# 4-18 NORTHWOOD RD & 274 & 274A LONGUEVILLE RD LANE COVE

## Flora and Fauna Assessment

Morrison Design Partnership Architects

30 September 2020

Final

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The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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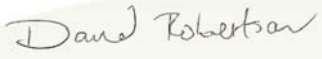
| **Signed:** |  |
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# Glossary

| Abbreviation | Definition |
|---|---|
| AOBV | Area of Outstanding Biodiversity Value |
| BAM | Biodiversity Assessment Method |
| BC Act | NSW *Biodiversity Conservation Act 2016* |
| BOS | Biodiversity Offset Scheme |
| BDAR | Biodiversity Development Assessment Report |
| Council | Lane Cove Council |
| DA | Development Application |
| DAWE | Department of Agriculture, Water and Environment |
| EES | Environment, Energy and Science Group, a part of DPIE |
| EPBC Act | Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* |
| EP&A Act | NSW *Environmental Planning and Assessment Act 1979* |
| FM Act | NSW *Fisheries Management Act 1994* |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| Locality | The area within a 10km radius of the subject site |
| MNES | Matters of National Environmental Significance |
| NSW | New South Wales |
| OEH | NSW Office of Environment and Heritage |
| The project | Development of combined mixed use age care facility |
| SMCMA | Sydney Metropolitan Catchment Management Authority |
| Subject site | Lot 1 DP857133, Lot 2 DP857133, Lot 1 DP663462, Lot 4 DP321048, Lot A DP307899, Lot B DP307899, Lot 1 DP445348, Lot 2 DP445348<br>Lot D DP307899, Lot C DP307899, Lot G DP307899, Lot B DP370042, Lot D DP370042 and Lot A DP370042 (see **Figure 1**) |
| TEC | Threatened Ecological Community |

# 1. Introduction

Cumberland Ecology Pty Ltd (Cumberland Ecology) has been commissioned by Pathways Property Group (the 'client') to conduct an ecological assessment to support a proposed Development Application (DA) for 4-18 Northwood Road and 274-274A Longueville Road, Lane Cove ('the subject site'). The proposed DA includes the development of a combined mixed use residential aged care facility within the subject site (the 'project').

## 1.1. Purpose

The purpose of this report is to describe the current biodiversity values of the subject site and to assess the potential impacts of the proposed development on flora and fauna, particularly threatened species, populations and communities that are listed under the New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The specific objectives of this report are to:

- Document the reasons why the Biodiversity Offsets Scheme (BOS) under the BC Act does not apply to the project;
- Describe the vegetation communities on the subject site;
- Describe fauna habitats and fauna usage of the subject site;
- Identify any threatened species, populations or ecological communities (as listed under the BC Act and/or EPBC Act) existing on the subject site;
- Assess the likelihood of occurrence of threatened species, populations or communities (as listed under the BC Act and/or EPBC Act) within the subject site;
- Assess the potential impact of the project on threatened communities, flora and fauna, including the completion of Tests of Significance under Section 7.3 of the BC Act; and
- Where relevant, recommend mitigation measures to reduce the impacts of the proposed development on biodiversity values.

## 1.2. Background

### 1.2.1. Site Description

The subject site is located at 4-18 Northwood Road, and 274 and 274A Longueville Road, Lane Cove and consists of 14 individual lots (see **Figure 1**) currently zoned as B4- Mixed Use under the Lane Cove Council Local Environment Plan (2009). **Table 1** provides the total area of all lots within the subject site. The total area of the subject site is 0.5 ha and is comprised of a mixture of residential and business developments along with small areas of vegetation primarily located within the northern and eastern boundaries of the subject site.

The subject site is bounded by residential developments to the north and south, a strip of native bushland within Gore Creek to the east, and Longueville and Northwood Roads to the west (see **Figure 2**). Generally, the subject site's topography slopes downward from east to west.

**Table 1 Area of individual lots and the entire subject site**

| Lot and DP | Area (ha) |
|---|---|
| Lot 1 DP857133 | 0.05 |
| Lot 2 DP857133 | 0.05 |
| Lot 1 DP663462 | 0.09 |
| Lot 4 DP321048 | 0.08 |
| Lot A DP307899 | 0.03 |
| Lot B DP307899 | 0.02 |
| Lot 1 DP445348 | 0.03 |
| Lot 2 DP445348 | 0.02 |
| Lot D DP307899 | 0.03 |
| Lot C DP307899 | 0.03 |
| Lot G DP307899 | 0.02 |
| Lot B DP370042 | 0.02 |
| Lot D DP370042 | 0.02 |
| Lot A DP370042 | 0.02 |
| **Total Subject Site** | **0.50** |

### 1.2.2. Description of the Proposed Development

The client is proposing to develop a combined mixed use residential aged care facility within the subject site. The proposed development will include an aged care facility, seniors wellness precinct and complimentary services (see **Figure 3**). To facilitate the construction of the proposed development, all existing structures within the subject site will be demolished. Additionally, all extant vegetation within the subject site will be cleared.

## 1.3. Relevant Legislation

### 1.3.1. Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's key piece of environmental legislation and is administered by the Commonwealth Department of Agriculture, Water and Environment (DAWE). It is designed to protect national environmental assets, known as Matters of National Environmental Significance (MNES), which include threatened species of flora and fauna, threatened ecological communities, migratory species as well as other protected matters. Among other things, it defines the categories of threat for threatened flora and fauna, identifies key threatening processes and provides for the preparation of recovery plans for threatened flora, fauna and communities.

Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES must be referred to the Commonwealth Minister for the Environment.

### 1.3.2. NSW Biodiversity Conservation Act 2016

The BC Act is the key piece of legislation in NSW relating to the protection and management of biodiversity and threatened species. The BC Act applies in relation to animals and plants and not in relation to fish and marine vegetation which are provided for under the *Fisheries Management Act 1994* (FM Act). The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is supported by regulations, including the *Biodiversity Conservation Regulation* 2017 (BC Regulation).

The BC Act requires consideration of whether a development or an activity is likely to significantly affect threatened species. For Part 4 local developments under the *Environmental Planning and Assessment Act 1979* (EP&A Act), projects that significantly affect threatened species or communities trigger the Biodiversity Offsets Scheme (BOS).

The BOS is intended to simplify biodiversity assessment and improve biodiversity outcomes by creating consistent assessment requirements to measure the likely biodiversity loss of development proposals and gains in biodiversity value achieved at offset sites through active management. The BOS requires an assessment following the Biodiversity Assessment Method (BAM) by an accredited BAM assessor and the preparation of a Biodiversity Development Assessment Report (BDAR). An assessment of whether the project triggers entry into the BOS is provided in ***Section 1.4.***

### 1.3.3. Biosecurity Act 2015

Under the NSW *Biosecurity Act 2015* (Biosecurity Act) all weeds are required to be controlled by all persons under a "General Biosecurity Duty". The General Biosecurity Duty means that all public and private land owners or managers and all other people who deal with weed species (biosecurity matters) must use the most appropriate approach to prevent, eliminate, or minimise the negative impact (biosecurity risk) of those weeds (DPI 2017).

State-wide management of weeds under this legislation is directed by the NSW Invasive Species Plan (NSW Local Land Services 2017). This assigns weed responses to four categories:

- Prevention of new weeds establishing;
- Eradication of small and localised infestations where feasible;
- Containment of larger infestation to stop wider spread; and
- Protection of key assets such as threatened plants and agricultural land, to prevent their damage or degradation by weed invasion.

Under the Biosecurity Act some weed species have been prioritised for management by specific regulations and controls under the act. These are known as State Level Priority Weeds.

The state has been divided into 11 regions (each covering a number of Local Government Areas) under the act, with each region managed by a Regional Weeds Committee. Management actions for weeds within a region

are detailed within a Regional Strategic Weed Management Plan. Within each region, additional weed species to the State Level Priority Weeds have been prioritised for management. These species are known as Regional Priority Weeds.

A further set of weeds are identified within the Regional Strategic Weed Management Plans as being "other weeds of regional concern". The Biosecurity Act provides powers to Local Control Authorities to take action in relation to these weeds in particular circumstances, for example where a weed threatens a high value asset, and prevention, elimination or reduction of the risk is feasible and reasonable. Examples of high values assets include the Environment, Human Health, and Agriculture.

All land within the subject site occurs within the South East Local Land Services region, and weed management within the region is to be undertaken under the direction of the Greater Western Sydney Strategic Weed Management Plan (LLS: Greater Sydney 2019). Appendix 1 and 2 of the Plan outline the State Priority Weeds, Regional Priority Weeds, and other weeds of regional concern.

### 1.3.4. Lane Cove Local Environmental Plan 2009

The Lane Cove Local Environment Plan (LEP) 2009 aims to make local environmental planning provision within the Lane Cove Local Government Area (LGA). The main ecological related objectives of the LEP are summarised as follows:

- Establish ecologically sustainable development;
- Preserve the environmental quality of land; and
- Protect and restore bushland, foreshore and riparian areas.

The proposed development is considered to be consistent with the aims of the LEP as impacts on ecologically sensitive areas are considered to be negligible.

### 1.3.5. 'Draft' Lane Cove Development Control Plan: Part D – Commercial development and mixed use localities, Locality 2 – Northwood Neighbourhood Centre

A site specific development control plan (DCP) has been drafted for the subject site that includes a number of site-specific ecology related development controls. Ecology related controls included in the site-specific DCP include setbacks to bushland, landscaping and bushland protection. The proposed development is considered to be generally consistent with the ecology related site-specific controls as appropriate set-backs have been incorporated into the design and any potential impacts on bushland areas are anticipated to be appropriately mitigated if all mitigation measures recommended within the report are implemented.

### 1.3.6. State Environmental Planning Policy No 19 – Bushland in Urban Areas

The State Environmental Planning Policy No 19 – Bushland in Urban Areas (SEPP 19) overall objective is to protect areas of bushland within urban areas and is applicable to the Lane Cove LGA, and the subject site. The proposed development is considered to be consistent with the overall aims of SEPP 19 as minimal areas of native bushland not listed under the BC Act or EPBC Act will be impacted. Furthermore, the most significant

areas of bushland located within Gore Creek to the east will be retained ensuring the natural heritage of the area is maintained.

## 1.4. Assessment of Entry into the Biodiversity Offset Scheme

The ecological impacts of the proposed development are required to be assessed in accordance with the BC Act. To determine the type of assessment required for a project under Part 4 (Local Development) of the BC Act, it is necessary to determine whether the proposed development triggers the BOS. For the proposed development to trigger the BOS, it would need to meet one of the following:

- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test of significance in Section 7.3 of the BC Act; or
- It exceeds the biodiversity offsets scheme threshold; or
- It is carried out in a declared area of outstanding biodiversity value (AOBV).

An assessment of the project against these three criteria is further detailed in the sections below. The results indicate that the proposed development does not trigger the BOS and therefore a general flora and fauna assessment is provided in the remainder of this document.

### 1.4.1. Test of Significance

A test of significance in accordance with Section 7.3 of the BC Act was undertaken for all threatened communities and species known, or considered likely, to be impacted by the proposed development (see **Appendix C**). None of these entities are considered to be significantly affected by the project and therefore the BOS is not triggered by this mechanism.

### 1.4.2. Biodiversity Offsets Scheme Threshold

A development can exceed the BOS threshold if it is or involves:

- The clearing of native vegetation of an area above a prescribed threshold based on the minimum lot size; or
- The clearing of native vegetation, or other prescribed action, on land included on the Biodiversity Values Map.

An assessment of these two components is provided below.

#### 1.4.2.1. Area Threshold

Any development being assessed under Part 4 (Local Development) of the EP&A Act that clears native vegetation above a threshold specified based on minimum lot size would trigger entry into the BOS. The threshold levels of clearing for each minimum lot size are defined by the *Biodiversity Conservation Regulation 2017* and are reproduced in **Table 2**.

The subject site is zoned as B4 (mixed use or residential care facility) under the *Lane Cove Local Environmental Plan 2009* (Amendment No 29). Since no minimum lot size exists for that zoning, the actual size of the smallest

lot was used. Since the smallest lot is less than 1 ha in size, native vegetation clearance of less than 0.25 ha is allowed without triggering the BOS (**Table 2**). The project will result in the clearance of approximately 0.13 ha of vegetation, including native vegetation, which is below the 0.25 ha threshold. Accordingly, the BOS threshold will not be triggered via this mechanism.

**Table 2 Area thresholds for entry into the BOS**

| Minimum Lot Size | Area of Clearing (Native Vegetation) |
|---|---|
| Less than 1 hectare | 0.25 hectares or more |
| Less than 40 hectares but not less than 1 hectare | 0.5 hectares or more |
| Less than 1,000 hectares but not less than 40 hectares | 1 hectare or more |
| 1,000 hectares or more | 2 hectares or more |

#### 1.4.2.2. Biodiversity Values Map

Any development being assessed under Part 4 (Local Development) of the EP&A Act that occurs within areas mapped on the Biodiversity Values Map would automatically enter into the BOS. No area of the subject site is included on the Biodiversity Values Map, and therefore the BOS will not be triggered by this mechanism.

### 1.4.3. Declared Area of Outstanding Biodiversity Value (AOBVs)

The BC Act currently lists the following AOBVs:

- Gould's Petrel habitat;
- Little Penguin population in Sydney's North Harbour habitat;
- Mitchell's Rainforest Snail in Stotts Island Nature Reserve; and
- Wollemi Pine habitat.

The subject site is not located within any of the currently identified AOBVs.

# 2. Methodology

## 2.1. Database Analysis

Database analysis was conducted for the locality using both the NSW Environment, Energy and Science Group (EES) Atlas of NSW Wildlife (EES 2020) and the Commonwealth Department of the Environment, Agriculture and Water (DAWE) Protected Matters Search Tool (DAWE 2020). The locality is defined as the area within a 10 km radius of the subject site. The Atlas of NSW Wildlife Database search was used to generate records of threatened flora and fauna species listed under the BC Act within the locality of the subject site. The Protected Matters Search Tool generated a list of Matters of National Environmental Significance listed under the EPBC Act potentially occurring within the locality of the subject site. Fish and marine species were excluded for the purpose of this report as no permanent waterbodies are present within the subject site. The lists generated from these databases were reviewed against available knowledge of the subject site, in conjunction with an analysis of the abundance, distribution and age of records, to ascertain the likelihood of occurrence of threatened species within the subject site.

## 2.2. Flora Survey

Flora surveys were undertaken within the subject site by Cumberland Ecology on 12 July 2016 by a botanist and ecologist over a 3.5 hour period. Surveys included vegetation mapping, random meander survey and targeted threatened flora searches. Further details of each of the survey methods are provided below.

All vascular plants recorded or collected were identified using keys and nomenclature provided in Harden (1990-1993). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from PlantNET (Botanic Gardens Trust 2016).

### 2.2.1. Vegetation Mapping

Previous broad-scale vegetation mapping conducted for the Sydney Metropolitan Catchment Management Authority (SMCMA) Vegetation Mapping project (OEH 2013) was utilised to determine potential vegetation communities likely to occur within the subject site. Cumberland Ecology conducted additional vegetation surveys to revise and update the vegetation mapping prepared by EES. The vegetation within the subject site was then ground-truthed to examine and verify the mapping, including the condition of vegetation and the extent of the different vegetation communities. Where vegetation community boundaries were found to differ from the OEH mapping, records were made of proposed new boundaries using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs.

The resultant information was synthesised using a Geographic Information System (GIS) to create a spatial database that was used to interpret and interpolate the data to produce a vegetation map of the subject site.

### 2.2.2. Random Meander Survey

Random meander survey was undertaken within the subject site to obtain information on species composition and community structure. Surveys were undertaken within all vegetation communities.

### 2.2.3. Targeted Threatened Flora Surveys

Targeted threatened flora searches via random meanders were undertaken within suitable habitat of threatened flora species known from the locality. The locations of threatened flora specimens observed during surveys were recorded using a hand-held GPS.

## 2.3. Fauna Survey

Fauna surveys were undertaken within the subject site by Cumberland Ecology on 12 July 2016. Surveys included a fauna habitat assessment, and incidental observations. Further details of each of the survey methods are provided below.

### 2.3.1. Habitat Assessments

The assessment included consideration of important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and wetland areas such as creeks and soaks. Structural features considered included the nature and extent of the understorey and ground stratum and extent of canopy. The survey also included an assessment of the presence of habitat features suitable for use by threatened fauna species known from the locality.

### 2.3.2. Incidental Observations

Any incidental fauna species that were observed, heard calling, or otherwise detected on the basis of tracks or signs, were recorded and listed in the total species list for the subject site.

## 2.4. Limitations

Vertebrate fauna and vascular flora of the locality are well known based upon a sizeable database of past records and various published reports. The surveys by Cumberland Ecology added to the existing database and helped to provide a clear indication of the likelihood that various species occur or are likely to occur within the subject site. The data obtained from database assessment and surveys of the subject site furnished an appropriate level of information to support this assessment.

The weather conditions at the time of the flora surveys were generally favourable for plant growth and production of features required for identification of most species. Shrubs, grasses, herbs and creepers were readily identifiable in most instances. It is expected that not all flora species present would have been recorded during surveys, particularly within planted garden areas. Despite this, it is considered that sufficient information has been collected to assess issues including conservation significance of the flora, condition and viability of bushland and likely impact on native vegetation. An assessment of the likelihood of occurrence of threatened flora species recorded within the locality of the subject site in the database searches was undertaken to supplement the flora survey.

Fauna surveys undertaken for this assessment relied on database analysis and fauna habitat assessment. In general, opportunistic observations of fauna provide a "snapshot" of some of the fauna present on a site that were active during time of the surveys. The data produced by the surveys is intended to be indicative of the types of species that could occur and not an absolute census of all vertebrate fauna species occurring within the subject site. Therefore, not all fauna utilising the subject site are likely to have been recorded during surveys.

An assessment of the likelihood of occurrence of threatened and migratory fauna species listed for the locality in the database searches was undertaken to supplement the fauna surveys. The combination of these techniques is considered appropriate for assessing the habitat values of the site for threatened fauna within the subject site.

# 3. Results

## 3.1. Vegetation Communities

The subject site was previously mapped for the SMCMA Vegetation Mapping (2013) project which identified the presence of the following two vegetation communities within the subject site:

- Coastal Enriched Sandstone Moist Forest; and
- Urban Native and Exotic Cover.

Flora surveys by Cumberland Ecology in July 2016 refined this previous mapping of the subject site. **Table 3** lists the vegetation communities occurring within the subject site, their conservation status and their extent. The distribution of these vegetation communities within the subject site is shown in **Figure 4** and detailed descriptions of each are provided below.

**Table 3 Conservation status and extent of vegetation communities**

| Vegetation Community | BC Act Status | EPBC Act Status | Area (ha) |
|---|---|---|---|
| Coastal Enriched Sandstone Moist Forest | Not listed | Not listed | 0.06 |
| Urban Native and Exotic Cover | Not listed | Not listed | 0.07 |
| **Total** | | | **0.13** |

### 3.1.1. Coastal Enriched Sandstone Moist Forest

BC Act Status: Not listed

EPBC Act Status: Not listed

Coastal Enriched Sandstone Moist Forest is the most commonly occurring native vegetation community within the Lane Cove Local Government Area with an estimated 43.5 ha present (Storm Consulting Pty Ltd. 2010). Approximately 0.06 ha of Coastal Enriched Sandstone Moist Forest is present on the subject site. The total extent of this community within the subject site is located within Lots 1 and 2 DP857133 (274 and 274A Longueville Road), which are in the northern section of the subject site. This community has a highly modified understorey and does not conform to a threatened ecological community (TEC) listed under the BC Act or EPBC Act. A complete list of all plant species recorded within this community is provided in **Appendix A**.

The community is dominated by *Syncarpia glomulifera* (Turpentine) trees which occur in scattered patches throughout the community's extent (see **Photograph 1**). One *Angophora costata* (Smooth-barked Apple) is present just outside the subject site's northern boundary; however its canopy extends into the subject site. None of these trees are naturally regenerating within the subject site as their understories are comprised of planted garden beds and mown grass.

The sub-canopy of this community is comprised almost entirely of exotic species with the exception of a few *Pittosporum undulatum* (Sweet Pittosporum) small trees located along the community's western boundary (see **Photograph 2**). Exotic sub-canopy species include a *Phoenix canariensis* (Canary Island Date Palm) and a *Cupressus* sp. (Cypress) tree located in the community's western edge, and several *Archontophoenix*

*cunninghamiana* (Bangalow Palm) that are located in the centre of the community (see **Photographs 3 and 4**). All of these species are planted individuals.

The shrub layer is comprised almost entirely of planted exotic and native shrub species (see **Photograph 5**). Planted native shrubs include *Syzygium australe* (Brush Cherry), *Syzygium oleosum* (Blue Lilly Pilly), *Syzygium paniculatum* (Magenta Lilly Pilly), *Callistemon viminalis* (Weeping Bottlebrush), *Grevillea* spp. and *Westringia longifolia* (Long-leaved Westringia). Planted exotic shrubs included *Jacaranda mimosifolia* (Jacaranda), *Plectranthus ciliatus*, *Photinia serrulata* (Chinese Photinia), *Murraya paniculata* (Orange Jasmine) and *Rosa* sp. The eastern edge of the community contains non-planted exotic species including weeds *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet) and *Cinnamomum camphora* (Camphor Laurel).

The community's entire ground layer has been previously cleared and exists within landscaped areas, including mown lawn or planted gardens (see **Photograph 6**). As such, the ground layer of this community is dominated by exotic herbs and grasses with scattered occurrences of native herbs, grasses and ferns. Commonly occurring exotic species include: *Bidens pilosa* (Cobbler's Pegs), *Taraxacum officinale* (Dandelion), *Sonchus oleraceus* (Common Sowthistle), *Sida rhombifolia* (Paddy's Lucerne), *Anagallis arvensis* (Scarlet Pimpernel), *Viola odorata* (Sweet Violet), *Ehrharta erecta* (Panic Veldtgrass), *Sporobolus africanus* (Marsh Bristlegrass) and *Stenotaphrum secundatum* (Buffalo Grass).

Native understorey species are most abundant within mown lawn located on the western and eastern edges of the community. Native herbs occurring sporadically in these areas include *Centella asiatica* (Indian Pennywort), *Cotula australis* (Carrot Weed), *Dichondra repens* (Kidney Weed) and *Viola banksii* (Wild Violet). *Microlaena stipoides* (Weeping Grass) and *Oplismenus aemulus* (Basket Grass) were the only native grass species recorded within the community, with all individuals occurring sporadically within the mown lawns in the community's east and west. Native fern species occurring include *Asplenium australasicum* (Bird's Nest Fern), *Cyathea cooperi* (Straw Treefern) and *Psilotum nudum* (Skeleton Fork-fern).

**Photograph 1 *Syncarpia glomulifera* (Turpentine) trees located along the community's western boundary**

**Photograph 2 *Pittosporum undulatum* (Sweet Pittosporum) (circled in red) small trees located along the community's western boundary**

**Photograph 3 *Phoenix canariensis* (Canary Island Date Palm) located in the western section of the community**

**Photograph 4 *Archontophoenix cunninghamiana* (Bangalow Palm) trees located in the centre of the community**

**Photograph 5 Planted shrubs within landscaped areas**

**Photograph 6 Mown lawn within eastern edge of the community**

### 3.1.2. Urban Native and Exotic Cover

BC Act Status: Not listed

EPBC Act Status: Not listed

This community exists as four separate patches within the subject site and has a total area of 0.07 ha. The community does not contain canopy trees as most of the community has been previously cleared. The largest patch exists primarily as a previously cleared easement located along the subject sites western boundary (see **Photograph 7**). Three additional areas of the community exist as isolated patches within the northern, central and southern sections of the subject site (see **Figure 4**). The patch in the north contains planted shrubs along a fence, the patch in the centre is comprised of a mown lawn, and the patch in the south consists of one planted *Cotoneaster pannosus* tree that is surround be concrete. The vegetation within this community as a whole is dominated by exotic species in all stratums, which is typical of previously cleared areas that are down slope and receive elevated amounts of nutrient rich run-off.

The sub-canopy of this community is comprised entirely of exotic species consisting of *Erythrina X sykesii* (Coral Tree), *C. pannosus*, *Musa* sp. and *L. lucidum* (Large-leaved Privet).

The shrub layer of this community is dominated by exotic species with only two native planted trees present consisting of *Homalanthus populifolius* (Bleeding Heart) and *S. australe* (Brush Cherry) (see **Photograph 8**). The remainder of this layer is dominated by *L. lucidum* (Large-leaved Privet), *L. sinense* (Small-leaved Privet) and *Lantana camara* (Lantana). Other exotic shrubs include *Bougainvillea* sp, *Citrus X Limon* (Rough Lemon), *Brachychiton acerifolius* (Flame Tree) and *Ochna serrulata* (Mickey Mouse Plant).

The groundcover vegetation within this community is highly degraded and dominated by exotic species including: *B. pilosa* (Cobbler's Pegs), *T. officinale* (Dandelion), *Medicago polymorpha* (Medic Burr), *S. rhombifolia* (Paddy's Lucerne), *Plantago lanceolata* (Lamb's Tongue) and *Stellaria media* (Common Chickweed) (see **Photograph 9**). Native groundcover species occurring predominately as isolated individuals include: *Cotula australis* (Carrot Weed), *D. repens* (Kidney Weed), *Commelina cyanea* and *Cyperus gracilis* (Slender Flat-sedge).

**Photograph 7 Easement located along the community's eastern boundary**

**Photograph 8 *Homalanthus populifolius* (Bleeding Heart) tree located along community's eastern boundary**

**Photograph 9 Condition of groundcover vegetation within the community**

## 3.2. Flora Species

### 3.2.1. General Species

Approximately 110 flora species were recorded within the subject site. Of these species 82 were exotic species. Ten of these species are listed either as State Priority weeds or Other Weeds of Regional Concern under the Biosecurity Act and the Greater Sydney Regional Strategic Weed Management Plan (LLS: Greater Sydney 2019), with three also listed as a Weed of National Significance (WONS) (see **Table 4**). A list of plant species that were detected on the subject site is provided in **Appendix A**.

**Table 4 State Priority weeds, Other Weeds of Regional Concern and WONS occurring on the subject site**

| Scientific Name | Common Name | Listing | WONS |
|---|---|---|---|
| *Acetosa sagittata* | Rambling Dock | OWRC | - |
| *Araujia sericifera* | Moth Vine | OWRC | - |
| *Asparagus aethiopicus* | Ground Asparagus | SP | Yes |
| *Cinnamomum camphora* | Camphor Laurel | OWRC | - |
| *Ipomoea cairica* | Coastal Morning Glory | OWRC | - |
| *Ipomoea indica* | Morning Glory | OWRC | - |
| *Lantana camara* | Lantana | SP | Yes |
| *Ligustrum lucidum* | Large-leaved Privet | OWRC | - |

| Scientific Name | Common Name | Listing | WONS |
|---|---|---|---|
| *Ligustrum sinense* | Small-leaved Privet | OWRC | - |
| *Rubus sp. aggregate* | Blackberry | SP | Yes |

*Key: SP = State Priority, OWRC = Other Weed of Regional Concern*

### 3.2.2. Threatened Species

One *Syzygium paniculatum* (Magenta Lily Pilly) was recorded within the Coastal Enriched Sandstone Moist Forest vegetation community within the subject site (see **Figure 4**). This species is listed as vulnerable under the BC Act. Although this species is listed under the BC Act, the individual recorded has been planted as part of a landscaped garden and does not occur naturally.

No other threatened flora species were recorded during surveys.

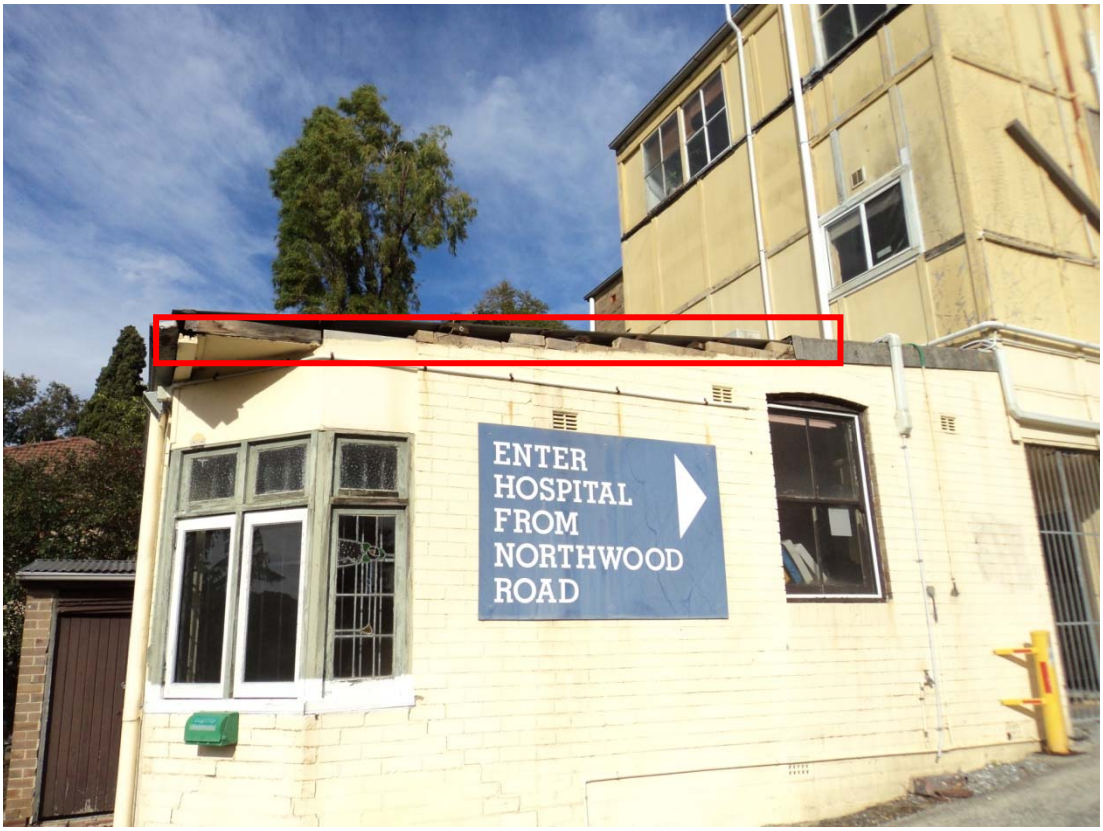
An analysis of the likelihood of occurrence on the subject site for each threatened flora species recorded within the locality is provided in **Appendix C**. This assessment concluded that due to the degraded nature of the subject site, no threatened flora species listed under the BC Act and/or EPBC Act are likely to occur.

## 3.3. Fauna

### 3.3.1. Fauna Habitat

The vegetation of the subject site provides some potential habitat for native fauna known to occur in the locality, including threatened species. Microhabitats present within the subject site are limited, but included crevices within roofing suitable for microbats, palm tree fronds suitable for medium sized birds and ground litter suitable for reptiles (see **Photograph 10**). **Figure 4** identifies the location of all potential habitats within the subject site. In addition to these microhabitats, the subject site contains numerous flowering plants and trees which can provide potential foraging resources for a range of birds that may use the subject site on occasion as part of a larger foraging range. Microhabitats such as tree hollows and decorticating bark are absent from the subject site. During surveys, it was evident that the southern sections of the subject site contained the highest number of foraging birds.

**Photograph 10 Crevices in roofing (outlined in red) suitable for microbats**




### 3.3.2. General Species

Six vertebrate fauna species were recorded within the subject site through incidental observations during the habitat assessment. All of these species were common bird species of the area, including high abundances of the Noisy Miner (*Manorina melanocephala*) within the northern and southern sections of the subject site. A full list of fauna species observed is provided in **Table 4**.

**Table 5 Fauna identified during surveys**

| Common Name | Scientific Name |
|---|---|
| Australian Brush Turkey | *Alectura lathami* |
| Australian Raven | *Corvus coronoides* |
| Indian Myna* | *Acridotheres tristis* |
| Noisy Miner | *Manorina melanocephala* |
| Pied Currawong | *Strepera graculina* |
| Rainbow Lorikeet | *Trichoglossus haematodus* |
| Sulphur-crested Cockatoo | *Cacatua galerita* |

** denotes exotic species*

### 3.3.3. Threatened Species

No threatened fauna species were recorded within the subject site during surveys. An analysis of the likelihood of occurrence on the subject site for each threatened fauna species recorded within the locality is provided in **Appendix C**. This assessment concluded that two threatened vertebrate fauna species and two migratory species have the potential to occur within the subject site. **Table 5** lists the threatened fauna species considered to have the potential to occur within the subject site.

**Table 6 Threatened fauna species with potential to occur on the subject site**

| Family | Common Name | Scientific Name | BC Act Status | EPBC Act Status |
|---|---|---|---|---|
| **Aves** | | | | |
| Apodidae | Fork-tailed Swift | *Apus pacificus* | | Mig. |
| Apodidae | White-throated Needletail | *Hirundapus caudacutus* | | Mig. |
| **Mammalia** | | | | |
| Pteropodidae | Grey-headed Flying-fox | *Pteropus poliocephalus* | V | V |
| Vespertilionidae | Eastern Bentwing-bat | *Miniopterus orianae oceanensis* | V | |

*Note: V=vulnerable, Mig.=Migratory*

# 4. Impact Assessment

## 4.1. Introduction

Approximately 0.135 ha of vegetation will be cleared as a result of the proposed development. The majority of the proposed development will be restricted to previously developed or cleared areas and its impact is likely to be negligible in terms of biodiversity loss. These areas are inhabited primarily by planted native and exotic tree species with a predominately exotic understorey, and offers little natural habitat to endemic fauna species.

## 4.2. Ecological Communities

### 4.2.1. Coastal Enriched Sandstone Moist Forest

Approximately 0.06 ha of this community is present within the subject site. The proposed development will clear all of this community present. This community is highly degraded and exists as previously cleared areas containing landscaped gardens and mown lawns with scattered canopy trees. As such, the vegetation to be cleared is unlikely to provide important habitat for threatened species known to occur in the locality. Furthermore, larger patches of the same community in better condition occur in areas adjacent to the subject site within Gore Creek to the east. Therefore, the removal of 0.06 ha of this community within the subject site is unlikely to significantly impact biodiversity values of the locality.

The vegetation within this community is not listed under the BC Act or EPBC Act; therefore further ecological assessments are not recommended.

### 4.2.2. Urban Native and Exotic Cover

Approximately 0.07 ha of this community is present within the subject site, all of which will be cleared by the proposed development. The vegetation within this community is highly degraded and is unlikely to provide important habitat to threatened species known to occur in the locality. Therefore, its removal is unlikely to significantly impact on the biodiversity values of the subject site or locality.

The vegetation within this community is not listed under the BC Act or EPBC Act; therefore further ecological assessments are not recommended.

## 4.3. Flora Species

One *Syzygium paniculatum* (Magenta Lilly Pilly), listed as vulnerable under the BC Act will be removed as a result of the proposed development. This individual has been planted and does not occur naturally within the subject site as no suitable habitat is present. Although the individual to be removed does not occur naturally within the subject site and technically does not comprise a threatened species as the individual has not been planted for restoration or propagation purposes, an assessment of significance was undertaken as a precaution. The assessment concluded that the proposed development is unlikely to have a significant impact on the species and therefore a BDAR is not required.

## 4.4. Fauna Species

No threatened fauna species were recorded as occurring in the study area during the time of the field survey. A total of two threatened fauna species listed under the BC Act, one of which is also listed under the EPBC Act,

and two migratory species listed under the EPBC Act were considered to have the potential to occur within the subject site.

Threatened fauna species listed under the BC Act include two bat species. A total of approximately 0.13 ha of suitable foraging habitat for both species and 20 $m^2$ of potential roosting habitat for one species will be removed as a result of the proposed development. An assessment of significance was undertaken for the two bat species considered to have the potential to occur within the subject site. Neither of the assessed species are considered to be significantly impacted by the proposed development and therefore no BDAR is required.

### 4.4.1. Eastern Bentwing-bat (*Miniopterus orianae oceanensis*)

The Eastern Bentwing-bat is considered to have the potential to occur as it may utilise the subject site for foraging and roosting purposes. Potential roosting habitat is limited to one structure in the south of the site containing an opening in the roof. Although this species is known to roost in such structures, it is not its preferred roosting habitat. This species is highly mobile and if the subject site is utilised as foraging habitat, it is likely only utilised on occasion as part of a much broader foraging range. The potential foraging habitat within the site is relatively small and exposed to a high degree of edge effects being bounded by development. As more suitable foraging habitat is present within bushland bounding the site's eastern edge, this species is unlikely to be dependent on the subject site for its long-term survival in the locality. Therefore, the proposed development is unlikely to have a significant impact on this species.

### 4.4.2. Grey-headed Flying-fox (*Pteropus poliocephalus*)

The Grey-headed Flying-fox is considered to have the potential to utilise the subject site for foraging purposes as part of a much broader foraging range. As a camp is not present and only a small amount of foraging habitat is available, this species is unlikely to be reliant on the subject site for survival and the removal of vegetation as a result of the proposed development is unlikely to adversely impact this species

### 4.4.3. Migratory Species

- Fork-tailed Swift (Apus pacificus); and
- White-throated Needletail (*Hirundapus caudacutus)*

The two migratory bird species listed under the EPBC Act are highly mobile species that may utilise the site on occasion as part of much broader foraging range. Both species are almost exclusively aerial species and would not be reliant on the habitat within the subject site and would only forage overhead. Therefore, the proposed development is unlikely to impact on these species.

## 4.5. Construction and Operational Impacts

Council has requested that a light and sound assessment is to be carried out to determine if the artificial light and noise produced by the proposed development will have any detrimental effects to the wildlife inhabiting the bushland located to the east of the subject site. This section includes the requested light and sound assessment in order to satisfy Council's request.

Indirect impacts relevant to the construction and operational phases of the proposed development include noise and light pollution. These indirect impacts are discussed in more detail below and appropriate mitigation measures for these indirect impacts have been provided in **Chapter 5**.

### 4.5.1. Noise

Noise can affect animal physiology and behaviour, and if it becomes an ongoing stress, it can be injurious to an animal's energy budget, reproductive success and long-term survival. There are other potential impacts that include habitat loss through avoidance, reduced reproductive success and a retreat away from favourable habitats (AMEC 2005).

Noise also affects the way that animal-created sounds are heard and interpreted by other animals. This can include mating calls, territorial calls and alarm calls. Interference with these calls by noise generated by a development has the potential to disrupt the species relying on these calls with deleterious results including reduced reproductive success and mortality (AMEC 2005).

The noise created by the construction of the proposed development as well as the operational phase of the proposed development is unlikely to significantly affect native species, and the value of the habitats that remain, further than current conditions.

The construction phase of the proposed development is expected to occur over an approximate 9 month period. Noise associated with the proposed construction works is likely to temporarily increase noise higher than what currently occurs.

The location of the proposed development is located in an area that is currently exposed to a low to moderate degree of noise being in close proximity to developed areas and Northwood Road. Noise impacts of the operational phase of the proposed development are not considered to be significantly greater than existing conditions.

It is expected that some species are likely to relocate in response to noise during both the construction and operational phases of the proposed development, and this has the potential effect of increasing the amount of habitat for native species that will be displaced as a result of the proposed development. However, it is likely that most animal species will habituate to the periodic noise disturbance (AMEC 2005), and the proposed development is likely to cause only temporary disturbance to fauna.

### 4.5.2. Light

The proposed development has the potential to increase the level of artificial light in the natural environment during the construction phase and after the completion of construction. Increased light levels may adversely impact wildlife by direct glare, chronic or periodic increased illumination and temporary unexpected fluctuations in light levels (Saleh 2007).

Research into impacts from altered lighting indicates that it can trigger behavioural and physiological responses that include but are not limited to:

- Changes in foraging behaviour;

- A disruption of seasonal day length cues which trigger critical behaviours (Longcore and Rich 2007, Saleh 2007, Longcore and Rich 2010);
- Disorientation and/or temporary blindness; and
- Interference with predator-prey relationships.

The construction phase of the proposed development is expected to occur over an approximate 9 month period. Lighting associated with the proposed construction works is likely to temporarily increase lighting to higher levels than what currently occurs. Light disturbances will only occur during the limited hours of operation. Potential impacts from light pollution during the construction phase are considered to elevate slightly than current levels; however, this increase is unlikely to significantly impact any fauna species as the majority of the fauna species recorded or are considered to have the potential to utilise the habitat present are either nocturnal or small birds. Nocturnal species are unlikely to be impacted by light pollution during the construction phase as works will be limited to daylight hours. Small birds are generally active within bushland areas to the east of the subject site to be retained. These areas are densely vegetated and are well shaded during the day. As such, any artificial light during the day is unlikely to increase current light levels within retained vegetation.

Areas of bushland located to the east of the subject site are currently exposed to a minimal amount of artificial lighting. The proposed development is likely to result in a minor increase of artificial light coming from the development, particularly in the evening. It is likely that most fauna species would habituate to the periodic disturbance and light pollution from the operational phase of the proposed development, which is unlikely to have a significant or long-term impact on any fauna species.

# 5. Mitigation Measures

A number of mitigation measures are recommended for the proposed development. These measures should be implemented to minimise impacts to the ecological values of the subject site and adjoining properties.

### 5.1.1. Vegetation Protection

To avoid unnecessary removal or damage to vegetation to be retained within the subject site, the clearing area should be clearly demarcated and signed, where appropriate, to ensure no vegetation beyond these boundaries is removed. Clearing works and equipment should be excluded from areas outside the clearing area. Site inductions are to be given by the civil contractor to ensure all site workers and visitors are aware of any no-access areas.

### 5.1.2. Erosion, Sedimentation and Pollution Control

Potential impacts to flora and fauna occurring in the construction phase that can be managed include: run-off, sedimentation, erosion and pollution. To reduce sedimentation on the construction site, erosion control measures should be implemented. This includes minimising the amount of exposed soils on the site at any given time. All soil stockpiles should be adequately covered when not in use to prevent erosion from heavy rainfall. Sediment fences should be established around the perimeter of the development area, especially in down slope areas to prevent the impacts of sedimentation on the adjoining vegetation and Gore Creek. During development, precautions should be taken to ensure that no pollution, such as petrochemical substances or water containing suspended solids, escapes the construction site. Pollution traps and efficient removal of pollution to an off-site location would help to minimise pollution impacts.

### 5.1.3. Pre-clearing and Clearing Surveys

Pre-clearing surveys are to be undertaken by a suitably qualified ecologist within one week of any clearing activities. Pre-clearing surveys will include:

- Demarcation of key habitat features such as hollow-bearing trees, nests, fallen logs and bushrock;
- Inspection of the building's roof containing potential roosting habitat for microbats; and
- Provision of a report following the completion of a pre-clearing survey, detailing the location and type of all habitat items.

To minimise impacts to native fauna species, clearing should be undertaken in the following two-stage process under the supervision of a suitably qualified ecologist:

- The initial phase of clearing will involve clearing around identified habitat features and leaving the features overnight; and
- The second stage will involve clearing of the habitat features left overnight as gently as possible, followed by an inspection.

If possible, trees marked as containing hollows/nests will be shaken by machinery prior to clearing to encourage any animals remaining to leave the hollows/nests and move on. An ecologist should investigate all hollows/nests for the presence of fauna following felling of the tree.

An ecologist should be present while clearing to rescue animals injured during the clearance operation. Provisions will be made to protect any native fauna during clearing activities by the following means:

- All persons working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;
- Animals disturbed or dislodged during the clearance but not injured should be assisted to move to the adjacent bushland to the east of the subject site; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized).

### 5.1.4. Weed Control Measures

Priority weed species and WONS occurring within the subject site should be managed in order to prevent further spread. Prior to any vegetation clearance, priority weeds and WONS should be demarcated during the pre-clearance survey in order for these to be disposed of separately from native material.

### 5.1.5. Revegetation Works

It is recommended that any revegetation works be carried out in accordance with an approved landscape plan that aims to provide suitable foraging/nesting habitat for native fauna. All plants should be sourced from local nurseries or come from seed sourced from areas of native vegetation to the east of the property.

### 5.1.6. Noise

Construction is expected to occur over an approximate 9 month period and it is recommended that all works be limited to daylight hours as outlined in the Construction Management Plan prepared for the proposed development. Additionally, during operation of the proposed development, it is recommended that restrictions are implemented on the hours of operation of the external terrace. The implementation of these measures are required in order to minimise the impacts of noise on nocturnal species.

No noise monitoring is recommended as the noise associated with the proposed development is anticipated to be minor and no sensitive habitats such as Grey-headed Flying-fox camps are located nearby.

### 5.1.7. Light

Construction is expected to occur over an approximate 9 month period and it is recommended that all works be limited to daylight hours to reduce the need for artificial lighting. Additionally, It is recommended that all lighting associated with proposed development restrict direct light from entering areas of retained bushland located to the east of the subject site. It is anticipated that Council will provide appropriate light restrictions be placed on buildings in close proximity to retained vegetation (e.g. no bright lights directed towards vegetation).

Design specifications to limit lighting impacts during operation are provided in the architectural plans and includes subdue, ambient external lighting, absence of bright spot lights, sensor/timing mechanisms to limit lighting impacts. Furthermore, it is recommended that restrictions are implemented on the hours of operation of the external terrace to minimise the impacts of light on nocturnal species.

# 6. Conclusion

The subject site is approximately 0.5 ha in area and is comprised primarily of previously developed areas. Approximately 0.13 ha of vegetation is present within the subject site's northern and eastern edges. With the exception of several scattered canopy trees in the north of the subject site, all of the vegetation has been previously cleared and none of the vegetation communities present are listed as a TEC under the BC Act or EPBC Act.

Even though none of the vegetation communities within the subject site are listed as a TEC, an impact assessment was undertaken to examine the impacts of the proposed development on the biodiversity values of the subject site.

Approximately 0.13 ha of non-TEC vegetation, including one planted threatened species will be cleared as a result of the proposed development. Due to the degraded nature of the vegetation present and the fact that bigger patches of better condition habitat will remain in areas adjacent to the east of the subject site, the proposed development is unlikely to have a significant impact on the biodiversity values of the locality. Additionally, the one threatened plant species present exists as a planted individual and its removal is unlikely to have a significant impact on a local population.

One building potentially offers roosting habitat for one threatened bat species and the vegetation present offers foraging habitat for two threatened bat species; however the potential roosting habitat is not preferred habitat for the species, and foraging habitat present is unlikely to be important to either of the species as it is likely only utilised periodically as part of a much broader foraging range. Therefore, the proposed development is unlikely to have a significant impact on either of the bat species that have potential to occur.

The impact assessment conducted has determined that if all mitigation measures provided in this report are implemented, the proposed development is unlikely to have a significant impact on the long-term survival of any threatened species and/or ecological communities occurring, or that have the potential to occur within the subject site or locality. Therefore, the project does not trigger entry into the BOS and a BDAR for further ecological assessments are not required.

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# APPENDIX A :

## Flora Species List

**Table 7 Flora species recorded on the subject site**

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| **Trees** | | | | | | | |
| Myrtaceae | *Angophora costata* | Smooth-barked Apple | | | | x | |
| Myrtaceae | *Syncarpia glomulifera* | Turpentine | | | | x | |
| **Small Trees** | | | | | | | |
| Arecaceae | *Archontophoenix cunninghamiana* | Bangalow Palm | * | | | x | |
| Arecaceae | *Phoenix canariensis* | Canary Island Date Palm | * | | | x | |
| Cupressaceae | *Cupressus sp.* | Cypress | * | | | x | |
| Fabaceae (Faboideae) | *Erythrina X sykesii* | Coral Tree | * | | | | x |
| Malaceae | *Cotoneaster pannosus* | | * | | | | x |
| Musaceae | *Musa sp.* | | * | | | | x |
| Oleaceae | *Ligustrum lucidum* | Large-leaved Privet | * | OWRC | | | x |
| Pittosporaceae | *Pittosporum undulatum* | Sweet Pittosporum | | | | x | |
| **Shrubs** | | | | | | | |
| Apocynaceae | *Plumeria sp.* | | * | | | x | |
| Bignoniaceae | *Jacaranda mimosifolia* | Jacaranda | * | | | x | |
| Euphorbiaceae | *Homalanthus populifolius* | Bleeding Heart | | | | | x |
| Lamiaceae | *Plectranthus ciliatus* | | * | | | x | |

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| Lamiaceae | *Westringia longifolia* | Long-leaved Westringia | | | | x | |
| Lauraceae | *Cinnamomum camphora* | Camphor Laurel | * | OWRC | | x | |
| Malvaceae | *Brachychiton acerifolius* | Flame Tree | * | | | | x |
| Myrtaceae | *Callistemon viminalis* | Weeping Bottlebrush | | | | x | |
| Myrtaceae | *Leptospermum laevigatum* | Coast Teatree | * | | | x | |
| Myrtaceae | *Leptospermum petersonii* | Lemon-scented Teatree | * | | | | x |
| Myrtaceae | *Sannantha similis* | | * | | | x | |
| Myrtaceae | *Syzygium australe* | Brush Cherry | | | | x | x |
| Myrtaceae | *Syzygium oleosum* | Blue Lilly Pilly | | | | x | |
| Myrtaceae | *Syzygium paniculatum* | Magenta Lilly Pilly | | | | x | |
| Nyctaginaceae | *Bougainvillea sp.* | | * | | | | x |
| Ochnaceae | *Ochna serrulata* | Mickey Mouse Plant | * | | | x | x |
| Oleaceae | *Ligustrum lucidum* | Large-leaved Privet | * | OWRC | | x | x |
| Oleaceae | *Ligustrum sinense* | Small-leaved Privet | * | OWRC | | x | x |
| Proteaceae | *Grevillea banksii X bipinnatifida* | Robyn Gordon | * | | | x | |
| Proteaceae | *Grevillea baueri X rosmarinifolia* | John Evans | * | | | x | |
| Rosaceae | *Photinia serrulata* | Chinese Photinia | * | | | x | |
| Rosaceae | *Rosa sp.* | | * | | | x | |

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| Rutaceae | *Citrus x Limon* | Rough Lemon | * | | | | x |
| Rutaceae | *Murraya paniculata* | Orange Jasmine | * | | | x | |
| Verbenaceae | *Lantana camara* | Lantana | * | SP | Yes | | x |
| **Dicots** | | | | | | | |
| Apiaceae | *Centella asiatica* | Indian Pennywort | | | | x | |
| Apiaceae | *Cyclospermum leptophyllum* | Slender Celery | * | | | x | x |
| Asteraceae | *Ageratina adenophora* | Crofton Weed | * | | | x | |
| Asteraceae | *Bidens pilosa* | Cobblers Pegs | * | | | x | x |
| Asteraceae | *Conyza sumatrensis* | Tall Fleabane | * | | | x | x |
| Asteraceae | *Cotula australis* | Carrot Weed | | | | x | x |
| Asteraceae | *Galinsoga parviflora* | Potato Weed | * | | | | x |
| Asteraceae | *Gamochaeta calviceps* | Cudweed | * | | | | x |
| Asteraceae | *Hypochaeris radicata* | Catsear | * | | | | x |
| Asteraceae | *Sonchus oleraceus* | Common Sowthistle | * | | | x | x |
| Asteraceae | *Taraxacum officinale* | Dandelion | * | | | x | |
| Brassicaceae | *Capsella bursa-pastoris* | Shepherd's Purse | * | | | | x |
| Brassicaceae | *Cardamine hirsuta* | Common Bittercress | * | | | | x |
| Brassicaceae | *Lepidium didymum* | Lesser Swinecress | * | | | | x |
| Caryophyllaceae | *Cerastium glomeratum* | Mouse-ear Chickweed | * | | | | x |

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| Caryophyllaceae | *Stellaria media* | Common Chickweed | * | | | x | x |
| Convolvulaceae | *Dichondra repens* | Kidney Weed | | | | x | x |
| Euphorbiaceae | *Euphorbia peplus* | Petty Spurg | * | | | | x |
| Fabaceae | *Medicago arabica* | Spotted Burr Medic | * | | | | x |
| Fabaceae | *Medicago polymorpha* | Burr Medic | * | | | | x |
| Fabaceae | *Trifolium repens* | White Clover | * | | | | x |
| Fumariaceae | *Fumaria muralis* | Wall Fumitory | * | | | | x |
| Geraniaceae | *Geranium solanderi* | Native Geranium | * | | | x | |
| Malvaceae | *Modiola caroliniana* | Red-flowered Mallow | * | | | | x |
| Malvaceae | *Sida rhombifolia* | Paddy's Lucerne | * | | | x | |
| Myrsinaceae | *Anagallis arvensis* | Scarlet Pimpernel | * | | | x | x |
| Oleaceae | *Ligustrum sinense* | Small-leaved Privet | * | OWRC | | x | x |
| Oxalidaceae | *Oxalis corniculata* | | * | | | x | x |
| Phyllanthaceae | *Phyllanthus tenellus* | Hen and Chicken | * | | | x | |
| Plantaginaceae | *Plantago lanceolata* | Lamb's Tongues | * | | | | x |
| Plantaginaceae | *Veronica arvensis* | Wall Speedwell | * | | | | x |
| Plantaginaceae | *Veronica plebeia* | Trailing Speedwell | | | | | |
| Solanaceae | *Solanum nigrum* | Black-berry Nightshade | * | | | x | x |
| Tropaeolaceae | *Tropaeolum majus* | Nasturtium | * | | | | x |

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| Urticaceae | *Parietaria judaica* | Pellitory | * | | | x | x |
| Violaceae | *Viola banksii* | Wild Violet | | | | x | |
| Violaceae | *Viola odorata* | Sweet Violet | * | | | x | |
| **Monocots (grasses)** | | | | | | | |
| Poaceae | *Bromus catharticus* | Prairie Grass | * | | | | x |
| Poaceae | *Cynodon dactylon* | Couch | * | | | | x |
| Poaceae | *Ehrharta erecta* | Panic Veldtgrass | * | | | x | x |
| Poaceae | *Microlaena stipoides* | Weeping Grass | | | | x | |
| Poaceae | *Oplismenus aemulus* | Basket Grass | | | | x | |
| Poaceae | *Pennisetum clandestinum* | Kikuyu | * | | | | x |
| Poaceae | *Poa annua* | Winter Grass | * | | | | x |
| Poaceae | *Sporobolus africanus* | Marsh Bristlegrass | * | | | x | x |
| Poaceae | *Stenotaphrum secundatum* | Buffalo Grass | * | | | x | |
| **Monocots (other)** | | | | | | | |
| Amaryllidaceae | *Clivia miniata* | Natal Lily | * | | | x | |
| Amaryllidaceae | *Nothoscordum borbonicum* | Honeybells | * | | | x | |
| Anthericaceae | *Chlorophytum comosum* | Spider Plant | * | | | x | |
| Araceae | *Monstera deliciosa* | Fruit Salad Plant | * | | | | x |
| Asparagaceae | *Asparagus aethiopicus* | Ground Asparagus | * | SP | Yes | x | x |

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| Asparagaceae | *Ophiopogon japonicus* | Mondo Grass | * | | | x | |
| Asteliaceae | *Cordyline australis* | Cabbage Tree | * | | | x | |
| Asteliaceae | *Cordyline stricta* | Narrow-leaved Palm Lily | * | | | | x |
| Commelinaceae | *Commelina cyanea* | | | | | | x |
| Commelinaceae | *Tradescantia fluminensis* | Wandering Jew | * | | | x | x |
| Cyperaceae | *Cyperus gracilis* | Slender Flat-sedge | | | | x | x |
| Lomandraceae | *Lomandra longifolia* | Spiny-headed Mat-rush | | | | x | |
| Orchidaceae | *Pterostylis sp.* | | | | | x | |
| Phormiaceae | *Dianella caerulea var. caerulea* | Blue Flax Lily | | | | x | |
| Strelitziaceae | *Strelitzia reginae* | Bird of Paradise | * | | | X | |
| **Climbers/Vines** | | | | | | | |
| Apocynaceae | *Araujia sericifera* | Moth Vine | * | OWRC | | | x |
| Apocynaceae | *Trachelospermum jasminoides* | Star Jasmine | | | | x | |
| Basellaceae | *Anredera cordifolia* | Madeira Vine | * | | | | x |
| Bignoniaceae | *Pyrostegia venusta* | Golden Shower | * | | | x | |
| Convolvulaceae | *Ipomoea cairica* | Coastal Morning Glory | * | OWRC | | x | |
| Rosaceae | *Rubus sp. aggregate* | Blackberry | * | SP | Yes | | x |
| **Ferns and Allies** | | | | | | | |

| Family | Species Name | Common Name | Exotic | Weed Listing | WONS | Coastal Enriched Sandstone Moist Forest | Exotic and Native Urban |
|---|---|---|---|---|---|---|---|
| Aspleniaceae | *Asplenium australasicum* | Bird's Nest Fern | | | | x | |
| Convolvulaceae | *Calystegia sepium* | | * | | | x | |
| Cyatheaceae | *Cyathea cooperi* | Straw Treefern | | | | x | |
| Lomariopsidaceae | *Nephrolepis cordifolia* | Fishbone Fern | * | | | x | |
| Polygonaceae | *Acetosa sagittata* | Rambling Dock | * | OWRC | | | x |
| Psilotaceae | *Psilotum nudum* | Skeleton Fork-Fern | | | | x | |
| Pteridaceae | *Adiantum aethiopicum* | Common Maidenhair | | | | | x |

*Key: SP = State Priority, OWRC = Other Weed of Regional Concern*

# APPENDIX B :

## Threatened Flora Likelihood of Occurrence

**Table 8 Threatened flora likelihood of occurrence within the subject site**

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Casuarinaceae | *Allocasuarina glareicola* | - | E | E | Species or species habitat likely to occur within area. | Grows in Castlereagh woodland on lateritic soil with *Eucalyptus parramattensis*, *Eucalyptus fibrosa*, *Angophora bakeri*, *Eucalyptus sclerophylla* and *Melaleuca decora*. Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. | Unlikely. No records from the locality and no suitable habitat is present. |
| Convolvulaceae | *Wilsonia backhousei* | Narrow-leafed Wilsonia | V | - | 1 | Occurs on margins of salt marshes and lakes. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Dilleniaceae | *Hibbertia sp. Turramurra* | Julian's Hibbertia | CE | - | 1 | Occurs in the Cumberland and Pittwater CMAs and grows in forest with the canopy species *Eucalyptus pilularis*, *E. resinifera*, *Corymbia gummifera* and *Angophora costata*. Prefers light clay soils occurring on shale sandstone soil transition. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Elaeocarpaceae | *Tetratheca glandulosa* | - | V | - | 3 | Associated with shale-sandstone transition habitat where shale- | Unlikely. Low number of records from the locality |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | cappings occur over sandstone. Occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Occurs in open woodland, woodland and open forest. | and no suitable habitat is present. |
| Ericaceae | *Epacris purpurascens var. purpurascens* | - | V | - | 13 | Found in a range of habitat types, most of which have a strong shale soil influence. | Unlikely. Low number of records from the locality and no suitable habitat is present. |
| Fabaceae (Faboideae) | *Dillwynia tenuifolia* | - | V | - | 1 | Locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Fabaceae (Mimosoideae) | *Acacia bynoeana* | Bynoe's Wattle | E | V | 1 | Found in heath and woodland on sandy soils. Prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include *Corymbia* | Unlikely. Only one record from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | *gummifera* (Red Bloodwood), *Eucalyptus haemastoma* (Scribbly Gum), *Eucalyptus parramattensis* (Parramatta Red Gum), Banksia serrata (Saw Banksia) and *Angophora bakeri* (Narrow-leaved Apple). | |
| Fabaceae (Mimosoideae) | *Acacia pubescens* | Downy Wattle | V | V | 1 | Occurs on alluviums, shales and at the intergrade between shales and sandstones. Occur in open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Fabaceae (Mimosoideae) | *Acacia terminalis* subsp. *terminalis* | Sunshine Wattle | E | E | 6 | Coastal scrub and dry sclerophyll woodland on sandy soils . | Unlikely. Low number of records from the locality and no suitable habitat is present. |
| Geraniaceae | *Pelargonium* sp. Striatellum | Omeo Stork's-bill | E | E | Species or species habitat likely to occur within area. | Has a narrow habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities. | Unlikely. No records from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Lobeliaceae | *Hypsela sessiliflora* | - | E | X | 1 | Currently known from one site located in Erskine Park. All previous sightings are from western Sydney at Homebush and at Agnes Banks. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Myrtaceae | *Callistemon linearifolius* | Netted Bottle Brush | V | - | 5 | Grows in dry sclerophyll forest on the coast and adjacent ranges. | Unlikely. Low number of records from the locality and no suitable habitat is present. |
| Myrtaceae | *Biconvex Paperbark* | Melaleuca biconvexa | V | V | Species or species habitat likely to occur within area. | Found in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. | Unlikely. No records from the locality and no suitable habitat is present. |
| Myrtaceae | *Darwinia biflora* | - | V | V | 150 | Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. | Unlikely. Although a high number of records from the locality, no suitable habitat is present within the site. |
| Myrtaceae | *Eucalyptus camfieldii* | Camfield's Stringybark | V | V | 1 | Found in exposed areas on sandstone ridges, slopes and plateaus near tall coastal heath or low open woodland. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Myrtaceae | *Eucalyptus nicholii* | Narrow-leaved | V | V | 6 | Occurs in dry grassy woodland on shallow soils of slopes and ridges. Prefers infertile soils derived from | Unlikely. Low number of records from the locality |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | Black Peppermint | | | | granite or metasedimentary rock on the lower slopes of the landscape. | and no suitable habitat is present. |
| Myrtaceae | *Melaleuca deanei* | Deane's Paperbark | V | V | 4 | Found in marshy heath on coastal sandstone plateaus. Restricted to sandstones of Sydney and south coast. | Unlikely. Low number of records from the locality and no suitable habitat is present. |
| Myrtaceae | *Syzygium paniculatum* | Magenta Lilly Pilly | E | V | 10 | On south coast of NSW occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. | Present. Individual present is a planted species. Natural occurrence of this species within the subject site is unlikely as all understorey vegetation has previously been cleared. |
| Orchidaceae | *Caladenia tessellata* | Thick Lip Spider Orchid | E | V | 1 | Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Orchidaceae | *Genoplesium baueri* | Bauer's Midge Orchid | E | E | 1 | Grows in dry sclerophyll forest and moss gardens over sandstone. | Unlikely. Only one record from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Orchidaceae | *Pterostylis saxicola* | Sydney Plains Greenhood | E | E | 1 | The species occurs in small pockets of shallow soil in flat areas on top of sandstone rock shelves above cliff lines, or on mossy rocks in gullies. Sclerophyll forest/woodland often occurs growing above where the species occurs, on shale or shale/sandstone transition soils. Flowering time is from October to December. It is currently only known to occur at five locations within western Sydney: Georges River National Park, close to Yeramba Lagoon, Peter Meadows Creek, and St Marys Towers. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Orchidaceae | *Cryptostylis hunteriana* | Leafless Tongue-orchid | V | V | Species or species habitat likely to occur within area. | Occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, Xanthorrhoea spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests. Soils are | Unlikely. No records from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | generally considered to be moist and sandy, however, this species is also known to grow in dry or peaty soils. Is associated with the community Bloodwood / Scribbly Gum / Silver-top Ash Forest on the South Coast. Species is known to have occurrence associated with other *Cryptostylis* species. Flowering occurs generally from November to February. | |
| Poaceae | *Deyeuxia appressa* | - | E | E | 1 | A highly restricted NSW endemic known only from two pre-1942 records in the Sydney area. Was first collected in 1930 at Herne Bay, Saltpan Creek, off the Georges River, south of Bankstown. Was then collected in 1941 from Killara, near Hornsby. Possibly extinct in wild. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Proteaceae | *Persoonia hirsuta* | Hairy Geebung | E | E | 1 | Occurs in dry sclerophyll forest and woodland with a shrubby understorey. | Unlikely. Only one record from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Proteaceae | *Grevillea parviflora subsp. parviflora* | Small-flower Grevillea | V | V | 1 | Grows in light sandy or clay soils over thin shales, often with lateritic ironstone gravels and nodules. Is known to occur in Shale/Sandstone Transition Forest. | Unlikely. Only one record from the locality and no suitable habitat is present. |
| Rutaceae | *Asterolasia elegans* | - | E | E | Species or species habitat likely to occur within area. | Occurs on Hawkesbury sandstone growing between sandstone boulders and rocky outcrops found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. It is currently only known from 7 populations occurring in the hills north of Maroota within a 22 $km^2$ extent of occurrence. | Unlikely. No records from the locality and no suitable habitat is present. |
| Santalaceae | *Austral Toadflax* | Thesium australe | V | V | Species or species habitat likely to occur within area. | Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. | Unlikely. No records from the locality and no suitable habitat is present. |
| Thymelaeaceae | *Pimelea curviflora var. curviflora* | - | V | V | 2 | Confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. Occurs on shaley/lateritic soils over sandstone | Unlikely. Low number of records from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. | |
| Thymelaeaceae | *Pimelea spicata* | Spiked Rice-flower | E | E | Species or species habitat likely to occur within area. | On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey. Coastal headlands and hilltops are the favoured sites. | Unlikely. No records from the locality and no suitable habitat is present. |

*Key: V = Vulnerable, E = Endangered, CE = Critically Endangered*

# APPENDIX C :

## Threatened Fauna Likelihood of Occurrence

**Table 9 Threatened fauna likelihood of occurrence within the subject site**

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| **Amphibia** | | | | | | | |
| Hylidae | *Litoria aurea* | Green and Golden Bell Frog | E | V | 2 | The species is found in a wide range of water bodies except fast moving streams. It commonly inhabits disturbed sites such abandoned quarries and mines, though generally breeds in habitats that include still, shallow, unpolluted water bodies, that are unshaded, contain aquatic plants are free of Mosquito fish and other predators, with a range of diurnal shelter sites (emergent aquatic vegetation). | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Myobatrachidae | *Mixophyes balbus* | Stuttering Frog | E | V | Species or species habitat likely to occur within area. | Typically found in association with permanent streams through temperate and sub-tropical rainforest, and wet sclerophyll forest. It is rarely found in dry, open, tableland, riparian vegetation, and moist gullies in dry forest. | Unlikely. No records from the locality and no suitable habitat is present. |
| Myobatrachidae | *Pseudophryne australis* | Red-crowned Toadlet | V | - | 33 | Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter. | Unlikely. Although a moderate number of records from the locality, no |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters. | suitable habitat is present. |
| Myobatrachidae | *Heleioporus australiacus* | Giant Burrowing Frog | V | V | Suitable habitat within the locality | Occurs in heath, woodland and open dry sclerophyll forest on a variety of soil types. Breeding habitat for this species usually contains soaks or pools within first of second order streams. | Unlikely. No records from the locality and no suitable habitat is present. |
| **Aves** | | | | | | | |
| Accipitridae | *Pandion cristatus* | Eastern Osprey | V | - | 5 | Found in littoral and coastal habitats and terrestrial wetlands. They generally are found in coastal areas though will travel inland along major water courses. They visit a wide range of wetland habitats including inshore waters, reefs, bays, coastal cliffs, estuaries, mangrove swamps, broad rivers, reservoirs, large lakes, and water holes. They feed on fish over clear, open water, and nest in trees or dead trees, generally within one kilometre of the ocean. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Accipitridae | *Hieraaetus morphnoides* | Little Eagle | V | - | 2 | The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland, or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it | Unlikely. Low number of records in the locality and no |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | requires a tall living tree within a remnant patch. | suitable habitat is present. |
| Anatidae | *Nettapus coromandelianus* | Cotton Pygmy-Goose | E | | 4 | Species is a rare visitor to NSW but occurs in freshwater lakes, lagoons, swamps and dams, preferring areas with waterlilies and other floating and submerged aquatic vegetation. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Apodidae | *Apus pacificus* | Fork-tailed Swift | - | Mig. | Species or species habitat likely to occur within area. | Species has been recorded throughout NSW, but mostly east of the Great Divide. The species is almost exclusively aerial in Australia and breeds overseas. It forages from a metre above the ground, up to hundreds of metres in altitude, and mostly occur over inland plains, though sometimes over foothills, and coastal areas. | Potential. Species may periodically forage overhead of the site. |
| Apodidae | *Hirundapus caudacutus* | White-throated Needletail | - | Mig. | Species or species habitat likely to occur within area. | Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Occur over most types of habitat, particularly above wooded areas including open forest and rainforest, between trees or in clearings and below the canopy. | Potential. Species may periodically forage overhead of the site. |
| Ardeidae | *Botaurus poiciloptilus* | Australasian Bittern | E | E | 2 | Occurs in freshwater wetlands, and more rarely, estuarine wetlands. It favours | Unlikely. Low number of |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | wetlands with tall, dense vegetation, and forages in shallow water up to a depth of 0.3m. It nests in deep vegetative cover over shallow pools. | records in the locality and no suitable habitat is present. |
| Ardeidae | *Ixobrychus flavicollis* | Black Bittern | V | - | 5 | Inhabits terrestrial and estuarine wetlands, generally in areas containing permanent water and dense vegetation. The species can occur in flooded grassland, woodland, rainforest, and mangroves. It feeds on frogs, reptiles, fish, and invertebrates such as snails, dragonflies, shrimp and crayfish. It roosts during the day on the ground amongst dense reeds or within trees. It nests in branches overhanging water. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Burhinidae | *Burhinus grallarius* | Bush Stone-curlew | E | - | 1 | Lives in open forest and woodlands with a sparse, grassy ground layer, and fallen timber. It feeds on insects and small insects and vertebrates including frogs, lizards, and snakes. Nesting is undertaken in a scrape or small bare patch. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Cacatuidae | *Callocephalon fimbriatum* | Gang-gang Cockatoo | V | - | 3 | In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban | Unlikely. Low number of records in the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | areas. In NSW, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. | |
| Cacatuidae | *Callocephalon fimbriatum* | Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas | E | | 3 | More often found in forest and woodland habitats containing old growth attributes. Known occurrences in Lane Cove National Park and Pennant Hills Park as well as other forested gullies. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Cacatuidae | *Calyptorhynchus lathami* | Glossy Black-Cockatoo | V | - | 5 | Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Ciconiidae | *Ephippiorhynchus asiaticus* | Black-necked Stork | E | - | 1 | Occurs in floodplain wetlands of major coastal rivers along with minor floodplains, coastal sandplain wetlands and estuaries. Species builds nest in high in trees close to water. | Unlikely. Low number of records in the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Columbidae | *Ptilinopus superbus* | Superb Fruit-Dove | V | - | 5 | Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Cuculidae | *Cuculus optatus* | Oriental Cuckoo | - | Mig. | Species or species habitat likely to occur within area. | Non-breeding visitor to Australia who is a brood parasite. Usually inhabits forested areas and can be found at all levels of the canopy and at a range of elevations. | Unlikely. No records from the locality and no suitable habitat is present. |
| Dasyonithidiae | *Dasyornis brachypterus* | Eastern Bristlebird | E | E | Species or species habitat likely to occur within area. | Inhabits low dense vegetation in: sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest. Found near the coast, on tablelands and in ranges. | Unlikely. No records from the locality and no suitable habitat is present. |
| Laridae | *Sternula albifrons* | Little Tern | E | Mig. | 2 | Occurs in sheltered coastal environments. | Unlikely. Low number of records in the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Meliphagidae | *Anthochaera phrygia* | Regent Honeyeater | | CE | Species or species habitat likely to occur within area. | Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises : E. microcarpa, E. punctata, E. polyanthemos, E. moluccana, Corymbia robusta, E. crebra, E. caleyi, Corymbia maculata, E. mckieana, E. macrorhyncha, E. laevopinea, and Angophora floribunda. Nectar and fruit from the mistletoes A. miquelii, A. pendula, A. cambagei are also eaten during the breeding season. | Unlikely. No records from the locality and no suitable habitat present due to lack of mistletoes and preferred canopy species. |
| Meliphagidae | *Grantiella picta* | Painted Honeyeater | V | V | Species or species | Sparsely distributed from south-eastern Australia to north-western Queensland and | Unlikely. No records from the |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | habitat may occur within area. | eastern North Territory. Most records and all breeding records are from the inland slopes of the Great Dividing Range between the Grampians in Victoria, to Roma in Queensland. It moves north-south following the fruiting of mistletoe species. It feeds predominately on mistletoe fruits, but occasionally nectar of eucalypts, mistletoes, and potentially banksias, and arthropods. The species prefers woodlands with large numbers of mature trees which host mistletoes. The species nests in mistletoes. | locality and no suitable habitat present due to lack of mistletoes. |
| Monarchidae | *Myiagra cyanoleuca* | Satin Flycatcher | - | Mig. | Suitable habitat within the locality | Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. | Unlikely. No records from the locality and no suitable habitat is present. |
| Motacillidae | *Motacilla flava* | Yellow wagtail | - | Mig. | Species or species habitat likely to occur within area. | Species is believed to be a regular summer visitor to NSW, preferring open grassy flats near water. | Unlikely. No records from the locality and no suitable habitat is present. |
| Muscicapidae | *Monarcha melanopsis* | Black-faced Monarch | - | Mig. | Species or species habitat | Found along the coast of eastern Australia, becoming less common further south. The Black-faced Monarch is found in rainforests, | Unlikely. No records from the locality and no |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | likely to occur within area. | eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating. | suitable habitat is present. |
| Muscicapidae | *Monarcha trivirgatus* | Spectacled Monarch | - | Mig. | Species or species habitat likely to occur within area. | Found along the entire eastern seaboard of Australia. More often found where there is thick understorey in rainforests, wet gullies, waterside vegetation and also in mangroves. | Unlikely. No records from the locality and no suitable habitat is present. |
| Muscicapidae | *Rhipidura rufifrons* | Rufous Fantail | - | Mig. | Suitable habitat within the locality | Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. | Unlikely. No records from the locality and no suitable habitat is present. |
| Neosittidae | *Daphoenositta chrysoptera* | Varied Sittella | V | - | 1 | Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Inhabits most of mainland Australia except the treeless deserts and open grasslands. | Unlikely. Only one record from the locality and no suitable habitat present. |
| Psittacidae | *Lathamus discolor* | Swift Parrot | E | CE | 5 | In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp | Unlikely. Low number of records in the locality and no |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Eucalyptus robusta, Corymbia maculata, C. gummifera, E. sideroxylon, and E. albens. Breeds in Tasmania in spring and summer. | suitable habitat is present. |
| Psittacidae | *Glossopsitta pusilla* | Little Lorikeet | V | - | 2 | Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Also utilises isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Scolopacidae | *Calidris canutus* | Red Knot | - | CE, Mig | Species or species habitat known to occur within area. | Summer migrant from the Northern Hemisphere where it breeds. In NSW it mainly occurs on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours, sandflats, and sandy beaches, of sheltered coasts. It is occasionally found closer to the open ocean, and rarely in terrestrial saline | Unlikely. No records in the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | and freshwater swamps. It forages near the water's edge on worms, bivalves, gastropods, crustaceans, and echinoderms. It roosts on sandy beaches, spits, islets, and mudflats close to feeding grounds in open areas. | |
| Scolopacidae | *Calidris ferruginea* | Curlew Sandpiper | E | Mig. | 4 | The Curlew Sandpiper is found in coastal areas with intertidal mudflats, including estuaries, inlets and lagoons, and ponds in saltworks. The species have also occasionally been recorded inland around lakes , dams and waterholes with mud or sand present. Main requirements for feeding habitats are the presence of mudflats or shallow water up to 60mm. The Curlew Sandpiper may also forage in saltmarsh environments and flooded paddocks. | Unlikely. No records in the locality and no suitable habitat is present. |
| Scolopacidae | *Calidris tenuirostris* | Great Knot | - | CE, Mig. | Species or species habitat known to occur within area. | Breeds in the Northern Hemisphere and migrates south from late Aug - Mar. Occurs within sheltered, coastal habitat with large intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. | Unlikely. No records in the locality and no suitable habitat is present. |
| Scolopacidae | *Limosa lapponica baueri* | Bar-tailed Godwit | - | V, Mig. | Species or species | Breeds in the Northern Hemisphere and migrates to Australia. Occurs mainly in | Unlikely. No records in the |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | habitat known to occur within area. | coastal habitat such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoon and bays. | locality and no suitable habitat is present. |
| Scolopacidae | *Limosa lapponica menzbieri* | Northern Siberian Bar-tailed Godwit | - | Mig. | Species or species habitat may occur within area. | Breeds in the Northern Hemisphere and migrates to Australia. Occurs mainly in coastal habitat such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoon and bays. | Unlikely. No records in the locality and no suitable habitat is present. |
| Scolopacidae | *Numenius madagascariensis* | Eastern Curlew | - | Mig. | 1 | Prefers sheltered coasts, especially estuaries, bays, harbours, inlets and lagoons. Also known to occur in sewage farms, wetlands and mangroves. Species roosts on sandy spits and in low Saltmarsh or mangroves. | Unlikely. Low number of records in the locality and no suitable habitat is present. |
| Strigidae | *Ninox connivens* | Barking Owl | V | - | 6 | Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Dense vegetation is used occasionally for roosting. Nests in hollows of large, old eucalypts. Hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but when loss of tree hollows decreases these prey populations it becomes more reliant on birds, invertebrates and terrestrial | Unlikely. Low number of records in the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | mammals. Requires very large permanent territories in most habitats due to sparse prey densities. | |
| Strigidae | *Ninox strenua* | Powerful Owl | V | - | 245 | In NSW the Powerful Owl lives in forests and woodlands occurring in the coastal, escarpment, tablelands and western slopes environments. Specific habitat requirements include eucalypt forests and woodlands on productive sites on gentle terrain; a mosaic of moist and dry types, with mesic gullies and permanent streams; presence of leafy sub canopy trees or tall shrubs for roosting; presence of large old trees to provide nest hollows. Optimal habitat includes a tall shrub layer and abundant hollows supporting high densities of arboreal marsupials. | Unlikely. Although a high number of occurrences from the locality, no suitable habitat is present. |
| Tytonidae | *Tyto tenebricosa* | Sooty Owl | V | - | 1 | Occurs in coastal rainforest, including dry, subtropical, and temperate rainforests, and moist eucalypt forests. Utilises tall trees in heavily vegetated areas for day time resting. It hunts during the night for small ground or tree dwelling mammals such as the Common Ringtail Possum or Sugar Glider. The species requires very large tree hollows for nesting. | Unlikely. Only one record from the locality and no suitable habitat present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| **Gastropoda** | | | | | | | |
| Camaenidae | *Pommerhelix duralensis* | Dural Woodland Snail | - | E | Species or species habitat likely to occur within area. | Species occurs under rocks or inside curled-up bark within communities in the interface region between sandstone-derived and shale-derived soils. | Unlikely. No records from the locality and no suitable habitat is present. |
| **Mammalia** | | | | | | | |
| Dasyuridae | *Dasyurus maculatus* | Spotted-tailed Quoll | V | E | 1 | Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. | Unlikely. Only one record from the locality and no suitable habitat present. |
| Macropodidae | *Petrogale penicillata* | Brush-tailed Rock-wallaby | E | V | Species or species habitat known to occur within area | Prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges, and isolated rock stacks. Vegetation types associated with the species include dense forest, wet sclerophyll forest, vine thicket, dry sclerophyll forest, and open forest. | Unlikely. No records from the locality and no suitable habitat is present. |
| Molossidae | *Mormopterus norfolkensis* | Eastern Freetail-bat | V | - | 10 | Found in dry sclerophyll forest, woodland, swamp forest and mangrove forests east of the Great Dividing Range. Primarily roosts in | Unlikely. Low number of records from the |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | | tree hollows but will also utilise man-made structures. | locality and no preferred habitat is present. |
| Muridae | *Pseudomys novaehollandiae* | New Holland Mouse | - | V | Species or species habitat known to occur within area | Occurs in open habitats (heathland, woodland and forest) with a heath understorey and vegetated sand dunes. The species prefers deep soft top soils in order to burrow. | Unlikely. No records from the locality and no suitable habitat is present. |
| Peramelidae | *Isoodon obesulus obesulus* | Southern Brown Bandicoot (eastern) | E | E | 1 | Within NSW, the species is rare and almost exclusively restricted to the coastal fringe of the state, from the southern side of the Hawkesbury River in the north to the Victorian border in the south. More specifically, the subspecies is considered to occur primarily in two areas: Ku-ring-gai Chase and Garigal National Parks; and in the far south-east corner of the state. Occurs within their distribution in a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland. | Unlikely. Only one record from the locality and no suitable habitat present. |
| Peramelidae | *Perameles nasuta* | Long-nosed Bandicoot population in inner | E | - | 2 | Population is not clearly defined but is known to occur within the Marrickville and Canada Bay LGAs. It is thought to likely occur in the Canterbury, Ashfield and | Unlikely. Low number of records in the locality and no |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | western Sydney | | | | Leichhardt LGA. Shelters under old houses and buildings and forages in backyards and parklands. | suitable habitat is present. |
| Petauridae | *Petaurus australis* | Yellow-bellied Glider | V | - | 1 | Occurs in tall, mature, eucalypt forest generally in areas with high rainfall and nutrient rich soils. It feeds primarily on plant and insect exudate, with insects providing protein. It extracts sap from trees by biting into the trunk and branches leaving distinctive 'V' shaped scars. It dens in large hollows within trees, in groups of two to six individuals. | Unlikely. Only one record from the locality and no suitable habitat present. |
| Petauridae | *Petaurus australis* | Greater Glider | - | V | Species or species habitat likely to occur within area. | Restricted to eastern Australia, and occurring from the Windsor Tableland in Queensland south to Wombat State Forest in central Victoria. Largely restricted to eucalypt forests and woodlands. The diet is predominately comprised of eucalypt leaves, and more rarely flowers. Highest abundances occur in tall montane forests with old trees and abundant hollows. | Unlikely. No record from the locality and no suitable habitat present. |
| Phascolarctidae | *Phascolarctos cinereus* | Koala (combined population of Qld, NSW | V | V | Species or species habitat known to | Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred feed species. Home range size | Unlikely. No records from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | and the ACT) | | | occur within area | varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. | |
| Pseudocheiridae | *Petauroides volans* | Greater Glider | | V | Species or species habitat likely to occur within area. | Occurs in eucalypt forests and woodlands from north-eastern Queensland to the Central Highlands of Victoria. The species has a relatively small home range which consists of numerous tree hollows. | Unlikely. No records from the locality and no suitable habitat is present. |
| Pteropodidae | *Pteropus poliocephalus* | Grey-headed Flying-fox | V | V | 187 | Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. | Potential. High number of records from the locality and small area of suitable foraging habitat available. Species would likely only utilise site periodically as part of a much broader foraging range. |
| Vespertilionidae | *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | Species or species habitat known to | The species is associated with areas dominated by sandstone escarpments; sandstone cliffs and fertile woodland valley habitat occurring in close proximity to each | Unlikely. No records from the locality and no |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| | | | | | occur within area | other is important for the species. It roosts in cliff/escarpment areas and forages in fertile forest. Roosting is predominately in arch caves with dome roofs, but has been observed in disused mines shafts, overhangs, and disused Fairy Martin nests. | preferred habitat is present. |
| Vespertilionidae | *Miniopterus australis* | Little Bentwing-bat | V | - | 1 | Moist eucalypt forest, rainforest or dense coastal Banksia scrub. Little Bentwing-bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. | Unlikely. Only one record from the locality and only a small area of highly disturbed habitat available. |
| Vespertilionidae | *Miniopterus orianae oceanensis* | Eastern Bentwing-bat | V | - | 68 | Forages above the canopy and eats mostly moths. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. | Potential. High number of records from the locality and small area of suitable foraging habitat available. Species would likely only utilise site periodically as part of a broader foraging range. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Vespertilionidae | *Myotis macropus* | Southern Myotis | V | - | 9 | Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. | Unlikely. Low number of records from the locality and no suitable foraging habitat is present. |
| Vespertilionidae | Scoteanax rueppellii | Greater Broad-nosed Bat | V | - | 1 | Found mainly in the gullies and river systems that drain the Great Dividing Range. Usually roosts in tree hollows and buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects. | Unlikely. Only one record from the locality and only a small area of highly disturbed habitat available. |
| **Reptilia** | | | | | | | |
| Elapidae | Hoplocephalus bungaroides | Broad-headed Snake | E | V | Species or species habitat likely to occur within area. | Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or hollows in large trees within 500m of escarpments in summer. | Unlikely. No records from the locality and no suitable habitat is present. |

| Family | Scientific Name | Common Name | BC Act | EPBC Act | Locality Records | Habitat Requirements | Likelihood of Occurrence |
|---|---|---|---|---|---|---|---|
| Varanidae | Varanus rosenbergi | Rosenberg's Goanna | V | - | 1 | Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. | Unlikely. Only one record from the locality and no suitable habitat present. |

*Key: V = Vulnerable, E = Endangered, CE = Critically Endangered, Mig. = Migratory*

Note: Exclusively marine species have been excluded from assessment as the subject site contains no suitable habitat.

# APPENDIX D :
## Tests of Significance

## D.1. Introduction

This appendix contains the formal Test of Significance required under Section 7.3 of the BC Act that have been prepared in accordance with the Threatened Species Test of Significance Guidelines (OEH, 2018). The Test of Significance is used for determining whether proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

Tests of Significance have been provided for communities and species listed as vulnerable, endangered or critically endangered under the BC Act. A Test of Significance is a series of factors (shown as italicised text below) for which a response has been supplied beneath in plain text.

## D.2. *Syzygium paniculatum* (Magenta Lilly Pilly)

a) *in the case of a threatened species, whether the proposed development or activity 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*,

The proposed development within the subject site is unlikely to have an adverse effect on the life cycle of this species such that a viable local population would be placed at risk of extinction. The subject site does not contain the species' natural habitat as rainforest or sandy areas are not present. Furthermore, the individual occurring has been planted as it exists within landscaped gardens. Based on previous advice provided by the then OEH for planted threatened species, the onsite individual technically does not comprise a threatened species as the individual has not been planted for restoration or propagation purposes.

*b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

*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*

Not applicable.

*c) In relation to the habitat of a threatened species or ecological community:*

*i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, 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 development or activity, and*

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

The proposed development will not remove any of the species natural habitat as none is present within the subject site.

The proposed development is unlikely to fragment or isolate habitat for this species, as no natural habitat will be removed.

The habitat to be removed as a result of the proposed development is not important to the long-term survival of these species in the locality. The individual present has been planted and no natural habitat is present within the subject site.

*d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

Only four areas of outstanding biodiversity value have been declared within NSW. No declared areas of outstanding biodiversity value will be impacted in any way by the proposed development.

*e) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The proposed development would constitute the key threatening process (KTP) of 'Clearing of native vegetation'; however, the native vegetation to be removed does not consist of the species' natural habitat. Therefore, this KTP is unlikely to have a significant impact on these species in the locality.

**Conclusion**

The proposed development will remove a small area of vegetation that does not provide natural habitat for the species. The subject site does not contain suitable characteristics for this species to occur naturally as it is not within rainforest or sand dunes. The individual to be removed has been planted and does not occur naturally within the subject site. Therefore, the proposed development is unlikely to have a significant impact on these species.

## *D.3. Eastern Bentwing-bat (Miniopterus orianae oceanensis)*

a) *in the case of a threatened species, whether the proposed development or activity 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*,

The proposed development within the subject site is unlikely to have an adverse effect on the life cycle of this species such that a viable local population would be placed at risk of extinction. The only suitable roosting habitat for this species is located in the roof of an existing building within the southern edge of the subject site. Although this species is known to roost in man-made structures, this is not its preferred roosting habitat.

*b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

*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*

Not applicable.

*c) In relation to the habitat of a threatened species or ecological community:*

*i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, 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 development or activity, and*

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

The proposed development will remove approximately 0.13 ha of suitable foraging habitat and 20 $m^2$ of potential roosting habitat for this species.

The proposed development is unlikely to fragment or isolate habitat for this species, but will remove a small area of potential roosting and foraging habitat. Although potential habitat will be removed, the species is highly mobile and able to access fragmented habitats.

The habitat to be removed as a result of the proposed development is not important to the long-term survival of these species. The potential roosting habitat to be removed is not the species preferred roosting habitat and the potential foraging habitat is likely only utilised as part of a broader foraging range. Additionally, more suitable habitat for this species is located to the east of the subject site and will be retained.

*d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

Only four areas of outstanding biodiversity value have been declared within NSW. No declared areas of outstanding biodiversity value will be impacted in any way by the proposed development.

*e) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The proposed development would constitute the key threatening process (KTP) of "Clearing of native vegetation". The vegetation to be removed constitutes a small area of potential habitat for these species and more suitable habitat directly east of the subject site within Gore Creek will be retained. Therefore, this KTP is unlikely to have a significant impact on these species in the locality.

**Conclusion**

The proposed development will remove a small area of non-preferred roosting habitat and potential foraging habitat for this species. Although a small area of potential habitat will be removed, this habitat is unlikely to be important for the long-term survival of a local population as more suitable habitat directly east of the subject

site will be retained. Therefore, the proposed development is unlikely to have a significant impact on these species.

## *D.4. Grey-headed Flying-fox (Pteropus poliocephalus)*

a) *in the case of a threatened species, whether the proposed development or activity 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*,

The Grey-headed Flying-fox is a highly mobile species and utilises resources from across a wide area and if a population did utilise resources on the subject site periodically, it would not be dependent on this for their survival. The removal of relatively small area of potential foraging habitat within the subject site will not place a viable local population at risk of extinction.

*b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*

*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*

Not applicable.

*c) In relation to the habitat of a threatened species or ecological community:*

*i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, 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 development or activity, and*

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

The proposed development will remove approximately 0.13 ha of suitable foraging habitat for this species.

The proposed development is unlikely to fragment or isolate habitat for this species but will encroach on potential habitat. Furthermore, the Grey-headed Flying-fox is highly mobile and able to access fragmented habitats.

The habitat to be removed as a result of the proposed development is not important to the long-term survival of these species. The habitat to be removed likely only constitutes potential foraging habitat for these species as no camp is present within the subject site. Additionally, this species is not likely dependent on the foraging habitat to be removed for its long-term survival as it is relatively small in size and would likely only be utilised by the species periodically as part of a much broader foraging range.

*d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

Only four areas of outstanding biodiversity value have been declared within NSW. No declared areas of outstanding biodiversity value will be impacted in any way by the proposed development.

*e) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

The proposed development would constitute the key threatening process (KTP) of "Clearing of native vegetation". As the vegetation to be removed constitutes a small area of potential foraging habitat that the species is unlikely to be dependent on for its long-term survival, this KTP is unlikely to have a significant impact on this species in the locality.

**Conclusion**

The proposed development will remove a small area of potential foraging habitat for the Grey-headed Flying-fox. This habitat is likely only utilised periodically as part of a much broader foraging range and is unlikely to be important to the species long-term survival in the locality. Therefore, the proposed development is unlikely to have a significant impact on this species.

# FIGURES


**Legend**

- Subject Site
- Lot Boundaries

Image Source:
Image © NearMap 2020
Dated: 1/8/2020

Data Source:
NSW Government Spatial Services
SIX Maps 'Clip and Ship'
Lane Cove LGA

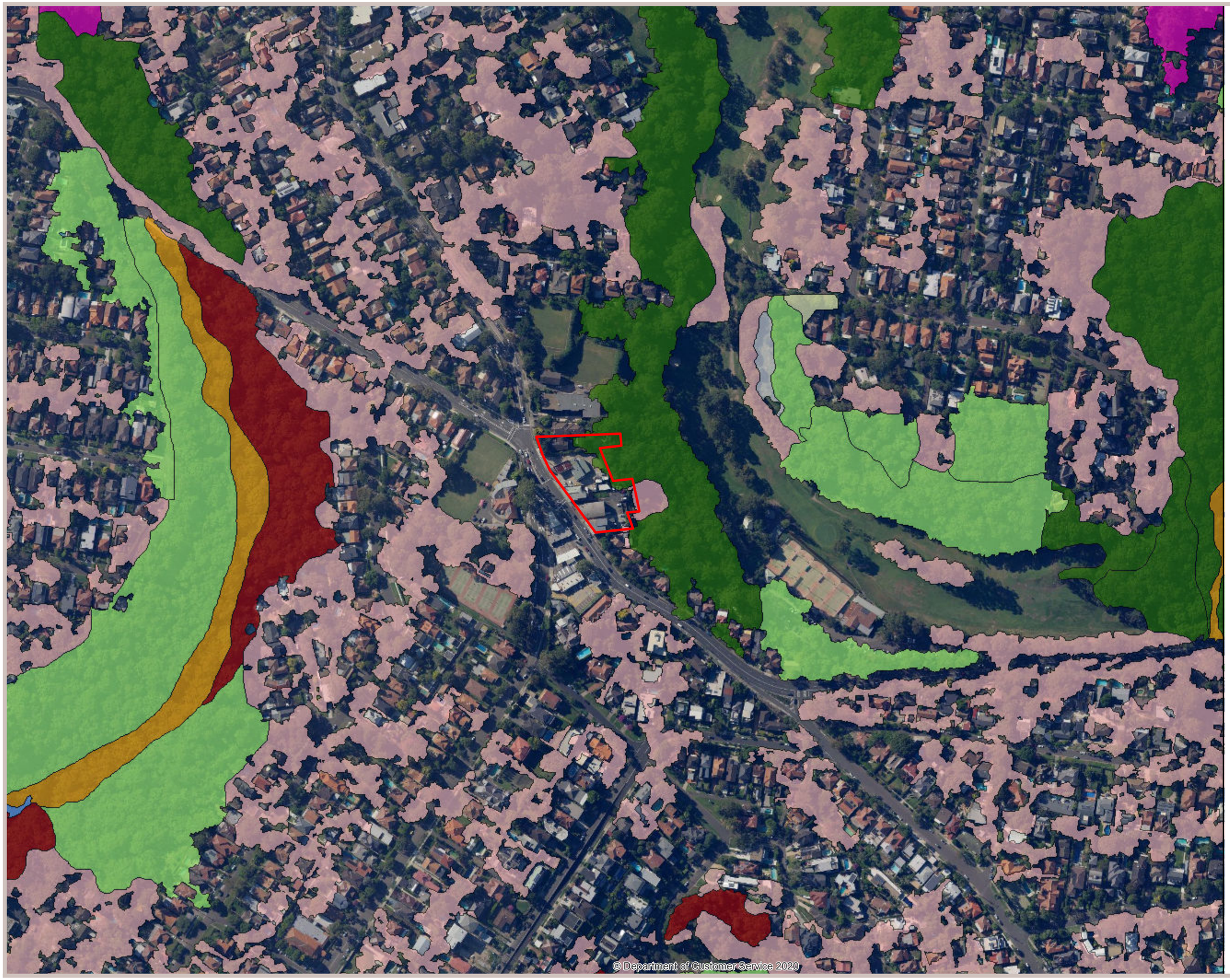
Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 30 m

I:\...\16124\Figures\RP1\20200811\Figure 1. The subject site

**Figure 1. The subject site**




**Legend**

- Subject Site

**Vegetation Community (OEH 2016)**

- Blue Gum High Forest
- Coastal Enriched Sandstone Dry Forest
- Coastal Enriched Sandstone Moist Forest
- Coastal Escarpment Littoral Rainforest
- Coastal Sandstone Foreshores Forest
- Estuarine Swamp Oak Forest
- Urban Exotic/Native
- Weeds and Exotics
- Cleared

Data Source:
NSW Government Spatial Services
SIX Maps 'Clip and Ship'
Lane Cove LGA

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 50 100 m

I:\...\16124\Figures\RP1\20200811\Figure 2. Surrounding area

**Figure 2. Surrounding area**

SITE AREA 5303 m²

WOODFORD STREET
KENNETH STREET
LANE COVE TENNIS CLUB
CENTRAL PARK
LONGUEVILLE SPORTING CLUB
SPORTING GREENS
RIVER ROAD W
LONGUEVILLE ROAD
NORTHWOOD ROAD
PROPOSED DEVELOPMENT
1 NORTHWOOD ROAD
22 NORTHWOOD ROAD
24 NORTHWOOD ROAD
26 NORTHWOOD ROAD
222 LONGUEVILLE ROAD
GORE CREEK

1 PROPOSED SITE PLAN
SCALE 1:200

PATHWAYS
RESIDENCES

PROJECT
LONGUEVILLE
4 - 18 NORTHWOOD RD, 274 & 274A LONGUEVILLE RD
LANE COVE
NSW 2066

DRAWING TITLE
PROPOSED SITE PLAN

| REV | DATE | AMENDMENT | INITIALS | CHECK |
|---|---|---|---|---|
| P01 | 26.08.20 | DA ISSUE | MDP | MP |

| PROJECT NO. | DRAWING NO. | REVISION |
|---|---|---|
| 2024 | DA050 | PA1 |

DRAWN
PROJECT TYPE/SCALE @ A1 1:200
DATE 6.10.2020

Morrison Design Partnership

I:\...\16124\Figures\RP1\20200811\Figure 3. Preliminary site plan

Image Source: Morrison Design Partnership 2020

**Figure 3. Preliminary site plan**


**Figure 4. Vegetation communities, threatened species and fauna habitat within the subject site**