

12 FREDERICK ST, ST LEONARDS

Flora and Fauna Assessment Report

For:

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Final



**PO Box 2474
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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 recommendations 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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Glossary of Terms

DoE	Department of the Environment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	<i>Fisheries Management Act 1994</i>
LGA	Local government area
Locality	Area within 5 km radius of the subject site
NSW	New South Wales
OEH	Office of Environment and Heritage
SIS	Species Impact Statement
Subject site	Refers to the area shown in Figure 1
TSC Act	<i>Threatened Species Conservation Act 1995</i>
WDCP 2006	Willoughby Development Control Plan 2006
WLEP 2012	Willoughby Local Environmental Plan 2012

Introduction

1.1 Purpose

This flora and fauna assessment report has been prepared to assess the potential ecological impacts of a proposed early works development application for 12 Frederick Street in St Leonards (Lot 1 DP 591747).

This assessment has been prepared in accordance with threatened species assessment requirements under Section 5A of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) and considers the potential for significant detrimental impacts on threatened species, populations and ecological communities as defined by the NSW *Threatened Species Conservation Act 1995* (TSC Act) and NSW *Fisheries Management Act 1994* (FM Act). This assessment also considers the potential for significant impacts on Matters of National Environmental Significance (MNES), as listed by the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The specific aims of this assessment are to:

- Identify and describe any remnant vegetation present;
- Determine whether there are threatened ecological communities present;
- Identify habitats for native fauna;
- Evaluate the likelihood of occurrence of threatened species and populations;
- Evaluate the likelihood of occurrence of MNES;
- Assess the level of impact on relevant threatened species, populations, ecological communities and MNES;
- Recommend measures to mitigate any potential impacts as required; and
- Advise whether a Species Impact Statement (SIS) or a referral to the federal Department for the Environment (DoE) is required.

1.2 Background

1.2.1 Site Location

The proposed early works development application subject to this assessment will be undertaken in the southern portion of Lot 1 DP 591747 (hereafter referred to as the subject site and shown on **Figure 1**). This flora and fauna assessment report has been prepared in relation to the subject site; that being the southern portion of Lot 1 DP 591747.

The subject site is part of Lot 1 DP 591747 and has a street address of 12 Frederick Street, St Leonards. It is approximately 0.9 hectares in size and is bound on its western perimeter by Reserve Road and by Westbourne Ave along its southern perimeter. The subject site is located within the Willoughby Local Government Area (LGA).

1.2.2 Site Context

The subject site is zoned IN1 - General Industrial under the *Willoughby Local Government Plan 2012* (WLEP 2012) and is currently occupied by a number of industrial and warehousing enterprises. The subject site is situated in a highly developed area, being surrounded by industrial land (including warehousing and distribution centres) and special uses land, including teaching and hospital facilities like the North Shore Private Hospital, TAFE NSW and Bradfield Senior College.

The nearest areas of remnant bushland are located at Cove Bushland Park (approximately 800 m to the west and separated by the Pacific Highway and Artarmon Park (approximately 700 m to the north and also separated by a major roadway, the Gore Hill Freeway).

1.2.3 Site History and Condition

The subject site was historically quarried for brick-making materials from the late 1800s to the 1960s (Coffey, 2016) and photographs from the early 1940s (sourced from the Department of Land and Property Information) show that by 1943 the subject site was completely cleared of native vegetation (see **Figure 2**).

The locality of the subject site once formed a low ridge underlain by Wianamatta Shales close to the interface with Hawkesbury Sandstone (Coffey, 2016). It may have previously supported vegetation types such as Coastal Enriched Sandstone Dry Forest, Blue Gum High Forest and Coastal Enriched Sandstone Moist Forest. Today, the majority of trees and shrubs encompassing the subject site and its locality are represented by urban plantings and urban weeds, with residual native vegetation in the wider locality forming remnant fragments (largely in Council reserves and parks).

The subject site itself is set below street level and steeply slopes down to warehouse buildings, where the roofs are used for car parking. It is partially vegetated, with the vegetation being largely concentrated on a steep embankment in the southern half of the subject site. This embankment was formerly the walls of the old quarry and is still bare in areas today. A flat, grassed area in the south corner of the subject site was used at some point as a hospital helipad.

1.2.4 Future Development of the Subject Site

The subject site is the location of a future development proposal to extend the existing North Shore Private Hospital. The St Leonards Dexus Property Group project (the 'project') has been proposed in response to the requirement for a new facility for Ramsay Health Care adjacent to the existing Ramsay Private Hospital Facility at Royal North Shore Hospital Campus.

The project aims to increase the quality and quantity of care in the local area through the extension of the existing North Shore Private Hospital. This will provide additional bed capacity and medical suites that support and dovetail with the existing Private hospital facility.

A summary of the project deliverables is outlined below:

- 128 Inpatients Beds;
- Endoscopy Operating theatres;
- Unloading bay for up to 4 ambulances;
- Support services including:
 - Medical records;
 - Administration;
 - Central Stores;
 - Linen Services;
 - Waste Management; and
 - Housekeeping;
- Bridge link to the existing Private Hospital;
- Provision for Radiology / Diagnostic Imaging centre;
- Specialist medical consulting suites (warm shell); and
- Retail tenancies such as coffee shop, florist and retail pharmacy.

The project will necessitate the demolition of existing structures and the clearance of any vegetation present on the subject site. The demolition and site preparation works required to facilitate the project is the subject of the early works development application (see next section) and is the focus of this flora and fauna assessment report.

The project will be subject to a separate application and assessment process and is not included within the scope of this flora and fauna assessment.

1.3 Early Works Development Application

The proposed early works development application will be submitted to Willoughby Council. The proposed early works development application covers:

- Demolition works (including removal of some trees and vegetation); and
- Site preparation works including excavation, piling and shorting to the site.

The demolition and site preparation works are required to facilitate the future extension of the existing North Shore Private Hospital into the subject site.

1.4 Legislative and Planning Considerations

This section lists and summarises the key legislative and planning documents relevant to the flora and fauna on the subject site.

1.4.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the overarching planning legislation in NSW. This act provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the consideration of the environment and biodiversity values, which is addressed in Section 5A (Significant effect on species, populations or ecological communities or their habitats). This includes threatened species, communities, habitat and processes as listed under the TSC Act and FM Act.

1.4.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as MNES.

Projects that may have a potential to significantly and detrimentally affect MNES must be referred to the Commonwealth government in order to determine whether federal approval is required.

1.4.3 Threatened Species Conservation Act 1995

The TSC Act is the key piece of legislation in NSW relating to the protection and management of biodiversity and threatened species. The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities that are listed under the Act through threat abatement and species recovery programs.

The TSC Act requires consideration of whether a development (Part 4) or an activity (Part 5) is likely to significantly impact threatened species, populations, communities or their habitat. The potential impacts of any developments, land use changes or activities would need to undergo an “Assessment of Significance” under Section 5A of the EP&A Act.

If the results of an Assessment of Significance indicate that a development or activity is likely to significantly affect threatened species, populations or ecological communities, the DA must be accompanied by an SIS, which is a detailed ecological study carried out in accordance with a set of assessment requirements issued by the Chief Executive of the NSW Office of Environment and Heritage (OEH).

1.4.4 Fisheries Management Act 1994

Threatened species legislation in NSW consists of both the FM Act, and the TSC Act. The FM Act protects threatened fish and marine vegetation and identifies associated threatening processes. It is administered by the NSW Department of Primary Industries (DPI). The TSC Act deals with all other threatened biota and threatening processes in the State and is administered by OEH.

Under the FM Act, “fish” means marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history and includes molluscs, crustaceans, echinoderms, beach worms and other polychaetes.

No threatened species assessment with reference to the FM Act is required as no fish habitat is present on the subject site.

1.4.5 State Environmental Planning Policy No 19—Bushland in Urban Areas

The general aim of *State Environmental Planning Policy No 19—Bushland in Urban Areas* (SEPP 19) is to protect and preserve bushland within the urban areas because of:

- Its value to the community as part of the natural heritage;
- Its aesthetic value; and
- Its value as a recreational, educational and scientific resource.

SEPP 19 makes provision to protect bushland in urban areas from further development, specifically land zoned or reserved for public open space.

The term 'bushland' in SEPP 19 means land on which there is vegetation that is either a remainder of the natural vegetation of the land; or if altered, is still representative of the structure and floristics of the natural vegetation.

1.4.6 Willoughby Development Control Plan 2006

The Willoughby Development Control Plan 2006 (WDCP2006) provides detailed guidelines and environmental controls to guide development within the Willoughby local government area. It supports the objectives and planning provisions contained within the WLEP 2012.

Any applications for development in Willoughby need to comply with all relevant provisions of the WDCP 2006. It will be used, in conjunction with WLEP 2012 in the assessment of all development applications and construction certificates.

The relevant provision (for the purposes of this flora and fauna assessment report) is Section C.9 Preservation of Trees or Vegetation, which requires that:

"...a person shall not poison, ringbark, cut down, remove, transplant, lop, prune, injure or wilfully destroy any tree or vegetation defined in Clause 3 except with the consent of Council under this Plan and in accordance with any conditions imposed as a condition of consent." (Clause 4)

Excerpt 1.1 Clause 3 (Section C.9 of the WDCP 2006): Trees and Vegetation to which this Plan applies

This Plan applies to (except where exempted under Clause 5):

1. All trees that have the following dimensions:
 - a. a height exceeding 4 metres, or
 - b. a trunk girth (circumference) exceeding 600 millimetres measured at 1.2 metres above ground level, or
 - c. a crown spread exceeding 3 metres;
2. All trees, regardless of dimensions, listed as Vulnerable or Threatened or a component of a Threatened Ecological Community or the removal of which would constitute a key threatening process listed under the Threatened Species Conservation Act 1995;
3. All trees, regardless of dimensions, listed as items under the Willoughby Natural Heritage Register;
4. All native bushland vegetation on private property.

The diagram shows a tree with a horizontal line indicating a crown spread greater than 3 metres. A vertical line on the right indicates a tree height greater than 4 metres. A circular arrow around the trunk indicates a girth greater than 600 mm measured at 1.2 metres above ground level.

Some plants can be removed without consent and includes Noxious Plants as declared under the *Noxious Weeds Act 1993* (NW Act) and other undesirable trees as listed in Clause 5 of Section C.9.

Excerpt 1.2 Clause 5.7 (Section C.9 of the WDCP 2006): Undesirable trees

Botanical Name	Common Name	Restrictions
<i>Acacia baileyana</i>	Cootamundra Wattle	None
<i>Acacia saligna</i>	Golden Wattle	None
<i>Acer negundo</i>	Box Elder Maple	None
<i>Ailanthus altissima</i>	Tree of Heaven	None
<i>Alnus jorullensis</i>	Evergreen Alder	None
<i>Celtis sinensis</i>	Nettle Berry	None
<i>Cinnamomum camphora</i>	Camphor Laurel	Only if less than 10 metres in height
<i>Cotoneaster spp</i>	Cotoneaster (all species)	None
<i>Cupressocyparis, leylandii</i> "Leighton Green"	Leighton Cypress	None
<i>Eriobotrya japonica</i>	Loquat Tree	None
<i>Erythrina x sykesii</i>	Coral Tree	None
<i>Ficus elastica and cvs.</i>	Rubber Tree	None
<i>Gleditsia triacanthos</i>	Honey Locust	None
<i>Grevillea robusta</i>	Silky Oak	None
<i>Ligustrum spp.</i>	Privet (all species)	None
<i>Liquidambar styraciflua</i>	Liquidambar	Only if less than 10 metres in height.
<i>Olea europaea</i> subsp. <i>cuspidata</i> . (synonym <i>africana</i>)	African Olive	None
<i>Phoenix canariensis</i>	Canary Island Date Palm	Only if trunk less than 7 metres in height.
<i>Populus spp.</i>	Poplar (all species)	None
<i>Salix spp.</i>	Willow (all species)	None
<i>Syagrus romanzoffianum</i>	Cocos Palm	None
<i>Robinia pseudoacacia</i>	Robinia	None

Methods

2.1 Desktop Review

2.1.1 *Baseline Mapping*

The vegetation of the subject site has been mapped and described in the past as part of a contemporary study of the native vegetation communities in the Sydney metropolitan area (OEH, 2013a). To gain an understanding of the types, extent, condition and conservation status of native vegetation communities occurring in the locality of the subject site, the data layers and technical reports associated with this study have been considered.

The distribution of extant vegetation was assessed using aerial photography. These were subsequently verified within the subject site during site surveys. Vegetation linkages to offsite remnant vegetation were also examined using aerial photography with particular focus on potential habitat corridor values.

Aerial photography (currency: 26/11/2015) was viewed via the Department of Finance and Services' *Spatial Information eXchange* portal (i.e. SIX Maps) and obtained from Google Earth Professional under licence.

2.1.2 *Threatened species atlas and MNES search tool*

i. Atlas of NSW Wildlife

The Atlas of NSW Wildlife (OEH, 2016a) is OEH's database of NSW flora and fauna records and contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates and some fish, including species listed under the TSC Act and FM Act.

Records are submitted by organisations with collection permits, in accordance with permit conditions, and also voluntarily by members of the general public. Therefore, the comprehensiveness of sightings for any particular area is dependent on the level of survey conducted by permit holders and also on the frequency of voluntary submissions from the general public. Nevertheless, sightings obtained from the Atlas provides a very useful indication of the types of threatened species that may occur in the general locality of any particular area of interest and guide subsequent threatened species survey and threatened species assessment.

Sightings of threatened flora and fauna species were retrieved from the Atlas of NSW Wildlife for a 5 km buffered search area around the subject site (i.e. the locality).

ii. Protected Matters Search Tool

The Protected Matters Search Tool is a web-based facility administered by DoE (DoE, 2016). This facility generates a report that provides an indication of the potential MNES that may be relevant for an area of interest. The results contained in the report are predictive and are based on known species and ecological community distribution, and presence of suitable habitat. The report generated by the Protected Matters Search Tool provides a useful indication of the types of threatened species that may occur in the general locality of any particular area of interest and guide subsequent threatened species survey and threatened species assessment.

A report was generated for the subject site and buffered by 5 km (i.e. for the locality) to gain an understanding of the Commonwealth-listed threatened species and threatened ecological communities that are likely to be relevant to the assessment of the subject site.

2.1.3 Site Inspection

A site inspection was conducted by two ecologists on 7 April 2016. During the site inspection, areas of vegetation present on the subject site were surveyed and photographs taken of representative areas of vegetation. Characteristic species were identified in order to determine the potential presence of remnant native vegetation.

A fauna habitat assessment was undertaken that included consideration of important indicators of habitat condition and complexity (such as 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. Tree hollows were used as a general indication of habitat quality for arboreal fauna, and hollow dwelling birds and bats. Hollows observed during the survey were noted and details of the size and type were recorded, if present. Additionally, artificial habitat for hollow dwelling fauna (such as cracks in building roofs and old sheds) were recorded, if present, and considered in terms of potential fauna habitat.

Indirect indicators of fauna use of the subject site such as droppings, diggings, footprints, scratches, nests, burrows, paths and runways were recorded. The field surveys included targeted searches for owl pellets in likely roosting habitats.

i. Survey Limitations

The site inspection was undertaken to provide a general indication of the flora and fauna assemblages present (or could be present) on the subject site; and to guide interpretation of flora and fauna information available from surrounding areas, particularly to determine the likelihood that various threatened species could make use of habitats on site. The onsite surveys were not intended to provide an exhaustive census of the species that are likely to occupy the site.

For this reason, presence of suitable habitat was considered when assessing the potential occurrence of a given threatened species. Where potential habitat was present and the species was known to occur at other locations in the locality, it was assumed that the species had potential to occur and were thus assessed accordingly.

The site inspection is intended to provide sufficient data to verify and/or refine existing vegetation mapping of the subject site. It is considered that the information obtained has provided sufficient information to reliably assess the proposed development in relation to impacts on threatened species and communities. Due consideration of the findings of the arboricultural study (Hills, 2016) commissioned for the proposed early works development application was also made when assessing the vegetation of the subject site.

Results

3.1 Vegetation and Flora

The subject site is a semi-vegetated block occupied by industrial buildings and car parking facilities. The vegetation is largely concentrated on a steep embankment in the southern half of the subject site; this embankment was formerly the walls of the old quarry. Areas of the embankment are still bare and lack vegetation. The vegetation forms part of a mosaic of scattered urban trees and shrubs that are isolated from remnant bushland in the broader locality by the Gore Hill Freeway to the north, the railway line to the east and the Pacific Highway to the west and south.

The native vegetation map for the Sydney Metropolitan Area (OEH, 2013a) indicates that the vegetation on the subject site, and indeed in the surrounding area, comprises urban native and exotic plants (**Figure 3**). Such vegetation does not represent remnant bushland and is not described as such by the mapping study (OEH, 2013b; OEH, 2013c).

The results of the site inspection are consistent with the baseline mapping for the subject site and shows that the vegetation present is dominated by a thick and dense occurrence of introduced trees and shrubs (**Table 3.1**). A reasonable number of these introduced trees and shrubs are considered to be highly problematic environmental weeds. Nine species are declared noxious weeds under the NW Act for the Willoughby LGA, six are listed as undesirable trees by the WDCP 2006 and three are also recognised Weeds of National Significance (WONS). The vegetation is largely dominated by Privet species (*Ligustrum* spp.), Lantana (*Lantana camara*) and Cotoneaster (*Cotoneaster glaucophyllus*), with African Olive (*Olea europaea* ssp. *cuspidata*) and Montpellier Broom (*Genista monspessulana*) occurring frequently. A small number of the introduced species recorded is represented by popular garden plants, such as Jacaranda (*Jacaranda mimosifolia*) and Trailing African Daisy (*Osteospermum fruticosum*), and are likely to be garden escapees.

Of the 49 species recorded within the subject site, only 17 species represent native species that occur naturally within the Sydney region. Some of these species would have formed part of the original vegetation prior to clearing for the historical quarry and include Forest Oak (*Allocasuarina torulosa*), Sweet Pittosporum (*Pittosporum undulatum*), Hickory Wattle (*Acacia falcata*) and Sydney Golden Wattle (*Acacia longifolia*). These species have most likely regenerated since quarrying works ceased in the 1960 but are not considered to be a prominent or distinguishing feature of the extant vegetation. The occurrences of Forest Oak (*Allocasuarina torulosa*), for instance, are relatively young whilst the wattle species are only present as scattered individuals.

There are two isolated Sydney Blue Gum (*Eucalyptus saligna*) that were recorded on the embankment slope well separated from the main occurrence of on-site vegetation. Although Sydney Blue Gum (*Eucalyptus saligna*) occurs naturally in the locality, these individuals appear to have been planted. These trees are relatively small and are highly unlikely to be remnant trees.

Other native species that were recorded on the subject site are not considered to occur naturally on the site. Native Rosemary (*Westringia fruticosa*) and Bracelet Honey-myrtle (*Melaleuca armillaris*) naturally occur on coastal heathland and sea cliffs but are highly popular landscaping species. These species would have been introduced to the site (intentional or otherwise). Weeping Bottlebrush (*Callistemon viminalis*) and River Oak (*Casuarina cunninghamiana*) are found naturally along watercourses and are also popular landscaping species that would have been introduced to the site. Brush Box (*Lophostemon confertus*) is a non-local native species (i.e. do not naturally occur in the area), occurring naturally in rainforest to wet sclerophyll habitats, from Newcastle in northern New South Wales to Maryborough in Queensland.

3.1.1 Threatened Ecological Communities and Threatened Flora

Remnant vegetation within the locality of the subject site includes Coastal Enriched Sandstone Moist Forest, Coastal Enriched Sandstone Dry Forest, Coastal Escarpment Littoral Rainforest and Blue Gum High Forest. Of these, Coastal Escarpment Littoral Rainforest is a critically endangered ecological community under the EPBC Act and an endangered ecological community under the TSC Act. Blue Gum High Forest is critically endangered under both Acts.

The vegetation on the subject site is consistent with the Sydney Metropolitan mapping, which categorises it as urban native and exotic vegetation. It does not comprise remnant bushland vegetation. It does not conform to the community descriptions for remnant vegetation communities present in the locality and it does not conform to any threatened ecological community listed under the TSC Act and EPBC Act. Although Sydney Blue Gum (*Eucalyptus saligna*), Sweet Pittosporum (*Pittosporum undulatum*) and Forest Oak (*Allocasuarina torulosa*) are characteristic species of Blue Gum High Forest, the understorey is too degraded to conform to the EPBC Act listing for Blue Gum High Forest critically endangered community,

The Sydney Blue Gum (*Eucalyptus saligna*) trees are relatively young and small (Hills, 2016) and occur on highly disturbed, quarried landforms. It is isolated from the majority of the vegetation occurring within the subject site, being situated on the bare embankment away from the remainder of the vegetation patch. The vegetation patch is also dominated by a proliferation of noxious weed species. For these reasons, the vegetation is not considered to conform to the TSC Act listing for Blue Gum High Forest critically endangered ecological community.

A small number of threatened shrub species have been recorded in the locality of the subject site, including *Epacris purpurascens* var. *purpurascens* and *Darwinia biflora*. No threatened species have been recorded on the subject site. The vegetated areas of the subject site do not currently support a diversity of native shrub species in general, being largely occupied by highly invasive woody weeds. Considering the highly altered nature of the vegetation, it is highly unlikely that the subject site supports threatened plant species. A likelihood of occurrence assessment of threatened plant species that have been recorded in the locality is provided in **Appendix A**.

A series of photographs are presented after **Table 3.1** to illustrate the condition and nature of the onsite vegetation.

Table 3.1 Plant species recorded on the subject site

Family	Species Name	Common Name	Status
Canopy trees			
Casuarinaceae	<i>Allocasuarina torulosa</i>	Forest Oak	native
Casuarinaceae	<i>Casuarina cunninghamiana</i>	River Oak	Native, popularly used as soil stabiliser and wind break. Occurs naturally along permanent freshwater streams.
Lauraceae	<i>Cinnamomum camphora</i>	Camphor Laurel	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed Undesirable tree (Section C.9, Clause 5.7, WDCP 2006)
Myrtaceae	<i>Eucalyptus saligna</i>	Sydney Blue Gum	native, potentially planted or seeded from surrounding trees off-site
Myrtaceae	<i>Lophostemon confertus</i>	Brush Box	naturalised in the Sydney region
Shrub			
Bignoniaceae	<i>Jacaranda mimosifolia</i>	Jacaranda	introduced
Fabaceae (Mimosoideae)	<i>Acacia falcata</i>	Hickory Wattle	native
Fabaceae (Mimosoideae)	<i>Acacia longifolia subsp. longifolia</i>	Sydney Golden Wattle	native

Table 3.1 Plant species recorded on the subject site

Family	Species Name	Common Name	Status
Fabaceae (Caesalpinioideae)	<i>Senna pendula</i> var. <i>glabrata</i>	Cassia	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed
Fabaceae (Faboideae)	<i>Genista monspessulana</i>	Montpellier Broom	Class 3 noxious weed Regionally Controlled Weed The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed Weed of national significance (WONS)
Lamiaceae	<i>Westringia fruticosa</i>	Native Rosemary	Native naturally occurs on coastal cliffs, coastal heathlands and foreshores as it withstands sea spray. Popularly used in gardens as decorative hedges.
Malaceae	<i>Cotoneaster glaucophyllus</i>	a Cotoneaster	Undesirable tree (Section C.9, Clause 5.7, WDCP 2006)
Myrtaceae	<i>Callistemon viminalis</i>	Weeping Bottlebrush	Native. Is probably one of the best known and most widely cultivated of all bottlebrush species. Naturally occurs along watercourses.
Myrtaceae	<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Bracelet Honey-myrtle	Native naturally occurs in coastal scrub on sandy soil in damp places in heathland and on exposed sites on headlands where windswept stunted bushes may be found.

Table 3.1 Plant species recorded on the subject site

Family	Species Name	Common Name	Status
Oleaceae	<i>Ligustrum lucidum</i>	Large-leaved Privet	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed Undesirable tree (Section C.9, Clause 5.7, WDCP 2006)
Oleaceae	<i>Ligustrum sinense</i>	Small-leaved Privet	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed Undesirable tree (Section C.9, Clause 5.7, WDCP 2006)
Oleaceae	<i>Olea europaea subsp. cuspidata</i>	African Olive	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed Undesirable tree (Section C.9, Clause 5.7, WDCP 2006)
Pittosporaceae	<i>Pittosporum undulatum</i>	Native Daphne	native

Table 3.1 Plant species recorded on the subject site

Family	Species Name	Common Name	Status
Verbenaceae	<i>Lantana camara</i>	Lantana	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed Weed of national significance (WONS)
Herbs - Dicots			
Asteraceae	<i>Bidens pilosa</i>	Cobblers Pegs	introduced
Asteraceae	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	introduced
Asteraceae	<i>Osteospermum fruticosum</i>	Trailing African daisy	introduced
Asteraceae	<i>Taraxacum officinale</i>	Dandelion	introduced
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	introduced
Euphorbiaceae	<i>Chamaesyce drummondii</i>	Caustic Weed	native
Malvaceae	<i>Modiola caroliniana</i>	Red-flowered Mallow	introduced
Oxalidaceae	<i>Oxalis perennans</i>		native
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues	introduced
Monocots (Grasses)			
Poaceae	<i>Andropogon virginicus</i>	Whisky Grass	introduced
Poaceae	<i>Aristida ramosa</i>	Purple Wiregrass	native

Table 3.1 Plant species recorded on the subject site

Family	Species Name	Common Name	Status
Poaceae	<i>Bothriochloa macra</i>	Red Grass	native
Poaceae	<i>Bromus catharticus</i>	Prairie Grass	introduced
Poaceae	<i>Cortaderia selloana</i>	Pampas Grass	Class 3 noxious weed Regionally Controlled Weed The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed
Poaceae	<i>Cynodon dactylon</i>	Couch, Bermuda Grass	naturalised
Poaceae	<i>Ehrharta erecta</i>	Panic Veldtgrass	introduced
Poaceae	<i>Imperata cylindrica</i>	Blady Grass	native
Poaceae	<i>Melinis repens</i>	Red Natal Grass	introduced
Poaceae	<i>Paspalum dilatatum</i>	Paspalum	introduced
Poaceae	<i>Pennisetum clandestinum</i>	Kikuyu Grass	introduced
Poaceae	<i>Poa sieberiana</i>	-	native
Poaceae	<i>Setaria parviflora</i>	Pigeon Grass	introduced
Poaceae	<i>Sporobolus creber</i>	Western Rat-tail Grass	native
Poaceae	<i>Axonopus fissifolius</i>	Narrow-leaved Carpet Grass	introduced
Poaceae	<i>Vulpia sp.</i>	a Fescue grass	introduced
Monocots (Other)			
Arecaceae	<i>Phoenix canariensis</i>	Canary Island Date Palm	Undesirable tree (Section C.9, Clause 5.7, WDCP 2006)

Table 3.1 Plant species recorded on the subject site

Family	Species Name	Common Name	Status
Asparagaceae	<i>Asparagus aethiopicus</i>	Ground Asparagus	Class 4 noxious weed Locally Controlled Weed The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed Weed of national significance (WONS)
Iridaceae	<i>Dietes sp.</i>	an Iris	introduced
Climber			
Fabaceae (Faboideae)	<i>Glycine tabacina</i>	a Lovecreeper	native



Photograph 3.1 Looking south east towards Westbourne Avenue from the top of the embankment on Reserve Road at the patch of vegetation in the subject site



Photograph 3.2 Thicket of noxious and other weeds, including African Olive, Cotoneaster and Montpellier Broom at the southern boundary of the subject site



Photograph 3.3 Within the vegetation patch: a tall, closed thicket of Large-leaved and Small-leaved Privet and Sweet Pittosporum below Forest Oak trees, with Cotoneaster (foreground) and Canary Island Date Palm (background)



Photograph 3.4 Privet and Lantana with Camphor Laurel along the Reserve Road perimeter



Photograph 3.5 Looking down into the roof top car park from Reserve Road and the top of the embankment: the Sydney Blue Gum (midground) is likely to have planted or may have seeded from surrounding areas



Photograph 3.6 The southern corner of the subject site at the location of the old helipad. The vegetation in the background is dominated by African Olive, Cotoneaster and Lantana

3.2 Fauna Habitat and Fauna

A number of threatened fauna species have been recorded within the locality of the subject site. The species previously recorded within the locality are largely represented by highly mobile species, namely birds and bat species.

The subject site provides only marginal habitat for native fauna. The vegetation as a patch is non-remnant (i.e. not representative of the original vegetation that would have once occupied the subject site), small in extent, and is highly isolated from intact bushland in the broader area.

The subject site and the vegetation present provide very few to almost no habitat features that would be considered valuable for resident native fauna (i.e. fauna that have potential to roost, nest or den on the subject site). The vegetation lacks trees of sufficient age and senescence that would be expected to supply tree hollows, which are a highly limited and very important habitat resource. The main tree species present, Forest Oak, is a poor supplier of decorticating bark. Decorticating bark commonly provides roost sites for small native bat species (referred to as microbats). The ground stratum is largely devoid of habitat structures that provide refugia for ground-dwelling fauna, such as fallen timber and rock piles. Although the shrub vegetation has potential to provide nesting and roosting habitat for small birds and other sedentary species, the accessibility of the understorey vegetation to urban predators like cats is relatively high, which lowers the value of the scrubby vegetation for small birds and mammals that may otherwise take refuge in such habitats. It is possible that some cave-roosting bat species may roost in the eaves of the building and car parking structures within the subject site; however, due to the occupation and usage of the buildings, the potential for such species to make use of these structures is considered to be very low.

The subject site may provide some foraging resources for highly mobile bird and bat species (which have large foraging ranges that are likely to encompass the site) but the area of vegetation is too small to be of significantly high value for these species. Rather, mobile species that forage for flowering resources and/or insects in the canopy are likely to visit the subject site from time to time as part of a larger foraging range. Some species that may potentially forage over the site from time to time include microbat species and Glossy Black-Cockatoo (*Calyptorhynchus lathamii*), the latter of which is known to feed almost exclusively on *Casuarina* and *Allocasuarina* species. Glossy Black-Cockatoo (*Calyptorhynchus lathamii*) is hollow-dependent and so is not expected to nest on the subject site.

Considering the limited patch size, disconnect from surrounding habitat, low composition of native species and intensity of surrounding industrial and infrastructure land use, the subject site is considered to be of marginal value for native fauna and very poor value for threatened species.

A likelihood of occurrence assessment of threatened fauna species that have been recorded in the locality is provided in **Appendix B**.

Impact Assessment

4.1 Threatened Ecological Communities

The vegetation on the subject site is consistent with the Sydney Metropolitan mapping, which categorises it as urban native and exotic vegetation. It does not comprise remnant bushland vegetation. It does not conform to the community descriptions for remnant vegetation communities present in the locality and it does not conform to any threatened ecological community listed under the TSC Act and EPBC Act.

Thus, no significant impact on threatened ecological communities is considered likely as a result of the proposed development and no further assessment is required.

4.2 Threatened Species

A small number of threatened shrub species have been recorded in the locality of the subject site, including *Epacris purpurascens* var. *purpurascens* and *Darwinia biflora*. The vegetated areas of the subject site do not currently support a diversity of native shrub species in general, being largely occupied by highly invasive woody weeds. Considering the highly altered nature of the vegetation, it is highly unlikely that the subject site supports threatened plant species.

The subject site provides very poor roosting and nesting habitat for native fauna and marginal foraging habitat for more mobile species such as birds and bats. It is unlikely that any threatened fauna species known to occur in the locality of the subject site would be dependent on the subject site for roosting, nesting or foraging.

For this reason, the proposed development is unlikely to have a significant impact on threatened flora and fauna species. A precautionary assessment of significance has been prepared for cave-roosting microbat species that have been recorded in the locality; and for Glossy Black-Cockatoo (*Calyptorhynchus lathamii*). The assessments of significance have been prepared in accordance with Section 5A of the EP&A Act and are provided in **Appendix C**.

4.3 SEPP 19

There is currently no bushland vegetation (as defined in SEPP 19) present on the subject site. The vegetation is not considered to comprise remnant natural vegetation or to be representative of the structure and floristics of the natural vegetation that would have once occupied the subject site. The subject site is not located within or adjacent to land zoned or reserved for public open space. The provisions of SEPP 19 are not considered to apply to the subject site.

4.4 Preservation of Trees or Vegetation

Section C.9 of the WDCP 2006 provides for the preservation of mature trees (of minimum girth, height or crown spread) and bushland vegetation (including threatened ecological communities) from development. Noxious weeds declared under the NW Act and "undesirable" tree species listed in the WDCP 2006 are exempt from this control.

The vegetation on the subject site is not considered to be remnant native bushland. It includes declared noxious weeds as well as "undesirable" tree species.

There are a number of trees and shrubs that are not noxious weeds or an undesirable tree species and which exceed a height of four metres. Such trees include the Forest Oak (*Allocasuarina torulosa*), the few eucalypts along the perimeter of the car park and potentially even larger examples of Sweet Pittosporum (*Pittosporum undulatum*). These trees will be subject to the provisions of this control.

There are few trees with a crown spread of more than three metres, and almost no trees with a girth wider than 600 mm. If present, these trees would also be subject to the provisions of this control.

Conclusions and Recommendations

The subject site is situated in a highly developed area, being surrounded by industrial land, and was historically cleared of native vegetation. Today, the subject site supports vegetation that no longer comprises remnant natural vegetation or vegetation that is regarded to be representative of the structure and floristics of the original vegetation. The subject site provides poor roosting, nesting and denning habitat for native species; and provides marginal foraging habitat for more mobile species such as birds and bats.

The proposed early works, that being the demolition and site preparation works, are not likely to have a significant impact on threatened species, populations or ecological communities listed under the TSC Act and EPBC Act. For this reason, no further assessment in the form of an SIS or a referral to the Commonwealth government is required.

It is noted that some native bat species that have been known to utilise artificial structures (such as building eaves and drainage culverts) have some potential to roost in the roofs of the buildings on the subject site. To minimise the risk on any native fauna that may be present on the subject site during proposed demolition and construction works, a pre-clearing survey of structures to be demolished should be undertaken prior to the commencement of demolition works. If there is evidence that there are bats present, clearing supervision should be carried out by a qualified ecologist to safely relocate any animals that may be disturbed during the works.

Furthermore, it is noted that some individual trees and shrubs present on site may be subject to the provisions of the Preservation of Trees and Vegetation development control and will require consent to be cleared on that basis.

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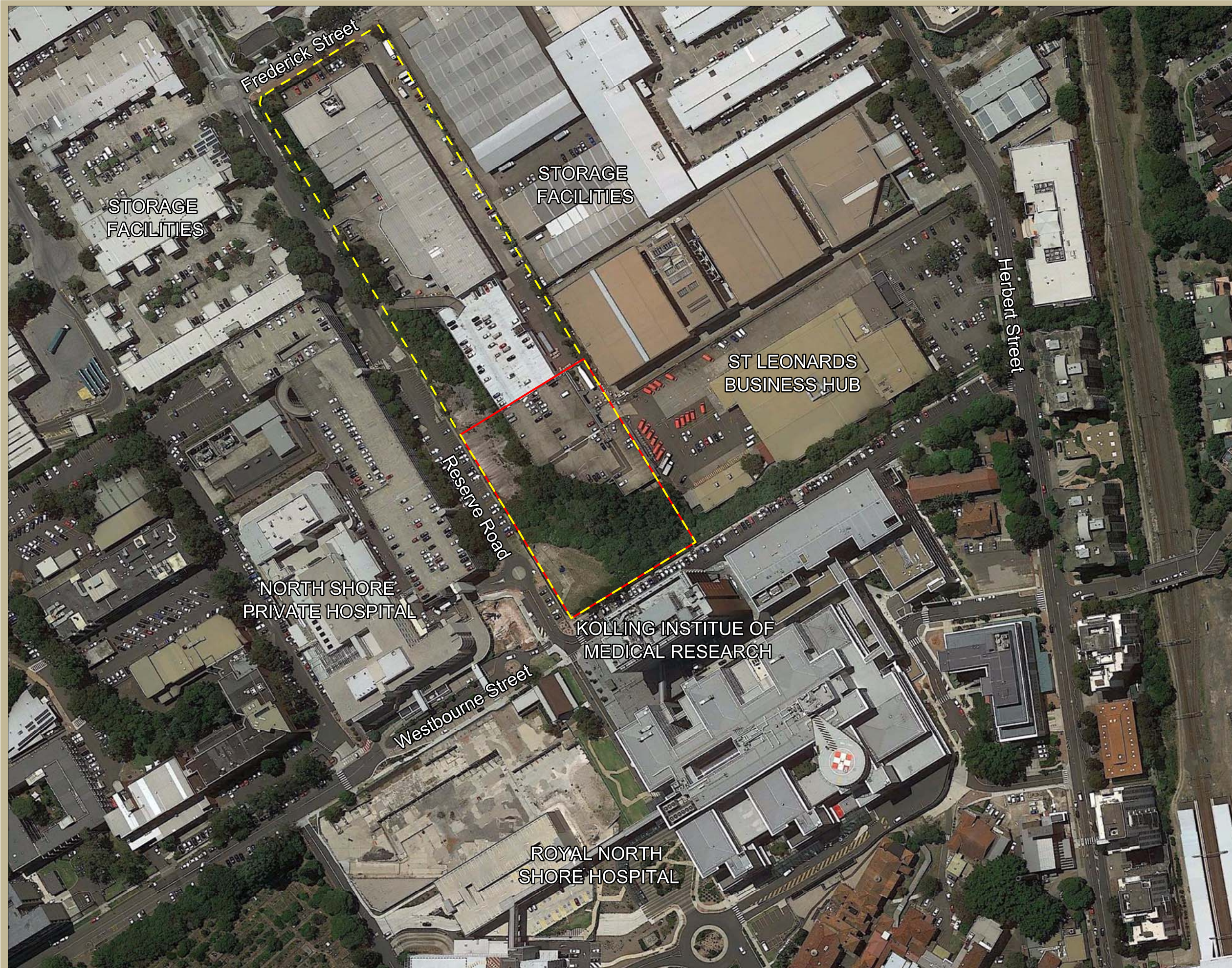
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OEH (2016b). "Eastern Bentwing-bat - profile."



- Legend**
- Subject Site
 - Lot 1 DP591747

Image Source:
Image © 2016 Google
(dated 26-11-2015)



Figure 1. The Subject Site



Legend

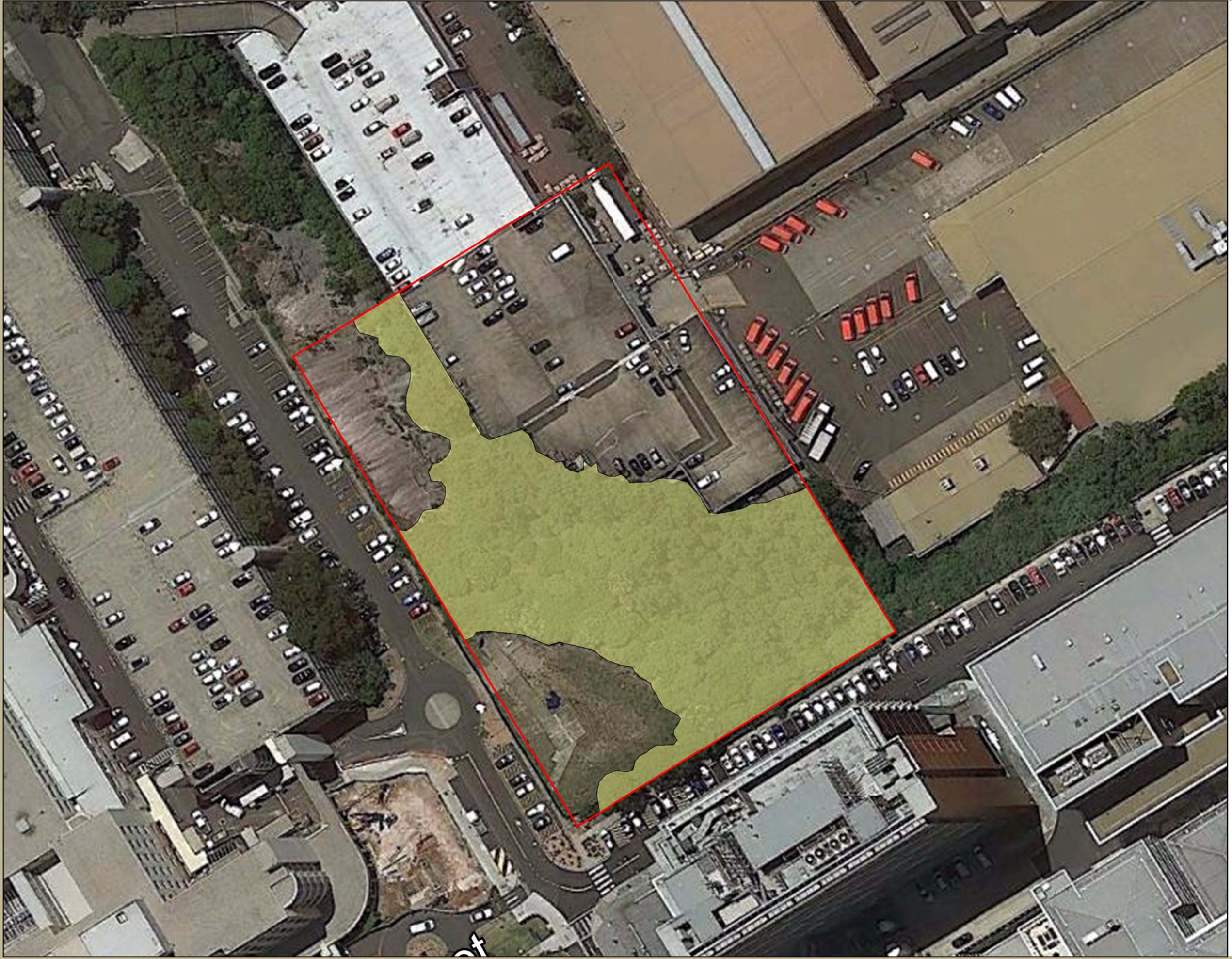
-  Subject Site
-  Lot 1 DP591747

Image Source:
Image © 2015
NSW Land and Property
Management Authority,
SIX Viewer

cumberland
ecology

Figure 2. Aerial photograph of the Subject Site, circa 1943

25 0 25 50 75 100 m



Legend

Subject Site

Vegetation Community

Urban Native and Exotic Cover

Image Source:
Image © 2016 Google
(dated 26-11-2015)

Data Source:
Adapted from: OEH (2013). The Native
Vegetation of the Sydney Metropolitan Area.
Office of Environment and Heritage NSW.



Figure 3. Vegetation of the Subject Site



Appendix A

Likelihood of Occurrence of Threatened Flora Species

The following table lists the flora species that have been recorded within the locality (i.e. 5 km radius) of the subject site. It lists the habitat requirements of each relevant species and evaluates the likely presence on the subject site.

Table A.1 Likelihood of occurrence of threatened flora species known from the locality of the subject site

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Ericaceae	<i>Epacris purpurascens</i> var. <i>purpurascens</i>	-	V		4	Found in a range of habitat types, in sclerophyll forest, scrubs and swamps on sandstone, on strong shale soil influence. This species is particularly susceptible to fire and clearing.	Unlikely to occur. No suitable habitat present within the site, which has been heavily modified and completely cleared in the past. There are only a couple of records within the locality. No heathy plants or indeed, small native shrubs excepting wattles, were observed on the subject site at the time of inspection.
Fabaceae (Mimosoideae)	<i>Acacia terminalis</i> subsp. <i>terminalis</i>	Sunshine Wattle	E	E	23	Sunshine Wattle is found in open coastal eucalypt woodland or forest, usually in sandy soil on creek banks, hill-slopes or in shallow soil in rock crevices and sandstone platforms on cliffs.	Unlikely to occur. The site has been heavily modified and completely cleared in the past. Although some wattle species were recorded during inspection of the site, no bipinnate species were observed.

Table A.1 Likelihood of occurrence of threatened flora species known from the locality of the subject site

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Malvaceae	<i>Lasiopetalum joyceae</i>	-	V	V	1	Grows in heath on sandstone on the Hornsby Plateau.	Unlikely to occur. The site lies just outside of the species' known distribution and no favourable habitat is present.
Myrtaceae	<i>Callistemon linearifolius</i>	Netted Bottle Brush	V		2	Found in dry sclerophyll forest.	Unlikely to occur. No suitable habitat present within the site and there are only a couple of records within the locality.
Myrtaceae	<i>Darwinia biflora</i>	-	V	V	110	Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include Eucalyptus haemastoma, Corymbia gummifera and/or E. squamosa. The vegetation structure is usually woodland, open forest or scrub-heath.	Unlikely to occur. No suitable habitat present within the site.

Table A.1 Likelihood of occurrence of threatened flora species known from the locality of the subject site

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Myrtaceae	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	5	Grows in dry grassy woodland on shallow and infertile soils, mainly on granite. This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range. Found largely on private property and roadsides, and occasionally in conservation reserves. Planted as urban trees, windbreaks and corridors.	Unlikely to occur. The subject site is outside of the natural distribution of this species. Occurrences in the Sydney region are planted.
Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	V	7	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 a community.	Unlikely to occur. The site does not support littoral rainforest habitats.

Appendix B

Likelihood of Occurrence of Threatened Fauna Species

The following table lists the fauna species that have been recorded within the locality (i.e. 5 km radius) of the subject site. It lists the habitat requirements of each relevant species and evaluates the likely presence on the subject site.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Amphibians	Myobatrachidae	<i>Pseudophryne australis</i>	Red-crowned Toadlet	V		32	Confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. 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. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters.	Unlikely to occur. There is no favourable habitat for this species within the site.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		C	43	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water.	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.
Birds	Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle	V		2	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Unlikely to occur. The site lacks favourable habitat. There are very few records of this species within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V		4	Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.
Birds	Anatidae	<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	E		4	Occurs around freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. The Cotton Pygmy-goose uses tall standing dead trees with hollows located close to water for roosting and breeding.	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift		C,J,K	6	The Fork-tailed Swift is almost exclusively aerial. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathlands or saltmarsh. They often occur over cliffs, beaches and islands.	Unlikely to occur. May be seen flying over the site however it is unlikely to utilise the site as they are almost exclusively aerial in Australia.
Birds	Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail		C,J,K	20	In Australia, White-throated Needletails almost always forage aerially, at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats	Unlikely to occur. There is no favourable habitat for this species within the site.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	3	In NSW, this species occurs along the coast and is frequently recorded in the Murray-Darling Basin. Occurs in permanent freshwater wetlands with tall, dense vegetation. Favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over muddy or peaty substrate. Nests in secluded places in densely-vegetated wetlands on a platform of reeds.	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Ardeidae	<i>Egretta sacra</i>	Eastern Reef Egret		C	1	The Eastern Reef Egret lives on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs.	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.
Birds	Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V		3	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. Nests are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks.	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	E		1	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	Unlikely to occur. The site lacks favourable habitat for this species and there has only been one previous record within the locality.
Birds	Cacatuidae	<i>Calyptorhynchus lathamii</i>	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 occur. Dependent on large hollow-bearing eucalypts for nest sites. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species).	Potential to occur however only marginal foraging habitat is available.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Columbidae	<i>Ptilinopus superb</i>	Superb Fruit-Dove	V		6	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 to occur. There is no favourable habitat for this species within the site. There are only limited records within the locality.
Birds	Diomedidae	<i>Diomedea exulans</i>	Wandering Albatross	E	E, J	1	Wandering albatross spend the majority of their time in flight, soaring over the southern oceans.	Unlikely to occur. This species does not rely on the habitat within the site.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Laridae	<i>Hydroprogne caspia</i>	Caspian Tern		C, J	1	The Caspian Tern usually forages in open wetlands, including lakes and rivers. They often prefer sheltered shallow water near the margins, but can also be found in open coastal waters. In coastal inlets they may prefer to forage in tidal channels, or over submerged mud banks	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.
Birds	Laridae	<i>Sterna hirundo</i>	Common Tern		C,J,K	1	Common Terns are marine, pelagic and coastal. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Laridae	<i>Sternula albifrons</i>	Little Tern	E	C,J,K	1	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers. Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.
Birds	Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V		3	Forages primarily in the canopy of open eucalypt 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 to occur. The site lacks favourable habitat. There are very few records of this species within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E	E	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 (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as <i>Eucalyptus robusta</i> , <i>Corymbia maculata</i> , <i>C. gummifera</i> , <i>E. sideroxylon</i> , and <i>E. albens</i> . Breeds in Tasmania in spring and summer.	Unlikely to occur. There is no favourable habitat for this species within the site. There are only limited records within the locality.
Birds	Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper		C,J,K	2	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats..	Unlikely to occur. The site lacks favourable habitat for this species, particularly the absence of water sources. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Strigidae	<i>Ninox connivens</i>	Barking Owl	V		9	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as Acacia and Casuarina species, or the dense clumps of canopy leaves in large Eucalypts. Nests in hollows of large, old eucalypts.	Unlikely to occur. There are several records within the locality however the site lacks favourable habitat for roosting and only marginal foraging habitat is available.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Birds	Strigidae	<i>Ninox strenua</i>	Powerful Owl	V		250	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 subcanopy 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 to occur. There are several records within the locality however the site lacks favourable habitat for roosting and only marginal foraging habitat is available.
Birds	Tytonidae	<i>Tyto tenebricosa</i>	Sooty Owl	V		2	Occurs in rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Species roosts in hollows of tall trees in dense vegetation.	Unlikely to occur. There is a lack of favourable habitat for this species within the site. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Mammals	Balaenidae	<i>Eubalaena australis</i>	Southern Right Whale	E	E	1	Migrate between summer feeding grounds in Antarctica and winter breeding grounds around the coasts of southern Australia, New Zealand, South Africa and South America.	Unlikely to occur as it is a marine species.
Mammals	Dasyuridae	<i>Dasyurus maculatus</i>	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 to occur. There is no favourable habitat for this species within the site. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Mammals	Molossidae	<i>Mormopterus norfolkensis</i>	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 tree hollows but will also utilise man-made structures.	Potential to occur. There is marginal roosting habitat available however may utilise the site as part of a larger foraging range.
Mammals	Otariidae	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	V		2	Prefers rocky parts of islands with jumbled terrain and boulders.	Unlikely to occur as it is a marine species.
Mammals	Otariidae	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	V		1	Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together.	Unlikely to occur as it is a marine species.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Mammals	Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	V		1	Found in tall mature eucalypt forest mostly where there is high rainfall and high nutrient soils. Dens in hollows of large trees often in family groups.	Unlikely to occur. There is no favourable habitat for this species within the site. There are only limited records within the locality.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Mammals	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	220	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.	Unlikely to occur. The species is highly resource driven and require high abundance of feed. Although there would be some flowering resources available from time to time, this would only provide marginal foraging habitat. There are no roosting sites for this species within the site.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Mammals	Vespertilionidae	<i>Miniopterus australis</i>	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.	Potential to occur. There is marginal roosting habitat available however may utilise the site as part of a larger foraging range.
Mammals	Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V		54	Forages above the canopy and eats mostly moths. Roosts in caves, old mines, road culverts.	Potential to occur. There is marginal roosting habitat available however may utilise the site as part of a larger foraging range.

Table B.1 Likelihood of occurrence of threatened fauna species known from the locality of the subject site

Class	Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Number of records within the Locality	Habitat Requirements	Likelihood of Occurrence
Mammals	Vespertilionidae	<i>Myotis macropus</i>	Southern Myotis	V		2	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 to occur. There is marginal roosting habitat available however the lack of foraging habitat (i.e. streams, pools, dams etc) within the vicinity of the subject site makes it unlikely that the species will roost on site.

Appendix C

Assessments of Significance

C.1 Introduction

The assessment of significance in this appendix has been prepared for:

- Glossy Black-cockatoo (*Calyptrorhynchus lathamii*);
- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Little Bentwing-bat (*Miniopterus australis*); and
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*).

Some general information about each species is provided below and is taken from the OEH Threatened Species Profile database¹. The assessment of significance is provided at the end of the appendix.

C.1.1 Glossy Black-cockatoo

i. Status

TSC Act: Vulnerable

EPBC Act: Not listed

ii. Description

The Glossy Black-Cockatoo is a small brown-black cockatoo with a massive, bulbous bill and a short crest. Males have a prominent red tail panel, while that of females is yellow to orange-red. The coloured tail panel is barred black in juvenile birds, with the extent of barring decreasing with age. The female usually has irregular pale-yellow markings on the head and neck, and may have yellow flecks on the underparts and underwing. They are usually seen in pairs or small groups feeding quietly in she-oaks.

iii. Distribution

The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia.

iv. Habitat and Ecology

- Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods.

¹ <<http://www.environment.nsw.gov.au/threatenedSpeciesApp/>>

- Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill.
- Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.

v. *Key Threats*

- Reduction of suitable habitat through clearing for development.
- Decline of hollow bearing trees over time due to land management activities.
- Excessively frequent fire which eliminates she-oaks from areas, prevents the development of mature she-oak stands, and destroys nest trees.
- Firewood collection resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, and disturbance of breeding attempts.
- Decline in extent and productivity of she-oak foraging habitat due to feral herbivores.
- Limited information on the location of nesting aggregations and the distribution of high quality breeding habitat.
- Disturbance from coal seam gas and open cut coal mining causing loss of foraging and breeding habitat as well as disturbing reproductive attempts.
- Forestry activity resulting in loss of hollow bearing trees, reduced recruitment of hollow bearing trees, degradation of foraging habitat, and disturbance of breeding attempts.
- Decline in extent and productivity of she-oak foraging habitat caused by moisture stress due to climate change.
- Degradation of foraging habitat and reduced regeneration of she-oak stands due to grazing by domestic stock.
- Loss of foraging habitat due to slashing/underscrubbing.
- Illegal bird smuggling and egg-collecting.
- Habitat infestation by weeds such as African boxthorn, *Gazania*, buffel grass and other invasive grasses.

C.1.2 Eastern Freetail-bat

i. Status

TSC Act: Vulnerable

EPBC Act: Not listed

ii. Description

The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane. Freetail-bats are also known as mastiff-bats, having hairless faces with wrinkled lips and triangular ears. They weigh up to 10 grams.

iii. Distribution

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW.

iv. Habitat and Ecology

- Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.
- Roost mainly in tree hollows but will also roost under bark or in man-made structures.
- Usually solitary but also recorded roosting communally, probably insectivorous.

v. Key Threats

- Loss of hollow-bearing trees.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.
- Artificial light sources spilling onto foraging and/or roosting habitat
- Large scale wildfire or hazard reduction burns on foraging and/or roosting habitat

C.1.3 Little Bentwing-bat

i. Status

TSC Act: Vulnerable

EPBC Act: Not listed

ii. Description

Little Bentwing-bats are small dark chocolate brown insectivorous bats with a body length of about 45 mm. The tip of the wing is formed by a particularly long joint of the third finger, folded back and bent under the wing while the bat is at rest. The fur is long and thick, especially over the crown and around the neck, and is slightly lighter in colour on the belly. They have distinctly short muzzles, and short, rounded roughly triangular shaped ears. Distinguished from the Common Bentwing-bat by its smaller size.

iii. Distribution

East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW.

iv. Habitat and Ecology

- Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.
- Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.
- They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters.
- In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (*Miniopterus schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young.
- Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer.
- Only five nursery sites /maternity colonies are known in Australia.

v. Key Threats

- Disturbance of colonies, especially in nursery or hibernating caves, may be catastrophic.
- Destruction of caves that provide seasonal or potential roosting sites.

- Changes to habitat, especially surrounding maternity/nursery caves and winter roosts.
- Pesticides on insects and in water consumed by bats bio accumulates, resulting in poisoning of individuals.
- Predation from foxes, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges.
- Predation from feral cats, particularly around maternity caves, winter roosts and roosts within culverts, tunnels and under bridges
- Introduction of exotic pathogens such as the White-nosed fungus.
- Hazard reduction and wildfire fires during the breeding season.
- Large scale wildfire or hazard reduction can impact on foraging resources.
- Poor knowledge of reproductive success and population dynamics.

C.1.4 Eastern Bentwing-bat

i. Status

TSC Act: Vulnerable

EPBC Act: Not listed

ii. Description

The Eastern Bentwing-bat has chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the "bent wing" appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm.

iii. Distribution

Eastern Bentwing-bats occur along the east and north-west coasts of Australia.

iv. Habitat and Ecology

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.

- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.

v. *Key Threats*

- Disturbance by recreational cavers and general public accessing caves and adjacent areas particularly during winter or breeding.
- Loss of high productivity foraging habitat.
- Introduction of exotic pathogens, particularly white-nose fungus.
- Cave entrances being blocked for human health and safety reasons, or vegetation (particularly blackberries) encroaching on and blocking cave entrances.
- Hazard reduction and wildfire fires during the breeding season.

Section 5A: Significant effect on threatened species, populations or ecological communities, or their habitats

(2) The following factors must be taken into account in making a determination under this section:

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

The proposed development will entail the removal of marginal foraging habitat for the Glossy Black-cockatoo and the microbats. It will entail the removal of very poor roosting habitat for the microbats. There is no nesting habitat for Glossy Black-cockatoo. At the time of writing, the occupation of the building structures by microbats is not confirmed and is considered to be unlikely due to the regular use of the site and the intensity of the surrounding land use.

This is supported by the record database. The Glossy Black-cockatoo and microbat records are largely concentrated within the reserve network within the locality, including Gore Creek Reserve, Lane Cove Bushland Park, Flat Rock Gully and Artarmon Reserve. There are no records within the industrial and hospital areas surrounding the subject site. The proposed development will not affect the occurrences within the reserve system in the locality.

For these reasons, the proposed development is not likely to have an adverse on the life cycle of these species such that a viable local population of the species is likely to be placed at risk of extinction.

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

Not applicable.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

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

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

The proposed development will remove the entire extent of vegetated habitats and artificial habitats provided by building and parking structures.

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

The habitats present on the subject site are considered to be isolated and fragmented from substantial habitat in the locality. The proposed action will not cause the habitats to become fragmented or isolated.

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

The proposed development will entail the removal of marginal foraging habitat for the Glossy Black-cockatoo and the microbats. It will entail the removal of very poor roosting habitat for the microbats. There is no nesting habitat for Glossy Black-cockatoo. At the time of writing, the occupation of the building structures by microbats is not confirmed and is considered to be unlikely due to the regular use of the site and the intensity of the surrounding land use. The subject site constitutes a very small fraction of a larger area of occupation for these species.

Thus, the habitats present are not considered to be important to the long-term survival of Glossy Black-cockatoo and the microbats.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

Not applicable. No critical habitat for Glossy Black-cockatoo and the microbats have been registered.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

There are no approved recovery plans for the Glossy Black-cockatoo or the relevant microbats assessed. There are no relevant threat abatement plans for these species.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed development is located in a highly urbanised area and does not support remnant native vegetation or remnant habitat for fauna. It is unlikely to constitute, cause or increase the impact of relevant key threatening processes such as competition from feral rabbits, invasion of native bushland by Lantana or African Olive, and loss of hollow-bearing trees.

Conclusion

The proposed development is not likely to have a significant impact on these species.