

# **PARRAMATTA LEAGUES CLUB HOTEL DEVELOPMENT**

## **Biodiversity Development Assessment Report**

For:

**Parramatta Leagues Club Pty Ltd**

December 2018

**Final**



**PO Box 2474  
Carlingford Court 2118**

**Report No. 18157RP1**

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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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Version	Date Issued	Amended by	Details
1	30/11/2018	Jesse Luscombe	Draft Report
2	04/12/2018	Jesse Luscombe	Final Report

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Approved by: David Robertson

Position: Director

Signed: 

Date: 4 December, 2018

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## Glossary of Terms

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Assessment Area	Area of land within a 1500 m buffer around the outer boundary of the subject land
BAAS	Biodiversity Assessor Accreditation System
BAM	Biodiversity Assessment Method
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
CBD	Central Business District
CEEC	Critically Endangered Ecological Community
DA	Development Application
Development site	The extent of the development footprint for the project
DoEE	Department of Environment and Energy
DP&E	Department of Planning and Environment
EEC	Endangered Ecological Community
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GIS	Geographic Information Systems
GPS	Global Positioning System
ha	Hectares
IBRA	Interim Biogeographical Regionalisation of Australia
LGA	Local Government Area
LLSA Act	<i>Local Land Services Amendment Act 2016</i>
LMBC	NSW Land Management and Biodiversity Conservation
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PLC	Parramatta Leagues Club
PMST	Protected Matters Search Tool
SAII	Serious and Irreversible Impact
SEARs	Secretary Environmental Assessment Requirements
SEPP	State Environment Planning Policy
SRD	State and Regional Development 2011 SEPP

SSD	State Significant Development
Subject land	The land on which the development site occurs
TEC	Threatened Ecological Community
The 'project'	Parramatta Leagues Club Hotel Development Project

# Executive Summary

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## S1.1 Introduction

Cumberland Ecology was commissioned by APP on behalf of Parramatta Leagues Club Pty Ltd (PLC) to prepare a Biodiversity Development Assessment Report (BDAR) for the PLC Hotel Development Project (the 'project') located at 1 Eels Place, Parramatta. The project involves the development of an integrated hotel, and aquatic, wellness and function centre. This BDAR will form part of the documentation to support an application for State Significant Development (SSD) Consent under Division 4.7 of Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). Secretary's Environmental Assessment Requirements (SEARs) for the project were issued by the NSW Department of Planning and Environment (DP&E) on 6 November 2017 which specified the requirement for a BDAR to be prepared in accordance with the Biodiversity Assessment Method (BAM).

The project includes the following components:

- Removal of seven (7) planted canopy trees as required, including six (6) native species and one (one) exotic species
- Excavation to one part below ground;
- Construction of a 17 storey hotel building containing approximately 209 rooms, retail uses and wellness recreational uses, ancillary to the hotel; and
- Shared access with Stage 2 construction of the Western Sydney Stadium along Ross Street extension.

## S1.2 Landscape Features

As the project is being assessed as a site-based project, the assessment area comprises the area of land within a 1,500 m buffer around the outer boundary of the subject land. A summary of the landscape features identified within the assessment area are detailed below:

- Native vegetation covers 9.44% of the assessment area;
- A category 4 stream within 150 m of the development site includes the Parramatta River;
- Areas mapped as coastal wetlands under the Coastal Management SEPP 2016 located 1300 m south-east of the development site;
- Little habitat connectivity exists within the development site. A minor flight path of the Grey-headed Flying-fox is located north-west of the development site;

- No karsts, caves, crevices cliffs or areas of geological significance were identified within the assessment area; and
- No Areas of Outstanding Biodiversity Value were identified within the assessment area.

### **S1.3 Native Vegetation Extent**

The subject land has been subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. Vegetation mapping was undertaken by an ecologist on 6 November 2018. Vegetation mapping included inspection of vegetated areas within the subject land and the recording of flora species and identification of Plant Community Types (PCTs), where relevant.

The subject land is predominantly cleared, with limited areas of vegetation comprising planted native and exotic trees. These areas contain no mid- or shrub layer with a mulched ground layer. Although some native plant species occur in the subject land, no naturally occurring vegetation community is considered to exist. Mostly exotic ground covers occur in patches within the mulched areas with few native species occurring periodically in these patches.

As the vegetation occurring within the subject land is planted and predominantly comprises non-endemic species, it is not considered to comprise a naturally occurring vegetation community and does not conform to a PCT.

The native vegetation in the subject land has been assigned to the closest mapped PCT. The closest mapped PCT to the subject land occurs on the banks of the Parramatta River, approximately 150 m west of the subject land. It comprises PCT 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion. PCT 835 is typically associated with River-flat Eucalypt Forest; a Threatened Ecological Community (TEC) listed under the BC Act. The vegetation within the subject land has been assessed as not conforming to the TEC.

The PCT identified within the subject land was considered to comprise one vegetation zone. This zone was identified as containing low condition vegetation with a vegetation integrity score of 33. Surveys followed the BAM, however the plot dimensions were adjusted to account for the linear nature of vegetation within the subject land. Surveys included establishment of a 10 m x 100 m plot.

### **S1.4 Threatened Species**

The BAM Calculator generates a list of species credit species requiring assessment utilising a number of variables. The predicted ecosystem credit species for the one vegetation zone within the subject land produced a list of 19 species. None of these species have been removed from consideration.

The following species have been identified as candidate species credit species for further assessment:

- White-bellied Sea-eagle (breeding habitat);
- Eastern Osprey (breeding habitat); and
- Grey-headed Flying-fox (breeding habitat).

Targeted surveys for these species were conducted to determine their presence or absence within the subject land in accordance with Section 6.5 of the BAM.

Prescribed impacts are outlined within the NSW *Biodiversity Conservation Regulation 2017*. The project is considered to result in the following prescribed impacts:

- Impacts on the habitat of a threatened species which comprises non-native vegetation;
- Impacts on the connectivity of habitat that facilitates the movement of threatened species; and
- Impacts on movement of threatened species that maintains their lifecycle.

### **S1.5 Avoid and Minimise Impacts**

Measures to avoid and minimise prescribed impacts identified in Section 5.4 for the below prescribed impacts are detailed within the report body:

- Threatened species habitat (non-native vegetation);
- Connectivity; and
- Species movement.

### **S1.6 Impact Assessment**

The project will result in the removal of seven planted native trees from the development site including six native species and one exotic species. The remaining native trees within the subject land are either approved for removal under a separate DA or will be retained as part of the project. The six native trees include; two *Corymbia maculata*, one *Eucalyptus grandis* and three *Eucalyptus nicholii*, none of which contain hollows. The single exotic species to be removed includes a *Platanus x hispanica* 'Acerifolia' (London Plane). These trees are planted with a predominantly cleared understorey.

The native trees to be removed form very small part of a large foraging range for the Grey-headed Flying-fox colony to the west of the subject land. While these trees serve as foraging habitat for the colony, they are not relied upon by the colony and will not significantly impact their foraging activities.

Indirect impacts associated with the project are detailed within the report body and include:

- Inadvertent impacts on adjacent habitat or vegetation; and

- Reduced viability of adjacent habitat due to noise, dust or light spill.

Prescribed impacts associated with the project are detailed in the report body and include impacts on:

- Threatened species habitat (non-native vegetation);
- Connectivity; and
- Species movement.

The following measures will be undertaken to mitigate impacts to native vegetation and habitat during and prior to construction:

- Replacement planting;
  - Plant eleven (11) advanced sized native trees within the landscaped works associated with the project,
- Dust management;
  - Establish erosion and sediment controls as part of construction management,
- Noise management;
  - All equipment used during construction is to meet Australian standards to minimise noise generation,
  - Construction noise will be shielded at its source where possible,
  - Pump silencers are to be used on all large concrete pumps to the eastern side of the site;
  - Construction at dawn and dusk will be minimised when the colony is returning to roost or leaving to forage, and
  - Construction equipment will be positioned as far from colony as possible; ideally on the eastern side of the subject land,
- Light spill management;
  - Install lights on the western side of the construction site so as to point them in an easterly direction, the opposite direction to the camp,
  - Minimise the time in which lighting is needed,
  - Use lowest possible brightness on light sources and machinery, and
  - Turn off lighting at night,



➤ Other;

- The development footprint will be clearly flagged to ensure retention of planted *Corymbia citriodora* outside the construction area, and
- Placement of large machinery and plant equipment will be minimised in the north-western portion of the site

The project is unlikely to result in any uncertain impacts that require adaptive management as listed in Section 9.4.2 of the BAM.

No potential Serious and Irreversible Impacts (SAII) entities have been assessed as likely to occur as a result of the proposed development.

As the project includes the removal of six native trees, offsets are required. In the absence of formal guidance on how planted vegetation is assessed under BAM, this assessment has assigned the vegetation to the closest mapped PCT to determine the offset liability. This assessment indicated that the removal of these trees results in an estimated credit liability of 1 ecosystem credit associated with PCT 835.

Further impacts of the project may entail minor indirect impacts and prescribed impacts. This includes indirect impacts on the Grey-headed Flying-fox, due to the proximity of the development to the colony occurring along the Parramatta River. The main impacts affecting this species include short-term impacts from construction activities and long-term impacts from disruption of flyways.

With the implementation of the proposed mitigation measures and the offsetting described previously, it is considered that the impacts of this project on biodiversity, in particular the Grey-headed Flying Fox will be minimal and can be appropriately managed.

## Introduction

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Cumberland Ecology was commissioned by APP on behalf of Parramatta Leagues Club Pty Ltd (PLC) to prepare a Biodiversity Development Assessment Report (BDAR) for the PLC Hotel Development Project (the 'project'). The project involves the development of an integrated hotel, and aquatic, wellness and function centre. This BDAR will form part of the documentation to support an application for State Significant Development (SSD) Consent under Division 4.7 of Part 4 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act).

### 1.1 Requirement of the BDAR

Section 7.9 of the NSW *Biodiversity Conservation Act 2016* (BC Act), requires all Development Applications (DAs) for SSD to be accompanied by a BDAR unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values. Secretary's Environmental Assessment Requirements (SEARs) for the project were issued by the NSW Department of Planning and Environment (DP&E) on 6 November 2017 which specified the requirement for a BDAR to be prepared in accordance with the Biodiversity Assessment Method (BAM).

In addition to noting the standard requirements for a BDAR, the SEARs include the following requirement:

*The BDAR is to also address the impacts of the proposed development on the existing Grey-headed Flying-fox colony adjacent the site. The report is to specifically consider the impact of construction noise, including any cumulative impacts of other developments in the area. The report is to provide detail on how the proposal will minimise and/or offset any identified impacts on the colony, this may include options to shift the location of the camp.*

Whilst the project is not considered likely to have a significant impact on biodiversity values, this BDAR has been prepared to address the requirements of the SEARs, specifically in relation to the indirect impacts on the Grey-headed Flying-fox.

## 1.2 Purpose

The purpose of this BDAR is to document the findings of an assessment undertaken for the project in accordance with Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM. Specifically, the objectives of this BDAR are to:

- Identify the landscape features and site context (native vegetation cover) within the subject land and assessment area;
- Assess native vegetation extent, plant community types (PCTs), threatened ecological communities (TECs) and vegetation integrity (site condition) within the subject land;
- Assess habitat suitability for threatened species that can be predicted by habitat surrogates (ecosystem credits) and for threatened species that cannot be predicted by habitat surrogates (species credit species);
- Identify potential prescribed biodiversity impacts on threatened species;
- Describe measures to avoid and minimise impacts on biodiversity values and prescribed biodiversity impacts during project planning;
- Describe impacts to biodiversity values and prescribed biodiversity impacts and the measures to mitigate and manage such impacts;
- Identify the thresholds for the assessment and offsetting of impacts, including:
  - Impact assessment of potential entities of serious and irreversible impacts (SAIL);
  - Impacts for which an offset is required;
  - Impacts for which no further assessment is required;
- Describe the application of the no net loss standard, including the calculation of the offset requirement.

## 1.3 Project Description

### 1.3.1 Location

The subject land comprises land within portions of Lot 369 DP 752058, Lot 7054 DP 1074335 and Residual Crown Plan 80-3000 (Sydney). The project is located on land commonly known as 1 Eels Place, Parramatta (although is also variously known as 1 Parramatta Park Land, Parramatta by Parramatta Council, and 17-19 O'Connell Street, Parramatta due to current linkages with Parramatta Leagues Club). It is to the south of the current Parramatta Leagues Club building and north of Parramatta Stadium (undergoing redevelopment) and currently contains parking on a bitumen surface, trees and services.

The site is owned by Parramatta Park Trust and is under an exclusive lease by Parramatta Leagues Club.

A site map and location map have been prepared in accordance with the BAM and are presented in **Figure 1.1** and **Figure 1.2**, respectively.

### **1.3.2 Project Overview**

The project involves the demolition of existing improvements and erection of a 17 storey hotel building (plus a single level basement for services) accommodating 209 beds and including the lower 4 levels containing a café, pool, fitness/recreational uses and a function room ancillary to the hotel. Access is proposed from O'Connell Street to the south of the building (via an access road to the adjoining Parramatta Stadium), and the proposal includes public domain works and service upgrades surrounding the building to integrate the building with the surrounding area and infrastructure. No additional parking is proposed, given the adjoining approved large carpark.

The proposal is depicted within the conceptual plans by HASSELL as attached to the EIS. The project includes the following components:

- Removal of seven (7) planted canopy trees as required, including six (6) native species and one (one) exotic species (**Figure 1.3**);
- Excavation to one part below ground;
- Construction of a 17 storey hotel building containing approximately 209 rooms, retail uses and wellness recreational uses, ancillary to the hotel; and
- Shared access with Stage 2 construction of the Western Sydney Stadium along Ross Street extension.

The layout of the project is shown in **Figure 1.3**.

### **1.3.3 Identification of the Development Site Footprint**

For the purposes of this assessment, the terms development site and development site footprint represents the same area. The area impacted by the project includes the hotel footprint and shared access, as shown in **Figure 1.4**. The construction and operational footprints are wholly contained within the development site.

It is noted that some vegetation within the development site will not be removed as part of the project, including the single *Corymbia citriodora* (Lemon-scented Gum) in the centre of the site, and a number of trees within the shared access area have already been approved for removal under the Western Sydney Stadium SSD. Therefore this assessment only assesses trees to be removed by the project, despite others occurring within the development footprint.

### **1.3.4 General Description of the Development Site**

Historically, the development site has been cleared of native vegetation. The land uses following clearing have included residential development initially and subsequently, development in the form of the PLC. The development site currently comprises hardstand areas and planted trees. The development site and wider subject land are used as a public area in conjunction with the Western Sydney Stadium currently under construction.

## **1.4 Information Sources**

### **1.4.1 Databases**

A number of databases were utilised during the preparation of this BDAR, including:

- NSW Office of Environment and Heritage (OEH) BioNet Atlas;
- OEH Threatened Biodiversity Data Collection;
- OEH BioNet Vegetation Classification database; and
- Commonwealth Department of the Environment and Energy (DoEE) Species Profile and Threat Database; and
- DoEE Protected Matters Search Tool (PMST).

### **1.4.2 Literature**

This BDAR has utilised the results and/or spatial data from the following documents:

- OEH (2016). *The Native Vegetation of the Sydney Metropolitan Area..* NSW Office of Environment and Heritage, Sydney.

Other literature consulted during the preparation of this BDAR is referenced in text.

### **1.4.3 Aerial Photography**

The aerial imagery utilised in this BDAR is sourced from Nearmap and is dated 9 September 2018.

## **1.5 Authorship and Personnel**

This document has been authorised by Dr David Robertson (BAM Accredited Assessor No: BAAS17027). This document, and associated field surveys and Geographic Information Systems (GIS) mapping, was prepared with the assistance of additional personnel as outlined in **Table 1.1**.

**Table 1.1 Personnel**

<b>Name</b>	<b>Tasks</b>	<b>Relevant Qualifications/Training</b>	<b>BAM Accredited Assessor No.</b>
Dr David Robertson	Report review	Doctor of Philosophy. Ecology, University of Melbourne, 1986 Bachelor of Science (Honours) in Ecology, University of Melbourne, 1980 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS17027
Katrina Wolf	Report preparation	Bachelor of Science (Environmental). The University of Sydney, 2007 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS18010
Jesse Luscombe	Report preparation, field surveys, GIS	Bachelor of Marine Science. Macquarie University, 2013 Certificate III in Conservation and Land Management. TAFE NSW, 2016 BAM Accredited Assessor Training. Muddy Boots, 2018	-
Eleanor Saxon	Field surveys	Bachelor of Science (Honours). The University of New South Wales, 2017 Bachelor of Environmental Management. The University of New South Wales, 2016	-
Bryan Furchert	Field surveys	Bachelor of Biodiversity and Conservation. Macquarie University, 2012 Diploma of Conservation and Land Management. TAFE NSW, 2008 BAM Accredited Assessor Training. Muddy Boots, 2017	BAAS18095
Michael Davis	Field surveys	Bachelor of Biodiversity and Conservation. Macquarie University, 2016 BAM Accredited Assessor Training. Muddy Boots, 2017	-





**Legend**

- Development Site
- Subject Land
- Cadastre

**Watercourses**

- 1st Order Stream
- 4th Order Stream

**Mitchell Landscapes**

- Ashfield Plains
- Pennant Hills Ridges
- Port Jackson Basin

**IBRA Bioregions**

- Sydney Basin

**IBRA Subregions**

- Cumberland

Image Source:  
Image © NearMap 2018  
Dated: 2/5/2018

Data Source:  
State Environmental Planning Policy  
(Coastal Management) 2018  
© Department of Finances,  
Services and Innovation 2017

DECCW (2008). Landscapes (Mitchell)  
of NSW - Version 3.

DSEWPac (2012). Interim  
Biogeographic Regionalisation for Australia  
(IBRA) - Version 7.

NSW Government Spatial Services  
SIX Maps 'Clip and Ship'  
Parramatta LGA

Coordinate System: MGA Zone 56 (GDA 94)



0 50 100 m

Figure 1.1. Site map





Figure 1.2. Location map



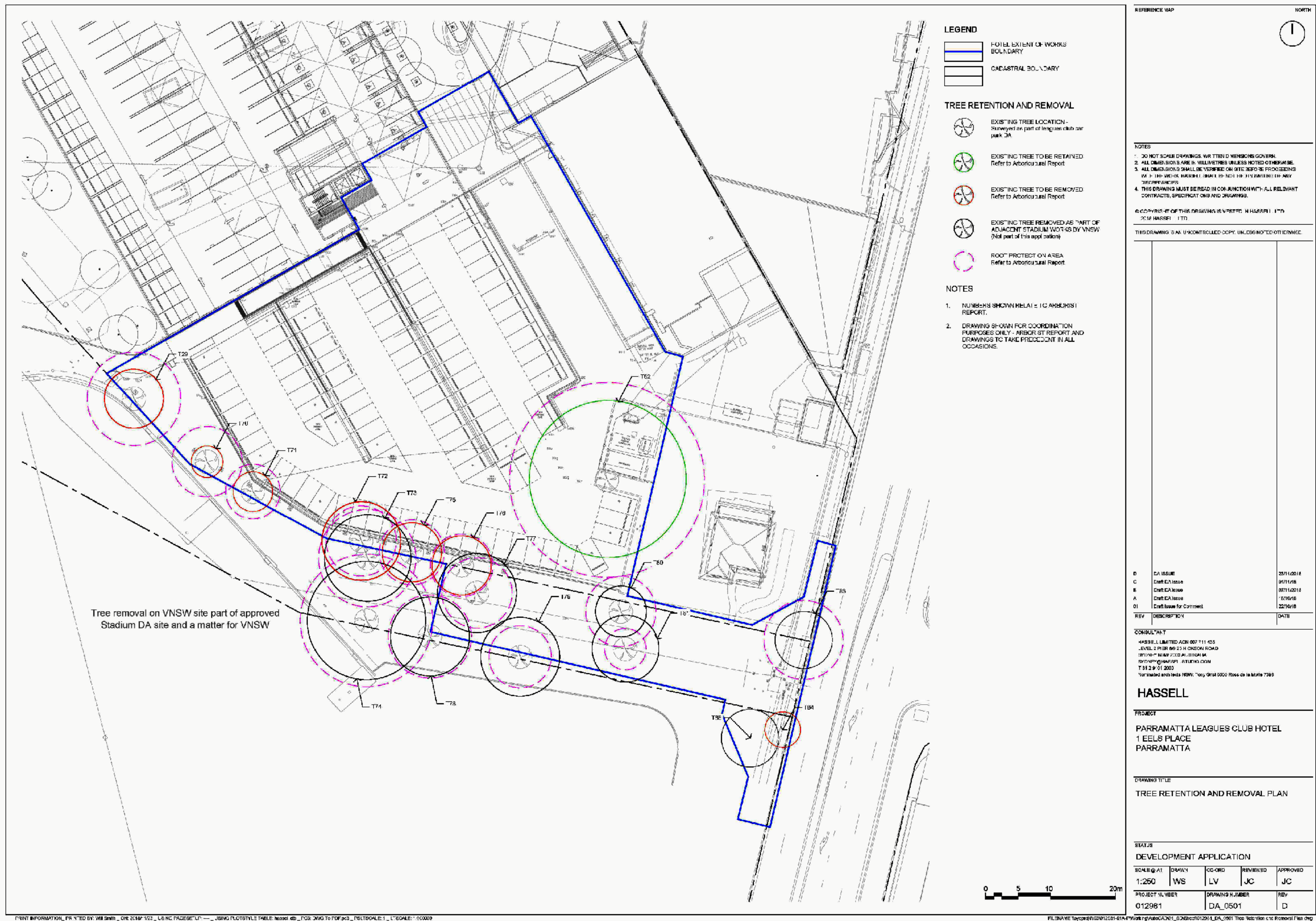
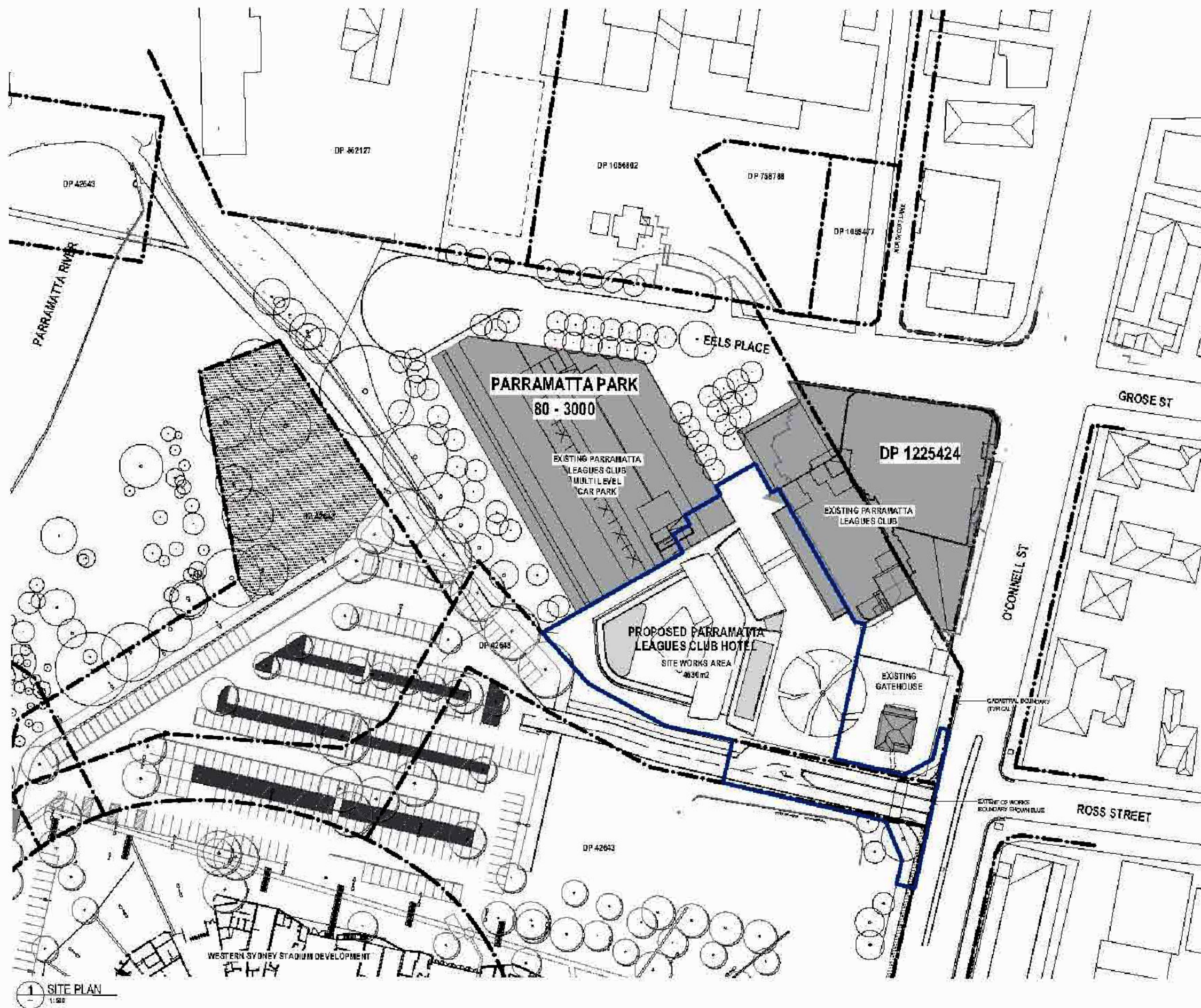


Figure 1.3. Tree retention and removal plan





REFERENCE MAP (N/S)

TRUE NORTH

SCALE BAR

0 10 20 40 m

1:500

REV	DESCRIPTION	DATE
H	FOR INFORMATION	10.11.2019
G	FOR INFORMATION	09.11.2019
F	SSO ISSUE DRAFT	02.11.2019
E	FOR INFORMATION	21.10.2019
D	SSO ISSUE DRAFT	20.10.2019
C	ISSUE FOR INFORMATION	19.10.2019
B	ISSUE FOR INFORMATION	25.09.2019
A	ISSUE FOR INFORMATION	15.09.2019

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**HASSELL**

CLIENT

PARRAMATTA LEAGUES CLUB

PROJECT

PROPOSED PARRAMATTA LEAGUES CLUB HOTEL DEVELOPMENT

1 EELS PLACE, PARRAMATTA, NSW 2150

DRAWING TITLE

SITE PLAN - PROPOSED

STATUS

DEVELOPMENT APPLICATION

SCALE @ A1	DRAWN	REVIEWED	APPROVED
1:500	HASSELL	LV	GS
PROJECT NUMBER	DRAWING NUMBER	REV	
012881	DA_0102	H	

Original Show Size: A1 - 841 x 594mm

Figure 1.4. Layout of the project



## Landscape Features

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### 2.1 Site Context

#### 2.1.1 Assessment Area

As the project is being assessed as a site-based project, the assessment area comprises the area of land within a 1,500 m buffer around the outer boundary of the subject land. The location of the assessment area is shown in **Figure 1.2**.

#### 2.1.2 Native Vegetation Cover

The native vegetation extent was determined through the use of GIS. To map native vegetation cover within the subject land and assessment area, this assessment utilised the data collected within the subject land by Cumberland Ecology in conjunction with broad scale mapping of the Sydney metropolitan area by OEH (2016). The native vegetation cover within the assessment area is shown in **Figure 1.2**. It occupies approximately 69.07 ha, which represents 9.44% of the assessment area. Therefore the native vegetation cover value is assigned to the cover class of 0-10%.

### 2.2 Landscape Features

Landscape features identified within the subject land and assessment area are outlined below. The extent of these features within the subject land is shown in **Figure 1.1** and the extent within the assessment area is shown in **Figure 1.2**.

#### 2.2.1 IBRA Bioregions and IBRA Subregions

The subject land and assessment area occurs within the Sydney Basin Bioregion and within the Cumberland Subregion.

#### 2.2.2 Rivers, Streams and Estuaries

The subject land and assessment area occurs within the Sydney Harbour and Parramatta River catchment. Notable surface drainage systems include the Parramatta River approximately 150 m west of the subject land. Category 1, 3 and 4 streams have been identified within the assessment area. A buffer of 10 m, 30 m and 40 m respectively on either side of the waterways applies to streams, in accordance with Appendix 3 of the BAM.

The location of streams and their associated riparian buffers within the assessment area are shown in **Figure 1.2**.

### ***2.2.3 Important Local Wetlands***

No important wetlands listed in the Directory of Important Wetlands in Australia are present in the subject land or assessment area. Coastal wetlands listed under the State Environmental Planning Policy (Coastal Management) 2018 do not occur within the subject land. However an area of coastal wetlands, and associated proximity area and coastal environment, occur within the assessment area, approximately 1,300 m south east of the subject land.

The location of wetland areas within the assessment area are shown in **Figure 1.2**.

### ***2.2.4 Habitat Connectivity***

The subject land and assessment area located in a highly urban context and are surrounded by development on the northern, eastern and southern boundaries. The density of the urban landscape within the assessment area has significantly reduced habitat connectivity in the form of vegetation. Fragmented connectivity occurs along the Parramatta River and connects habitat within Parramatta Park to vegetated lands outside of the assessment area to the north and north east. Additionally, as a Grey-headed Flying-fox occurs to the west of the subject land, fly-ways occur throughout the assessment area as the species disburses for foraging.

### ***2.2.5 Karsts, Caves, Crevices, Cliffs and Areas of Geological Significance***

No karsts, caves, crevices, cliffs or areas of geological significance have been identified within the assessment area.

### ***2.2.6 Areas of Outstanding Biodiversity Value***

No Areas of Outstanding Biodiversity Value have been mapped within the assessment area.

### ***2.2.7 Additional Features Required by SEARs***

The SEARs include a requirement for the BDAR to specifically assess the impacts of the project on the Grey-headed Flying-fox (*Pteropus poliocephalus*) colony located adjacent to the subject land. The location of the Grey-headed Flying-fox colony in relation to the subject land and assessment area is shown in **Figure 1.2**.

### ***2.2.8 Mitchell Landscapes***

The Mitchell Landscape that occurs in the subject land and surrounds is Ashfield Plains.

### ***2.2.9 Soil Hazard Features***

Soil Hazard Features are not required to be identified or mapped for SSDs.

## Native Vegetation

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### 3.1 Native Vegetation Extent

The subject land has been subject to detailed surveys by Cumberland Ecology for the purpose of this BDAR. Vegetation mapping was undertaken by an ecologist on 6 November 2018. Vegetation mapping included inspection of vegetated areas within the subject land and the recording of flora species and identification of PCTs, where relevant.

The subject land is predominantly cleared, with limited areas of vegetation comprising planted native and exotic trees. These areas contain no mid- or shrub layer with a mulched ground layer. Although some native plant species occur in the subject land, no naturally occurring vegetation community is considered to exist. Mostly exotic ground covers occur in patches within the mulched areas with few native species occurring periodically in these patches.

The vegetation extent within the subject land is summarised in **Table 3.1** and shown in **Figure 3.1**. **Photograph 3.1** provides an example of the cleared and vegetated areas within the subject land.

Native vegetation within the subject land includes: two *Corymbia maculata* (Spotted Gum), one *Eucalyptus grandis* (Flooded Gum), four *Eucalyptus microcorys* (Tallowwood), one *Eucalyptus maidenii* (Maiden's Gum) and three *Eucalyptus nicholii* (Narrow-leaved Black Peppermint). While these canopy trees are native to NSW, only *Corymbia maculata* (Spotted Gum) is considered likely to occur in the immediate locality of the subject land.

*Eucalyptus nicholii* (Narrow-leaved Black Peppermint) is listed as Vulnerable under the BC Act and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). *Eucalyptus nicholii* is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield in northern NSW (OEH, 2014). As this species are not endemic to the study area or locality, and the individuals have been planted, they are not considered to be natural components of the landscape and their ecological significance is reduced.

The exotic vegetation within the subject land also comprises planted canopy trees and exotic ground covers. The planted trees comprise one (1) *Corymbia citriodora* (Lemon-scented Gum) and one (1) *Platanus x acerifolia* (London Plane). Whilst the canopy extends over a large area, there is no understorey as asphalt extends to the base of the trees. The remaining area within the subject land comprises cleared land in the form of a car park.

**Table 3.1**      **Vegetation extent within the subject land**

Vegetation Type	Area (ha)
Planted native vegetation	0.10
Exotic vegetation	0.13
Cleared land	1.11
<b>Total</b>	<b>1.33</b>



**Photograph 3.1** Overview of vegetation within the subject land, *Corymbia citriodora* (left) and planted natives (right)

## 3.2 Plant Community Types

As the vegetation occurring within the subject land is planted and predominantly comprises non-endemic species, it is not considered to comprise a naturally occurring vegetation community and does not conform to a PCT. Advice provided by OEH on a separate project with the same planted vegetation issue is as follows:

*Where there is native vegetation on site that does not conform to a PCT OEH's advice is to apply the BAM and prepare a BDAR assessing it against the best-fit PCT. OEH will look to provide some additional advice on this to assist assessors in the short term. In the medium term, it appears the best solution will be to include an additional streamlined module in the BAM to assess planted vegetation and we hope to have this in place during the second half of 2018.*

To date, OEH has not released any further guidance to Accredited Assessors on this matter. Therefore for the purpose of this BDAR, the native vegetation has been assigned to the closest mapped PCT. The closest mapped PCT to the subject land occurs on the banks of the Parramatta River, approximately 150 m west of the subject land. It comprises PCT 835 -

Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion. PCT 835 is typically associated with River-flat Eucalypt Forest; a Threatened Ecological Community (TEC) listed under the BC Act. The vegetation within the subject land has been assessed as not conforming to the TEC.

A summary of the selected PCT is as follows:

- **PCT:** 835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion;
- **Vegetation Formation:** Forested Wetland;
- **Vegetation Class:** Coastal Floodplain Wetlands;
- **Area:** 0.10 ha (0.04 ha to be cleared within development site);
- **Percent Cleared:** 93%;
- **TEC Status:** Not listed; and
- **Justification of PCT Selection:** As vegetation comprises planted vegetation, closest mapped PCT has been selected.

Figure 3.2 shows the PCT identified within the subject land.

### 3.3 Vegetation Integrity Assessment

The PCT identified within the subject land was considered to comprise one vegetation zone. A summary of this vegetation zone is provided in **Table 3.2**.

One vegetation integrity plot was undertaken within this vegetation zone, which meets the minimum number of plots required under BAM. The vegetation integrity of each vegetation zone has been assessed for composition, structure and function against the benchmark data for PCT 835.

**Table 3.2 Vegetation zones and vegetation integrity assessment**

Zone	PCT	Condition	Area (ha)	Patch Size (ha)	Vegetation Integrity Score
1	835	Low	0.04	101	33

Surveys followed the BAM, however the plot dimensions were adjusted to account for the linear nature of vegetation within the subject land. Surveys included establishment of a 10 m x 100 m plot within which the following data was collected:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 10 m x 40 m plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 10 m x 40m plot;
- Cover of 'High Threat Exotic' weed species;
- Assessment of function attributes within a 10 m x 100 m plot, including:
  - Count of number of large trees;
  - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
  - Regeneration based on the presence of living trees with stems <5 cm DBH;
  - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 10 m x 100 m plot; and
- Number of trees with hollows that are visible from the ground within the 10 m x 100 m plot.





# Legend

- Development Site
- Subject Land

## Vegetation Extent

- Planted Native Vegetation
- Exotic Vegetation
- Cleared

Image Source:  
Image © NearMap 2018  
Dated: 9/9/2018

NSW Government Spatial Services  
SIX Maps 'Clip and Ship'  
Parramatta LGA

Coordinate System: MGA Zone 56 (GDA 94)



cumberland  
ecology

0 25 m

Figure 3.1. Vegetation extent within the subject land





Figure 3.2. PCTs within the subject land



## Threatened Species

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### 4.1 Threatened Species for Assessment

The BAM Calculator generates a list of species credit species requiring assessment utilising a number of variables. The following criteria have been utilised to predict the threatened species requiring further assessment:

- IBRA subregion: Cumberland;
- Geographic constraints: Parramatta River adjacent to vegetation.
- Associated PCTs: 835 – Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion;
- Percent native vegetation cover in the assessment area: 9.44%;
- Patch size: PCT 835: ≥100 ha; and
- Credit type: Ecosystem and Species.

It is noted that whilst no PCTs have been identified within the subject land, this assessment utilised the closest PCT mapped by OEH (2016) to determine a list of potential species credit species.

### 4.2 Ecosystem Credit Species

The predicted ecosystem credit species for the one vegetation zone within the subject land includes:

- Regent Honeyeater (Foraging);
- Dusky Woodswallow;
- Australasian Bittern;
- Speckled Warbler;
- Brown Treecreeper (eastern subspecies);

- Spotted-tailed Quoll;
- Little Lorikeet;
- White-bellied Sea-Eagle (Foraging);
- Swift Parrot (Foraging);
- Hooded Robin (south-eastern form);
- Little Bentwing-bat (Foraging);
- Eastern Bentwing-bat (Foraging);
- Eastern Freetail-bat;
- Eastern Osprey (Foraging);
- Scarlet Robin;
- Flame Robin;
- Koala (Foraging);
- Grey-headed Flying-fox (Foraging); and
- Diamond Firetail

None of these species have been removed from consideration.

### 4.3 Species Credit Species

#### 4.3.1 Threatened Species Requiring Assessment

#### 4.3.2 Assessment of Habitat Constraints and Microhabitats

**Table 4.1** lists the species credit species predicted by the BAM Calculator and details whether species have been further assessed based on the presence or absence of habitat constraints or microhabitats within the subject land.

Under Section 6.4.1.13 of the BAM, species credit species can be excluded from further assessment if it is determined that none of the habitat constraints are present within the subject land. Under Section 6.4.1.17 of the BAM, species credit species can be excluded from further assessment if an assessment of habitat constraints and microhabitats determines that the habitat within the subject land is substantially degraded such that the species credit species is unlikely to occur.

A habitat assessment was undertaken by an ecologist on 6 November 2018. The habitat assessment focused on habitat features relevant to the species credit species predicted to

occur. This included determining the presence/absence of the habitat constraints identified for the predicted threatened fauna species and the condition of these habitat constraints and other microhabitats.

It is noted that a species credit species that was not predicted by the BAM Calculator, has been recorded within the subject land. Three individuals of *Eucalyptus nicholii* occur within the subject land. As these individuals have been planted and the species is not endemic to the Sydney region, these trees have not been assessed as species credit species within this assessment. Clarification regarding this approach has been sought from OEH, however advice was not received prior to the finalisation of this assessment.

**Table 4.1 Assessment of species credit species habitat**

Species Credit Species	Habitat Constraint	Included or Excluded	Reason for Inclusion or Exclusion
<b>FLORA</b>			
<i>Callistemon linearifolius</i> Netted Bottle Brush	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Cynanchum elegans</i> White-flowered Wax Plant	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Eucalyptus benthamii</i> Camden White Gum	None	Excluded	No suitable habitat within the subject land, with the canopy previously cleared.
<i>Hibbertia</i> sp. Bankstown	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Marsdenia viridiflora</i> ssp. <i>Viridiflora</i>	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Persicaria elatior</i> Tall Knotweed	Within 50 m of semi-permanent or ephemeral wet areas, swamps or waterbodies.	Excluded	Habitat constraint not present within subject land.
<i>Persoonia hirsuta</i> Hairy Geebung	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Pilularia novae-hollandiae</i> Austral Pillwort	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Pomaderris brunnea</i> Brown Pomaderris	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared.
<i>Wahlenbergia multicaulis</i>	Land situated in damp, disturbed sites	Excluded	Habitat constraint not present within subject land.

**Table 4.1 Assessment of species credit species habitat**

Species Credit Species	Habitat Constraint	Included or Excluded	Reason for Inclusion or Exclusion
<b>FAUNA</b>			
<i>Anthochaera phrygia</i> Regent Honeyeater (Breeding)	As per mapped areas	Excluded	Habitat constraint not present within subject land.
<i>Haliaeetus leucogaster</i> White-bellied Sea Eagle (Breeding)	Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Included	Habitat constraint present within subject land. Requires further assessment.
<i>Lathamus discolor</i> Swift Parrot (Breeding)	As per mapped areas	Excluded	Habitat constraint not present within subject land.
<i>Litoria aurea</i> Green and Golden Bell Frog	Within 1km of wet areas, within 1km of swamp or within 1km of waterbody	Excluded	Habitat constraint present within the subject land, however habitat features (wet areas, swamp, waterbody) absent within subject land.
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	None	Excluded	No suitable habitat within the subject land, with the understorey previously cleared and an absence of fallen logs, and leaf litter.
<i>Miniopterus australis</i> Little Bentwing-bat (Breeding)	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.	Excluded	Habitat constraint not present within subject land.
<i>Miniopterus schreibersii</i>	Cave, tunnel, mine, culvert or other structure known or	Excluded	Habitat constraint not present within subject land.

**Table 4.1 Assessment of species credit species habitat**

Species Credit Species	Habitat Constraint	Included or Excluded	Reason for Inclusion or Exclusion
<i>oceanensis</i> Eastern Bentwing-bat (Breeding)	suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500		
<i>Myotis macropus</i> Southern Myotis	Within 200 m of riparian zone, bridges, caves or artificial structures within 200 m of riparian zone and rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200m of the site	Excluded	Habitat constraint present within the subject land, however suitable hollow-bearing trees absent within the subject land.
<i>Pandion cristatus</i> Eastern Osprey (Breeding)	Living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting .	Included	Habitat constraint present within subject land. Requires further assessment.
<i>Petaurus norfolcensis</i> Squirrel Glider	None	Excluded	No suitable habitat present within subject land, with no hollow-bearing trees present
<i>Phascolarctos cinereus</i> Koala (Breeding)	Areas identified via survey as important habitat. Important' habitat is defined by the density of koalas and quality of habitat determined by on-site survey	Excluded	No important habitat identified within the subject land.
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox (Breeding)	Breeding camps	Included	Known colony adjacent to subject land. Requires further assessment.



### 4.3.3 Candidate Species for Further Assessment

The following species were identified as candidate species credit species for further assessment:

- White-bellied Sea-eagle (breeding habitat);
- Eastern Osprey (breeding habitat); and
- Grey-headed Flying-fox (breeding habitat).

These species required targeted surveys to determine their presence or absence within the subject land in accordance with Section 6.5 of the BAM.

### 4.3.4 Presence of Candidate Species

#### i. Surveys

Targeted surveys for the candidate species credit species for further assessment undertaken within the subject land are summarised in **Table 4.2**. Survey locations are shown in **Figure 4.1**.

**Table 4.2 Surveys for candidate species credit species**

Species	Suitable Survey Months	Surveys Undertaken
White-bellied Sea-eagle (breeding habitat)	July – December	Subject land inspected by an ecologist for the presence of nests and individuals for a one hour period on 6 November 2018.
Eastern Osprey (breeding habitat)	April – November	Subject land inspected by an ecologist for the presence of nests and individuals a one hour period on 6 November 2018.
Grey-headed Flying-fox	October – December	Subject land inspected by an ecologist for the presence of roosting individuals on 6 November 2018. Additional surveys undertaken by two ecologists for a period of two hours on 12 November 2018 to determine fly-over and foraging occurrences within the subject land.

#### ii. Species Occurrence

No individuals of the White-bellied Sea-eagle or Eastern Osprey were detected during surveys of the subject land, and no nests of these species were observed. As these species were not detected within the subject land, or considered likely to utilise the habitat within the subject land, no further assessment is required for these species.

Daytime surveys of the subject land did not record individuals of the Grey-headed Flying-fox within the subject land. A known camp of the species is located in vegetation immediately adjacent to the Parramatta River and the extent of the camp does not include the subject land. Individuals of the Grey-headed Flying-fox were recorded flying over the subject land and foraging within trees. As the subject land does not form part of the extent of the camp, which represents breeding habitat, no further assessment is required for this species.

#### 4.4 Prescribed Impacts

Prescribed impacts are outlined within the NSW Biodiversity Conservation Regulation 2017. The project is considered to result in the following prescribed impacts:

- Impacts on the habitat of a threatened species which comprises non-native vegetation;
- Impacts on the connectivity of habitat that facilitates the movement of threatened species; and
- Impacts on movement of threatened species that maintains their lifecycle.

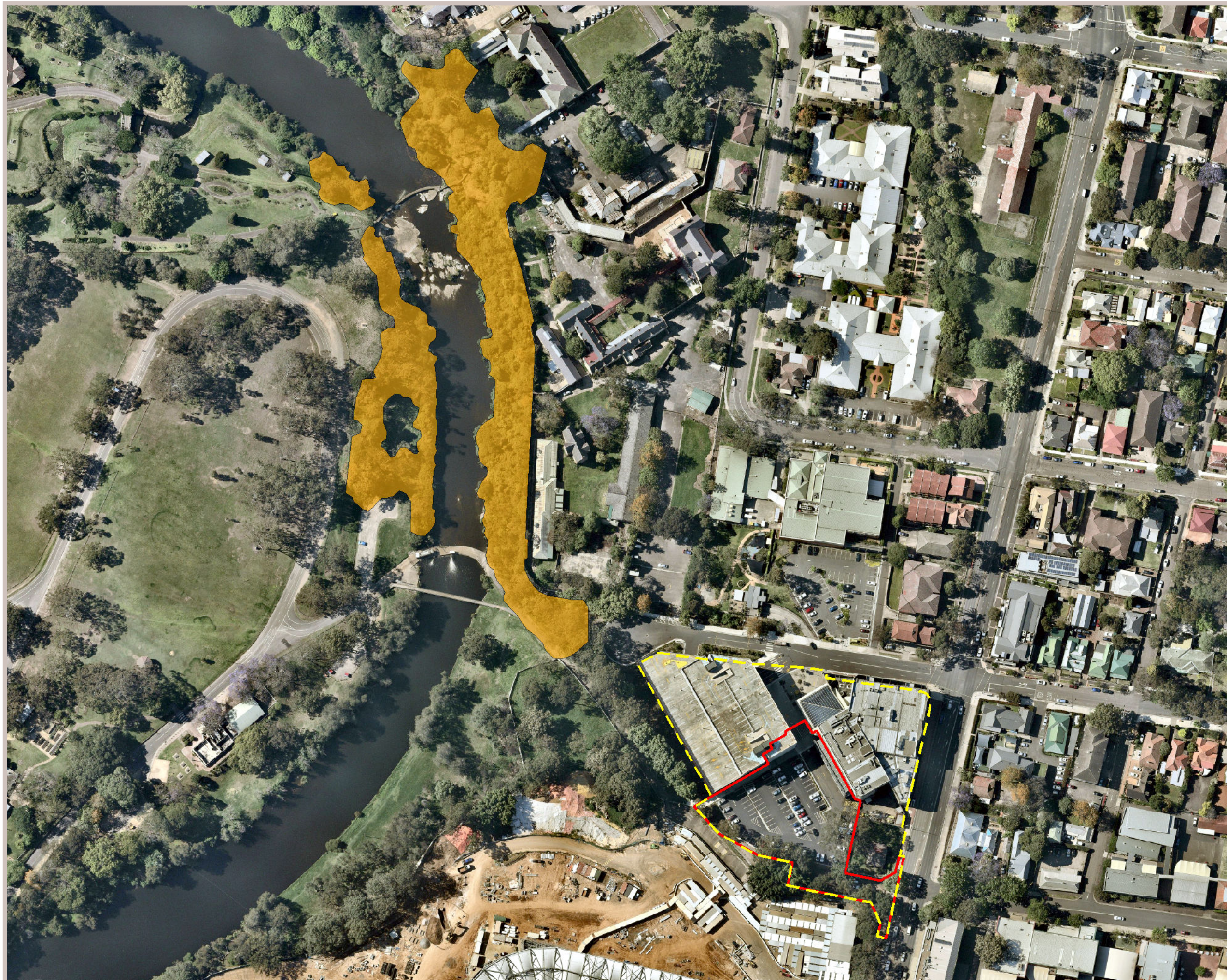
The species potentially impacted by these prescribed impacts is the Grey-headed Flying-fox. The southern edge of a camp for this species is located approximately 110 m north west of the subject land (**Figure 4.2**). The occurrence of the non-native vegetation within the subject land provides for some potential foraging habitat for the Grey-headed Flying-fox. This species has been recorded as flying over the subject land and may forage or roost within the habitat occurring within the subject land. More specifically, the flyout patterns of the colony have been previously identified by Eco Logical Australia (2016) and AMBS Ecology and Heritage (2017). These studies identified multiple flyways. The most recent study by AMBS Ecology and Heritage (2017) identified a northerly flyway along the Parramatta River, an easterly flyway from the northern tip of the colony, and a southerly flyway also along the Parramatta River. The direction of flight paths however, will typically change seasonally depending on the emergence of food resources.





Figure 4.1. Targeted species credit species survey locations





#### Legend

- Development Site
- Subject Land
- Grey-headed Flying-fox Colony Approximate Location

Image Source:  
Image © NearMap 2018  
Dated: 9/9/2018

NSW Government Spatial Services  
SIX Maps 'Clip and Ship'  
Parramatta LGA

Coordinate System: MGA Zone 56 (GDA 94)



cumberland  
ecology

0 50 m

Figure 4.2. Approximate location of the Grey-headed Flying-fox camp



## Avoid and Minimise Impacts

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### 5.1 Avoid and Minimise Impacts on Native Vegetation and Habitat

#### 5.1.1 Project Location

The project has been situated within the PLC Property to allow the development footprint to provide for operational requirements of the site, yet minimise impacts to biodiversity values. The development footprint does not require the removal of any naturally occurring native vegetation.

Alternative development layouts were considered throughout the planning stage; however these were amended due to the presence of the planted *Corymbia citriodora* within the subject land. This tree will be retained within the subject land. Therefore, it is determined the development footprint is located in a position that avoids significant direct impacts to biodiversity values of the subject land.

#### 5.1.2 Project Design

The project design has been developed to avoid and minimise clearing of vegetation and habitat by restricting the development footprint mostly to the cleared land within the subject land. As noted above, the *Corymbia citriodora* and associated habitat within the subject land will be retained and managed within landscaped areas.

### 5.2 Avoid and Minimise Prescribed Impacts

Measures to avoid and minimise prescribed impacts identified in Section 5.4 are outlined below.

#### 5.2.1 Threatened Species Habitat (Non-native Vegetation)

The development footprint for the project has minimised removal of species habitat within non-native vegetation, with the existing canopy tree retained within the landscaped portions of the subject land. Additional landscaping will occur within the subject land, which may provide additional foraging resources for the Grey-headed Flying-fox.

### **5.2.2 Connectivity**

The non-native vegetation within the subject land provides stepping-stone habitat between the vegetation occurring along the Parramatta River and other canopy trees within the urban landscape of Parramatta. The project will retain one non-native canopy tree within the subject land ensuring this stepping-stone habitat is maintained. An additional eleven (11) native canopy tree species will be planted as part of the project.

### **5.2.3 Species Movement**

The building component of the project has the potential to impact the movement of the Grey-headed Flying-fox. Given the limited area of land on which the development footprint occurs, there were limited options for the relocation of the building envelope. The vegetation planned to be removed is however, not considered to be relied upon by the Grey-headed Flying-fox colony.

## Impact Assessment

### 6.1 Assessment of Impacts to Native Vegetation and Habitat

#### 6.1.1 Direct Impacts

The project will result in the removal of seven planted native trees from the development site including six native species and one exotic species. The remaining native trees within the subject land are either approved for removal under a separate DA or will be retained as part of the project. The six native trees include; two *Corymbia maculata*, one *Eucalyptus grandis* and three *Eucalyptus nicholii*, none of which contain hollows. The single exotic species to be removed includes a *Platanus x hispanica* 'Acerifolia' (London Plane) These trees are planted with a predominantly cleared understory.

The native trees to be removed form very small part of a large foraging range for the Grey-headed Flying-fox colony to the west of the subject land. While these trees serve as foraging habitat for the colony, they are not relied upon heavily by the colony and will not significantly impact their foraging activities.

#### 6.1.2 Change in Vegetation Integrity Score

Approximately 0.04 ha of "native vegetation" will be removed as part of the project. The changes in vegetation integrity scores as a result of clearing are shown in **Table 6.1**.

**Table 6.1 Change in Vegetation Integrity Score**

Zone	PCT	Area (ha)	Current Vegetation Integrity Score	Future Vegetation Integrity Score	Change in Vegetation Integrity Zone
1	835	0.04	33	0	-33

#### 6.1.3 Indirect Impacts

The following indirect impacts to native vegetation and habitat may occur as a result of the project:

- Inadvertent impacts on adjacent habitat or vegetation; and

- Reduced viability of adjacent habitat due to noise, dust or light spill.

An assessment of these indirect impacts is detailed below.

*i. Inadvertent Impacts on Adjacent Habitat or Vegetation*

*a. Extent*

The proposed development is not predicted to have any indirect impacts on vegetation.

The proposed new building may interfere with flying fox flight paths and the use of the surrounding land. The Grey-headed Flying-fox colony has been observed to utilise the airspace above the subject land as a minor flyway, through which some animals move to and from the adjacent colony. The construction will therefore cause some individuals to utilise alternative flyways in other directions.

*b. Frequency*

This impact on flight paths of flying fox will be ongoing post construction.

*c. Duration*

The impact on adjacent habitat is likely to be a long term, permanent impact obstructing the minor flyway above the subject land.

*d. Likely Affected Threatened Entities*

Grey-headed Flying-fox is the only likely affected threatened entity.

*e. Consequences*

The construction of the project will result in a 17 story, approximately 62-63 m tall hotel. This will potentially have an indirect impact to the bioregional persistence of the Grey Headed Flying-fox colony to the west of the subject land on Parramatta River.

The vegetation within the subject land appears to act as a very minor stepping stone and foraging habitat for some individuals of the Grey-headed Flying-fox colony. Clearing for the construction of the project will result in the removal of 0.04 ha of planted trees and therefore; foraging habitat.

The building will interrupt a minor flight path for some bats but the colony is expected to adapt and fly alternate routes.

The consequences of removal of six trees and the interference with a flight path is expected to be nil or minimal.



ii. *Reduced Viability of Adjacent Habitat Due to Noise, Dust or Light Spill;*

a. Extent

The extent of impacts due to noise, dust or light spill is unable to be defined. It is likely that such impacts may occur within the immediate surrounds of the subject land.

b. Frequency

The impacts due to noise, dust and light spill are likely to occur daily during the construction phase of the project. Noise and light spill specifically has the potential to continue through the life of the hotel.

c. Duration

The impacts due to noise, dust or light spill are likely to occur most in the short term during the construction phase of the project.

d. Likely Affected Threatened Entities

Grey-headed Flying-fox is the only likely affected threatened entity.

e. Consequences

An increase in dust is likely to be a predominantly short term impact that will occur as a result of construction activities. The dust has the potential to travel and settle in the patches of vegetation, including the patches of native vegetation bordering the Parramatta River. Extra dust is likely a short term impact to the habitat of the Grey-headed Flying-fox colony; potentially causing issues with visibility. The consequences of short term additional dust is likely to be insignificant in the long term to the threatened species; namely the colony of Grey Headed Flying-fox, and threatened ecological communities of the locality.

Noise and light spill will be both short and long term impacts resulting from construction activities in the short term and from the expansion of production to include 24hr operations in the long term. Noise and light spill are likely a long term impact to the habitat of the Grey-headed Flying-fox colony; potentially causing issues with visibility. These impacts are predicted to have minor consequences to the surrounding habitats, including the Grey Headed Flying-fox colony, and will not significantly impact on the bioregional persistence of any threatened species or ecological communities.

Noise from construction may disturb bats roosting during the day. Light spill is not expected to be of consequence for the flying fox colony as the species is active at night and animals generally forage away from the roosting site. For this reason flying foxes are likely to be absent during much or all of the period when additional lighting is occurring.

The scale of the development envelope is minor in comparison to the scale of the inhabited land in the surrounding urban setting, and the marginal increase in these indirect impacts are not likely to have ongoing effects or undue consequences on biodiversity values of the PLC Property or surrounds.

## 6.2 Assessment of Prescribed Impacts

Impacts associated with prescribed impacts identified in **Section 6.2** are outlined below.

### 6.2.1 *Threatened Species Habitat (Non-native Vegetation)*

The subject land occurs within a highly cleared landscape. A single non-native tree will be removed within the development site. The threatened species habitat within non-native vegetation to be indirectly impacted comprises only a single *Corymbia citriodora* within the subject land. Individuals from the Grey-headed Flying-fox colony to the west of the subject land potentially use this tree for foraging however, none were observed doing so during the survey period. The construction of the hotel adjacent to this tree will obstruct the potential for the individuals from foraging within the tree however, as none were observed within the tree during the surveys, this prescribed impact is not seen as significant. The potential foraging habitat provided by this tree is considered minor in the context of the large amounts of similar treed habitat that will remain in the locality.

### 6.2.2 *Connectivity*

Connectivity is very limited within the subject land. Individuals from the Grey-headed Flying-fox colony have been observed to utilise the vegetation as a stepping stone when dispersing in the evening during foraging activities. The erection of a 17 story building will limit the Grey-headed Flying-fox use of the trees. The Stage 2 Assessment of the Western Sydney Stadium DA describes in detail that this flyway is not a main flyway for the colony. As stated previously, the colony primarily uses the river corridor in a northerly and southerly direction for their main flyways. The project will primarily be a long term impact for the duration of the operation of the hotel. The hotel will permanently obstruct the movement of the Grey-headed Flying-fox from foraging within the retained tree within the subject land.

### 6.2.3 *Species Movement*

The Grey-headed Flying-fox is known to fly over the subject land as it disperses from the nearby camp along the Parramatta River. The erection of a 17 story hotel within this space will disrupt the movement of the species as the building will be avoided. The species is known to disperse through high-rise areas (e.g. Sydney CBD) and the species is likely to adapt to the presence of the building. Like the impacts on connectivity, the project is likely to have a long term impact on the movement of the Grey-headed Flying-fox colony however, as stated above; previous studies have detailed the flyway over the subject land to be secondary to the colony's main flyways along the Parramatta River. The project is therefore unlikely to have a significant impact on the movement of threatened species.

## 6.3 Mitigation Measures for Impacts to Native Vegetation and Habitat

The following measures will be undertaken to mitigate impacts to native vegetation and habitat during and prior to construction:

- Replacement planting;
  - Plant eleven (11) advanced sized native trees within the landscaped works associated with the project,
- Dust management;
  - Establish erosion and sediment controls as part of construction management,
- Noise management;
  - All equipment used during construction is to meet Australian standards to minimise noise generation,
  - Construction noise will be shielded at its source where possible,
  - Construction at dawn and dusk will be minimised when the colony is returning to roost or leaving to forage, and
  - Construction equipment will be positioned as far from colony as possible; ideally on the eastern side of the subject land,
- Light spill management;
  - Install lights on the western side of the construction site so as to point them in an easterly direction, the opposite direction to the camp,
  - Minimise the time in which lighting is needed,
  - Use lowest possible brightness on light sources and machinery, and
  - Turn off lighting at night as this may assist in navigation,
- Other;
  - The development footprint will be clearly flagged to ensure retention of planted *Corymbia citriodora* outside the construction area,
  - Placement of large machinery and plant equipment will be minimised in the north-western portion of the site, and
  - Pump silencers are to be used on all large concrete pumps to the eastern side of the site.

## 6.4 Mitigation Measures for Prescribed Impacts

### 6.4.1 *Threatened Species Habitat (Non-native Vegetation)*

Non-native vegetation in the form of a single *Corymbia citriodora* will be retained and incorporated into landscaping within the subject land. Additional vegetation will be planted to provide additional biodiversity value.

### 6.4.2 *Connectivity*

As stated in Section 6.4.1 above, The development footprint was designed to minimise direct impacts on vegetation. There is one occurrence of a *Corymbia citriodora* within the subject land and it is to be incorporated into the overall plan for the completed hotel. The project will also plant eleven (11) advanced sized native trees that in the long term will provide further foraging habitat for the Grey-headed Flying-fox colony.

### 6.4.3 *Species Movement*

The project will limit works to occur outside of breeding times for the Grey-headed Flying fox colony. Additionally, typically, the Grey-headed Flying-fox utilise dusk and dawn for fly-out periods. Works will not commence until after the morning fly-in period and will cease prior to the evening fly-out period.

## 6.5 Adaptive Management of Uncertain Impacts

The project is quite unlikely to result in any uncertain impacts that require adaptive management as listed in Section 9.4.2 of BAM.

## 6.6 Assessment Thresholds

Unavoidable impacts of the project have been considered and a determination made of the assessment thresholds. The following sections outline the assessment thresholds and their relevance to the project.

### 6.6.1 *Impacts to Potential Serious and Irreversible Impact Entities*

No potential SAI entities have been assessed as occurring within the subject land.

### 6.6.2 *Impacts that Require an Offset*

#### *i. Native Vegetation*

As noted in **Section 3.2**, the native vegetation within the development site comprises planted vegetation that does not conform to a PCT. In the absence of further guidance from OEH in dealing with planted vegetation, the closest mapped PCT to the subject land was utilised to assess native vegetation within the development site. PCT 835 was used as a surrogate for the native vegetation within the development site. **Table 6.2** details the offset requirements

for the clearing of the six planted native trees within the development site. A total of one ecosystem credit for PCT 835 was generated within the development site. **Table 6.3** details the like-for-like options to offset these credits. The currently price for one PCT835 credit is \$22,232.45 including GST.

The area of land requiring an offset is shown in **Figure 6.1**.

**Table 6.2 Ecosystem credit liability**

PCT	TEC	Area (ha)	Credits
835-Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Not a TEC	0.04	1

**Table 6.3 Like for like options for PCT 835**

Any PCT in the below class	And in any of below trading groups	Containing HBT	In the below IBRA subregions
Coastal Floodplain Wetlands (including PCT's 835, 1234, 1720)	Coastal Floodplain Wetlands - ≥ 90% cleared group (including Tier 2 or higher)	Yes	Cumberland ,Burraborang, Pittwater, Sydney Cataract, Wollemi and Yengo. or Any IBRA subregion that is within 100 kilometres of the outer edge of the impacted site

*ii. Threatened Species*

No species credit species have been assessed as directly impacted within the development footprint and therefore no offset is required.

**6.6.3 Impacts that do not Require Further Assessment**

Much of the subject land has been previously cleared. All areas identified in **Figure 6.2** as 'Cleared' or 'Exotic Vegetation' do not require no further assessment.





# Legend

- Development Site
- Subject Land
- Impacts that require Offsets

Image Source:  
Image © NearMap 2018  
Dated: 9/9/2018

NSW Government Spatial Services  
SIX Maps 'Clip and Ship'  
Parramatta LGA

Coordinate System: MGA Zone 56 (GDA 94)

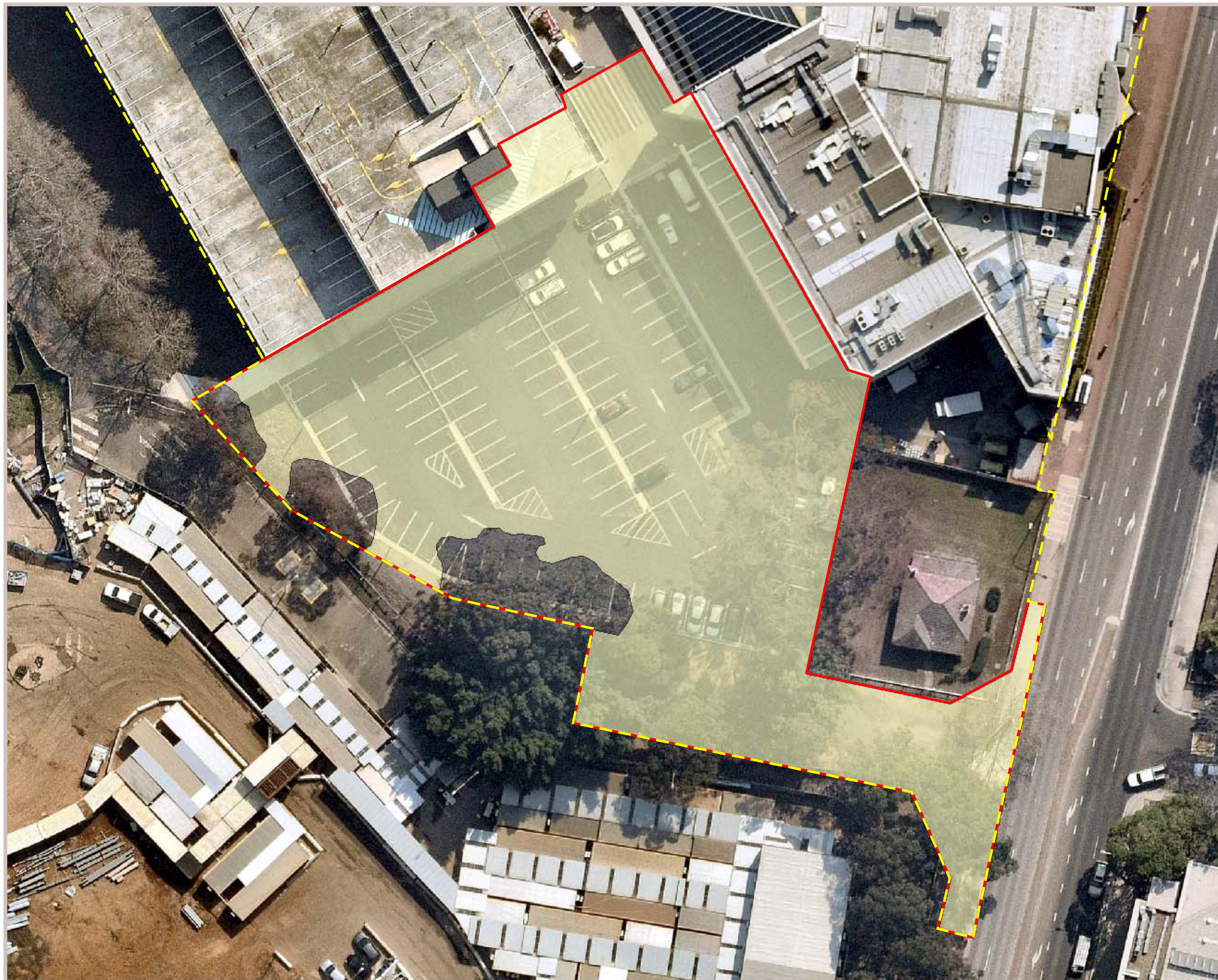


cumberland  
ecology

0 20 m

Figure 6.1. Location of impacts that require an offset





**Legend**

- Development Site
- Subject Land
- Impacts that do not require Offsets

Image Source:  
Image © NearMap 2018  
Dated: 9/9/2018

NSW Government Spatial Services  
SIX Maps 'Clip and Ship'  
Parramatta LGA

Coordinate System: MGA Zone 56 (GDA 94)



cumberland  
ecology

0 20 m

**Figure 6.2. Location of impacts that do not require an offset**



## Conclusion

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This BDAR has been prepared to assess the impacts of the proposed development on threatened species. The preparation of this BDAR is a requirement of the SEARs, which also included the following specific requirement:

*The BDAR is to also address the impacts of the proposed development on the existing Grey-headed Flying-fox colony adjacent the site. The report is to specifically consider the impact of construction noise, including any cumulative impacts of other developments in the area. The report is to provide detail on how the proposal will minimise and/or offset any identified impacts on the colony, this may include options to shift the location of the camp.*

No naturally occurring native vegetation occurs within the subject land. Minor potential habitat for the Grey-headed Flying-fox occurs within the subject land in the form of planted native/exotic vegetation. Six native canopy trees and one non-native tree are planned for removal while the remaining vegetation within the subject land will be retained as part of the hotel development. The project will not impact any potential SAI entities.

As the project includes the removal of six native trees, offsets are required. In the absence of formal guidance on how planted vegetation is assessed under BAM, this assessment has assigned the vegetation to the closest mapped PCT to determine the offset liability. This assessment indicated that the removal of these trees results in an estimated credit liability of 1 ecosystem credit associated with PCT 835.

Further impacts of the project may entail minor indirect impacts and prescribed impacts. Whilst these impacts may generally affect biodiversity values, it is considered that the project may indirectly affect the Grey-headed Flying-fox, due to the proximity of the development to the colony occurring along the Parramatta River. The main impacts affecting this species include short-term impacts from construction activities and long-term impacts from disruption of flyways.

Some mitigation measures are proposed to minimise the impacts to biodiversity values and the Grey-headed Flying-fox. Ongoing monitoring of the adjacent colony of Grey-headed Flying-fox will also be undertaken during the construction period.

With the implementation of the proposed mitigation measures and the offsetting described previously, it is considered that the impacts of this project on biodiversity, in particular the Grey-headed Flying Fox will be minimal and can be appropriately managed.

## References

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- AMBS Ecology & Heritage (2017). *Western Sydney Stadium Stage 2: Biodiversity Assessment*. AMBS Ecology & Heritage Pty Ltd.
- Eco Logical Australia (2016). *Western Sydney Stadium, Parramatta - Biodiversity Assessment. Prepared for AECOM*. Eco Logical Australia Pty Ltd.
- OEH (2014). *Eucalyptus nicholii - profile*. Office of Environment and Heritage, Hurstville.
- OEH (2016). *The Native Vegetation of the Sydney Metropolitan Area - VIS\_ID 4489*. Office of Environment and Heritage, Sydney.

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*Appendix A*

## BAM Plot/Transect Data

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**Table A.1 BAM Plot Data**

Scientific Name	Common Name	Native	Exotic	High Threat Weed	BAM Growth Form Group	Cover	Abundance
						Plot number 1	1
<i>Nothoscordum borbonicum</i>	Onion Weed		YES		N/A		
<i>Gomphrena celosioides</i>	Gomphrena Weed		YES		N/A	3.00	300
<i>Cyclosporum leptophyllum</i>	Slender Celery		YES		N/A	0.10	10
<i>Bidens pilosa</i>	Cobbler's Pegs		YES	YES	N/A	0.10	5
<i>Conyza bonariensis</i>	Flaxleaf Fleabane		YES		N/A	0.10	10
<i>Cotula australis</i>	Common Cotula	YES			Forb (FG)	0.10	15
<i>Gamochaeta spp.</i>			YES		N/A	0.10	5
<i>Hypochaeris microcephala var. albiflora</i>	White Flatweed		YES		N/A	1.00	50
<i>Hypochaeris radicata</i>	Catsear		YES		N/A	0.50	30
<i>Soliva sessilis</i>	Bindyi		YES		N/A	1.00	100
<i>Sonchus asper</i>	Prickly Sowthistle		YES		N/A	0.10	20
<i>Sonchus oleraceus</i>	Common Sowthistle		YES		N/A		
<i>Taraxacum officinale</i>	Dandelion		YES		N/A	0.10	15
<i>Capsella bursa-pastoris</i>	Shepherd's Purse		YES		N/A	0.25	35
<i>Lepidium africanum</i>	Common Peppergrass		YES		N/A	0.25	30
<i>Buxus microphylla</i>			YES		N/A		

**Table A.1 BAM Plot Data**

Scientific Name	Common Name	Native	Exotic	High Threat Weed	BAM Growth Form Group	Cover	Abundance
<i>Paronychia brasiliensis</i>	Chilean Whitlow Wort, Brazilian Whitlow		YES		N/A	1.00	100
<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed		YES		N/A	0.25	35
<i>Stellaria media</i>	Common Chickweed		YES		N/A	0.10	10
<i>Commelina cyanea</i>	Native Wandering Jew	YES			Forb (FG)	0.10	5
<i>Ophiopogon japonicus</i>	Dwarf lilyturf		YES		N/A	0.10	5
<i>Dichondra repens</i>	Kidney Weed	YES			Forb (FG)	0.10	30
<i>Cyperus gracilis</i>	Slender Flat-sedge	YES			Grass & grasslike (GG)	0.10	25
<i>Chamaesyce prostrata</i>	Red Caustic Weed		YES		N/A	0.10	20
<i>Medicago polymorpha</i>	Burr Medic		YES		N/A	0.50	100
<i>Fumaria officinalis</i>			YES		N/A	0.10	10
<i>Lavandula spp.</i>			YES		N/A		
<i>Lomandra longifolia</i> 'Tanika'		YES			N/A		
<i>Malva parviflora</i>	Small-flowered Mallow		YES		N/A	1.00	50
<i>Modiola caroliniana</i>	Red-flowered Mallow		YES		N/A	1.00	50
<i>Sida rhombifolia</i>	Paddy's Lucerne		YES		N/A		
<i>Ficus microcarpa</i>			YES		N/A		
<i>Corymbia citriodora</i>	Lemon-scented Gum		YES		N/A		
<i>Corymbia maculata</i>	Spotted Gum	YES			Tree (TG)		

**Table A.1 BAM Plot Data**

Scientific Name	Common Name	Native	Exotic	High Threat Weed	BAM Growth Form Group	Cover	Abundance
<i>Eucalyptus grandis</i>	Flooded Gum	YES			Tree (TG)		
<i>Eucalyptus microcorys</i>	Tallowwood	YES			Tree (TG)		
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	YES			Tree (TG)		
<i>Eucalyptus microcorys</i>	Tallowwood	YES			Tree (TG)	20.00	2
<i>Eucalyptus maidenii</i>	Maiden's Gum	YES			Tree (TG)	10.00	1
<i>Oxalis corniculata</i>	Creeping Oxalis		YES		N/A	0.25	50
<i>Oxalis purpurea</i>			YES		N/A	0.10	10
<i>Plantago lanceolata</i>	Lamb's Tongues		YES		N/A	0.10	10
<i>Platanus spp.</i>			YES		N/A		
<i>Bromus catharticus</i>	Praire Grass		YES		N/A	0.50	30
<i>Cenchrus clandestinus</i>	Kikuyu Grass		YES		N/A	0.25	30
<i>Cenchrus spp.</i>			YES		Grass & grasslike (GG)		
<i>Cynodon dactylon</i>	Common Couch	YES			Grass & grasslike (GG)	10.00	
<i>Digitaria sanguinalis</i>	Crab Grass		YES		N/A		
<i>Echinochloa crus-galli</i>	Barnyard Grass		YES		N/A		
<i>Ehrharta erecta</i>	Panic Veldtgrass		YES	YES	N/A	0.25	50
<i>Eragrostis tenuifolia</i>	Elastic Grass		YES		N/A	2.00	200
<i>Lolium perenne</i>	Perennial Ryegrass		YES		N/A	0.10	5



**Table A.1 BAM Plot Data**

Scientific Name	Common Name	Native	Exotic	High Threat Weed	BAM Growth Form Group	Cover	Abundance
<i>Paspalum dilatatum</i>	Paspalum		YES	YES	N/A		
<i>Sporobolus africanus</i>	Parramatta Grass		YES		N/A		
<i>Stenotaphrum secundatum</i>	Buffalo Grass		YES	YES	N/A		
<i>Eleusine tristachya</i>	Goose Grass		YES		N/A	0.50	100
<i>Rumex brownii</i>	Swamp Dock	YES			Forb (FG)	0.25	20
<i>Portulaca oleracea</i>	Pigweed	YES			Forb (FG)	0.10	15
<i>Gardenia spp.</i>			YES		N/A		

Note: Records without 'Cover' and 'Abundance' values were not within the plot

**Table A.2 BAM Plot/Transect Data**

Composition						Structure						Function										
Trees	Shrub	Grass	Forbs	Ferns	Other	Trees	Shrubs	Grass	Forbs	Ferns	Other	Large (80+)	HBT*	Litter Cover	Logs	5 to 10 cm	10 to 20 cm	20 to 30 cm	30 to 50 cm	50 to 80cm	Regen	HTE
2	0	2	5	0	0	30.0	0.0	10.1	0.7	0.0	0.0	1	0	60.0	0.0	0	0	1	1	1	0	0.4

\*HBT = Hollow-bearing Trees, HTE = High Threat Exotic

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*Appendix B*

# Credit Report

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# BAM Credit Summary Report

## Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00012986/BAAS17027/18/00012987	18157 - PLC Hotel	07/11/2018
Assessor Name	Report Created	BAM Data version *
David Robertson	04/12/2018	4
Assessor Number	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BAAS17027		

## Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAI	Ecosystem credits
<b>Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion</b>								
1	835_Low	33.0	0.0	0.25	High Sensitivity to Potential Gain	2.50		1
							<b>Subtotal</b>	<b>1</b>
							<b>Total</b>	<b>1</b>