Sydney Swans Headquarters, Moore Park
Biodiversity Development Assessment Report

APP Corporation Pty Limited

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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by APP Corporation Pty Limited to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed adaptive reuse of the Royal Hall of Industries for a high-performance sport and community facility in Moore Park, Sydney (the development site). The proposed redevelopment will be assessed as a State Significant Development (SSD-9726) in accordance with the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Secretary's Environmental Assessment Requirements (SEARs) have been issued and require the preparation of a BDAR under the NSW *Biodiversity Conservation Act* (BC Act).

The proposed development will impact upon biodiversity values as such a BDAR is required to assess the clearing of vegetation and modification of human-made structures under the BC Act. This report has been prepared to meet the requirements of the Biodiversity Assessment Method 2017 (BAM) established under Section 6.7 of the BC Act. State Environmental Planning Policy 47 – Moore Park Showground (SEPP 47) applies to the development site and have been addressed in this document. Due to the SEPP 47 zoning, the requirements of the Sydney *Local Environmental Plan 2012* (LEP) do not apply. The *Development Control Plan 2012* (DCP) has been reviewed for additional legislative requirements.

The vegetation within the development site contains a small area of planted native (0.009 ha) and exotic vegetation (0.002 ha). Under the BAM, all vegetation native to NSW must be assigned a Plant Community Type (PCT). Where native vegetation has been planted and does not clearly conform to any PCT, a 'best-fit' PCT must be assigned. Based on the available data, it was considered that the planted native vegetation could be assigned to PCT 1776 *Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast*. This PCT does not correspond to a threatened ecological community listed under the BC Act or Commonwealth *Environment Protection Biodiversity Conservation Act 1999.*

During the field survey, potential habitat for microchiropteran (microbats) was assessed. Targeted survey was conducted for microbats which may utilise the roof cavities of buildings for roosting habitat. One threatened microbat species, *Miniopterus orianae oceanensis* (Large Bent-winged Bat) and possibly three non-threatened microbat species were recorded during anabat surveys. The Large Bent-winged Bat is a dual candidate species; ecosystem species for foraging habitat and species credit for breeding habitat (i.e. specific maternity caves). The development site does not contain caves and as such this species was assessed for prescribed impacts under section 9.2 of the BAM and no offsets were determined to be required.

No other threatened fauna or threatened flora species were recorded within the development site. There is potential that highly mobile fauna species may utilise the vegetation for foraging resources on occasion. Consideration has been given to these highly mobile species during the preparation of this BDAR.

Measures taken to avoid, minimise and mitigate impacts to the vegetation and species habitat present within the development site and methodologies to minimise impacts during construction and operation of the development have been included in this BDAR.

Following consideration of all the above aspects, the residual unavoidable impacts of the project were calculated in accordance with the BAM by utilising the Biodiversity Assessment Method Credit Calculator (BAMC). For PCT 1176 the BAMC calculated a vegetation integrity score of 3.7. Under the BAM, no ecosystem credits are required to offset the removal of 0.005 ha of native vegetation if the vegetation integrity score is less than or equal to a score of 20.

One Matter of National Environmental Significance (MNES) was identified as having potential to be adversely affected by the proposed works: *Pteropus poliocephalus* (Grey-headed Flying-fox) is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and it is considered that this species is likely to utilise the planted vegetation within the development site for occasionally foraging. An assessment of the Commonwealth Significant Impact Criteria was undertaken for the Grey-headed Flying-fox and concluded that the project would not have a significant affect on this species. As such, a referral to the Commonwealth is not required.

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
DCP	Development Control Plan
DoEE	Commonwealth Department of the Environment and Energy
DPIE	NSW Department of Planning, Industry and Environment (previously known as NSW Department of Planning and Environment, DPE)
EEC	Endangered Ecological Community
EES	NSW Environment, Energy and Science (previously known as NSW Office of Environment and Heritage, OEH)
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FM Act	NSW Fisheries Management Act 1994
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LEP	Local Environmental Plan
LLS	Local Land Service
NSW	New South Wales
OEH	Office of Environment and Heritage (now part of DPIE)
PCT	Plant Community Type
RHI	Royal Hall of Industries
SAII	Serious and Irreversible Impacts
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW Water Management Act 2000

1. Stage 1: Biodiversity assessment

1.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared in order to satisfy the comments made by the Environment, Energy and Science Group (EES) in response the Environmental Impact Assessment (EIA) made for the proposed Adaptive Reuse of the Royal Hall of Industries, a State Significant Development (SSD-9726). This BDAR has been prepared by Belinda Failes (BAAS18159), who is an Accredited Person under the NSW *Biodiversity Conservation Act 2016* (BC Act). The report has been peer reviewed by Nicole McVicar (BAAS18077), who is also an accredited person under the BC Act.

1.1.1 General description of the development site

The proposed development site, defined as the area of land that is subject to the proposed development application, is approximately 1.08 ha in size.

The proposed development site is located at 1 Driver Avenue, Moore Park and comprises a portion of two separate lots, legally described as Lot 3 DP861843 and Lot 52 DP1041134. The site is owned by the Centennial Park and Moore Park Trust and is leased to the Sydney Swans for the purposes of the development.

The proposed development relates to the Royal Hall of Industries (RHI) building, and the associated courtyard area to the immediate south of the building. The proposed development site is located in the south-western corner of the Entertainment Quarter precinct and has a direct frontage to Driver Avenue to the west, Lang Road to the south and Errol Flynn Boulevard to the east, an access road within the Entertainment Quarter precinct.

The development site has been subject to considerable vegetation disturbance as a result of historical use of the grounds. No remnant native trees or ground cover species are present within the development site. Vegetated areas of the development site consist of planted trees and shrubs and hardstand areas.

This report includes two base maps, the Site Map (Figure 1) and the Location Map (Figure 2). The development site construction footprint is provided in Figure 3.

1.1.2 Development site footprint

This application seeks approval for the proposed adaptive reuse of the RHI for a high-performance sport and community facility. The development will maintain the structural integrity and façade of the RHI, whilst re-purposing the interior of the building to support a number of compatible uses and utilise the space effectively. In addition to the repurposing of the RHI, an extension of the building will be constructed to the south of the building in the current service and courtyard area and will include a pool and other infrastructure.

Four *Corymbia maculata* (Spotted Gum) trees are proposed to be removed as part of this proposal. Exotic trees, *Liquidambar styraciflua* (Liquidambar) will be pruned for the construction works on the existing brick wall along the southern boundary. These impacts have been included in the development site boundary (Allied Tree Consultancy 2019).

It is understood that the operational and construction footprint will be contained wholly within the development site. The development site footprint is shown in Figure 3.

1.1.3 Sources of information used

The following data sources were reviewed as part of this report:

- BioNet Vegetation Classification System (VIS)
- BioNet / Atlas of NSW Wildlife 5 km database search (DoPIE 2019)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool 5 km database search (DotEE 2019)
- Threatened Biodiversity Data Collection (DoPIE 2019)
- NSW Government Biodiversity Values Map (accessed on 21 October 2019)
- The Native Vegetation of the Sydney Metropolitan Area (Office of Environment and Heritage (OEH) now DoPIE 2013)
- Additional GIS datasets including soil, topography, geology and drainage Arcadia Landscape Architecture – Sydney Swans HQ & Hordern Plaza Masterplan (October 2019)
- Allied Tree Consultancy – Addendum arborist report 2019
- Request for Secretary's Environmental Assessment Requirements
- Environmental Impact Statement Sydney Swans high performance sports facility (Urbis 2019)
- Sydney Swans Head Quarters Microbat Survey Report – Royal Hall of Industries – Prepared for APP, on behalf of the Sydney Swans (ELA 2019).

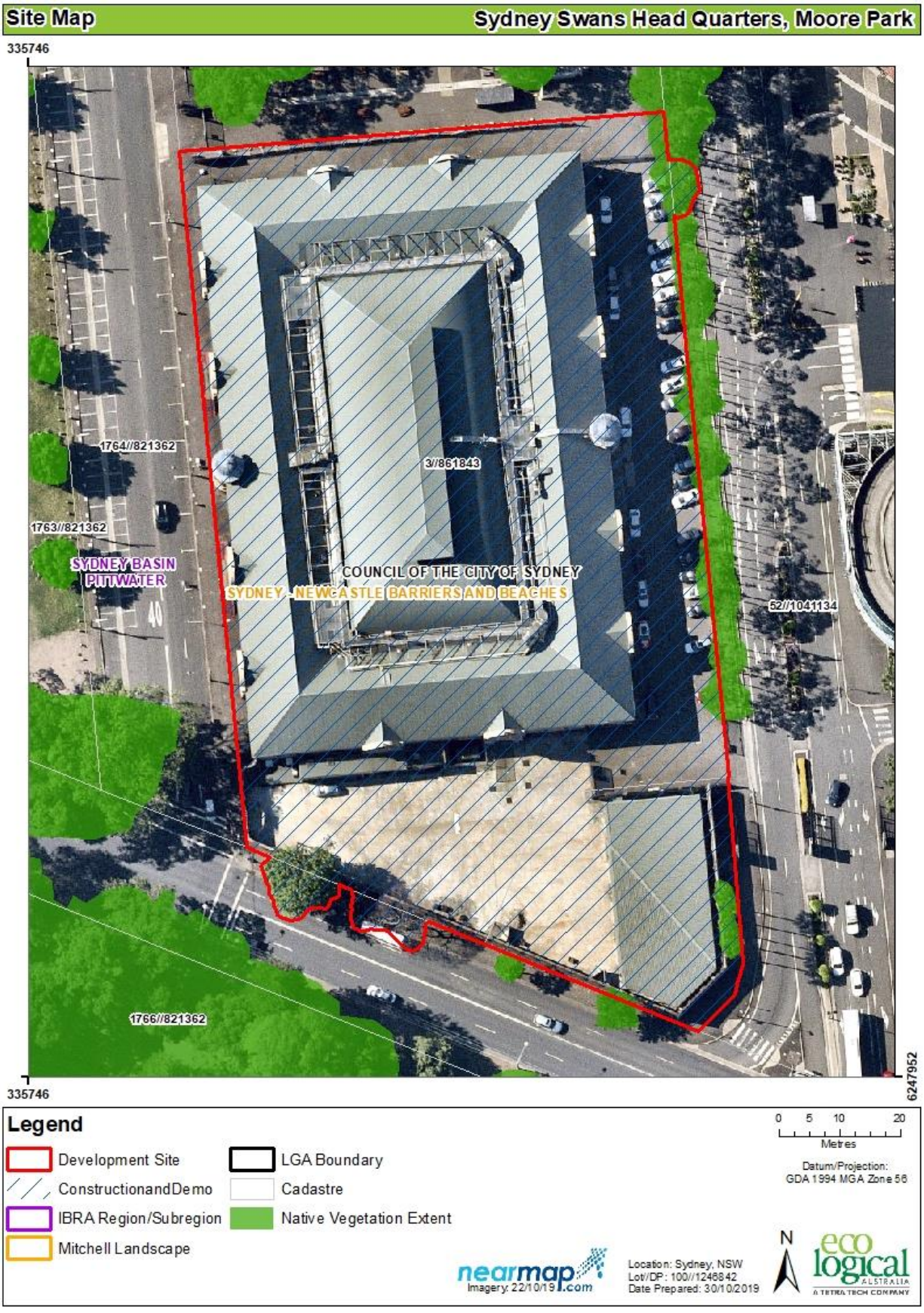

Figure 1: Site Map

Figure 2: Location Map

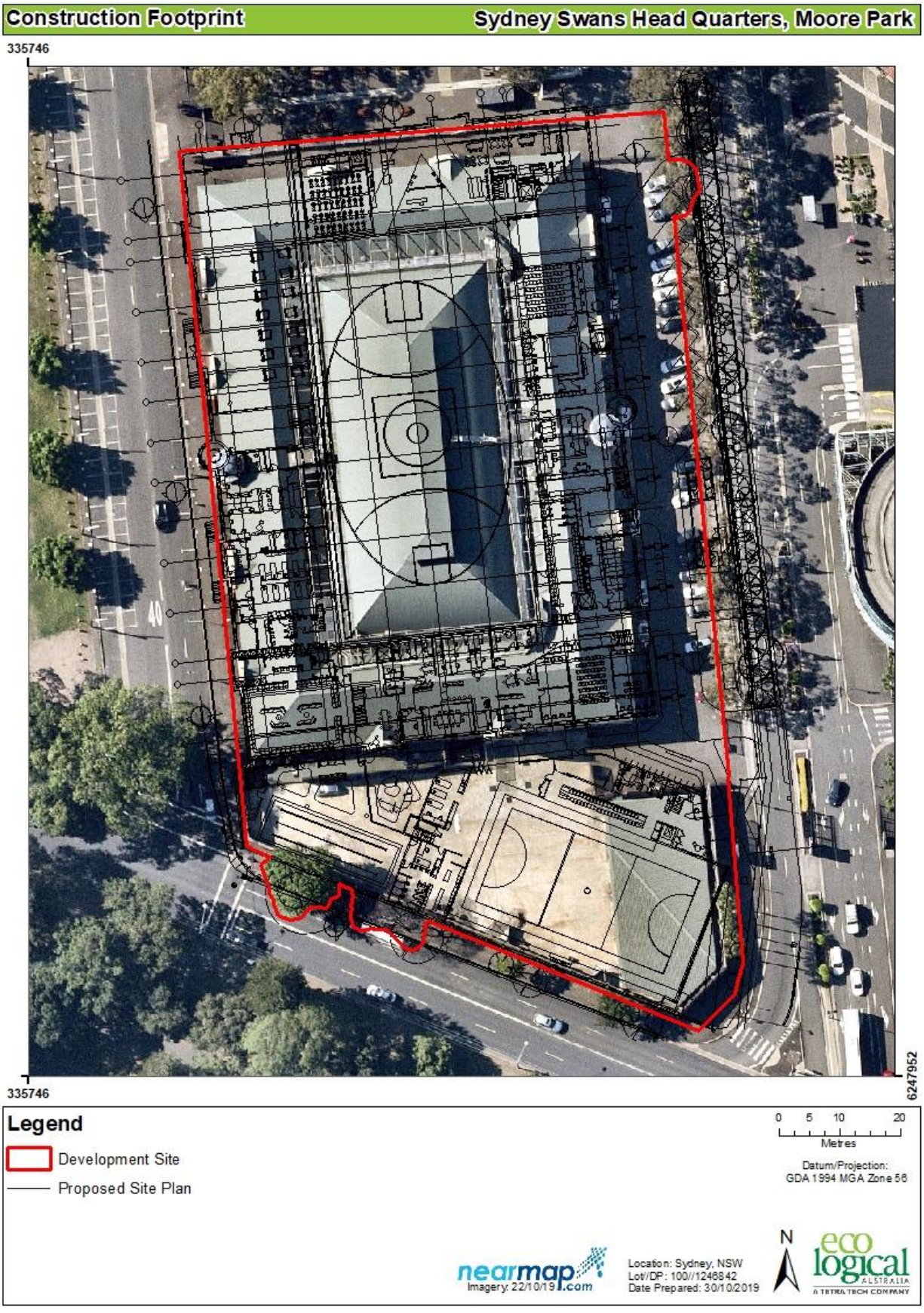

Figure 3: Development site footprint

1.2 Legislative context

Table 1: Legislative context

Name	Relevance to the project
Commonwealth	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES) have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is not likely to have a significant impact on MNES.
State	
Environmental Planning and Assessment Act 1979 (EP&A Act)	The proposed development is State Significant Development and requires consent under the EP&A Act.
Biodiversity Conservation Act 2016 (BC Act)	Section 7.9 of the BC Act requires the submission of the SSD to be accompanied by a Biodiversity Development Assessment Report (BDAR) (i.e. this report). Secretary's Environmental Assessment Requirements have been issued and require assessment of the following: *10. Biodiversity: The EIS shall provide an assessment of the proposal's biodiversity impacts in accordance with the Biodiversity Conservation Act 2016, including the preparation of a Biodiversity Development Assessment Report where required under the Act.*
Fisheries Management Act 1994 (FM Act)	The development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.
Water Management Act 2000 (WM Act)	The project does not involve works on waterfront land. A Controlled Activity Approval under s91 of the WM Act is not required.
Local land Services Amendment Act 2016 (LLS Act)	The LLS Act does not apply to areas of the state to which the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 applies. This SEPP applies to the City of Sydney local government area, in which the proposed development site is located (see Vegetation SEPP below).
Planning Instruments	
State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP)	The Vegetation SEPP applies to development that does not require consent. As this project requires consent under the EP&A Act the Vegetation SEPP is not applicable.
SEP (Coastal Management) 2018	The proposed development site is not located on land subject to SEPP (Coastal Management) 2018.
SEPP 44 - Koala Habitat Protection (SEPP 44)	The proposed development site is not located within a Local Government Area (LGA) to which SEPP 44 applies.
Sydney Local Environment Plan (LEP) 2012	The proposed development site is within the map boundaries of SEPP 47 – Moore Park Showground, and as such the local provisions of the Sydney LEP 2012 do not apply.
Sydney Development Control Plan (DCP) 2012	The Sydney DCP has been reviewed for additional biodiversity provision which may relate to the development site. Section 3.5.1 Urban Ecology of the DCP relates to the: • Protection of existing habitat features within and adjacent to development sites

Name	Relevance to the project
	• Improve the diversity and abundance of locally indigenous flora and fauna species across the LGA. Under the DCP, development is to be consistent with the Street Tree Master Plan, Park Tree Management Plans and the Landscape Code. These matters have been addressed in this report.
SEPP 47 – Moore Park Showground (SEPP 47)	The proposed development site is within the map boundaries of SEPP 47. The proposed development site is largely shown as vertically hatched on the SEPP map. A small portion in the southeast corner of the proposed development site is mapped as diagonally hatched. As such, Part 2 and Part 3 of the SEPP apply. The SEPP aims to provide recreational facilities. The proposed development is in accordance with the SEPP.

1.3 Landscape features

1.3.1 Interim Biogeographic Regionalisation for Australia (IBRA) regions and subregions

The development site falls within the IBRA region and subregions as outlined in Table 2 and Table 3.

Table 2: IBRA regions

IBRA region	Area within development site (ha)
Sydney Basin	1.07

Table 3: IBRA subregions

IBRA subregion	Area within development site (ha)
Pittwater	1.07

1.3.2 Mitchell Landscapes

The development site falls within the Sydney – Newcastle Barriers and Beaches Mitchell Landscapes (DECC 2002) as outlined in Table 4.

Table 4: Mitchell Landscapes

Mitchell landscape	Description	Area within Development Site (ha)
Sydney – Newcastle Barriers and Beaches	Quaternary coastal sediments on long recurved quartz sand beaches between rocky headlands backed by sand dunes and intermittently closed and open lagoons. This includes areas of more extensive high dunes often located on top of the headlands. General elevation 0 to 30 m, local relief 10 m. Cliff top dunes may be found as high as 90 m above sea level. Distinct zonation of vegetation and increasing soil development from the beach to the inland dunes.	1.07

1.3.3 Native vegetation extent

The extent of native vegetation within the development site and buffer is outlined in Table 5. There are no differences between the mapped vegetation extent and the aerial imagery.

Table 5: Native vegetation extent

Area within the development site (ha)	Area within the 1.500 m buffer	Cover within the 1,500 m buffer area (%)
96.85 ha	771.42 ha	13%

1.3.4 Rivers and streams

The development site does not contain any rivers or streams.

1.3.5 Wetlands

The development site does not contain any wetlands.

1.3.6 Connectivity features

The development site contains limited connectivity features outlined in Table 6.

Connectivity to any vegetation has been disconnected by the formation of major arterial roads and urban multistorey development. Large *Ficus* sp. are established along roads and within open spaces such as Moore Park, Moore Park Golf Course and Centennial Park. Centennial park is located 500 m directly east of the development site and contains intact native vegetation. However, outside of the 1500 m buffer the connectivity is limited to occasional roadside street trees. Therefore, some connectivity may remain for highly mobile species such as bird and bat species. This includes flyways between vegetation patches.

Table 6: Connectivity features

Connectivity feature name	Feature type
Centennial Park	Core bushland and riparian areas
Moore Park	Connectivity link

1.3.7 Areas of geological significance and soil hazard features

The development site does not contain areas of geological significance and soil hazard features.

1.3.8 Site context

1.3.8.1 Method applied

The site-based method has been applied to this development.

1.3.8.2 Percent native vegetation cover in the landscape

The current percent native vegetation cover in the landscape was assessed in a Geographic Information System (GIS) using aerial imagery sourced from Nearmap using increments of 5%. The results of this analysis are shown in Table 7.

Table 7: Percent native vegetation cover in the landscape

Area within the development site (ha)	Area within the 1.500 m buffer	Cover within the 1,500 m buffer area (%)
96.85 ha	771.42 ha	13%

1.3.8.3 Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. The patch size area is 81 ha, this includes patches of Urban Exotic / Native vegetation as mapped by OEH (2013) vegetation mapping.

1.4 Native vegetation

1.4.1 Survey effort

The initial site inspection was undertaken on 4 March 2019 by accredited assessor Kirsten Velthuis (BSSA 19048) to identify potential biodiversity values of the development site. A visual survey of potential microbat roosts at the RHI undertaken by ELA ecologist Kirsten Velthuis on 1 September 2019 and targeted microbat survey (see Appendix C:).

Vegetation survey was undertaken within the development site by Belinda Failes on 24 October 2019 (Figure 5). A total of one (1) full-floristic and vegetation integrity plot was undertaken to identify Plant Community Types (PCTs) and threatened ecological communities (TECs) within the development site

(Table 8 and Table 9). A modified version of the BAM vegetation integrity plot was undertaken to account for the narrow vegetation zone. The integrity plot was modified into a 10 m x 100 m configuration. The site inspection also involved an assessment of habitat features including recording of hollow-bearing trees (HBTs), threatened species foraging resources and a general traverse of the vegetation immediately adjacent to the development site.

All field data collected at full-floristic and vegetation integrity plots is included in Appendix B:.

Table 8: Full-floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	1

Table 9: Vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Condition	Total area (ha)	Plots required	Plots surveyed
1	1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Low	0.009	1	1
2	N/A	Exotic vegetation	Low	0.002	0	0

1.4.2 Plant Community Types present

The development site contained predominately human-made structures (

Photo 1) and limited vegetation. A row of planted native canopy species was located along the eastern boundary (Photo 2). A small raised garden contained several tall planted *Livistona australis* (Cabbage Palm) and *Syzygium* species located along the southern boundary. Several street exotic trees were recorded along Lang Road and will be trimmed during the proposed works (Photo 3). The remaining portion of the development site contains the RHI and concrete open space. Under the BAM, planted vegetation native to NSW requires consideration as to the 'best-fit' PCT.

One PCT was identified within the development site (Table 10, Figure 4) and is not listed as a TEC under the BC or EPBC Act. The development site does not contain any listed TECs under the BC Act or EPBC Act. Justification for the selection of PCTs occurring on the development site is provided in Table 11.

Table 10: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Total area (ha)	Percent cleared
1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Sydney Coastal Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrubby sub-formation)	0.009	64%

Photo 1: Royal Hall of Industries looking east from Driver Avenue

Photo 2: Vegetation zone 1 - *PCT 1776 Smooth-barked Apple-Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast_planted*

Photo 3: Exotic vegetation along Lang Road to be trimmed during the removal of the wall. Note the Jacaranda tree in background contains a tree hollow

1.4.3 PCT selection justification

One PCT was recorded within the development site, PCT 1776 *Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast*. The desktop database assessment and site inspection did not record remnant vegetation within the development site or within the broader locality of the development site. The absence of remnant vegetation makes the selection of an appropriate PCT problematic. Additionally, the BAM vegetation integrity data and floristic data could not be used to quantitatively to determine the appropriate PCT as only one species was recorded within the plot, and this species does not represent a species from a known local vegetation community.

A review of the available vegetation database mapping within the broader landscape of the development site recorded the presence of two mapped PCTs, (PCT 1828 and PCT 1231) however, these

PCTs did not represent the geographic location or aspect found within the development site (see Table 11). In the absence of suitable pre-European vegetation data, a description of the Mitchell Landscape and soil landscape was used as an indicator of the historical soil landscape and potential characteristic species represented within the development site. A description of the Mitchells Landscape is found in Table 4.

Tuggerah soil landscapes were mapped within the development site. This soil landscape is associated with coastal dunefields which contain dry sclerophyll forests (Chapman and Murphy 1989). In summary, the pre-European vegetation may have contained a canopy of *Angophora costata* (Sydney Red Gum), *Eucalyptus pilularis* (Blackbutt) and *Corymbia gummifera* (Red Bloodwood). These dominant species were compared with vegetation descriptions present on the BioNet Vegetation Classification System (VIS). Additionally, the VIS search was refined by using the IBRA subregion and Sydney LGA. Justifications of the PCT selection criteria are provided in Table 11.

Table 11: PCT selection justification

PCT ID	PCT Name	Selection criteria	Species relied upon for identification of vegetation type and relative abundance
1776	**Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast**	**IBRA subregion, LGA and dominant species *Angophora costata*, *Eucalyptus piperita*, *Eucalyptus pilularis* and *Corymbia gummifera* from Mitchells' Landscapes and soil landscapes (Tuggerah)**	**This PCT was chosen as the best representation of the pre-European vegetation type within the development site.** **This PCT occurs on upper slopes and dry gullies on sandstone soils. The description of the PCT in VIS represents similarities to the vegetation described in Mitchell's Landscapes and Tuggerah soil landscapes.**
1646	Smooth-barked Apple - Blackbutt - Old Man Banksia woodland on coastal sands of the Central and Lower North Coast	IBRA subregion, LGA and dominant species (*Eucalyptus pilularis* and *Corymbia gummifera)* from Mitchells' Landscapes	Components of this PCT are associated with River-flat Eucalypt Forest which is a TEC and occurs along riparian habitats. This PCT was not selected as the development site is not associated with any known watercourses or riparian habitats and the vegetation in the VIS does not correlate to vegetation described in the Mitchell's Landscapes.
1845	Smooth-barked Apple - Red Bloodwood - Blackbutt tall open forest on shale sandstone transition soils in eastern Sydney	IBRA subregion, LGA and dominant species from Mitchells' Landscapes	Although the dominant species associated with the Mitchell Landscapes and soil landscapes occurs within this PCT (i.e. *Eucalyptus*

PCT ID	PCT Name	Selection criteria	Species relied upon for identification of vegetation type and relative abundance
			pilularis and *Corymbia gummifera*) this PCT is associated with clay-influenced soils with residual shale or lateritic capping which does not represent the Tuggerah sandy soils identified within the development site.
1828	Coachwood - Lilly Pilly - Water Gum gallery rainforest in sandstone gullies of the Sydney basin	This PCT has been mapped within 1 km of the development site from OEH 2013 vegetation mapping datasets.	This PCT is associated with sheltered sandstone riparian zones. The development site does not contain riparian zones. Therefore, this PCT was not chosen.
1231	Swamp Mahogany swamp sclerophyll forest on coastal lowlands of the Sydney Basin Bioregion and South East Corner Bioregion	This PCT has been mapped within 1 km of the development site from OEH 2013 vegetation mapping datasets.	This PCT is associated with drainages and depressions on sandy alluviums. The development site is not located within drainage lines or depressions. Therefore, this PCT was not chosen.
664	Banksia heath on aeolian sands of eastern Sydney suburbs, Sydney Basin Bioregion	IBRA subregion, LGA and dominant species from soil landscape description *(Angophora costata* and *Banksia aemula*	This PCT contains heath vegetation which does not represent the dry sclerophyll forests described from soil landscapes.

1.4.4 Vegetation integrity assessment

A vegetation integrity assessment using the Credit Calculator (BAMC) was undertaken and the results are outlined in Table 12. Under the BAMC the impact area of 0.005 ha was considered too small and therefore the BAMC automatically increased the impact area to 0.01 ha for the vegetation zone.

Table 12: Vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	0.005	0.5	7.8	13.8	3.7

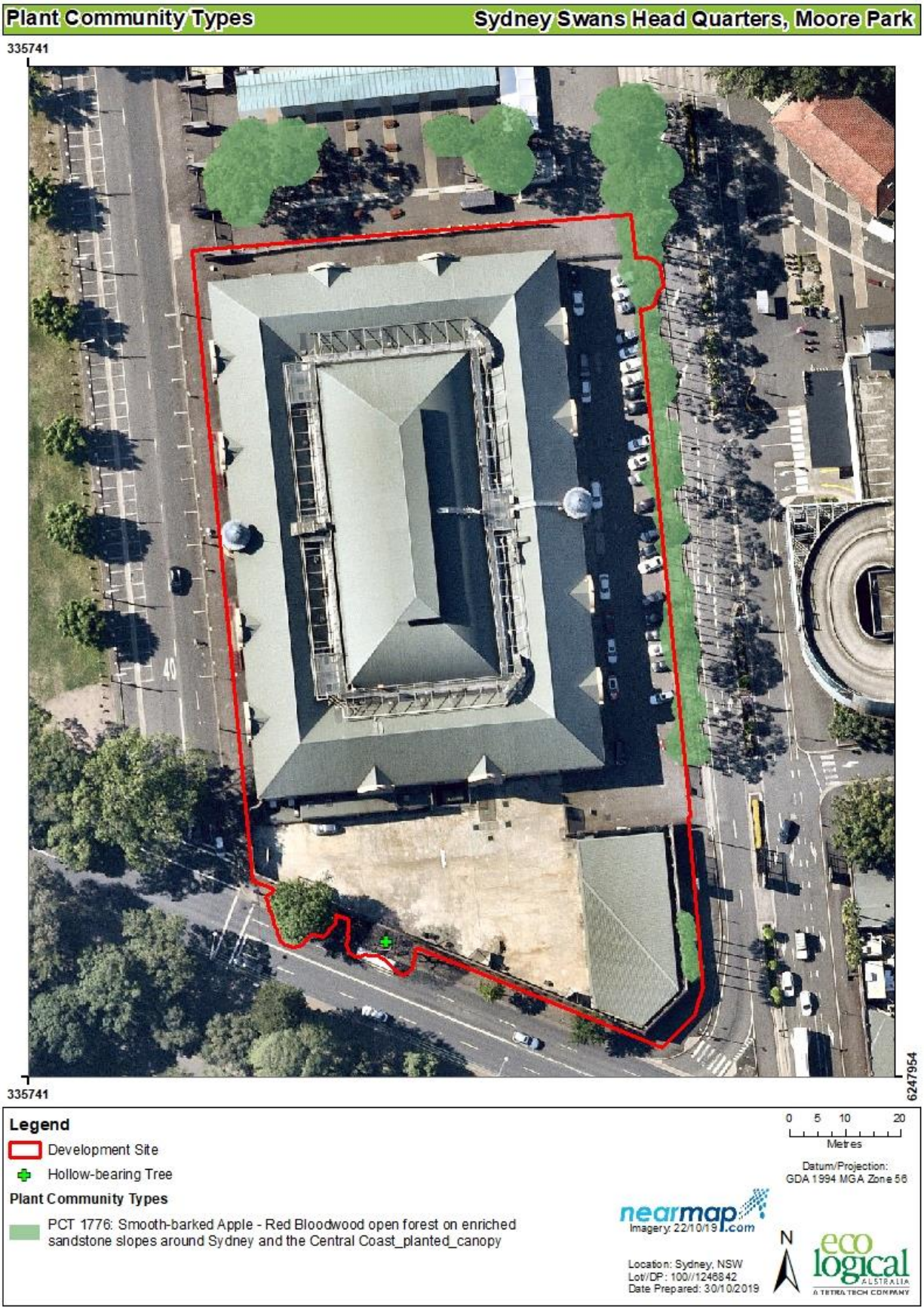

Figure 4: Plant Community Types and habitat features

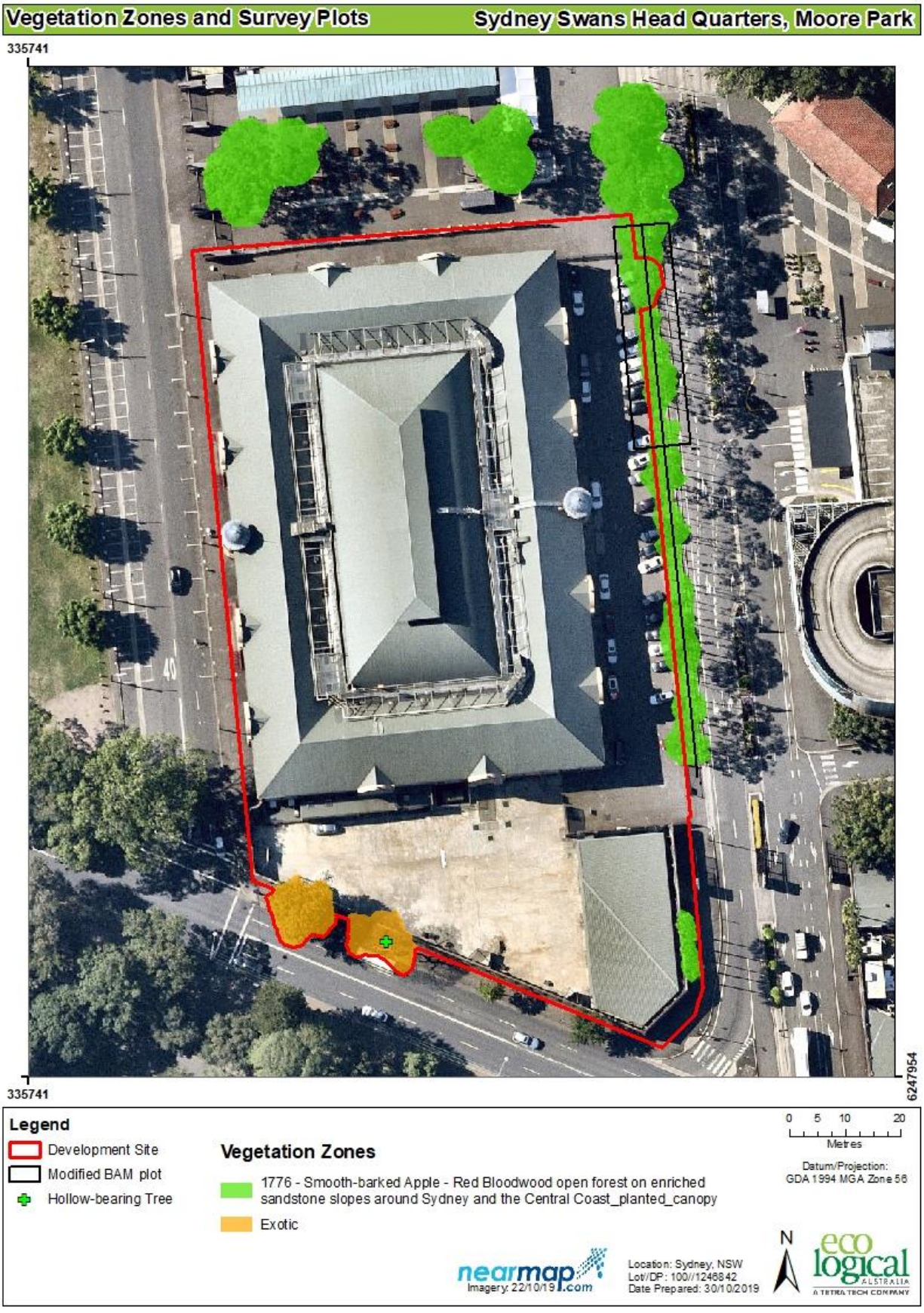

Figure 5: Vegetation zone and plot location

1.5 Threatened species

Habitat assessments were undertaken as part of the field surveys. Habitat assessments involved a search of possible hollow-bearing trees (HBTs) within the development site and on ground inspection of roof cavities using binoculars for possible entrances for microbats, and inspection for other associated evidence of fauna roosting habitat including white wash within roof cavities.

One hollow-bearing tree was recorded along the southern boundary, within a *Jacaranda mimosifolia* (Jacaranda) along Lang Road (Photo 3). The hollow dimension was approximate 15 cm wide and may provide habitat for common arboreal mammal species. This tree will be trimmed for the removal of the existing brick wall. Pruning will not impact upon the hollow. No tree hollows were considered to be of a suitable size to accommodate microbat species. A number of hollow-bearing trees were noted during a wider traverse of the adjacent lands surrounding the development site.

Due to the presence of a large number of mature *Ficus* species within the surrounding land, a number of bird species which are not common within urban environments, were heard calling from vegetation adjacent to the development site. Flowering of canopy species recorded along the eastern boundary of the development site may provide additional foraging resources for these bird species. The development site is also located in close proximity (i.e. 500 m) to Centennial Park which contains native vegetation and supplementary habitat resources for birds and microbat species.

Human made structures were recorded within the development site and may contain habitat for microbat species which are assesses as prescribed impacts (see Section 2.1.2). Targeted surveys for microbats were undertaken within the development site and more information is provided in 1.6.1.

1.5.1 Ecosystem credit species

Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 13.

Ecosystem credit species which have been excluded from the assessment and relevant justification is also included in Table 13.

Table 13: Justification for exclusion of predicted ecosystem credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Anthochaera phrygia	Regent Honeyeater (Foraging)	N/A	High	CE	CE	Excluded *Corymbia maculata* (Spotted Gum), which is identified as a key tree species for the Regent Honeyeater, was identified within the development site. However, the vegetation within the development site is substantially degraded and not considered suitable foraging habitat for this species.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Artamus cyanopterus cyanopterus	Dusky Woodswallow	N/A	Moderate	V	Not Listed	Excluded Habitat features for this species are not present at this site. The vegetation within the development site is substantially degraded.
Callocephalon fimbriatum	Gang-gang Cockatoo (Foraging)	N/A	Moderate	V	Not Listed	Excluded Habitat features for this species are not present at this site. The vegetation within the development site is substantially degraded.
Calyptorhynchus lathami	Glossy Black-Cockatoo (Foraging)	N/A	High	V	Not Listed	Excluded This species has a very specific foraging habitat requirement (i.e. presence of *Allocasuarina* or *Casuarina* cones). The development site does not comprise key habitat resources required for foraging.
Daphoenositta chrysoptera	Varied Sittella	N/A	High	V	Not Listed	Excluded Habitat present does not contain suitable habitat features for this species. The vegetation within the development site is substantially degraded.
Dasyurus maculatus	Spotted-tailed Quoll	N/A	High	V	E	Excluded Habitat features for this species are not present at this site. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage.
Glossopsitta pusilla	Little Lorikeet	N/A	High	V	Not Listed	Excluded Flowering species, which the Little Lorikeet may utilise for occasional foraging, were identified within the development site. However, the vegetation within the development site is substantially degraded and not considered suitable foraging habitat for this species.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Haliaeetus leucogaster	White-bellied Sea-Eagle (Foraging)	Waterbodies Within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines	High	V	Not Listed	**Included** Habitat features associated with this species are not present in the development site. However, the development site is located within 1 km of large open waterbodies present in Centennial Park and thus this species was included in the assessment.
Hieraaetus morphnoides	Little Eagle (Foraging)	N/A	Moderate	V	Not Listed	Excluded Habitat present does not contain suitable habitat features for this species. The vegetation within the development site is substantially degraded.
Lathamus discolor	Swift Parrot (Foraging)	N/A	Moderate	E	CE	Excluded *Corymbia maculata* (Spotted Gum), which is identified as a favoured feed tree for the Swift Parrot, was identified within the development site. However, the vegetation within the development site is substantially degraded and not considered suitable foraging habitat for this species.
Lophoictinia isura	Square-tailed Kite (Foraging)	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present on the development site. This species requires dry woodlands and open forests with a particular preference for timbered watercourses.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site. This species occupies forests or woodlands dominated by box and ironbark eucalypts (especially Mugga Ironbark), which the development site is not dominated by.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	N/A	High	V	Not Listed	**Included** A visual survey of potential microbat roosts at the RHI identified five entry / exit points considered likely to provide access to potential microbat roosting habitat within the RHI (ELA 2019).

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Miniopterus australis	Little Bent-winged Bat (Foraging)	N/A	High	V	Not Listed	**Included** A visual survey of potential microbat roosts at the RHI identified five entry / exit points considered likely to provide access to potential microbat roosting habitat within the RHI (ELA 2019).
Miniopterus orianae oceanensis	Large Bent-winged Bat (Foraging)	N/A	High	V	Not Listed	**Included** A visual survey of potential microbat roosts at the RHI identified five entry / exit points considered likely to provide access to potential microbat roosting habitat within the RHI. Ultrasonic survey identified this species as definitely present within the development site (ELA 2019).
Neophema pulchella	Turquoise Parrot	N/A	High	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site.
Ninox connivens	Barking Owl (Foraging)	N/A	High	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site.
Ninox strenua	Powerful Owl (Foraging)	N/A	High	V	Not Listed	**Included** Marginal foraging habitat was identified in this assessment. A breeding pair is known to occupy Centennial Park, which is located less than 1 km away from the development site.
Pandion cristatus	Eastern Osprey (Foraging)	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site. This species is a specialist feeder requiring large open waterbodies which are absent from the development site.
Petroica boodang	Scarlet Robin	N/A	Moderate	V	Not Listed	Excluded Habitat features associated with this species includes an abundance of logs and fallen timber, these features were not present in the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Phascolarctos cinereus	Koala (Foraging)	N/A	High	V	V	Excluded *Corymbia maculata* (Spotted Gum) identified as Koala feed tree, were identified within the development site. However, there is no connectivity for this species with other vegetation patches.
Pteropus poliocephalus	Grey-headed Flying-fox (Foraging)	N/A	High	V	V	**Included** Seasonal foraging habitat was identified in this assessment. A Nationally Important Flying-fox Camp is located in Lachlan Swamp, Centennial Park 1.3 km away.
Tyto novaehollandiae	Masked Owl (Foraging)	N/A	High	V	Not Listed	Excluded Habitat features associated with this species are not present in the development site.
Varanus rosenbergi	Rosenberg's Goanna	N/A	High	V	Not Listed	Excluded Habitat features for this species are not present in the development site. Critical habitat components such as subterranean termite mounds are not present in the development site. This species does not utilise arboreal termite mounds.

CE = Critically Endangered; E = Endangered; E2 = Endangered Population; V = Vulnerable

1.6 Species credit species

Species credit species predicted to occur at the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 14.

Species credit species which have been excluded from the assessment and relevant justification is also included in Table 14.

Table 14: Justification for exclusion of species credit species

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Ancistrachne maidenii	Ancistrachne maidenii	N/A	High	V	Not Listed	Excluded The presence of this species was not identified. It was determined that the habitat features associated with this

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
						species are not present within the development site.
Anthochaera phrygia	Regent Honeyeater (Breeding)	Other As per mapped areas	High	CE	CE	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site is not within an important breeding area for the species as identified in the National Recovery Plan for the Regent Honeyeater 2016.
Caladenia tessellata	Thick Lip Spider Orchid	N/A	Moderate	E	V	Excluded Habitat for this species was not considered suitable in the development site. The site is substantially degraded, and this species occurs in grassy sclerophyll woodlands which were not recorded within the development site.
Callistemon linearifolius	Netted Bottle Brush	N/A	Moderate	V	Not Listed	Excluded The presence of this species was not identified (conspicuous species). The development site does not form part of the 5-6 populations remaining in the Sydney area.
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	Hollow bearing trees Eucalypt tree species with hollows greater than 9 cm diameter	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as Eucalypt trees with hollows >9cm in diameter and shrubs that are suitable for the species to utilise the site.
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	Hollow bearing trees Living or dead tree with hollows greater than 15 cm diameter and greater than 5 m	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain larger patches of intact vegetation or trees with large hollows that are suitable for the species to utilise the site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		above ground				
Cercartetus nanus	Eastern Pygmy-possum		High	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. There is no nesting habitat present or preferred foraging habitat such as *Banksia* sp. present.
Chalinolobus dwyeri	Large-eared Pied Bat	Cliffs Within 2 km of rocky areas containing caves, overhangs, escarpment, outcrops, or crevices, or within 2 km of old mines or tunnels	Very High	V	V	Excluded The development site does not contain cliffs and is not within 2 km of rocky areas, old mines or tunnels.
Darwinia peduncularis	Darwinia peduncularis	Rocky areas Or within 50 m of rocky areas	High	V	Not Listed	Excluded Habitat features associated with this species (rocky areas) are not present in the development site or within 40 m of the development site.
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	Other Living or dead mature trees within suitable vegetation within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain larger patches of intact vegetation or trees with large hollows that are suitable for the species to utilise the site.
Hibbertia puberula	Hibbertia puberula	N/A	High	E	Not Listed	Excluded Habitat features associated with this species (sandy soils) are not present in the development site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Hibbertia spanantha	Julian's Hibbertia	N/A	High	CE	CE	Excluded The presence of this species was not identified, and it was determined that the habitat features associated with this species, such as forest or light clay soils, are not present within the development site.
Hieraaetus morphnoides	Little Eagle (Breeding)	Other Nest trees – live – (occasionally dead) large old trees within vegetation	Moderate	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat.
Lathamus discolor	Swift Parrot (Breeding)	Other As per mapped areas	Moderate	E	CE	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The Swift Parrot is known to breed in Tasmania.
Lophoictinia isura	Square-tailed Kite (Breeding)	Other Nest trees	Moderate	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat that is suitable for the species to utilise the site. No nests were observed during field surveys.
Miniopterus australis	Little Bent-winged Bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabita	Very High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as caves that are suitable for the species to utilise the site.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		t code 'IC – in cave' Observation type code 'E nest-roost' With numbers of individuals > 500 Or from the scientific literature				
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	Caves 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	Very High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as caves, tunnels, mines or culverts.
Mixophyes iteratus	Giant Barred Frog	Other Land within 40 m of semi-permanent and permanent drainages	Moderate	E	E	Excluded This species requires specific habitat resources which are not represented within the development site.
Myotis macropus	Southern Myotis	Hollow bearing	High	V	Not Listed	Excluded

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		trees Within 200 m of riparian zone, other Bridges, caves or artificial structures within 200 m of riparian zone, waterbodies This includes rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200 m of the site				This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as suitable hollow bearing trees within 200m of water.
Ninox connivens	Barking Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter and greater than 4 m above the ground	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain breeding habitat such as hollow bearing trees.
Ninox strenua	Powerful Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows greater than	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat such as hollow bearing trees.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
		20 cm diameter				
Pandion cristatus	Eastern Osprey (Breeding)	Other Presence of stick-nests in living and dead trees (> 15 m) or artificial structures within 100 m of a floodplain for nesting	Moderate	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain suitable breeding habitat such as large waterbodies or large nests.
Petaurus norfolcensis	Squirrel Glider	N/A	High	V	Not Listed	Excluded Habitat present is substantially degraded such that this species is unlikely to utilise the development site. Habitat in the development site is isolated and disturbed with a higher likelihood of this species more suitable habitat within the locality. Additionally, this species has a strong preference for old growth forests which does not include the development site.
Petaurus norfolcensis - endangered population	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	Barrenjoey Peninsula	High	E2	Not Listed	Excluded The proposed development is located 36 km south of the Barrenjoey Peninsula.
Phascolarctos cinereus	Koala (Breeding)	Other Areas identified via survey as important habitat	High	V	V	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. Habitat present is considered unsuitable and substantially degraded such that this species is highly unlikely to utilise the site for breeding.
Phascolarctos cinereus - endangered population	Koala in the Pittwater Local Government Area	Pittwater LGA	High	E2	Not Listed	Excluded The proposed development is not located within the Pittwater LGA.

Species	Common Name	Habitat constraints/ Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification if species excluded
Pimelea curviflora var. *curviflora*	Pimelea curviflora var. curviflora	N/A	High	V	V	Excluded The presence of this species was not identified (conspicuous species) and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise the development site.
Pseudophryne australis	Red-crowned Toadlet	N/A	Moderate	V	Not Listed	Excluded The development site does not contain dense vegetation or debris beside ephemeral creeks and gutters, a feature of breeding habitat for this species.
Pteropus poliocephalus	Grey-headed Flying-fox (Breeding)	Other Breeding camps	High	V	V	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain any breeding sites that are suitable for the species to utilise.
Tyto novaehollandiae	Masked Owl (Breeding)	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter	High	V	Not Listed	Excluded This is a dual credit species, and only a species credit species when specific habitat constraints are present for breeding. The development site does not contain hollow bearing trees.

CE = Critically Endangered; E = Endangered; E2 = Endangered Population; V = Vulnerable

1.6.1 Targeted surveys

No targeted surveys were conducted for species credit species and no species polygons were required. However, due to the presence of a disused historic building with a large amphitheatre roof space, targeted surveys were conducted for microbat species and assessed as part of prescribed biodiversity impacts.

Some microbat species are dual credit species with only breeding habitat considered for species credits. None of the candidate dual credit species are known to breed in human-made structures such as roof cavities. However, under Section 9.2.1 of the BAM, the assessor must take into consideration Prescribed Biodiversity Impacts including any human-made structures, which may be roosting habitat of the following threatened microbat species:

- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)

- *Miniopterus australis* (Little Bentwing-bat)
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat).

The methodology and results for the microbat surveys are detailed in the Prescribed Biodiversity Impact Assessment Section 2.1.2.

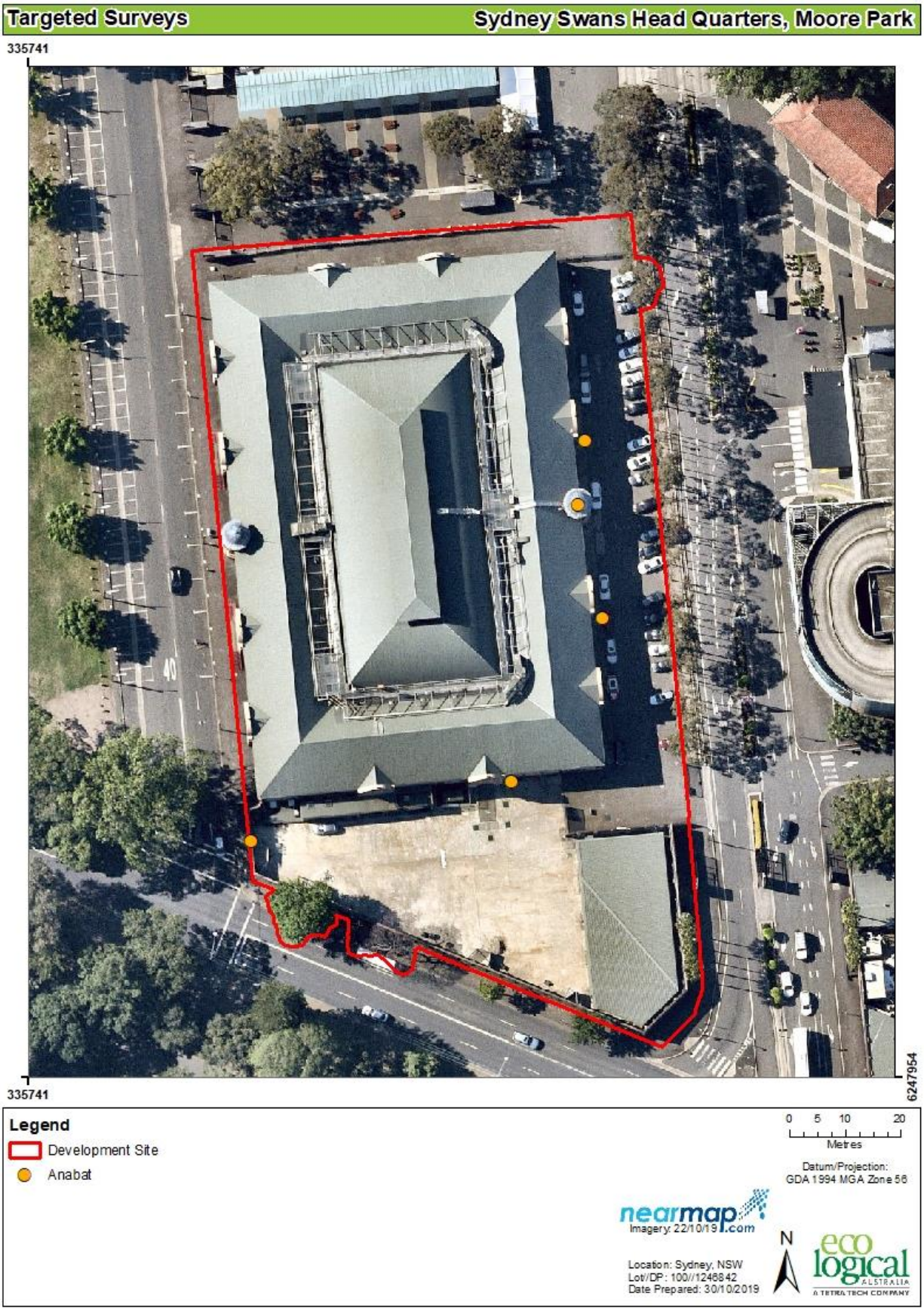

Figure 6: Microbat anabat survey locations

2. Stage 2: Impact assessment (biodiversity values)

2.1 Avoiding impacts

2.1.1 Locating and designing a project to avoid and minimise impacts on vegetation and habitat

The project will result in the removal of a small patch of planted canopy species from within the development site. The site is located in an urban area which avoids and minimises impacts to better quality vegetation and more important habitat in the locality, as outlined in Table 15. This development has also been designed in a way to avoid and minimise impacts. These matters have also been addressed in Table 15. As the development is located within an urbanised environment with low biodiversity values the locating and designing of a project assessment have been amalgamated.

Table 15: Locating and designing a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed	Justification
Locating and designing the project in areas where there are no biodiversity values	Biodiversity values within the proposed development site will be partially protected.	The development site does not contain significant biodiversity values such as TECs. However, the development site does contain a small area of planted native vegetation, a hollow bearing tree, and multiply entry / exit points for microbats into the RHI. Some planted native vegetation and the microbat access points will be removed as part of the project design. Some native and exotic planted canopy trees will be retained.
Locating and designing the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The project has been designed and located within areas of disturbed planted vegetation and cleared or built land.	The project has been generally located to utilise existing disturbed or previously developed areas. The native vegetation within the development site has been planted. There are no indigenous threatened flora species recorded within the development site. There is no important habitat for threatened fauna species within the development site. Removal of some supplementary habitat will occur under the design. However, effort has been made to retain as many canopy species located along the eastern and southern boundary and only limited vegetation will be removed. Of the approximately 50+ *Corymbia maculata* along the eastern boundary, only four are proposed to be removed and the remaining 46+ will be retained. Additional mitigation measures including pruning, rather than removing trees, have been adopted by the current design. Additionally, the construction footprint has been designed to retain the raised garden bed which contains the planted patch of *Livistona australis*.

Approach	How addressed	Justification
Locating and designing the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species	The project has been designed and located within areas of disturbed planted vegetation and cleared or built land.	The development site does not contain vegetation that comprises important habitat for threatened species or vegetation in high threat categories. Existing microbat access points to the RHI will be removed as part of the project design. However, mitigation measures have been implemented to reduce impacts to microbats and their habitat resources.
Locating and designing the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The project is located in a highly fragmented landscape, some connectivity for highly mobile species will be retained in the landscape under the project design.	A number of native trees will be retained to provide connectivity for highly mobile species. The project design includes planting trees throughout the development site, thus potentially contributing to connectivity for highly mobile species.

2.1.2 Prescribed biodiversity impacts

The list of potential prescribed impacts as per the BAM is provided below:

- Occurrence of karst, caves, crevices and cliffs – none occur within the development site
- Occurrence of rock – no rock outcrops or scattered rocks occur within the development site
- Occurrence of human made structures and non-native vegetation – **Yes, see section below**
- Hydrological processes that sustain and interact with the rivers, streams and wetlands – none occur within the development site
- Proposed development for a wind farm and use by species as a flyway or mitigation route – the project does not involve a wind farm development.

The development site contains human made structures and non-native vegetation. Additional information regarding consideration of human made structures is provided below. Non-native vegetation will be trimmed as part of the works. The development site has the prescribed biodiversity impacts as outlined in Table 19.

A literature review was conducted to identify if buildings or structures could potentially be utilised as a roosting resource by microbats, including BioNet records within the development site and surrounding landscape. Visual surveys were conducted to visually determine if the buildings within the development site contain potential openings, possibly utilised by microbats.

Five anabat ultrasonic devices were placed around the RHI including one device located within the eastern tower and one device located inside the RHI main hall area. The location of anabats are shown on Figure 6. Surveys were conducted to identify potential microbat species utilising the building for roosting habitat. Dates of the survey and weather conditions are outlined in Table 16 and Table 17. The full report is provided in Appendix D:

Anabat devices were positioned at a 45-degree angle. Four anabats were directed towards the entrance of potential holes in the RHI. One Anabat was located within the tower of the RHI. Anabats were left for five consecutive nights. Anabat detection begin 30 minutes before sunset and continued until 3

hours after sunrise on each night. The recordings from the anabat device were analysed by ELA ecologist Alicia Scanlon.

One threatened microbat species (*Miniopterus orianae oceanensis* – Large Bent-winged Bat) and up to three non-threatened microbat species were recorded on the anabats (see Table 18). The Large Bent-winged Bat was recorded soon after dawn indicating that this species may roost close to or within the RHI (Appendix C:). This species is known to utilise caves as primary roosting habitat but will also utilise derelict mines, storm-water tunnels, buildings and other human made structures (i.e. bridges) (OEH 2019). Breeding habitat is restricted to known maternity caves with specific humidity and temperature. The development site does not contain breeding habitat for this species.

Due to the anabat results it was assumed that this species may utilise the RHI as roosting habitat. This species is known to form large colonies in maternity caves (OEH 2019). The development site does not provide suitable breeding habitat for Large Bent-winged Bat.

Table 16: Survey dates

Date	Surveyors	Target species
25 September 2019	Anabat set by Kirsten Velthuis	Microbat species
26 September 2019	Anabat remains in-situ	Microbat species
27 September 2019	Anabat remains in-situ	Microbat species
28 September 2019	Anabat remains in-situ	Microbat species
29 September 2019	Anabat collected by Kirsten Velthuis	Microbat species

Table 17: Weather conditions

Date	Rainfall (mm)	Minimum temperature 0C	Maximum temperature 0C
25 September 2019	0 mm	9.7	21.9
26 September 2019	0 mm	12.6	20.8
27 September 2019	0 mm	13.9	25.3
28 September 2019	0 mm	15.3	21.7
29 September 2019	0 mm	11.3	21.21

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Table 18: Microbat species recorded during anabat surveys

Species	Common Name	Conservation status	Species presence	Geographic limitations
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable under BC Act	Recorded from anabat device	This species breeds in specific maternity caves. Outside breeding season, they may roost in mines, culverts or buildings.
Austronomus australis	White-striped Free-tailed Bat	N/A	Recorded from anabat device	This is a tree dwelling species
Chalinolobus gouldii	Gould's Wattled Bat	N/A	Recorded from anabat device	This species may roost primarily in tree hollows but has been recorded in buildings

Species	Common Name	Conservation status	Species presence	Geographic limitations
Chalinolobus gouldii / *Ozimops ridei*	Gould's Wattled Bat / Ride's Free-tailed Bat	N/A	Recorded from anabat device	These species may roost primarily in tree hollows but has been recorded in buildings

Table 19: Prescribed biodiversity impacts

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
Impacts of development on the habitat of threatened species or ecological communities associated with: • **karst, caves, crevices, cliffs and other geological features of significance, or** • **rocks, or** • **human made structures, or** • **non-native vegetation**	The development site contains a historic building and a small amount of exotic vegetation. Targeted surveys were conducted to determine if microbat species are likely to utilise the building for roosting habitat. One threatened microbat species and up to three non-threatened species were recorded from anabats (including Large Bent-winged Bat). The project will result in the reduction or modification of roosting habitat for microbat species. The proposed works will also result in a reduction of 20% foliage canopy of one *Jacaranda mimosifolia* and 13% of one *Liquidambar styraciflua* located along Lang Road. The vegetation does not represent suitable foraging resources for threatened species such as Grey-headed Flying Fox. However, the *Jacaranda mimosifolia* contains a tree hollow which may provide habitat for prey items for *Ninox strenua* (Powerful Owl).	Potential non-breeding roosting habitat for threatened microbat species within the RHI. Potential foraging habitat for microbat bat species above non-native vegetation canopy or human made areas (i.e. concrete areas and around buildings). The trimming of the *Jacaranda mimosifolia* will not result in the loss of HBT or reduction in foraging resources for *Ninox strenua* (Powerful Owl) which are known to occur within Centennial Park.
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	The proposed development will require the modification of internal structure of a human made structure and trimming of two exotic street trees.	The development site is located within a matrix of large planted *Ficus* species which provide connectivity for highly mobile species between an urbanised landscape. The proposed works will result in the very minor reduction of the foliage canopy cover of two street trees and alteration of the internal structure of an existing building. These works will not result in the loss of connectivity between habitats within the landscape.

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
Impacts of development on movement of threatened species that maintains their lifecycle	The proposed development will result in modification of the internal structure of one human made structure. This may result in a loss of non-breeding habitat for microbat species and modification of foraging habitat due to new development.	The Large Bent-winged Bat will traverse large distances (300 km) from breeding caves to non-breeding habitat. The works are unlikely to result in impacts to the lifecycle of this species. Impacts to Grey-headed Flying Fox and Powerful Owl are likely to be marginal and not result in long term impacts to the local viable population.

2.1.2.1 Locating and designing a project to avoid and minimise prescribed biodiversity impacts

The development has been located and designed in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 20.

Table 20: Locating and designing a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
Locating and designing the development to avoid direct impacts on the habitat features	Habitat features including roosting and foraging habitat for threatened microbat species supplementary foraging resources for *Ninox strenua* will be impacted or modified for the proposed project.	The development has avoided impacts to the majority of the planted canopy species located along the eastern perimeter of the development site. Vegetation will be trimmed and not removed along the southern boundary. The facades of the human-made structure will remain largely intact with modification occurring within the internal structure and within the courtyards. The modification may result in indirect impact upon microbat species including production of noise or vibration.
Locating and designing the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	The project has reduced the amount of vegetation to be removed to reduce severing connectivity of vegetation within the landscape.	Although the development will result in the removal of some native vegetation and trimming of some exotic vegetation within the development site, the connectivity will be retained through the adjacent vegetation along the eastern perimeter.
Optimising project layout to minimise interactions with threatened and protected species and ecological communities, e.g. designing turbine layout to allow buffers around features that attract and support aerial species, such as forest edges, riparian corridors and wetlands, ridgetops and gullies	The planning proposal has been located in an area which avoids impacts to areas of high biodiversity value in the locality.	The development site does not contain areas of high biodiversity values. The project layout has utilised the existing building footprint and open paved areas where possible for the development footprint. Some removal of native and exotic vegetation is required; however, this is limited to low biodiversity value vegetation.

2.2 Assessment of Impacts

2.2.1 Direct impacts

The direct impacts of the development on:

- native vegetation are outlined in Table 21
- threatened species and threatened species habitat is outlined in outlined in Section 2.2.4
- prescribed biodiversity impacts is outlined in Section 2.2.4.

Direct impacts including the final project footprint (construction and operation) are shown on Figure 7.

Table 21: Direct impacts to native vegetation

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Sydney Coastal Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrubby sub-formation)	0.005

2.2.2 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 22.

Table 22: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Low	1.07	3.8	0	-3.8

2.2.3 Indirect impacts

The indirect impacts of the development are outlined in Table 23.

Table 23: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Runoff during construction works	Confined to development site with	During heavy rainfall or storm events	During rainfall events	Short-term impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
			sediment fencing			
Noise, dust or light spill	Construction	Noise and dust created from machinery (no night works proposed therefore no light spill is anticipated)	Noise and dust likely to carry beyond development site boundary	Daily, during construction works	Sporadic throughout construction period	Short-term impacts
Inadvertent impacts on adjacent habitat or vegetation	Construction	Damage to adjacent habitat or vegetation	Adjacent vegetation	Daily, during construction works	Throughout construction period	Short-term impacts
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Spread of weed seed or pathogens	Potential for spread into adjacent habitat	Daily, during construction works	Sporadic throughout construction period	Potentially long-term impacts
Vehicle strike	Construction / operation	Potential for native fauna to be struck by working machinery and moving vehicles	Within access road and development site	Daily, during both construction and operational phases.	Throughout life of project	Short-term impacts
Rubbish dumping	Construction / operation	Illegal dumping by local residents/ construction crews	Potential for rubbish to spread via wind into adjacent site	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
Increase in pest animal populations	Construction / operation	Potential to increase if introduced	In vegetation in the southern portion of the development site	Potential to occur at any time throughout construction or operational phases	Throughout life of project	Short-term impacts
Increased risk of fire	Construction / operation	Potential due to presence of vegetation retained in the south of the development site	In vegetation in the southern portion of the development site	Potential to occur at any time, although, more likely during dry, windy conditions	Throughout life of project	Short-term and long-term impacts

2.2.4 Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 24.

Table 24: Direct impacts on prescribed biodiversity impacts

Prescribed biodiversity impact	Nature	Extent	Frequency	Duration	Timing
Impacts of development on the habitat of threatened species or ecological communities associated with: • karst, caves, crevices, cliffs and other geological features of significance, or • rocks, or • human made structures, or • non-native vegetation	Construction / operation / on-going	Confined to the development site. Modification of the internal structure of the RHI	Daily, during construction works Ongoing additional noise, vibration and light at night	Throughout construction period and on-going	Long-term impacts
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	Construction / operation / on-going	Confined to the development site Production of noise, vibration and light	Daily, during construction works Ongoing additional noise and vibration during construction and additional light at night as part of the new development	Throughout construction period and on-going	Long-term impacts
Impacts of development on movement of threatened species that maintains their lifecycle	Construction / operation / on-going	Confined to the development site	Daily, during construction works Ongoing additional noise and vibration during construction and additional light at night as part of the new development	Throughout construction period and on-going	Long-term impacts

2.2.5 Mitigating and managing impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 25.

Table 25: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	High	Minor	Additional microbat surveys are required to detect the exact location of microbat roosts sites and identify entry/ exit points into the roof cavity. Survey methods may include visual observation, thermal imagery or additional anabat surveys. The results of the microbat surveys will determine what additional mitigation measures may be required. This may include closing up entry/exit points at night after microbats have exited. Pre-clearance works may best occur in winter to reduce impacts to breeding cycles. Alternatives to retain microbat roosting habitat will also be explored during additional surveys.	Resident fauna relocated in a sensitive manner	Prior to and during clearing works and major roof modification	Project Manager / Ecologist
Timing works to avoid critical life cycle events such as breeding or nursing	High	Minor	It is recommended that noise producing works commence in spring to avoid impacts to breeding cycle of Large Bent-wing Bat microbats.	Impacts to fauna during nesting / nursing avoided	During clearing works and during peak noise or vibration production	Project Manager
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	High	Minor	Pre-clearance surveys are required to identify the exact location of microbat access into the RHI. Ecologist or wildlife handler to supervise the pruning of the HBT (*Jacaranda mimosifolia*) to avoid impacts to potential roosting arboreal species.	Any fauna utilising habitat within the development site will be identified and managed to ensure clearing works	During clearing works and during peak noise or vibration production	Project Manager / Ecologist

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
				minimise the likelihood of injuring resident fauna		
Installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move from the impacted site, e.g. nest boxes	High	Minor	Bat nest boxes should be installed around the development site to provide microbat an alternative roost location prior to construction works within the development site.	Replacement of habitat features removed	Prior to and during clearing works	Project Manager / Ecologist
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chain-saw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	Minor	Negligible	Vegetation identified for retention along Erol Flynn Blvd and Lang Road should be delineated as a 'No Go' zone with high visibility bunting. No temporary facilities i.e. site offices/ toilets / soil stockpiles to occur within tree protection zone	Vegetation to be retained outside the development site boundary will not be disturbed / impacted	Demarcation of vegetation to be set up prior to any works occurring on site and to remain throughout the duration of construction works	Project Manager
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Moderate	Minor	Appropriate controls are to be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge into culverts and stormwater. Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior the commencement of the construction work and must be regularly inspected and maintained throughout the development of the site.	Erosion and sedimentation will be controlled	For the duration of construction works	Project Manager
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	High	Minor	Noise barriers may be required to reduce impacts to adjacent nesting fauna species.	Limit night works or provide noise barriers to	During clearing works and on-going	Project Manager / Ecologist

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
				protect behaviour of nocturnal or diurnal fauna species		
Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	High	Minor	Light pollution can be reduced by limiting the duration of spotlight illumination, reducing the brightness of lights where possible, installing shield fixtures to reduce light scattering and using narrow-spectrum light sources to reduce the wavelengths likely to interfere with animal behaviour. High priority areas where the implementation of measure to reduce light pollution should be considered adjacent to possible microbat entry / exit points into the roof cavity and near the HBT. Wildlife friendly lighting (i.e. filtered yellow-green and amber LEDs wavelength of 590 nm with light shield protection controlling light spill) should be considered in the retained bushland areas.	Lighting impacts on nocturnal and diurnal fauna are minimised	During clearing works and on-going	Project Manager / Landscape Designer / Ecologist
Adaptive dust monitoring programs to control air quality	Moderate	Minor	Appropriate dust monitoring should be conducted to prevent poor air quality within the RHI building (including roof cavities) and adjacent areas	Impacts to fauna habitat due to poor air quality	During clearing works and peak noise or vibration production	Project Manager
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Moderate	Minor	Timing of construction works should be planned to occur outside of the winter/spring breeding season.	Impacts to fauna during nesting / nursing avoided	During clearing works and peak noise or vibration production	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Minor	Negligible	Phytophthora control measures must be undertaken from the commencement of the project to minimise the risk of spread and to the site. The following guidelines should be followed: https://www.rbgsyd.nsw.gov.au/science/plants/pests-diseases/phytophthora-dieback/disinfection-procedures http://www.environment.gov.au/biodiversity/invasive-species/publications/management-phytophthora-cinnamomi-biodiversity-conservation Vehicles, machinery and building refuse should remain only within the development site. Hygiene protocols are required to prevent weed from entering the development site.	Spread of weeds and pathogens prevented	Post-construction	Project Manager
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	Construction staff to be briefed prior to work commencing to be made aware of any sensitive biodiversity values present and environmental procedures such as: • Site environmental procedures (vegetation clearance limits, exclusion area of microbats, protection of HBT) • What to do in case of environmental emergency (chemical spills, fire, injured fauna)	All staff entering the development site are fully aware of all the ecological values present within the development site and documentation of what to do in case of any environmental emergencies.	To occur for all staff entering/ working at the development site. Site briefing should be updated based on phase of the work and when environmental issues become apparent.	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development site	Minor	Negligible	Landscaping in the development site is to use appropriate local native species. An additional 26 new native trees will be planted within the development site as per Section 4 of the Revised Public Domain and Landscaping Plans.	Areas within the development site will be landscaped using appropriate species	Following major construction works	Project Manager

2.2.6 Serious and Irreversible Impacts (SAII)

The development does not have any Serious and Irreversible Impacts (SAII).

2.3 Risk assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures (Table 25) have been applied. Likelihood criteria, consequence criteria and the risk matrix are provided in Table 26, Table 27 and Table 28 respectively.

Table 26: Likelihood criteria

Likelihood criteria	Description
Almost certain (Common)	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely (Has occurred in recent history)	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible (Could happen, has occurred in the past, but not common)	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely (Not likely or uncommon)	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Remote (Rare or practically impossible)	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

Table 27: Consequence criteria

Consequence category	Description
Critical (Severe, widespread long-term effect)	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major (Wider spread, moderate to long term effect)	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
Moderate (Localised, short-term to moderate effect)	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor (Localised short-term effect)	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.
Negligible	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Consequence category	Description
(Minimal impact or no lasting effect)	

Table 28: Risk matrix

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Remote
Critical	Very High	Very High	High	High	Medium
Major	Very High	High	High	Medium	Medium
Moderate	High	Medium	Medium	Medium	Low
Minor	Medium	Medium	Low	Low	Very Low
Negligible	Medium	Low	Low	Very Low	Very Low

Table 29: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
Vegetation clearing	Construction / operation	Low	Very Low
Sedimentation and contaminated and/or nutrient rich run-off	Construction	Medium	Low
Noise, dust or light spill	Construction	High	Low
Inadvertent impacts on adjacent habitat or vegetation	Construction	High	Low
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Low	Very Low
Vehicle strike	Construction / operation	Low	Very Low
Rubbish dumping	Construction / operation	Low	Very Low
Increase in pest animal populations	Construction / operation	Low	Very Low
Increased risk of fire	Construction / operation	Low	Very Low

2.4 Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered and addressed in Section 2.5 and no further impacts are required to be addressed. For major projects: details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain.

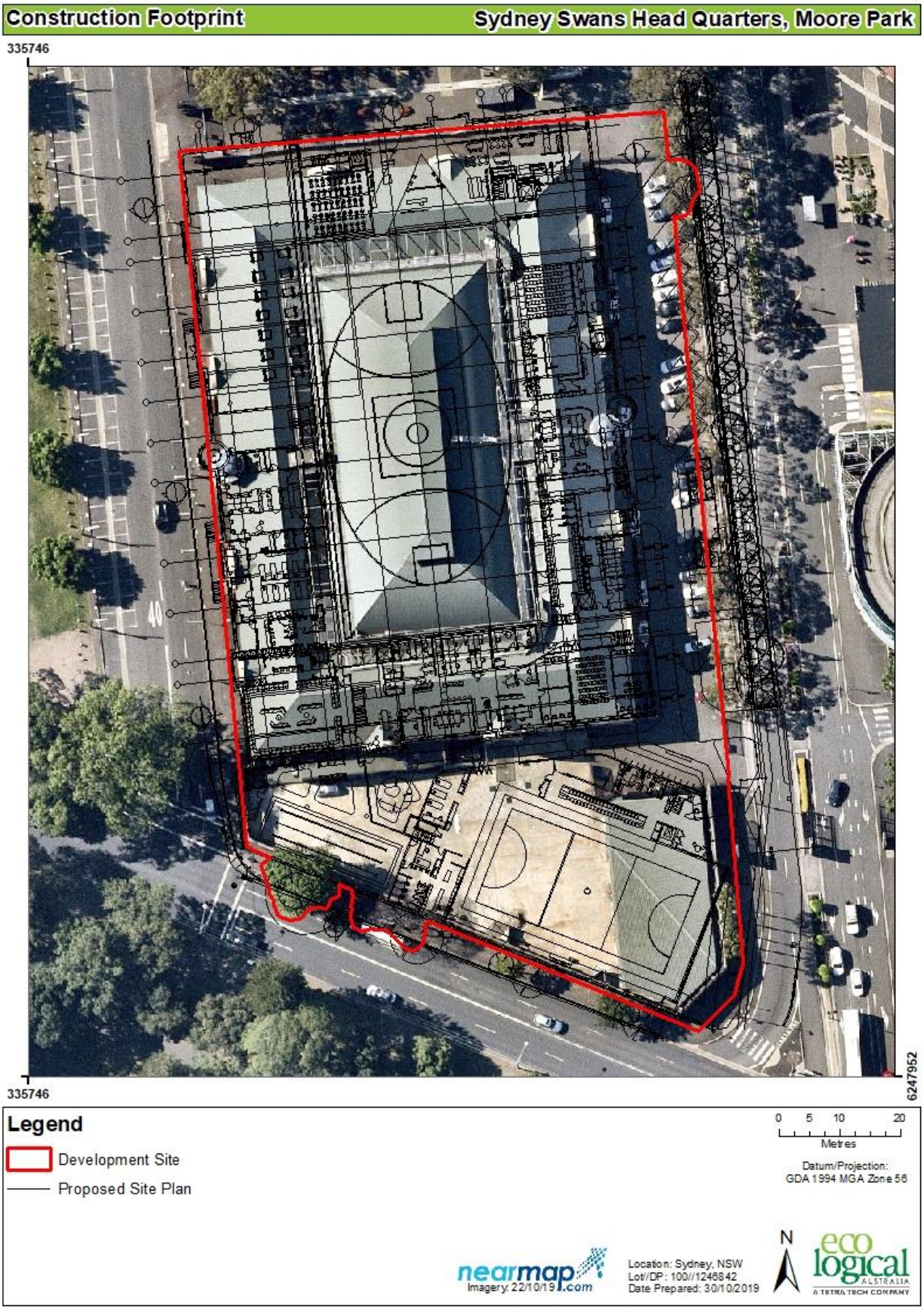

Figure 7: Final project footprint including construction and operation

2.5 Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

2.5.1 Serious and Irreversible Impacts (SAII)

The development does not have any Serious and Irreversible Impacts (SAII).

2.5.2 Impacts requiring offsets

The development will not result in impacts requiring offsets. The vegetation integrity score for PCT 1776 was 3.8. This is lower than the threshold required for offsetting in accordance with Section 3.1.1.3 of the BAM.

2.5.3 Impacts not requiring offsets

The development will result in the direct removal of 0.005 ha of PCT 1776 vegetation. The vegetation integrity score for PCT was 3.8, which does not require offsetting are outlined in Table 30 and shown on Figure 8. The RHI (0.61 ha) provides roosting habitat for one threatened species, Large Bent-winged Bat. However, under the BAMC, only breeding habitat is considered for species credit species. This species has been assessed for prescribed impacts however, no offset credits are required.

Table 30: Impacts to vegetation not requiring offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)	Rationale
1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Sydney Coastal Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrubby sub-formation)	0.005	The vegetation integrity score of 3.8 was below the vegetation integrity score of 20 where the PCT is not representative of a TEC or associated with threatened species habitat, therefore, no offsets are required.

2.5.4 Areas not requiring assessment

Areas not requiring assessment include existing concrete carpark and exotic vegetation. The development site contains cleared areas and exotic vegetation (0.007 ha) and are shown in Figure 9. These areas were not consistent with any listed PCT, nor did they contain any threatened species habitat for threatened species. Areas not requiring assessment are shown on Figure 9.

2.5.5 Credit summary

The number of ecosystem credits required for the development are outlined in Table 31. The number of species credits required for the development are outlined in Table 31. A biodiversity credit report is included in Appendix D:.

Table 31: Ecosystem credits required

PCT ID	PCT Name	Vegetation Formation	Direct impact (ha)	Credits required
1776	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Dry Sclerophyll Forest (Shrubby sub-formation)	0.005	0

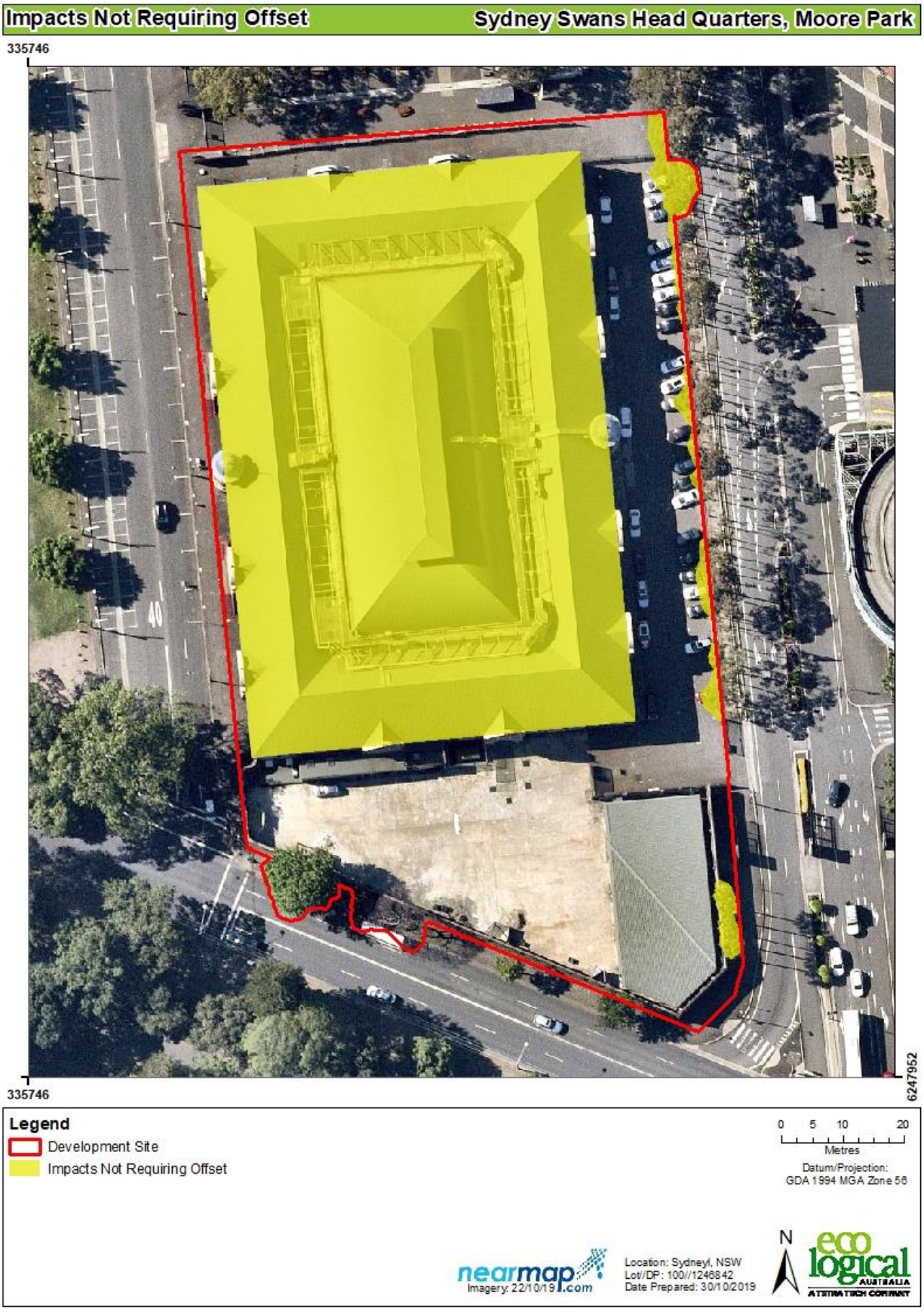

Figure 8: Impacts not requiring offset

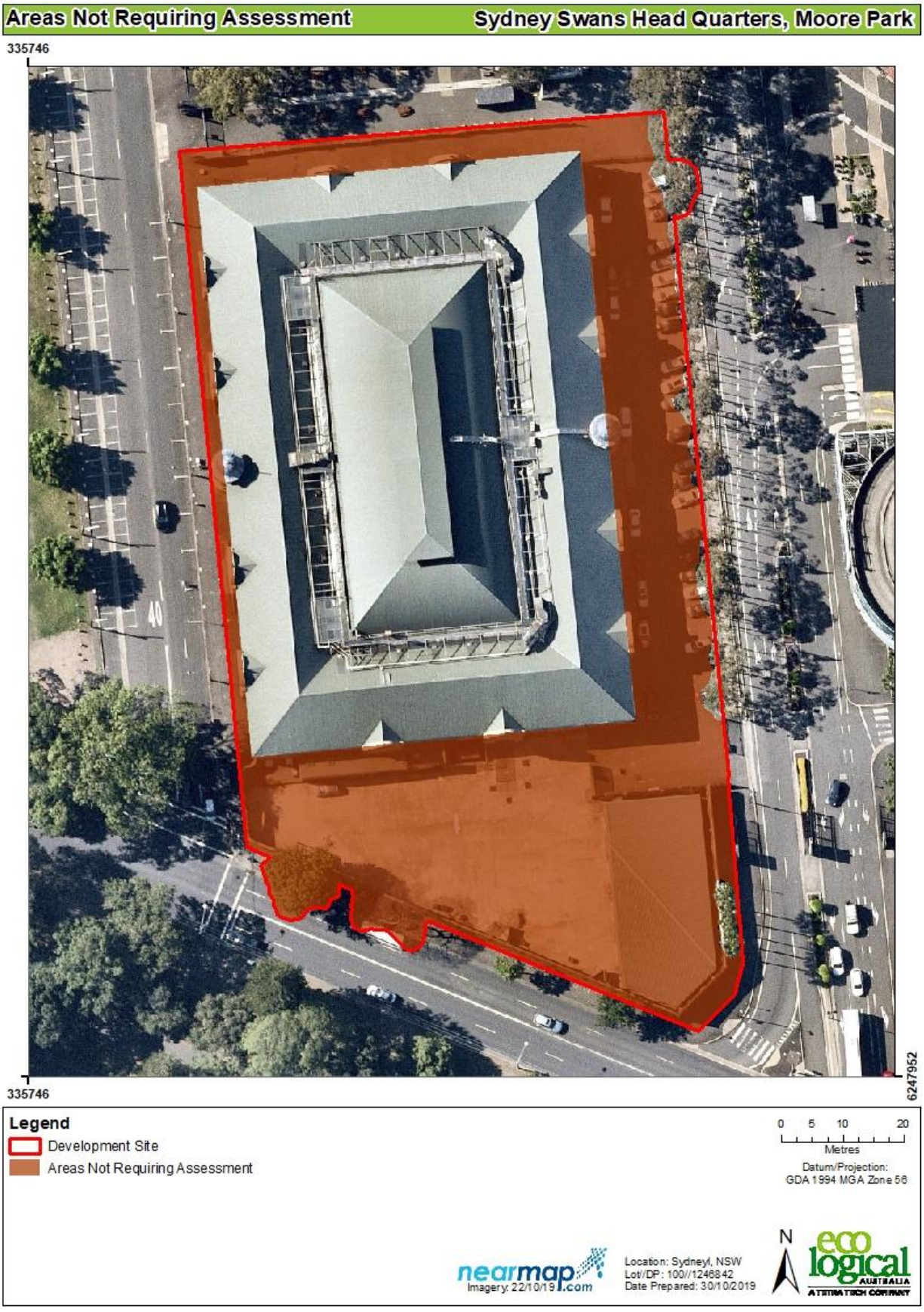

Figure 9: Areas not requiring assessment

2.6 Consistency with legislation and policy

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential "Matters of National Environmental Significance" (MNES) in accordance with the EPBC Act have been addressed in Section 2.6.1. Matters relating to City of Sydney Council planning instruments have been addressed in Section 2.6.4.

2.6.1 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where "Matters of National Environmental Significance" (MNES) may be affected. Under the Act, any action which "has, will have, or is likely to have a significant impact on a matter of MNES" is defined as a "controlled action", and requires approval from the Commonwealth Department of the Environment and Energy (DoEE), which is responsible for administering the EPBC Act (DoEE 2014).

The process includes conducting an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be impacted as a result of the proposed action. Significant impact guidelines (DoEE 2014) that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

A habitat assessment and Likelihood of Occurrence was completed and one MNES *Pteropus poliocephalus* (Grey-headed Flying-fox) was assessed under the Act as there are BioNet records for this species within the broader landscape (5 km radius) of the development site.

Pteropus poliocephalus (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as a Vulnerable species under the EPBC Act.

This species utilises a wide variety of habitats (including disturbed areas) for foraging and have been recorded travelling long distances on feeding forays. Fruits and flowering plants of a wide variety of species are the main food source. The species roosts in large 'camps' of up to 200 000 individuals. Camps are usually formed close to water and along gullies, however, the species has been known to form camps in urban areas (DECCW 2009).

The Centennial Park Grey-headed Flying-fox (GHFF) camp is known from the locality to be within 1.3 km of the development site (OEH 2019c). The vegetation within the development site provides potential foraging habitat. It is considered likely that this species would use the site on occasion for foraging purposes. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have been recorded within the development site (DoEE 2019).

Table 32: EPBC Act of Significance for *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Assessment
Criterion a: lead to a long-term decrease in the size of an important population of a species	The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • Key source populations either for breeding or dispersal • Populations that are necessary for maintaining genetic diversity, and/or • Populations that are near the limit of the species range

Criterion	Assessment
	No important populations have been recorded within the development site. The site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species range. According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DoEE 2019). The nearest active GHFF camp occurs approximately 1.3 km to the east of the development site, within Centennial Park (DoEE 2019).
Criterion b: reduce the area of occupancy of an important population	No important populations have been recorded within the development site. Therefore, the proposed works would not reduce the area of occupancy of an important population.
Criterion c: fragment an existing important population into two or more populations	No important populations have been recorded within the development site. The potential foraging habitat to be removed is marginal relative to adjacent potential habitat within the region. Whilst the potential foraging habitat may contribute as a 'stepping stone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works. Furthermore, this species has been recorded in urban environments and is likely to continue to forage adjacent to the development site and across the broader locality.
Criterion d: adversely affect habitat critical to the survival of a species	Approximately four of the 50 potential foraging canopy trees within the development site will be removed by the proposal. These individual trees represent a negligible amount of potential foraging resources in the locality. Additionally, planting of native canopy species has been recommended as part of the landscaping to compensate for the loss of four canopy species. Potential foraging habitat in the form of street trees will persist in close proximity to the development site. Given that this species is highly mobile (traveling up to 50 km to forage), it is considered unlikely that the works would adversely affect habitat critical to the survival of this species.
e: disrupt the breeding cycle of an important population	According to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DoEE 2019). The nearest active GHFF camp occurs approximately 1.3 km to the east of the development site within Centennial Park (DoEE 2019). Thus, no important population of GHFF occurs within the development site, and the proposed works are unlikely to disrupt the breeding cycle of an important population.
Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The potential foraging habitat to be removed is marginal and of low quality. Given the small amount of potential foraging habitat to be removed, that potential foraging habitat will persist adjacent to the development site and across the locality, and that this species is highly mobile, it is unlikely that the habitat to be removed would cause the species to decline. Furthermore, according to the National Flying-fox Monitoring Program, no GHFF camps currently occur or have ever been recorded within the development site (DoEE 2019). The nearest active GHFF camp occurs approximately 1.3 km to the east of the development site, within Centennial Park (DoEE 2019). Therefore, no known GHFF roosting camps for this species will be impacted by the proposed works.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed works will not result in the establishment of an invasive species that is harmful to GHFF.
Criterion h: Introduce disease that may cause the species to decline	The proposed works will not result in the introduction of a disease that is harmful to the GHFF.

Criterion	Assessment
Criterion i: Interfere substantially with the recovery of the species	Considering the above factors, the proposed works will not interfere substantially with the recovery of the species.
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the GHFF.

2.6.2 Sydney Local Environmental Plan 2012 (LEP)

The development site is mapped under the Moore Park SEPP and therefore, the LEP does not apply.

2.6.3 State Environmental Planning Policy (SEPP) No 47 - Moore Park

The overall aims and objectives of this SEPP relevant to this proposal are as follows:

- *to enable the redevelopment of the Moore Park Showground in a manner that is consistent with its status as an area of importance for State and regional planning in New South Wales, and*
- *to improve and enhance the cultural and recreational facilities of Sydney for the people of New South Wales by furthering the development of Sydney as a world class film, television and video production centre, and*
- *to ensure that a range of impacts is considered by the consent authority in determining development applications, and*
- *to recognise the heritage significance of the Moore Park Showground and protect any archaeological relics.*

The development site is located within area mapped as the following:

- *Part 2 Development on land shown diagonally hatched and*
- *Part 3 Development on land shown vertically hatched*

The development design is considered appropriate according to the aims and objectives of the SEPP 47 Moore Park. The development design requires development consent for the proposed multi-purpose facility.

2.6.4 Sydney Development Control Plan 2012 (DCP)

Clause 3.5 Urban Ecology of the DCP objectives are as follows:

- *Protect existing habitat features within and adjacent to development sites*
- *Improve the diversity and abundance of locally indigenous flora and fauna species across the LGA.*

The provisions of the clause are as follows:

- *Development is to be consistent with the Street Tree Master Plan, Park Tree Management Plans and the Landscape Code.*
- *Existing habitat features including cliff lines, rocky outcrops, waterbodies, trees, shrubs and groundcover vegetation are to be retained.*

- *New habitat features including trees, shrubs and groundcover vegetation, waterbodies, rockeries and green roofs and walls are to be included, wherever possible.*
- *Link and enhance existing and potential biodiversity corridors wherever possible.*
- *Landscaping is to comprise a mix of locally indigenous tree, shrub and groundcover species as outlined in City's Landscape Code. Where this is not possible it is preferred that plants native to Australia are used.*
- *Shrubs are to be densely planted and trees are to be well-spaced, as outlined in the City's Landscape Code.*

The proposed development aims to conserve the majority of the native planted vegetation along the eastern perimeter of the development site and minimise unnecessary damage or removal of trees. It has been recommended that landscaping will be conducted in accordance with the above clause and include revegetation using locally indigenous native flora species.

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Appendix A: Definitions

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the EES database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

Terminology	Definition
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines
Operational Manual	The Operational Manual published from time to time by EES, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site.
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by EES and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.

Terminology	Definition
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by EES and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B: Vegetation plot data

Table 33: Vegetation integrity data (Composition, Structure and function)

Plot location data							
Plot no.	PCT	Vegetation Zone	Condition	Zone	Eastings	Northings	Bearing
1	1776	1	Planted	56	335902	6248076	154

Composition (number of species)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	1	0	0	0	0	0

Structure (Total cover %)						
Plot no.	Tree	Shrub	Grass	Forb	Fern	Other
1	15	0	0	0	0	0

Function											
Plot no.	Large Trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5-9	Tree Stem 10-1 9	Tree Stem 20-2 9	Tree Stem 30-49	Tree Stem 50-79	Tree Regen	High Threat Weed Cover
1	0	0	0	0	1	1	1	1	0	0	0

Table 34: Change in vegetation integrity scores for each management zone

Veg zone	Management zone	Area ha	Composition	Structure	Function	Vegetation integrity score	Change in score	Total Change in integrity score
1	Planted	0.005	0.5	7.8	13.8	3.7	-3.7	-3.7

Table 35: Species matrix (species recorded by plot)

Stratum	Form	Species name	Exotic (*)	High Threat Weed (*)	Cover (%) Plot 1
U	TG	*Corymbia maculata*			15

Table 36: Species matrix (species recorded during a traverse of the study area)

Family	Species name	Common Name	Native / Exotic
Altingiaceae	*Liquidambar styraciflua*	Liquidambar	E
Arecaceae	*Livistona australis*	Cabbage Fan Palm	N
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda	E
Caprifoliaceae	*Abelia x grandiflora*	Abelia	E
Malvaceae	*Brachychiton populneus*	Kurrajong	N
Myrtaceae	*Corymbia maculata*	Spotted Gum	N
Myrtaceae	*Angophora costata*	Sydney Red Gum	N
Myrtaceae	*Syzygium* sp.		N
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo	N

Appendix C: Microbat analysis report

The Microbat Survey Report – Royal Hall of Industries has been submitted on the 1st November 2019.

Appendix D: Biodiversity credit report

NSW GOVERNMENT

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00018014/BAAS18159/19/00018015	Sydney Swans	30/10/2019
Assessor Name	Report Created	BAM Data version *
	07/11/2019	16
Assessor Number	BAM Case Status	Date Finalised
	Open	To be finalised
Assessment Revision	Assessment Type	
0	Major Projects	

* 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.

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	Potential SAII	Ecosystem credits

BAM Credit Summary Report

Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast								
1	1776_planted_canopy	3.8	0.0	0.25	High Sensitivity to Potential Gain	1.75		0
							Subtotal	**0**
							Total	**0**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

Assessment Id	Proposal Name	Page 2 of 2
00018014/BAAS18159/19/00018015	Sydney Swans	

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