage</td>
<td>23 comments</td>
<td>The proposed pedestrian bridge design is not sympathetic with the heritage aesthetic of the local area. <strong>RMMR</strong> needs to take to reduce them. We will seek your feedback on the expected impacts in the coming months as more information becomes available. The concept for this proposal is based on Roads and Maritime’s design standard for pedestrian bridges. The design standard has been developed through a collaboration of urban designers and engineers to be used in built up areas. We are preparing a Review of Environmental Factors to assess the environmental impacts including heritage amenity of the proposal. Heritage aspects such as character of the local area will be considered in finalising the detailed design of the bridge.</td>
</tr>
<tr>
<td>Location</td>
<td>33 comments</td>
<td>The proposed pedestrian bridge location is not convenient for the majority of pedestrians crossing at the intersection of Beecroft Road and Copeland Road. <strong>RMMR</strong> has been designed to provide a safe and efficient crossing for Beecroft Public School students. While the pedestrian movements of the community have been considered in the development of the proposal, the key priority for the proposed bridge is to ensure a safe crossing for students. The proposed pedestrian bridge has been developed to minimise the visual impact on the Beecroft Community Centre, mature trees in the Beecroft Village Green and Beecroft Public School grounds and parking within the Beecroft Public School. The proposed location provides good connections for the community close to the intersection. A pedestrian bridge located north of the proposed location, such as at the intersection of Hannah Street and Beecroft Road, would be more beneficial. A pedestrian bridge would not be feasible at the intersection of Beecroft Road and Hannah Street due to the limited space which would require potential acquisition of private property. The proposed pedestrian bridge has been designed to provide a safe and efficient crossing for Beecroft Public School students. While the pedestrian movements of the community have been considered in the development of the proposal, the key priority for the proposed bridge is to ensure a safe crossing for students.</td>
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<td>The location is neither near the school gate nor convenient for the majority of pedestrians accessing the school.</td>
<td>Roads and Maritime is discussing with Beecroft Public School the possibility of an additional entry and exit point to the school grounds directly from the proposed pedestrian bridge. We will keep the community and stakeholders informed about any changes to the proposal design.</td>
</tr>
<tr>
<td>Design</td>
<td>A ramp design would better facilitate cyclists and would not require maintenance or break down like lifts. Ramps could be constructed to reach the corner of Beecroft Road and Copeland Road on the western side, and to come around behind the community centre on the eastern side.</td>
<td>The proposal aims to reduce the environmental impact to the area. The stairwell/lift design has been chosen as it reduces the bridge footprint, project cost and visual impact of the bridge. A ramp design would produce a much larger footprint resulting in greater environmental impacts, including vegetation removal from the Beecroft Village Green and Beecroft Public School grounds. On this basis a ramp design would not be suitable for this proposal.</td>
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<td></td>
<td>Two or more years ago there was a ‘sky walk’ design proposed by Hornsby Shire Council. What has happened with this design?</td>
<td>Roads and Maritime previously consulted with Council on an early design for the proposed pedestrian bridge. This was a strategic design that has since changed following further development of the proposal. Since this time we have carried out further investigations, discussions with key stakeholders and developed our pedestrian bridge design standard. These factors have contributed to the development of the concept design. A ‘sky walk’ design would not be suitable for the proposed pedestrian bridge due to the potential impact on mature trees in the Beecroft Village Green, larger environmental footprint and ongoing maintenance costs for a timber deck. The current design provides the least impact on mature trees in the Beecroft Village Green and Beecroft Public School grounds.</td>
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<td>The amenity of Beecroft will be damaged if advertising is allowed on the proposed bridge.</td>
<td>Roads and Maritime acknowledges the community’s concerns about heritage and amenity in regards to this proposal. We would not include advertising as part of this proposal as it is not considered in keeping with the character of the local area.</td>
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<td>Access</td>
<td>The lifts will require maintenance and may not cope with the volume of pedestrians seeking to use them, risking breakdowns. A warning system is needed on either side of the road to advise pedestrians at the Copeland Road intersection when the lifts aren’t working.</td>
<td>Roads and Maritime has a strict protocol for lifts including regular cleaning and routine maintenance, call outs for breakdowns and emergency response for lift entrapment. A 24-hour phone number for the public to report issues with the lifts such as offensive graffiti or breakdowns would be provided outside the lift door and inside the lift. We acknowledge the request for a warning system at Copeland Road to advise pedestrians the lifts are not working and will investigate this option as we develop the proposal.</td>
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<td></td>
<td>The pedestrian crossing at the southern side of the Beecroft Road and Copeland Road intersection should not be removed.</td>
<td>Use of the pedestrian bridge would be encouraged as the safest way to cross Beecroft Road and therefore the pedestrian crossing on the southern side of Beecroft Road and Copeland Road intersection would be removed. Removal of this pedestrian crossing would also slightly improve the traffic flow by limiting the amount of time vehicles spend waiting for pedestrians to cross the road. The pedestrian crossing on the northern side of Beecroft Road and Copeland Road intersection would be retained in the event the lifts are out of order.</td>
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<td>The footpath is too narrow on the western side of Beecroft Road between the road and Community Centre.</td>
<td>The footpath on the western side of Beecroft Road is narrow due to the location of Beecroft Community Centre and the traffic barrier behind the kerb. At this stage the location of the barrier will remain unchanged as part of this proposal.</td>
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<td>The community update does not clearly state the types of access the proposed pedestrian bridge will have, such as stairs, beyond the lifts.</td>
<td>Stairs as well as lifts are proposed in the concept design.</td>
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<tr>
<td>Project</td>
<td>The proposed pedestrian bridge seems like a use of funds that could be better spent for the community in other areas. Cost benefit of the proposed pedestrian bridge to the community.</td>
<td>The proposed pedestrian bridge was announced by Transport for NSW in <em>Sydney’s Walking Future (2013)</em> to provide safe access to Beecroft Public School, town centre and station. The project is funded by the NSW Government’s Active Transport Pedestrian Bridges Program.</td>
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<td>The project aims to improve safety for school students and pedestrians crossing Beecroft Road. The pedestrian bridge would provide a safe and efficient crossing for school children during peak traffic times and slightly improve traffic flow by reducing the time vehicles spend waiting at the intersection of Beecroft Road and Copeland Road.</td>
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<td>More information such as crash data, the environmental assessment and expected construction timeframes needs to be provided to the community so informed feedback can be provided to Roads and Maritime.</td>
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<td>Between July 2003 and June 2014 there were four incidents involving pedestrians at the intersection of Hannah Street and Beecroft Road, including one fatality. This is about 200 metres from the location of the proposed pedestrian bridge. Construction is expected to take about nine months to complete, weather permitting. If funding is available and land access is granted from the Department of Education and the Federal Government, work to build the pedestrian bridge would start in the 2015/16 financial year. The current consultation period is for concept design. We will continue developing the design and Review of Environmental Factors and will seek feedback in the coming months as more information becomes available.</td>
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<td>No evidence has been presented showing improvements to traffic flow at the intersection.</td>
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<td>The proposal aims to improve safety for school students and pedestrians crossing Beecroft Road. Traffic modelling of the Beecroft Road and Copeland Road intersection shows the removal of the southern pedestrian crossing would slightly improve traffic flow during morning peak periods by reducing the time vehicles spend waiting.</td>
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<td>This work cannot be done in isolation. The proposal needs to be considered in the context of other infrastructure and development activities occurring in the area.</td>
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<td>We understand that there are a number of infrastructure projects happening in the area and are committed to minimising the impact of this proposal on the environment and the community. Construction activities would be coordinated with other infrastructure and development activities occurring in the area to minimise disruption to the local community.</td>
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<td>The timing of the proposal appears politically motivated.</td>
<td>The proposed pedestrian bridge was announced by Transport for NSW in <em>Sydney's Walking Future (2013)</em>. Roads and Maritime has been in discussion with Beecroft Public School and Hornsby Shire Council about the proposal since 2011. We had planned to invite feedback from the community and stakeholders in late 2014, however geotechnical investigations were required to progress the concept design before it could be presented to the community. These investigations were carried out in January during the school holidays to minimise impact on the school. We invited feedback as soon as the concept design was finalised.</td>
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</table>

**Safety**

**Eight comments**

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<thead>
<tr>
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<th>Improved school zone signage is required, including flashing lights.</th>
<th>Roads and Maritime acknowledges this request for improved school zone signage and has referred it to our Network and Safety Services section for consideration.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The existing pedestrian fence on the eastern side of Beecroft Road looks inadequate. Crash fencing should be used on both sides.</td>
<td>As part of this proposal the existing pedestrian fence on the western side of Beecroft Road would be removed and replaced to match the configuration planned for the eastern side of Beecroft Road. This will include safety barriers on both sides of Beecroft Road for short sections directly in front of the proposed bridge and a pedestrian fence from the intersection to just south of the proposed location.</td>
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<td>Additional fencing on the eastern side of Beecroft road is not required.</td>
<td>Additional fencing on the eastern side of Beecroft Road would be required to encourage use of the proposed pedestrian bridge and to prevent pedestrians from attempting to cross Beecroft Road in unsafe locations.</td>
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<td></td>
<td>The current design would encourage pedestrians to cut around the community centre.</td>
<td>The proposed concept design provides entry and exit points from both the stairs and the lifts to the footpath on the eastern side of Beecroft Road. Pedestrians can then use the footpath to access Beecroft Community Centre, the town centre and the station. They would not be encouraged to use the path behind the Community Centre.</td>
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<tr>
<td>Roads and Maritime response</td>
<td>Removal of school zone along Beecroft Road as part of the project.</td>
<td>The 40km/h school zone will not be removed as part of this proposal.</td>
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<tr>
<td></td>
<td>Emergency vehicle access to the Beecroft Village Green will be impeded by the additional pedestrian fencing.</td>
<td>A fence currently exists along the boundary of the Beecroft Village Green with emergency vehicle access located near the tennis courts. This would not be affected by the proposal. A safety barrier and additional pedestrian fencing along Beecroft Road is needed to improve safety for pedestrians. The additional pedestrian fencing would not have any impact on existing access to the Beecroft Village Green.</td>
</tr>
<tr>
<td>Alternative options</td>
<td>Alternative safety measures in lieu of a pedestrian bridge should be investigated.</td>
<td>The proposed pedestrian bridge was announced by the NSW Government in <em>Sydney's Walking Future (2013)</em> to provide safe access to Beecroft Public School, town centre and station. The proposal has been designed to provide a safe and efficient crossing for Beecroft Public School students. The proposed pedestrian bridge is the preferred option for improving pedestrian safety as it would provide a complete separation of pedestrians and motorists.</td>
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<td>A tunnel would provide the same access with less visual impact.</td>
<td>Underpasses are not a preferred option for pedestrian crossings due to the lack of passive surveillance, posing a risk to personal safety and targets for vandalism. Long flat ramps would be needed to pass under Beecroft Road to comply with disability access requirements, resulting in a greater environmental impact. Construction would also require major disturbance to traffic along Beecroft Road. For these reasons a tunnel under Beecroft Road is not feasible.</td>
</tr>
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<td></td>
<td>An alternative to a bridge would be a multiple direction crossing at the Beecroft and Copeland Road intersection.</td>
<td>Multiple directional crossings, or scrambled crossings, are only installed at intersections with heavy, continuous pedestrian traffic throughout the day that require diagonal crossing movements. Traffic modelling of the Beecroft Road and Copeland Road intersection indicates that a scrambled crossing would have a negative impact on the overall performance of the intersection and is not considered feasible for this proposal.</td>
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### Category

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<th>Comment</th>
<th>Roads and Maritime response</th>
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<tr>
<td>An immediate benefit could be achieved by installing a dual right turn from Copeland Road onto Beecroft Road southbound.</td>
<td>Although the aim of this proposal is to provide a safe crossing for school students crossing Beecroft Road, a review of this suggestion was carried out. Traffic modelling of the Beecroft Road and Copeland Road intersection indicates that an additional right hand turn lane would result in slight improvements during the morning peak period, but would result in no benefit to overall intersection performance during the evening peak period. It was also found that there is not enough room for more than two cars to turn at the same time. A rigid 8.8 metre vehicle such as a bus could not make the turn while safely staying within the lanes. For these reasons this option is not feasible.</td>
</tr>
</tbody>
</table>

### Outside project scope

| 18 comments | Accessibility upgrades at Beecroft station, such as lifts like those for the proposed bridge, would be beneficial to people with limited mobility. | The aim of this proposal is to provide a safe crossing of Beecroft Road for school students and pedestrians. We have referred this request to Transport for NSW for consideration. |
| Intersection and pedestrian facility upgrades are needed at the intersections of Beecroft Road and Mary Street, Wenham Street or Kirkham Street. | Roads and Maritime will consider this suggestion in planning for future upgrades in the area. |
| The existing fence on the western side of Beecroft Road needs cleaning. | Roads and Maritime has referred this request to our maintenance contractor. |
| A pedestrian crossing was removed on Wongala Crescent some years ago. It would assist greatly with pedestrian traffic if it could be reinstated. | Wongala Crescent is under the care and control of Hornsby Shire Council. We have referred this request to Council for its consideration. |
| The Beecroft Village Green should have the post rail fence replaced with fencing to prevent playing children from wandering onto the road. The status of the Beecroft Community Centre should be reviewed in light of the changing community, converting it to a childcare centre would be of great benefit to young families in the area. | The Community Centre is a Hornsby Shire Council asset. We have forwarded the request to Council for its consideration. A pedestrian fence and safety barrier will be provided on the eastern side of Beecroft Road to encourage use of the pedestrian bridge and to prevent pedestrians from crossing Beecroft Road in unsafe locations. However the extent of the pedestrian and safety fences will not extend the entire length of the Beecroft Village Green fronting Beecroft Road. |
4.0 Decision

Roads and Maritime has considered the feedback received and will proceed with development of the proposed pedestrian bridge over Beecroft Road near the intersection of Copeland Road.

5.0 Next steps

Roads and Maritime is preparing a Review of Environmental Factors document to outline the possible impact of the proposal and the steps we need to take to reduce them. The environmental assessment will be made available to view on Roads and Maritime’s website in the coming months.

We would like to thank everyone who took time to review the proposal and provide feedback. We will continue to keep the community and stakeholders informed as the proposal progresses.
Appendix A – Community update - Have Your Say

Have your say

We will be meeting with key representatives from Beecroft Public School and the Beecroft Community Centre regarding the proposal and will continue to do so throughout the project.

We are also seeking your feedback on this proposal and would appreciate any comments by Monday 2 March 2015.

Please send your written comments to our delivery partner:

Downer EDL
Attention: New Pedestrian Bridge, Beecroft
PO Box 5499
North Ryde NSW 2113
to email enquiries_nw@downeredl.com

Next Steps

Roads and Maritime will consider community and stakeholder feedback in finalising the design of the bridge and before making any decisions about the proposal.

We will continue to seek feedback at appropriate times and will keep you updated as the project progresses. For more information please contact the project team on 1300 332 900 or enquiries_nw@downeredl.com

Translating and Interpreting Service

If you need an interpreter, please call 1300 444 900 and ask for your Downer EDL interpreter or call 1300 332 800. If you need a speech pathologist, please call 1300 108 800.

Available languages include:

Arabic
Burmese
Chinese (traditional)
Chinese (simplified)
English
French
Greek
Hindi
Italian
Japanese
Korean
Persian
Russian
Spanish
Turkish
Vietnamese

Annex A – Community update - Have Your Say

Have your say

FEBRUARY 2015

New pedestrian bridge proposed on Beecroft Road, Beecroft

The NSW Government is funding this proposal to improve road and pedestrian safety and connectivity in Beecroft as part of its school pedestrian bridge program. Roads and Maritime Services is seeking your feedback on this proposal by Monday 2 March 2015.

Looking north along Beecroft Road

NSWNow
The new state of business
New pedestrian bridge proposed on Beecroft Road, Beecroft

Benefits
The proposed bridge would:
- Provide a safe crossing for school children and other pedestrians.
- Better connect the school and properties on the western side of Beecroft Road to the station, Community Centre and Beecroft Village Green.
- Improve traffic flow along Beecroft Road by limiting the amount of time vehicles spend waiting for pedestrians to cross.
- Include fencing on each side of Beecroft Road to ensure the bridge is accessible for people with limited mobility and mobility.

Location
The bridge would be located on Beecroft Road about 30 metres south of the Copeland Road intersection.
This location was chosen to limit the impact on the Beecroft Community Centre and native native trees in the Beecroft Village Green and in the Beecroft Public School grounds.

Project features
The proposed pedestrian bridge would be about 0.5 metres high and allow a clearance for heavy vehicles up to about 5.5 metres.
The features of the project include:
- Bridge to be shared by pedestrians only with access to the school or community centre.
- Removal of the existing pedestrian crossing on the southern side of the intersection to improve traffic efficiency and encourage pedestrians to use the bridge.
- A new pedestrian crossing on the eastern side of Beecroft Road to encourage the use of the pedestrian bridge and further improve pedestrian safety.
- A new pedestrian crossing on the northern side of the intersection for pedestrians to use in the event the bridge fails.
- The existing pedestrian fence on the western side of Beecroft Road.

About the design
Parks and Maritime has developed the proposal so that it is beneficial to the local context and provides good connections.
An artist impression is provided to help explain the proposal. Please note, the artist's impression is indicative only – a full urban design assessment and detailed design is still being completed.

Assessing our impact
We are committed to minimising the impact of this proposal on the environment and the community.
To complete an environmental impact assessment, Roads and Maritime will prepare a Review of Environmental Factors. This will outline the possible impacts of the proposal and the steps we need to take to reduce them.

We are still developing the design to fully understand impacts so that we can prepare the Review of Environmental Factors.
We believe we will need to remove some vegetation including trees, bushes and shrubs from Beecroft Village Green and Beecroft Public School to allow us to construct the bridge.
We will seek your feedback on the expected impacts in the coming months as more information becomes available.
Appendix B – Community letter - extended consultation period

Have your say

New pedestrian bridge on Beecroft Road, Beecroft:

Roads and Maritime Services is proposing to improve road and pedestrian safety and connectivity in Beecroft as part of its Active Transport Pedestrian Bridges Program. We are currently seeking feedback from the community and stakeholders and have decided to extend the closing date to Friday 10 April.

- Provide a safe crossing for school children and other pedestrians
- Better connect the school and properties on the western side of Beecroft Road to the station, Community Centre and Beecroft Village Green
- Improve traffic flow along Beecroft Road by limiting the amount of time vehicles spend waiting for pedestrians to cross
- Include 15% on each side of Beecroft Road to ensure the bridge is accessible for people with limited mobility and prams.

We have provided artists impressions to help you better understand our proposal.

Further information is available on our website at www.new.nsw.gov.au by typing 'Beecroft pedestrian bridge' into the search bar.

Some members of the community have asked for more time to provide feedback on this proposal, so Roads and Maritime has extended the closing date to Friday 10 April. Please send your written comments to our delivery partner:

Dowmen Mossel
Attention: New Pedestrian Bridge, Beecroft
PO Box 5400
North Ryde NSW 2113

or email enquiries_nsa@dowmenmossel.com

Roads and Maritime will consider community and stakeholder feedback in finalising the design of the bridge and before making any decisions about this proposal. We will continue to keep you updated as the project progresses.

For more information please contact the project team on 1600 332 660 or email enquiries_nsa@dowmenmossel.com

For more information contact DowmenMossel
Phone 1600 332 660 Email: enquiries_nsa@dowmenmossel.com

Translating and Interpreting Service
If required an interpreter, please call 131 450 and ask them to call DowmenMossel on 1600 332 660

Arabic

Korean

Vietnamese

Note: These numbers are for use within NSW. For contact in other states, contact the relevant transport authority in other states.