



Streamlined Biodiversity Development Assessment Report

Taronga Wildlife Hospital –Taronga Zoo Sydney

Report prepared by Narla Environmental Pty Ltd

For the Taronga Conservation Society Australia

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NARLA

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Glossary

Acronym/ Term	Definition
Accredited Biodiversity Assessor	Individuals accredited by the Department of Planning, Industry and Environment (DPIE) to apply the Biodiversity Assessment Method.
BAM	The NSW Biodiversity Assessment Method
BAMC	The NSW Biodiversity Assessment Method Calculator
BC Act	New South Wales Biodiversity Conservation Act 2016
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.
Biodiversity Offsets	Management actions that are undertaken to achieve a gain in biodiversity values on areas of land in order to compensate for losses to biodiversity from the impacts of development.
Biodiversity values	The composition, structure and function of ecosystems, including threatened species, populations and ecological communities, and their habitats.
BOS	NSW Biodiversity Offset Scheme
DPE	NSW Department of Planning and Environment (formerly DPIE)
DPIE	NSW Department of Planning, Industry and Environment (now DPE)
Ecosystem credit	The class of biodiversity credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).
EEC	Endangered Ecological Community
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ha	Hectares
HTE	High Threat Exotic
km	Kilometres
LGA	Local Government Area
Locality	A 1500m buffer area surrounding the Subject Land
m	metres
Native Vegetation	Means any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation), (d) plants occurring in a wetland.
NSW	The State of New South Wales
OEH	Office of Environment and Heritage (now DPE)
PCT	NSW Plant Community Type
Proposal	The development, activity or action proposed.
SAII	Serious and Irreversible Impacts
SAII entity	Species and ecological communities that are likely to be the subject of serious and irreversible impacts (SAIIs)
SBDAR	Streamlined Biodiversity Development Assessment Report
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
Species credit	The class of biodiversity credit that relate to 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.
SSDA	State Significant Development Application
Subject Land	The location of the proposed works within the Taronga Zoo Site
Subject Property	Taronga Zoo Sydney; Bradleys Head Rd, Mosman NSW 2088 (Lot 22/DP843294)
Threatened species, populations and ecological communities	Species, populations and ecological communities specified in Schedules 1 and 2 of the BC Act 2016.

Acronym/ Term	Definition
TPZ	Tree Protection Zone: A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development
VIS Plot	Vegetation Integrity Survey Plot

Executive Summary

Narla Environmental Pty Ltd (Narla) was engaged by Taronga Conservation Society Australia ('the proponent') to prepare a Streamlined Biodiversity Development Assessment Report (SBDAR). The SBDAR will accompany an Environmental Impact Statement (EIS) as part of the Secretary's Environmental Assessment Requirements (SEARs) for the proposed Taronga Wildlife Hospital, located within Taronga Zoo at Bradleys Head Rd, Mosman NSW 2088 (Lot 22/DP843294; hereafter referred to as the 'Subject Property').

This SBDAR will assess the biodiversity impacts of the proposed development in accordance with the requirements of the Biodiversity Conservation Act 2016 and Biodiversity Conservation Regulation 2017. The assessment has been completed in accordance with Appendix L of the BAM (DPIE 2020a).

The proposed Wildlife Hospital will replace existing veterinary facilities that have exceeded their lifecycle, and enhance the operations of Taronga's veterinary services as well as contribute to the ongoing education and advocacy for Wildlife Conservation. The proposed development includes the operational and the construction footprint (0.24ha), which is collectively referred to as the 'Subject Land'. The proposed development has been positioned to minimise impacts on native vegetation and habitat as much as possible. The majority of the proposed development is located within historically modified land, comprising of existing buildings and hardstand, amongst areas of exotic and remnant native vegetation.

The proposed development is expected to impact one (1) Plant Community Type (PCT) 1778: Coastal sandstone foreshores forest. The following ecosystem credits are required to be offset in order to mitigate the impacts upon biodiversity as a result of the proposed development:

- two (2) ecosystem credit for PCT 1778.

One (1) threatened species, *Myotis macropus* (Southern Myotis), was assumed present as it has been historically recorded within the broader Taronga Zoo, with the Subject Land containing known habitat (vegetation within 200m from waterbodies) for this species. Therefore, the following species credits are required to be offset in order to mitigate the impacts to this species:

- One (1) species credit for *Myotis macropus* (Southern Myotis).

In order to avoid and minimise potential impacts of the proposal on local biodiversity values, a series of mitigation and management measures have been identified, which are to be implemented as part of any Construction Environmental Management Plan (CEMP) produced for the site. This includes assigning an experienced, suitably qualified and licenced wildlife expert to undertake a pre-clearing survey and to supervise the clearing of all vegetation in relation to the proposed development.

1. Introduction

1.1 Project Background

Taronga is the leading provider of veterinary services to the zoo's resident animals, wildlife rescue and rehabilitation in NSW. With the Zoo caring for over 1500 sick, injured and orphaned native animals each year. During the 2020 bushfires, the Wildlife Hospital played a leading role in both the immediate rescue of wildlife and the rehabilitation of injured animals.

The proposed Taronga Wildlife Hospital (TWH) leverages from this expertise to deliver better outcomes and to train the next generation of wildlife vets and vet nurses. The TWH will support the health and wellbeing of wildlife, and Taronga Zoo's animals, through the provision of upgraded veterinary services and facilities. The proposed development will replace the existing Wildlife Hospital providing a new state of the art treatment and teaching animal hospital. The facility will provide dedicated and purpose-built spaces for the husbandry, treatment, diagnostics and education specifically related to the care of wildlife. The spaces include rehabilitation facilities (including wildlife intensive care and Marine turtle facilities), surgeries, necropsy room/s, pathology labs, medical equipment and supplies storage, medical equipment and quarantine facilities to replace existing facilities on site.

The TWH will include upgraded animal quarantine facilities to assist in the management of Taronga Zoo's animals and to support the conservation partnerships and animal management with other zoos. The new TWH will also include upgraded clinical diagnostic facilities that will assist in the forensic activities of the Taronga's clinical team and the Australian Registry of Wildlife Health. The new facilities will ensure the safety and welfare of wildlife in care but also for Taronga's staff. The TWH will strengthen Taronga's existing educational facilities by offering learning and training spaces that will enable training specific to veterinary treatment and wildlife care.

The TWH will be located in the heart of the zoo, to become part of every zoo guest's experience. The TWH will be positioned at a strategic location to allow access by all guests to experience and engage with the day-to-day activities that occur within the Hospital. General guests will not access inside the TWH but be able to view into Marine Rescue, Animal Treatment and Diagnostic spaces, as well as Clinical Pathology and Nutrition Spaces. The public area will create a sheltered plaza that enables guests to watch Taronga's medical team at work. Back of house access to the TWH will only be accessible to staff and escorted visitors, and is accessed via the existing zoo roadway network.

The TWH will replace existing veterinary facilities that have exceeded their lifecycle, and enhance the operations of Taronga's veterinary services as well as contribute to the ongoing education and advocacy for Wildlife Conservation.

1.2 Overview

Narla Environmental Pty Ltd (Narla) was engaged by the Taronga Conservation Society Australia ('the proponent') to prepare a SBDAR to accompany an Environmental Impact Statement (EIS) as part of the Secretary's Environmental Assessment Requirements (SEARs) for the proposed Taronga Wildlife Hospital, located within Taronga Zoo at Bradleys Head Rd, Mosman NSW 2088 (Lot 22/DP843294; hereafter referred to as the 'Subject Property').

The proposed Taronga Wildlife Hospital development is a State Significant Development (SSD). Part 4, Division 4.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) establishes the assessment framework for SSD's. The preparation of this SBDAR is in response to the SEARs issued for the EIS by the NSW Department of Planning and Environment.

This SBDAR has been prepared as a ‘Streamlined assessment module- small area development that requires consent’ as it does not exceed the area clearing threshold for small area developments as outlined in the Biodiversity Assessment Method (BAM; DPIE 2020a; **Table 1**). Narla have produced this report in accordance with the requirements of the Biodiversity Conservation Act 2016 and Biodiversity Conservation Regulation 2017. The assessment has been completed in accordance with Appendix L of the BAM (DPIE 2020a).

Table 1. Area limits for application of small area development threshold on land not shaded on the biodiversity value map. Dark border indicated clearing threshold relevant to this report.

Minimum lot size associated with the property	Maximum area clearing limit for application of the small area development module
Less than 1ha	≤1ha
Less than 40ha but not less than 1ha	≤2ha
Less than 1000ha but not less than 40ha	≤5ha
1000ha or more	≤10ha

1.3 The Subject Land and Project Area

The proposed development consists of the footprint of the proposed works, which includes the replacement of the existing veterinary and quarantines facilities and the creation of a new accessway as well as some additional vegetation removal areas to facilitate development, mostly consisting of overhanging canopy. All aspects of the proposed development will hereafter be referred to as the Subject Land.

The Subject Land covers an area of approximately 0.24ha, and encompasses all areas within the Project Area that will be impacted by the proposed development (**Appendix 1**). Areas within the Project Area that are to be retained as part of the works have not been included within the Subject Land. These excluded areas have however been assessed for potential indirect impacts resulting from the proposed works.

The Subject Land is mostly comprised of existing buildings and hardstand, although some areas of remnant native vegetation and exotic vegetation are present. The proposed works have been strategically located in a way that will minimise potential impacts on biodiversity where possible.

1.4 Site Location and Description

The Subject Property is situated within the suburb of Mosman in the Mosman Council Local Government Area (LGA), covering an area of approximately 28ha on land zoned as ‘SP1 - Special Activities: Zoological Gardens’. The Subject Property is situated within the northern area of Bradleys Head, and is surrounded by Sydney Harbour National Park on the eastern and southern boundaries, and low density residential to the north (**Figure 2**).

1.5 Sources of Information Used

A thorough literature review was undertaken to gain an insight into the ecology and applicable legislation within the locality and the Mosman LGA. Relevant data and literature reviewed in preparation of this report included:

- Relevant State and Commonwealth Databases & Datasets:
 - NSW BioNet. The website of the Atlas of NSW Wildlife (DPIE 2022a);
 - NSW BioNet. Threatened Biodiversity Data Collection (DPIE 2022b);
 - NSW BioNet. Vegetation Classification System (DPIE 2022c); and
 - NSW Government Spatial Services: Six Maps Clip & Ship (NSW Government Spatial Services 2022)
- Vegetation and Soil Mapping:
 - The Native Vegetation of the Sydney Metropolitan Area and Vegetation Information System (VIS) 3.1 (OEH 2016)
 - Soil Landscapes of the Sydney 1:100 000 Sheet (Chapman and Murphy 2009).
- NSW State Guidelines:
 - Biodiversity Assessment Method (DPIE 2020a);
 - Guidance to assist a decision-maker to determine a serious and irreversible impact (DPIE 2019a);
 - Biodiversity Assessment Method Calculator Version 1.4.0.00 (DPIE 2021a);
 - Biodiversity Offsets and Agreement Management System (BOAMS);
 - Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method (DPIE 2020b); and
 - Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC 2004).
- Council Documents:
 - Mosman Local Environmental Plan (LEP) 2012
 - Mosman Development Control Plan (DCP) 2012
 - Weeds Declared in the Greater Sydney Region (DPI 2021)

Preparation of this BDAR also involved the review of the following accompanying project documents:

- Taronga Zoo Wildlife Hospital– Site Plan – Proposed Works: issue E (DWP 2022; **Appendix 1**);
- Arboricultural Impact Appraisal and Method Statement: Taronga Wildlife Hospital (Naturally Trees 2022).

These sources were used to gain an understanding of the natural environment and ecology of the Subject Land and its surrounds. Searches using NSW Wildlife Atlas (BioNet) were conducted to identify current threatened flora and fauna records within and surrounding the Subject Land. These data were used to assist in establishing the presence or likelihood of any biodiversity values as occurring on, or adjacent to, the Subject Land, and helped inform our Ecologist on what to look for during the site assessment.

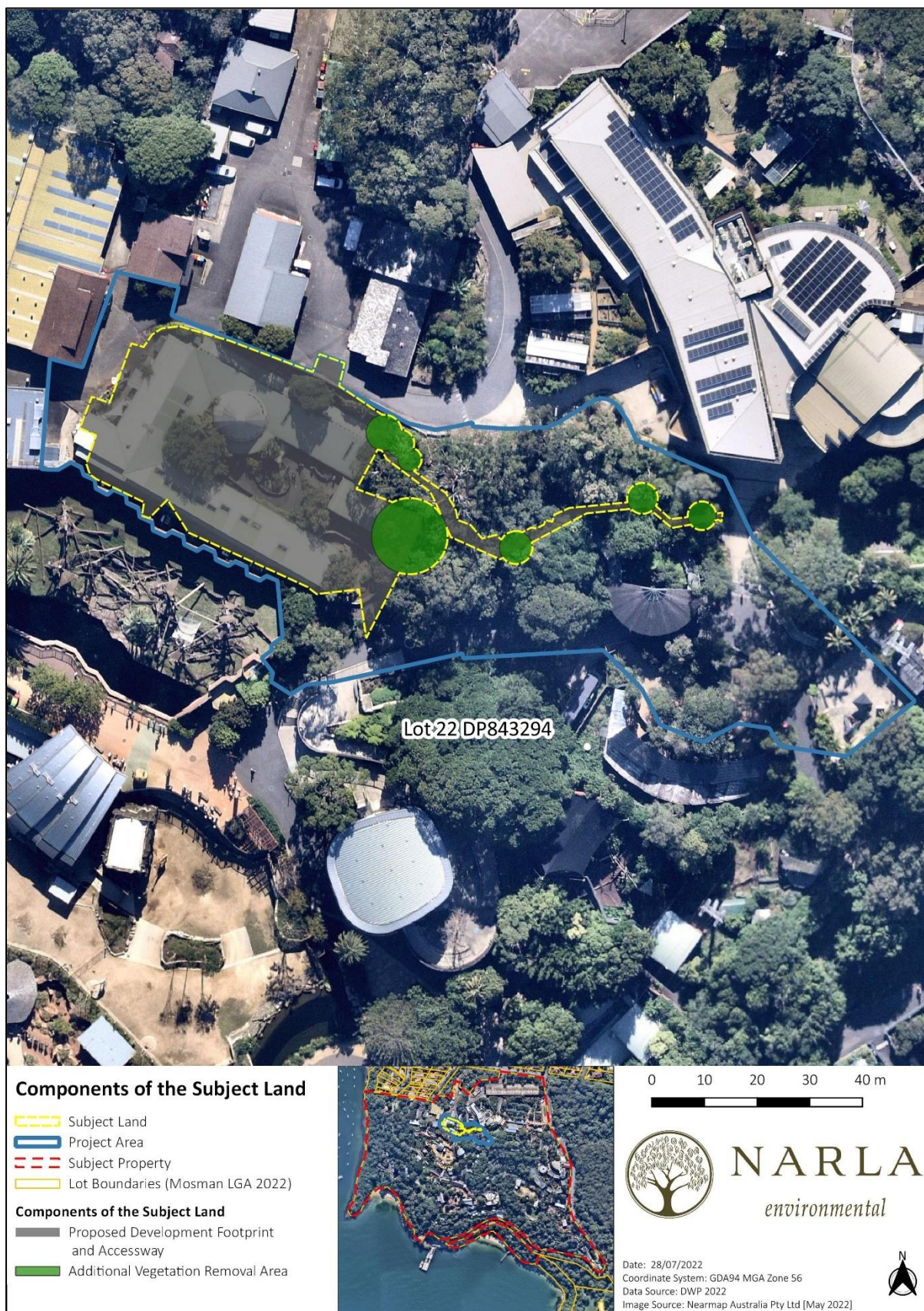


Figure 1. Components of the Subject Land and the location of the Subject Land within the Subject Property.

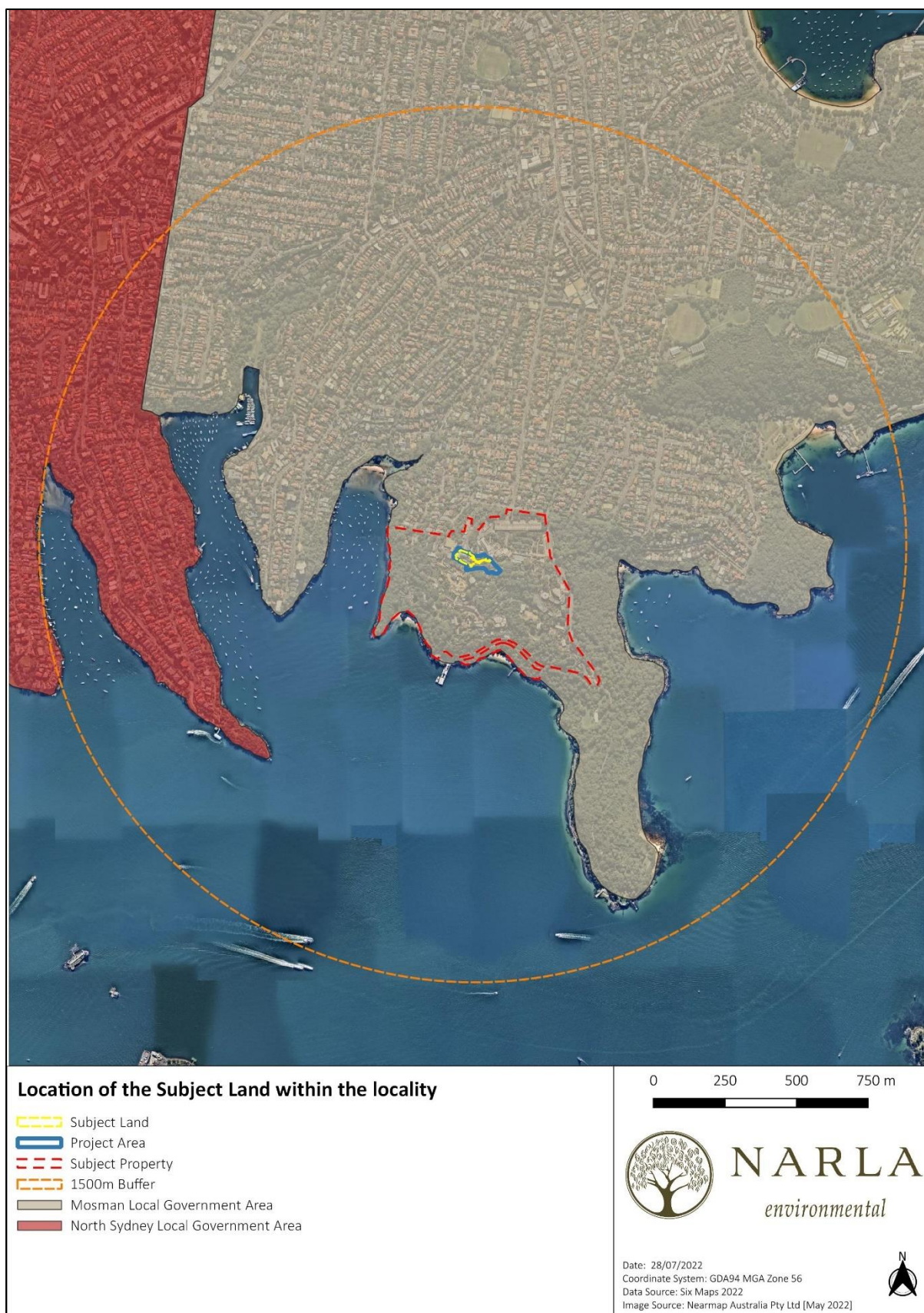


Figure 2. The location of the Subject Land within the locality.

1.6 Aim and Approach

This report has been prepared in accordance with the BAM (DPIE 2020a) and aims to:

- Describe the biodiversity values present within the Subject Land, including the extent of native vegetation, vegetation integrity and the presence of Threatened Ecological Communities (TECs);
- Determine the habitat suitability within the Subject Land for candidate threatened species;
- Prepare an impact assessment in regard to potential impacts of the proposed development on biodiversity values, including potential prescribed impacts and SAIIs within the Subject Land;
- Discuss and recommend efforts to avoid and minimise impacts on biodiversity values; and
- Calculate the biodiversity credits (i.e., ecosystem credits and species credits) that measure potential impacts of the development on biodiversity values. This calculation will inform the decision maker as to the number and class of offset credits required to be purchased and retired as a result of the proposed development.

2. Landscape Context

2.1 IBRA Bioregion and Subregion

The Subject Land occurs within the 'Pittwater' Interim Biogeographic Regionalisation for Australia 7 (IBRA7) Subregion, which is part of the 'Sydney Basin' IBRA7 Bioregion (**Figure 3**).

2.2 Mitchell Landscapes

Mitchell Landscapes (2002) groups ecosystems into meso-ecosystems representing larger natural entities based on topography and geology. The naming of ecosystems and meso-ecosystems was standardised so that each name provided location information and a meaningful descriptive landscape term.

The Subject Land occurs within the 'Belrose Coastal Slopes' Mitchell Landscape Ecosystem (**Figure 4**). The Belrose Coastal Slopes landscape is characterised by benched hill slopes and deep valleys of the coastal fall on horizontal Triassic quartz sandstone, lithic sandstone and shales. High proportion of rock outcrop with discontinuous cliffs to 5m high. General elevation 0 to 180m, local relief 80m. Shallow uniform or gradational sands and earthy sands on ridges, deeper sands, loamy sands and organic sands on wet benches and in hanging swamps, grey or yellow texture-contrast soils on shale benches. Accumulations of deeper sand and occasional podsoles in depositional sites and along streams. Low woodland of Scribbly Gum (*Eucalyptus haemastoma*), Red Bloodwood (*Corymbia gummifera*), Yellow-top Ash (*Eucalyptus leuhmanniana*), and Narrow-leaved Apple (*Angophora bakeri*) in deeper soils on ridges. Scrub and heath of She-oak (*Allocasuarina distyla*) and Heath Banksia (*Banksia ericifolia*), with other *Hakea*, *Grevillea*, and *Baeckea* sp., on ridges and upper benches. Wet heath and swamps with *Gahnia* sp. and Swamp Banksia (*Banksia robur*) in hanging valleys. Coastal forest in sheltered areas on better quality shale soil with; Sydney Blue Gum (*Eucalyptus saligna*), Blackbutt (*Eucalyptus pilularis*), Turpentine (*Syncarpia glomulifera*), Grey Ironbark (*Eucalyptus paniculata*), Spotted Gum (*Corymbia maculata*), Southern Mahogany (*Eucalyptus botryoides*), Cabbage-tree Palm (*Livistona australis*) and Burrawang (*Macrozamia* sp.). Coastal headlands with scrub of *Allocasuarina distyla*, Coast Rosemary (*Westringea fruticosa*), and Dwarf Kangaroo Grass (*Themeda triandra*).

2.3 Topography, Geology and Soils

The Subject Land is situated on a relatively steep terrain with an elevation ranging between 65m and 72m above sea level (Google Earth 2022). The Subject Land is mapped as occurring on the GyMEA/Lambert Soil Landscape. The GyMEA/Lambert Soil Landscape is typically characterised by undulating to rolling rises and low hills on Hawkesbury Sandstone. The GyMEA Soil Landscape occurs extensively throughout the Hornsby Plateau and along the foreshores of Sydney Harbour and the Parramatta and Georges Rivers. Examples include areas of Northbridge, Forestville, Drummoyne, Balmain, Arcadia and Berrilee. The underlying geology is typical of Hawkesbury Sandstone, which is a medium to coarse-grained quartz sandstone with minor shale and laminite lenses. Soils are shallow to moderately deep (30-100cm) Yellow Earths and Earthy Sands on crests and inside of benches; shallow (Siliceous Sands on leading edges of benches; localised Gleyed Podzolic Soils and Yellow Podzolic Soils on shale lenses; shallow to moderately deep (<100cm) Siliceous Sands and Leached Sands along drainage lines (Chapman et al. 2009).

2.4 Areas of Geological Significance and Soil Hazards

The Subject Land did not contain any areas of geological significance, such as karsts, caves, cliffs however small areas of bush rock and sandstone rock ledging were present immediately adjacent to the Subject Land. The Subject Land was not mapped as occurring on Acid Sulfate Soils nor mapped as having risk/probability of exhibiting occurrence of acid sulfate soils.

2.5 Hydrology

No mapped watercourses are located within the Subject Land. Several 1st order watercourses occur within the broader locality (1500m buffer; **Figure 5**).

2.6 State Environmental Planning Policy (Resilience and Hazards) 2021: Chapter 2 - Coastal Management

The Subject Land and the immediate surrounds (within the 1500m buffer) do not contain any areas of native vegetation identified as 'Coastal Wetlands' as per chapter 2 of the SEPP. However, areas mapped as containing Coastal Use Area and Coastal Environmental Area as per the SEPP were mapped within the Subject Land, and areas of Littoral Rainforest and Proximity to Littoral Rainforest do occur within the broader landscape (**Figure 6**).

2.7 Native Vegetation Cover and Connectivity

Native vegetation cover and connectivity have been assessed in accordance with Section 3.2 of the BAM (DPIE 2020a). The native vegetation cover will be used to assess the habitat suitability of the Subject Land for threatened species. Areas of connectivity will determine the extent of habitat that may facilitate the movement of threatened species across their range. A 1500m buffer around the boundary of the Subject Land was calculated to determine the extent of native vegetation and habitat connectivity. Native vegetation covered approximately 125ha within the buffer circle (total land area = 418ha) and was assigned to the >10–30% class.

Areas of connectivity will determine the extent of habitat that may facilitate the movement of threatened species across their range. Areas of connectivity that may facilitate the movement of threatened species were evident within the 1500m surrounding the Subject Land (**Figure 7**; **Figure 8**) with the most significant areas being located to the south and east along the Sydney Harbour foreshore.

2.8 Areas of Outstanding Biodiversity Value

No Areas of Outstanding Biodiversity Value occur on the Subject Land or surrounding area.

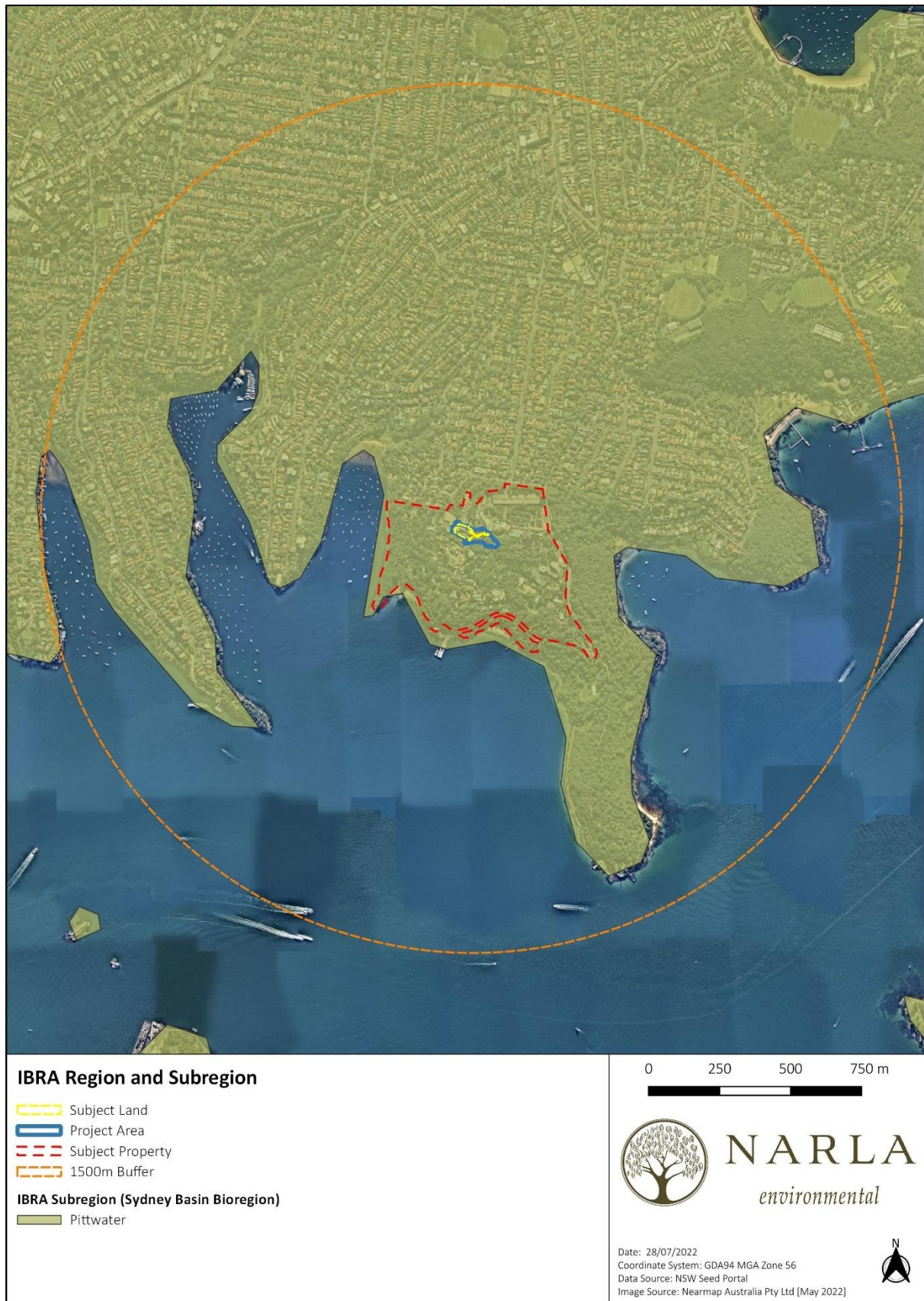


Figure 3. IBRA Bioregion and Subregion of the Subject Land, and within a 1500m buffer.

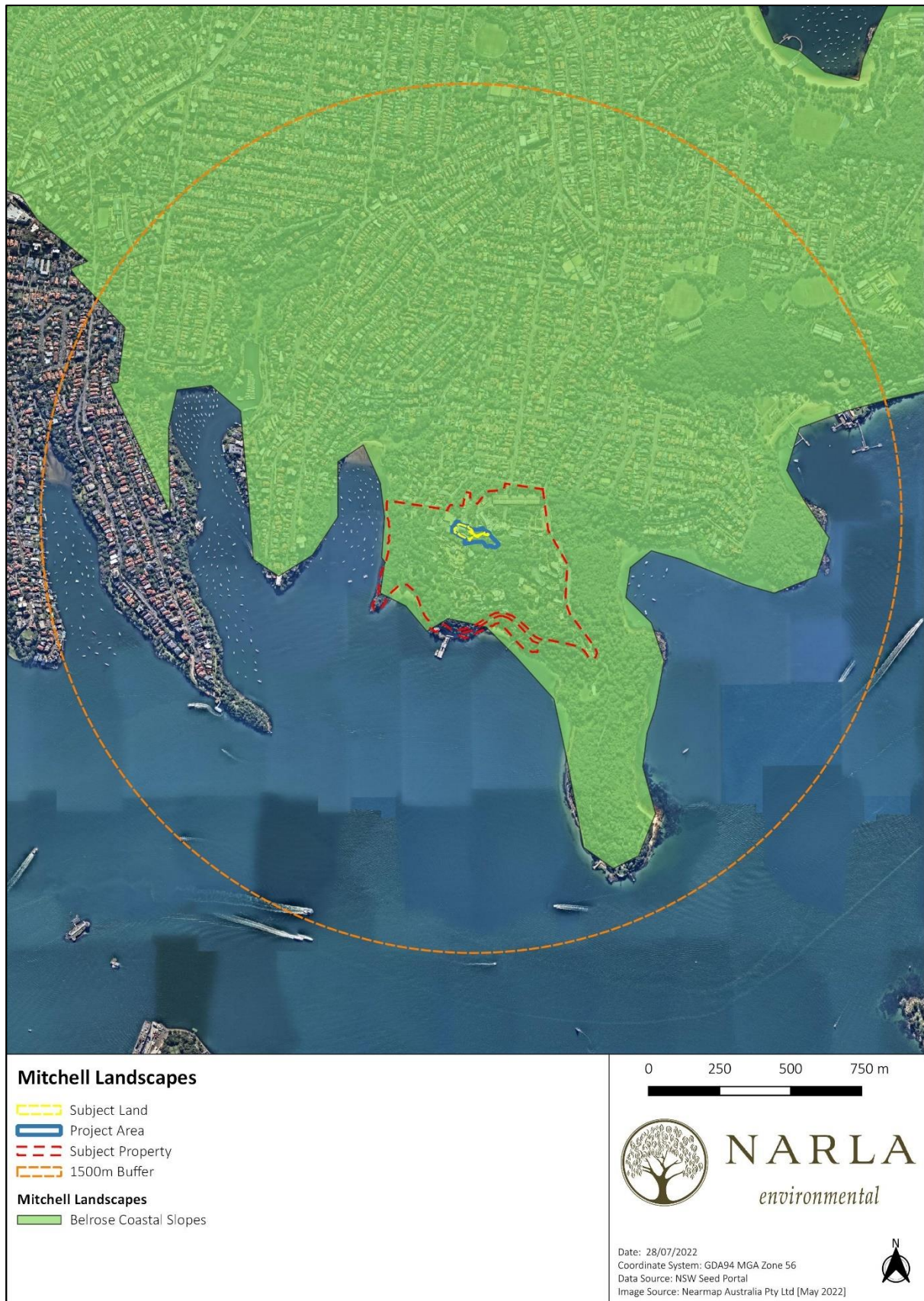


Figure 4. Mitchell Landscapes of the Subject Property and Subject Land, and within a 1500m buffer.

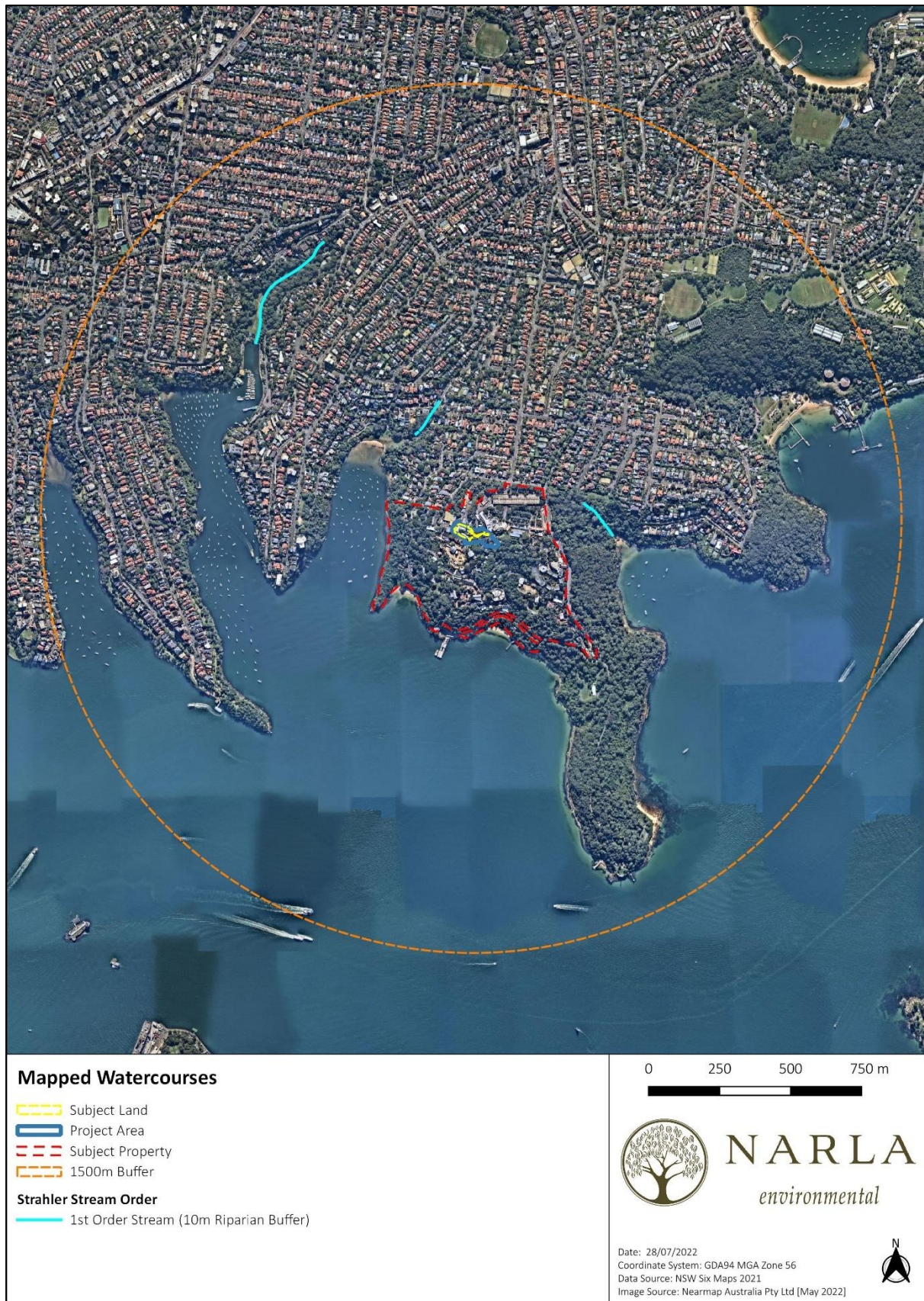


Figure 5. Rivers and streams (with associated riparian buffers) occurring within the 1500m buffer.

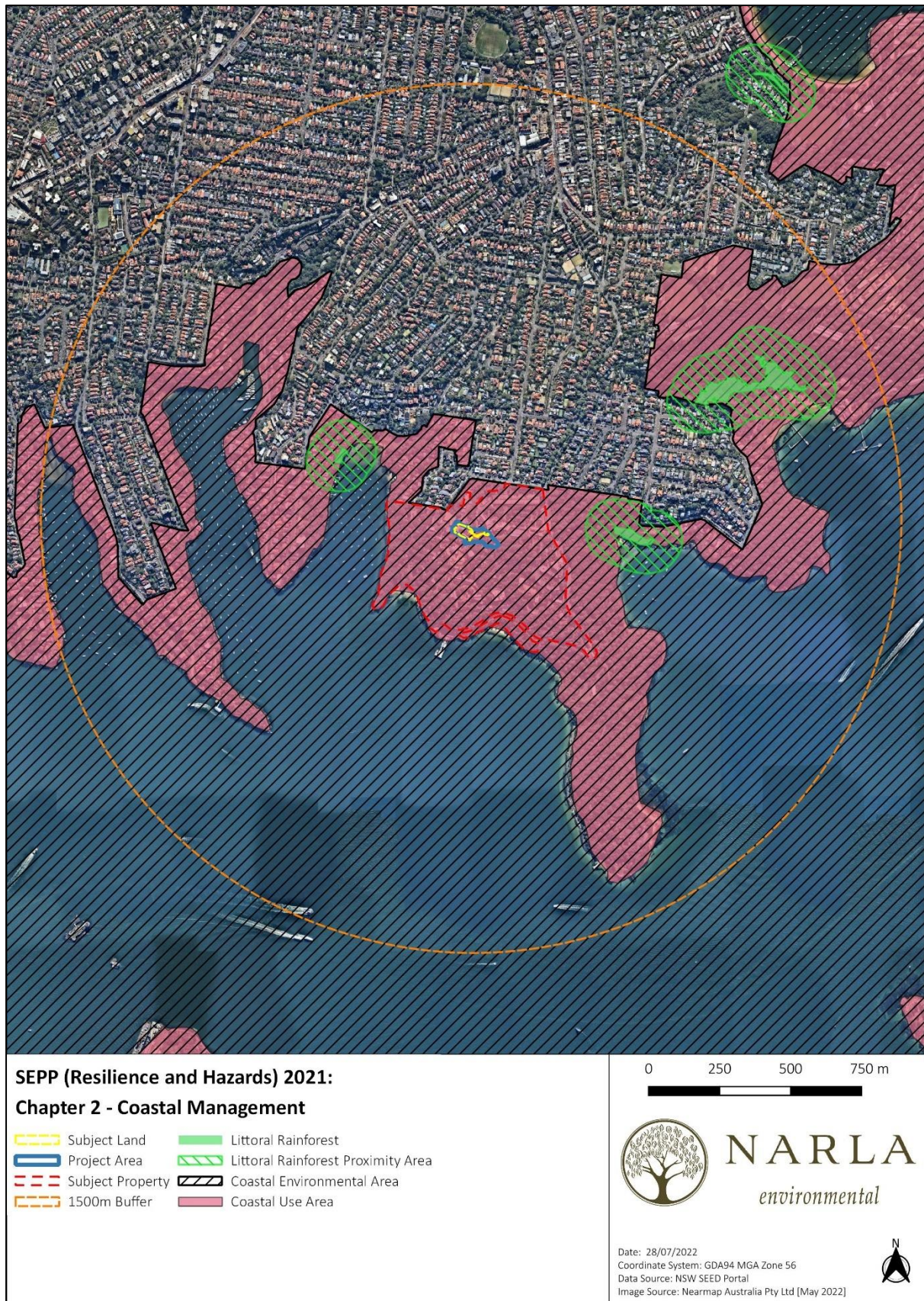


Figure 6. Areas mapped under Chapter 2 of the Resilience and Hazards SEPP in relation to the Subject Land and general locality.

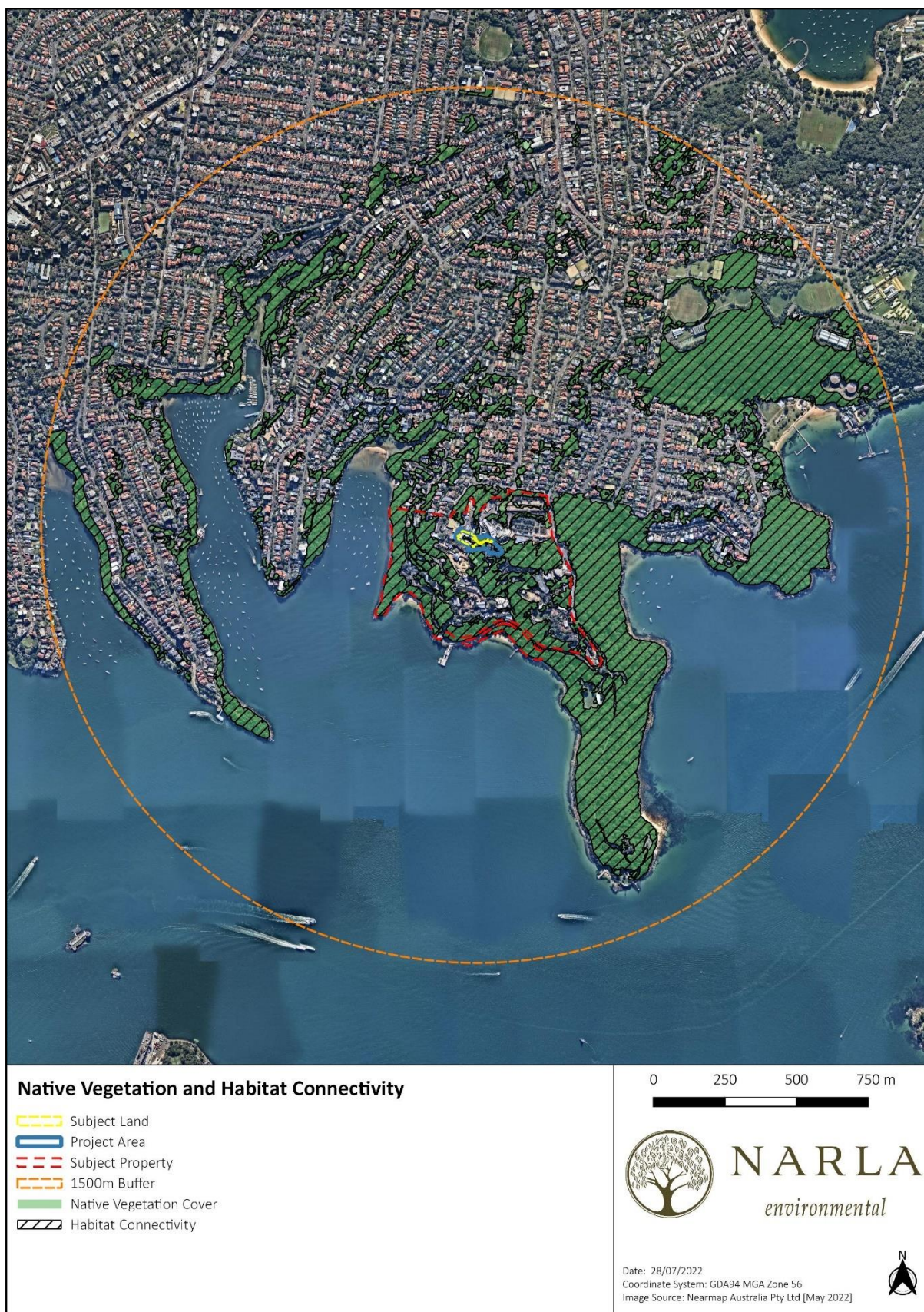


Figure 7. The extent of native vegetation and habitat connectivity within the 1500m buffer.

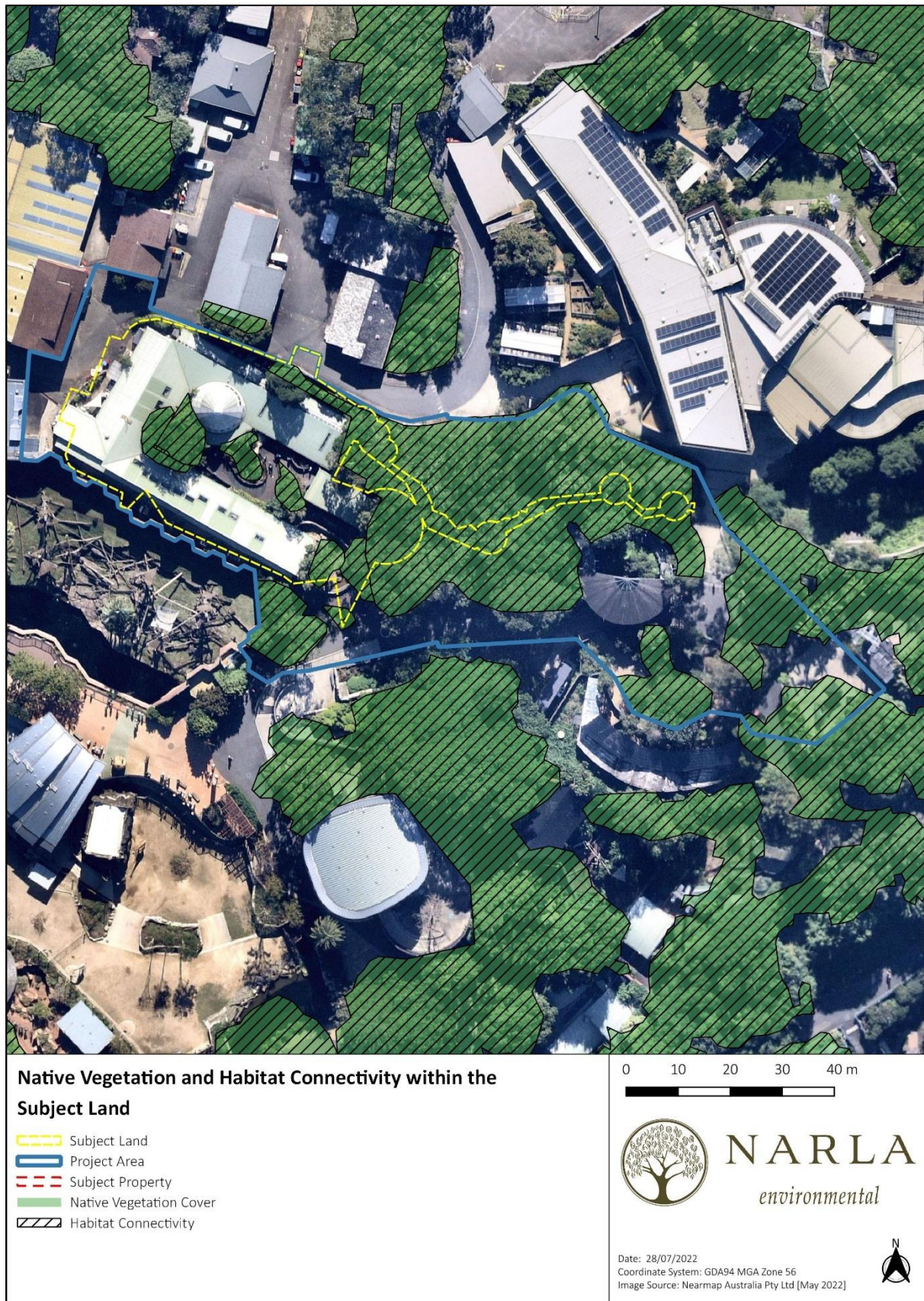


Figure 8. The extent of native vegetation and habitat connectivity within the Subject Land.

3. Native Vegetation

3.1 Plant Community Types (PCTs) Identified within the Subject Land

3.1.1 Historically Mapped Vegetation

The Native Vegetation of the Sydney Metropolitan Area (OEH 2016a; OEH 2016b) identifies the vegetation within the Subject Land as comprising for Weeds and Exotics. One (1) PCT however is identified in close proximity to the Subject Land:

- PCT 1778 - Coastal sandstone foreshores forest

3.1.2 Plant Community Type Selection Process

Flora species assemblage, structure and landscape interpretation data collected from the BAM plot were compared against all potentially occurring PCTs in order to determine the most likely candidates that occur within the Subject Land. Selection was undertaken using information and databases provided in the BioNet Vegetation Classification System (DPE 2022c).

A single PCT was assigned to vegetation within the Subject Land as the assessment is a streamlined assessment, in which only the dominating PCT is assigned to vegetation. Best-fit PCT selection for the vegetation was undertaken using information and databases provided in the BioNet Vegetation Classification System (DPIE 2021c). The following selection criteria were used in the PCT Filter Tool to develop the PCT shortlist:

- IBRA Bioregion: Sydney Basin
- IBRA Subregion: Pittwater
- Dominant Species: *Eucalyptus punctata*, *Eucalyptus robusta*, *Eucalyptus tereticornis* and *Eucalyptus botryoides*.

This process delivered a selection of six (6) PCT's that occur within the Pittwater IBRA Subregion (and Sydney Basin Bioregion) that had two or more (out of four) of the observed dominant species (i.e., the highest potential of occurring within the Subject Land). Based on historical mapping, an additional PCT (PCT 1778) was added to the selection process. The geographical distribution and landscape position of each shortlisted PCT was then compared against the location and landscape of the Subject Land, resulting in one (1) candidate PCT (**Table 2**). The steps taken to justify the candidate PCT within the Subject Land are detailed in **Table 3**.

Table 2. Output from the PCT Filter Tool (DPE 2022c) and subsequent shortlisting of candidate PCTs. Green shading indicates the PCTs from the output that occur within the distribution and landscape position of the Subject Land.

Plant Community Type (PCT)	Subject Land within known distribution/landscape position?	No. of Floristic Matches	<i>Eucalyptus punctata</i>	<i>Eucalyptus robusta</i>	<i>Eucalyptus tereticornis</i>	<i>Eucalyptus botryoides</i>
PCT 659: Bangalay - Old-man Banksia open forest on coastal sands, Sydney Basin Bioregion and South East Corner Bioregion	No. The Subject Land does not occur on deep coastal sands.	2		x		x

Plant Community Type (PCT)	Subject Land within known distribution/landscape position?	No. of Floristic Matches	<i>Eucalyptus punctata</i>	<i>Eucalyptus robusta</i>	<i>Eucalyptus tereticornis</i>	<i>Eucalyptus botryoides</i>
PCT 661: Coastal sand littoral forest	No. The Subject Land does not occur on coastal dune sand.	2		x		x
PCT 1231: Coastal sand Swamp Mahogany Forest	No. The Subject Land does not occur on drainage lines and depressions on sandy alluvium, and sand flats in low altitude coastal areas.	2		x		x
PCT 1385: Rough-barked Apple - Grey Gum grassy open forest of the hinterland hills of the Central Coast, Sydney Basin Bioregion	No. The Subject Land does not occur within Mangrove Creek Catchment or Dharug National Park.	2	x		x	
PCT 1598: Forest Red Gum grassy open forest on floodplains of the lower Hunter	No. The Subject Land does not occur on a floodplain in the Lower Hunter.	2	x		x	
PCT 1778: Coastal sandstone foreshores forest	Partial. The Subject Land occurs on sheltered sandstone slopes along the foreshores of Sydney's major waterways, although occurs at an elevation above 45m.	1				x
PCT 1847: Sydney Foreshores shale forest	No. The Subject Land does not occur at an elevation between 6m and 20m.	2	x		x	

Table 3. PCT Selection Criteria. Green indicates the selected PCT.

Candidate PCT	Characteristics (DPE 2022c)	Justification
PCT 1778: Coastal sandstone foreshores forest	Landscape position/ geology	Narla have assigned this PCT to the vegetation within the Subject Land as it is the best fit within the landscape profile and comprises a number of diagnostic species. The Subject Land is situated on sheltered sandstone slopes along the foreshores of Sydney's major waterways (Sydney Harbour) and coastal escarpments. The underlying geology is Hawksbury Sandstone. The majority of the Subject Land is situated at an elevation between 65m and 72m above sea level which is slightly above the expected elevation for this PCT. However, this PCT has been historically mapped as immediately adjacent to the Subject Land. Mean annual rainfall recorded at the closest weather station (Sydney Botanic Gardens; which is approximately 4.5km from Mosman) is 1229 mm Furthermore, PCT 1778 is described as having a canopy that contains localised patches of bangalay (<i>Eucalyptus botryoides</i>), coast banksia (<i>Banksia integrifolia</i>), as well as stands of smooth-barked apple (<i>Angophora costata</i>), which were all identified within or immediately surrounding the Subject Land. This PCT also contained a number of diagnostic floristic species which were identified within the Subject Land and wider Project Area.
	Occurs on sheltered sandstone slopes along the foreshores of Sydney's major waterways and coastal escarpments, within 10 km of the coastline. It is restricted to sandstone soils derived from either Hawkesbury or Narrabeen geology.	
	The distribution is coastal and requires a combination of low elevation (between two and 45 metres above sea level) and mean annual rainfall that exceeds 1100 millimetres per annum.	
	Characteristic canopy	
	<i>Banksia integrifolia</i> and <i>Eucalyptus botryoides</i> .	
	Characteristic mid-storey/ shrub	
	<i>Glochidion ferdinandi</i> , <i>Pittosporum undulatum</i> , <i>Allocasuarina littoralis</i> , <i>Breynia oblongifolia</i> , <i>Notelaea longifolia</i> , <i>Dodonaea triquetra</i> , <i>Elaeocarpus reticulatus</i> , <i>Polyscias sambucifolia</i> and <i>Acacia longifolia</i> .	
	Characteristic ground layer	
	<i>Dianella caerulea</i> , <i>Pteridium esculentum</i> , <i>Lomandra longifolia</i> , <i>Entolasia stricta</i> , <i>Imperata cylindrica</i> , <i>Microlaena stipoides</i> var. <i>stipoides</i> , <i>Poa affinis</i> , <i>Themeda australis</i> and <i>Xanthorrhoea arborea</i> .	

3.1.3 Final PCT and Vegetation Zone Selection

Field surveys conducted by Narla confirmed that one (1) PCT was identified within the Subject Land:

- PCT 1778: Coastal sandstone foreshores forest

One (1) vegetation zone was identified within the Subject Land:

- Zone 1: PCT 1778 Moderate Condition.

This vegetation zone is detailed in **Table 4**, and displayed in **Figure 9**.

Table 4. Vegetation zones identified within the Subject Land.

PCT 1778: Coastal sandstone foreshores forest	
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Total area within Subject Land	0.08ha
Condition Class	Moderate Condition
Field survey effort	A site assessment was conducted by experienced Narla Ecologist Sarah Cardenzana on the 13 th January 2021. One (1) BAM plot was established within the Project Area.
Description of vegetation within the Subject Land	
Vegetation within this zone consisted of a mixture of natural occurring remnant vegetation of all strata levels as well as exotic and landscaped vegetation (Plate 1). Native canopy species located within BAM plot included <i>Commelina cyanea</i> , <i>Cupaniopsis anacardioides</i> , <i>Dianella caerulea</i> , <i>Eucalyptus botryoides</i> , <i>Eucalyptus punctata</i> , <i>Eucalyptus robusta</i> , <i>Eucalyptus tereticornis</i> , <i>Glochidion ferdinandi</i> , <i>Pittosporum undulatum</i> and <i>Polyscias sambucifolia</i> .	
Description in the VIS (DPIE 2022c)	
Coastal Sandstone Foreshores Forest is found on sheltered sandstone slopes along the foreshores of Sydney's major waterways and coastal escarpments. It is an open forest with a moist shrub layer and a ground cover of ferns, rushes and grasses. The flora of this community has a maritime influence given its exposure to prevailing sea breezes. The canopy can be dominated by pure stands of Smooth-barked Apple (<i>Angophora costata</i>), though more regularly this is found in combination with other tree species. Localised patches of Bangalay (<i>Eucalyptus botryoides</i>) and Coast Banksia (<i>Banksia integrifolia</i>) occur closest to the coast, whereas Sydney Peppermint (<i>Eucalyptus piperita</i>) and Blackbutt (<i>Eucalyptus pilularis</i>) prefer more protected locations and in the case of the latter some minor shale enrichment in the soil. A prominent layer of hardy mesic small trees and shrubs is present. These include Sweet Pittosporum (<i>Pittosporum undulatum</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Blueberry Ash (<i>Elaeocarpus reticulatus</i>). In the suburban environment the proliferation of these species in the understorey at long unburnt sites has generated considerable debate, particularly as there appears to be strong correlation between time since fire and their density (Rose and Fairweather 1997). It also appears that these species are more common in these littoral zones than in other sheltered sandstone forests situated further away from the coast.	
This forest is restricted to sandstone soils derived from either Hawkesbury or Narrabeen geology. The distribution is coastal and requires a combination of low elevation (between two and 45 metres above sea level) and mean annual rainfall that exceeds 1100 millimetres per annum. It is noticeable that most sites are exposed to salt-laden winds. Samples are situated up to 10 kilometres from the coastline, but still in close proximity to major waterways.	

PCT 1778: Coastal sandstone foreshores forest

Structure of vegetation	All stratum (canopy, shrub and groundcover) were present across the zone and within the broader Project Area. Native vegetation within the BAM plot comprised of trees (68.2%), shrubs (19.9% cover) and groundcovers (4.2%). A moderate litter cover of 64% was present, as well as 20m of fallen logs. The vegetation zone contained trees in all stem size classes, including regenerating trees and one large tree (>50cm). No hollow bearing trees were recorded within the zone.
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Scientific Reference from VIS (DPIE 2022c)	OEH (2016) The Native Vegetation of the Sydney Metropolitan Area NSW Office of Environment and Heritage Sydney.
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TEC Status (BC Act 2016 and EPBC Act 1999)	Not listed
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Estimate of percent cleared value of PCT in the major catchment area	90%
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Plate 1. Representative photo of PCT 1778 (Vegetation Zone 1) in the Subject Land.

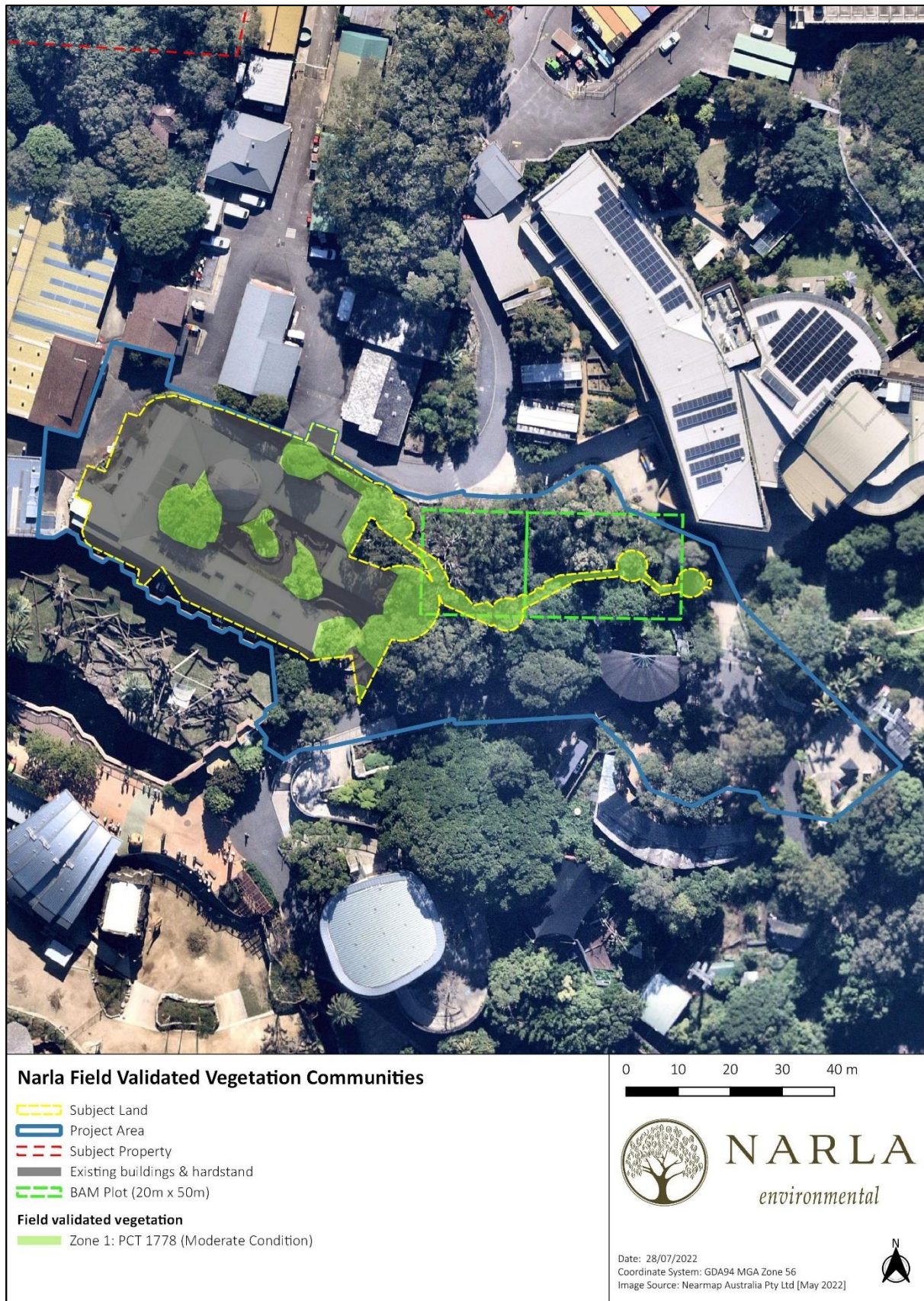


Figure 9. Narla field validated vegetation mapping and location of BAM plots within the Subject Land.

3.2 Assessing Patch Size

As defined by the BAM, a patch is an area of native vegetation that occurs on the Subject Land and includes native vegetation that has a gap of less than 100m from the next area of native vegetation (or ≤ 30 m for non-woody ecosystems). A patch may extend onto adjoining land. For each vegetation zone, the assessor must determine the patch size in hectares and assign it to one of the following classes:

- <5ha
- 5–<25ha
- 25–<100ha
- ≥ 100 ha.

The patch size class is used to assess habitat suitability on the Subject Land for threatened species. The assessor may assign more than one patch size class to the vegetation zone if both of the following apply:

- A vegetation zone comprises two or more discontinuous areas of native vegetation, and
- The areas of discontinuous native vegetation have more than one patch size class.

As areas outside of the Subject Property were not assessed as part of the scope of this assessment, the vegetation zones identified within the Subject Land were separated into the following categories to allow for aerial mapping of patch size within the broader area (**Figure 10**):

- Woody Ecosystems:
 - Zone 1: PCT 1778.

Table 5. Patch size classes of each PCT and associated vegetation zones.

Plant Community Type	Category	Vegetation Zone	Patch Size Class
PCT 1778	Woody Ecosystems	Zone 1	≥ 100 ha



Figure 10. The patch size of Vegetation Zone 1 occurring within the 1500m buffer. The patch does however extend further than the buffer boundary.

3.3 Vegetation Integrity Survey (VIS) Plots

One (1) BAM VIS Plot was established within the Project Area. Plot data gathered for each attribute used to assess the function of the Subject Land vegetation is detailed in **Appendix 2**. Vegetation Integrity (VI) Scores represented by existing vegetation within the vegetation zone are detailed in **Table 6**.

3.3.1 Determining future vegetation integrity scores

Most projects will result in complete clearing of vegetation and threatened species habitat within the development footprint. In this scenario, the assessor must assess the proposed future value of each of the VI attributes as zero in the BAMC (DPIE 2020a).

The Subject Land will be exposed to full clearing as a result of the proposed development (**Figure 11**):

- Vegetation Zone 1: PCT 1778:
 - Management Zone 1.1: Total Impact – this area is defined by the construction and operational footprints.

All areas outside of the above management zone consist of existing buildings and hardstand and have therefore not been assigned to a management zone.

Table 6. Vegetation integrity scores for each identified zone.

PCT	Management Zone	Area (ha)	Survey Effort	Composition Condition Score	Structure Condition Score	Function Condition Score	VI Score	Future VI Score	Change in VI Score	Total VI Loss	Hollow bearing trees
PCT 1778: Coastal sandstone foreshores forest	Management Zone 1.1: Total Impact	0.08	1 x 1000m ² (20m x 50m) VIS Plot	39.6	38.1	63.7	45.8	0	-45.8	-45.8	0

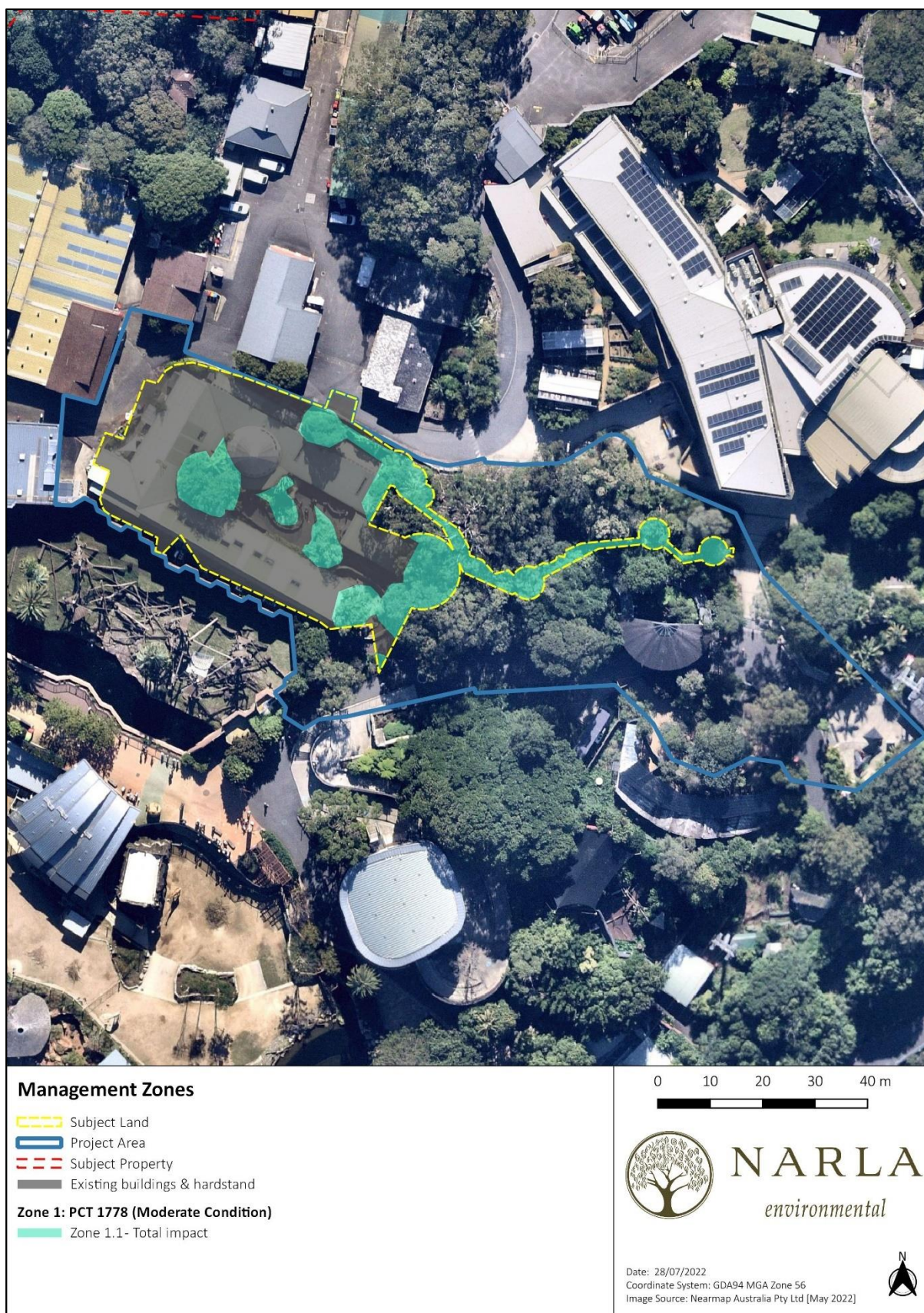


Figure 11. Management zones within the Subject Land.

4. Threatened Species

4.1 Candidate Ecosystem Credit Species

Ecosystem credit species associated with the Subject Land are listed below in **Table 7**. No species predicted by the BAM calculator as potential ecosystem credits were excluded from the assessment due to habitat constraints.

Table 7. Candidate ecosystem credits predicted to occur within the Subject Land.

Scientific Name	BC Act Status	Excluded from Assessment	Reason for Exclusion from Assessment
<i>Anthochaera phrygia</i> Regent Honeyeater (Foraging)	Critically Endangered	No	-
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	Vulnerable	No	-
<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo (Foraging)	Vulnerable	No	-
<i>Daphoenositta chrysoptera</i> Varied Sittella	Vulnerable	No	-
<i>Dasyurus maculatus</i> Spotted-tailed Quoll	Vulnerable	No	-
<i>Glossopsitta pusilla</i> Little Lorikeet	Vulnerable	No	-
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle (Foraging)	Vulnerable	No	-
<i>Hieraetus morphnoides</i> Little Eagle (Foraging)	Vulnerable	No	-
<i>Hirundapus caudacutus</i> White-throated Needletail	Vulnerable (EPBC Act Only)	No	-
<i>Lathamus discolor</i> Swift Parrot (Foraging)	Endangered	No	-
<i>Lophoictinia isura</i> Square-tailed Kite (Foraging)	Vulnerable	No	-
<i>Micronomus norfolkensis</i> Eastern Coastal Free-tailed Bat	Vulnerable	No	-
<i>Miniopterus australis</i> Little Bent-winged Bat (Foraging)	Vulnerable	No	-
<i>Miniopterus orianae oceanensis</i> Large Bent-winged bat (Foraging)	Vulnerable	No	-
<i>Ninox connivens</i> Barking Owl (Foraging)	Vulnerable	No	-
<i>Ninox strenua</i> Powerful Owl (Foraging)	Vulnerable	No	-
<i>Pandion cristatus</i> Eastern Osprey (Foraging)	Vulnerable	No	-
<i>Pseudomys novaehollandiae</i> New Holland Mouse	Vulnerable	No	-

Scientific Name	BC Act Status	Excluded from Assessment	Reason for Exclusion from Assessment
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox (Foraging)	Vulnerable	No	-
<i>Tyto novaehollandiae</i> Masked Owl (Foraging)	Vulnerable	No	-
<i>Varanus rosenbergi</i> Rosenberg's Goanna	Vulnerable	No	-

4.2 Historically Recorded Threatened Species

The following threatened species credit species have been historically recorded within the broader Subject Property however outside the Subject Land (**Figure 12**):

- *Acacia terminalis* subsp. Eastern Sydney (Sunshine Wattle);
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat);
- *Myotis macropus* (Southern Myotis);
- *Petaurus norfolcensis* (Squirrel Glider);
- *Pteropus poliocephalus* (Grey-headed Flying Fox); and
- *Syzygium paniculatum* (Magenta Lilly Pilly).

Each species is therefore required to have their specific habitat requirements assessed in this assessment regardless of whether or not the species is considered an SAI. If suitable habitat is identified within the Subject Land, these species are required to be assumed present or be surveyed to rule out their presence in accordance with section 5.2 of the BAM (DPIE 2020a).

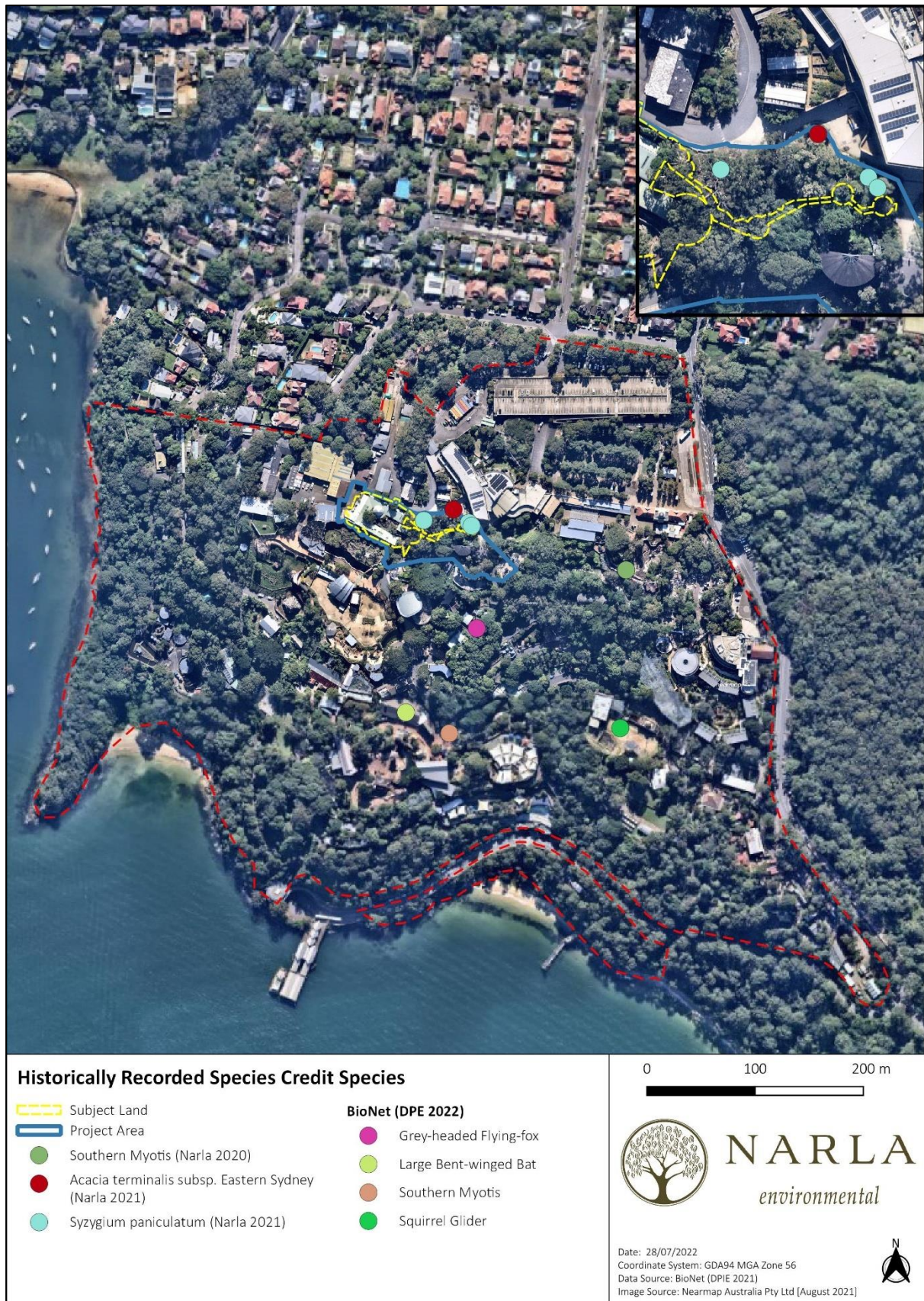


Figure 12. Historically recorded species credit species within the Subject Property.

4.3 Candidate Species Credit Species Summary

This section provides a summary of the candidate species credit fauna and flora species for the Subject Land derived from BAMC (DPIE 2021a). A summary of the targeted survey effort applied to each species is provided along with the results of the survey effort, specifically whether or not the species credit needs to be offset through retiring of Biodiversity Offset Credits (**Table 8; Table 9**).

As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species or those threatened species incidentally located where suitable habitat was present.

Table 8. Candidate fauna credit species predicted to occur within the Subject Land.

Scientific Name	Included in Assessment?	Targeted Survey conducted?	Present within Subject Land?	Biodiversity Risk Weighting	Biodiversity Offset Credits Required?
<i>Anthochaera phrygia</i> Regent Honeyeater (Breeding)	No, the Subject Land is not included on the map of important areas for Regent Honeyeaters.	No	NA	Very High - 3	No
<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High -2	No
<i>Cercartetus nanus</i> Eastern Pygmy-possum	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	This species is known to occur within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels. Such geological features were not observed within or adjacent to the Subject Land. Potential foraging habitat occurs within the Subject Land, however, as impacts to foraging habitat is not considered an SAI it has not been assessed in this SBDAR.	No	NA	Very High - 3	No

Scientific Name	Included in Assessment?	Targeted Survey conducted?	Present within Subject Land?	Biodiversity Risk Weighting	Biodiversity Offset Credits Required?
<i>Eudyptula minor</i> -endangered population Little Penguin in the Manly Point Area (being the area on and near the shoreline from Cannae Point generally northward to the point near the intersection of Stuart Street and Oyama Cove Avenue, and extending 100 metres offshore from that shoreline)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAIL species. This species is not an SAIL species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAIL species. This species is not an SAIL species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Hieraetus morphnoides</i> Little Eagle (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAIL species. This species is not an SAIL species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Lathamus discolor</i> Swift Parrot (Breeding)	No, the Subject Land is not included on the map of important areas for Swift Parrot. It is however acknowledged that mapped important areas are located in close proximity to the Subject Land however these areas will not be impacted by the proposed development.	No	NA	High - 2	No
<i>Lophoictinia isura</i> Square-tailed Kite (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAIL species. This species is not an SAIL species and was therefore excluded from the assessment.	No	NA	Moderate - 1.5	No

Scientific Name	Included in Assessment?	Targeted Survey conducted?	Present within Subject Land?	Biodiversity Risk Weighting	Biodiversity Offset Credits Required?
<i>Meridolum maryae</i> Maroubra Woodland Snail	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Miniopterus australis</i> Little Bent-winged Bat (Breeding)	This species is known to breed in caves, tunnels, mines and culverts. As such habitat constraints are not present within the Subject Land, this species was excluded from the assessment.	No	NA	Very High - 3	No
<i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat (Breeding)	This species is known to breed in caves, tunnels, mines and culverts. This species has been historically recorded within the broader Taronga Zoo, however as there is no breeding habitat (caves, tunnels, mines and culverts) present within the Subject Land, this species was excluded from the assessment.	No	NA	Very High - 3	No
<i>Myotis macropus</i> Southern Myotis	This species has been historically recorded with the broader Taronga Zoo (Narla 2020). As the Subject Land is located within 200m of known habitat for this species, this species is required to be assumed present and offset accordingly.	No	Assumed Present	High - 2	Yes
<i>Ninox connivens</i> Barking Owl (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Ninox strenua</i> Powerful Owl (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No

Scientific Name	Included in Assessment?	Targeted Survey conducted?	Present within Subject Land?	Biodiversity Risk Weighting	Biodiversity Offset Credits Required?
<i>Pandion cristatus</i> Eastern Osprey (Breeding)	As per Appendix C of the BAM (DPIE2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	Moderate - 1.5	No
<i>Perameles nasuta</i> - endangered population Long-nosed Bandicoot, North Head	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Petaurus norfolcensis</i> Squirrel Glider	One (1) historic record of the species is located within the broader Taronga Zoo, however outside the Subject Land. This species prefers vegetation with large old trees with hollows (DPE 2022c). No hollows were present within the Subject Land. Therefore, this species has been excluded from the assessment.	No	NA	High - 2	No
<i>Phascolarctos cinereus</i> Koala (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Pseudophryne australis</i> Red-crowned Toadlet	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	Moderate - 1.5	No
<i>Pteropus poliocephalus</i> Grey-headed Flying-fox (Breeding)	One (1) historic records of this species occur in the broader Taronga Zoo however, no camps were present within the Subject Land. Therefore, this species has been excluded from the assessment.	NA	NA	High - 2	No
<i>Tyto novaehollandiae</i> Masked Owl (Breeding)	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No

Table 9. Candidate Flora Credit Species predicted to occur within the Subject Land.

Scientific Name	Included in Assessment?	Targeted Survey conducted?	Present within Subject Land?	Biodiversity Risk Weighting	Biodiversity Offset Credits Required?
<i>Acacia terminalis</i> subsp. Eastern Sydney Sunshine wattle	Although not identified within the BAMC (DPIE 2021a) as having the potential to occur within the Subject Land, this species was incidentally located within the broader Project Area during the site assessment. However, as the one (1) individual located is likely to have been planted and is situated outside of the Subject Land and will not be impacted by the proposed works, therefore no offsets are required.	Yes	No	High - 2	No
<i>Allocasuarina portuensis</i> Nielsen Park She-oak	As the Subject Land is located to the east of Gladesville and within 5km of the Sydney Harbour foreshore it is within the geographic distribution for this species. Therefore, the species was included in the assessment.	Yes	No	Very High – 3	No
<i>Leptospermum deanei</i>	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High - 2	No
<i>Melaleuca biconvexa</i> Biconvex Paperbark	As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAI species. This species is not an SAI species and was therefore excluded from the assessment.	No	NA	High – 2	No
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	Although not identified within the BAMC (DPIE 2021a) as having the potential to occur within the Subject Land, this species was incidentally located within the Project Area during the site assessment. However, the three (3) individuals located were planted and was not observed within the Subject Land. As these species are planted and are located outside their natural distribution no offsets are required.	Yes	No	High - 2	No

4.4 Targeted Species Credit Surveys

Targeted surveys were undertaken for species credit species considered likely to have suitable habitat within the Subject Land. These surveys were implemented in accordance with Section 6.5 of the BAM and all relevant DPE threatened species survey guidelines.

Targeted surveys were undertaken on 13th January 2021. Weather conditions taken from the nearest weather station (Sydney - Observatory Hill station no. 066214) in the lead up and during the field survey are outlined in **Table 10**.

Pre-survey weather conditions were generally conducive for identifying threatened species should they occur within the Subject Land. Rainfall in the week and month prior to the targeted survey provided ideal conditions for the flowering and/or emergence of the targeted flora species. Such rainfall also allowed for optimal conditions for the emergence of shrubs and groundcovers within the Subject Land, which ensured maximum species diversity was observed during the site visit.

Table 10. Weather conditions taken from the nearest weather stations (Station number 067021) in the lead up and during the field survey (BOM 2022). Survey date is in bold.

Timing/activities	Date	Day	Temperature		Rainfall (mm)
			Min	Max	
Lead up to the survey	6/01/2021	Wednesday	19.8	25.4	1.6
	7/01/2021	Thursday	18.4	23.5	1.8
	8/01/2021	Friday	17.6	22.7	5.4
	9/01/2021	Saturday	16.7	26.7	0
	10/01/2021	Sunday	17	27.8	0
	11/01/2021	Monday	18.2	28.6	0
	12/01/2021	Tuesday	18.8	29.3	0
Site Assessment	13/01/2021	Wednesday	20.9	29.8	0

4.4.1 Fauna Species Credit Survey

A total of twenty-two (22) threatened fauna species were identified within the BAMC (DPIE 2021a) as having the potential to occur within the Subject Land. One (1) threatened species not at risk of SAIL, *Myotis macropus* (Southern Myotis), was assumed present as it has been historically recorded within the broader Taronga Zoo, with the Subject Land containing known habitat (vegetation within 200m from waterbodies) for this species. The remaining twenty-one (21) species were excluded from assessment due to the following:

- Species are considered unlikely to occur and no further assessment is required for that species if it is determined that no habitat constraints are present on the entire Subject Land for the threatened species (as per Section 5.2.2 of the BAM, DPIE 2020a);
- As per Appendix C of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAIL species. Therefore, all non-SAIL species were excluded from the assessment.

4.4.2 Flora Species Credit Survey

A total of five (5) threatened flora species were identified as having the potential to occur within the Subject Land. Two (2) of these species; *Leptospermum deanei* and *Melaleuca biconvexa* were not surveyed for due to the following:

- As per Appendix c of the BAM (DPIE 2020a), the Streamlined Assessment Module only requires surveying for SAIL species. Therefore, all non-SAIL species were excluded from the assessment.

The remaining three (3) species were surveyed for within the Subject Land. The targeted surveys were undertaken for these species in accordance with the 'Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method' (DPIE 2020e; **Figure 13**). These species were not located within the Subject Land.

Table 11. Species credit flora species requiring targeted surveys.

Candidate Fauna Species	Survey Period (BAMC)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Allocasuarina portuensis</i> Nielsen Park She-oak	✓											
<i>Acacia terminalis</i> subsp. Eastern Sydney Sunshine wattle	✓											
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	✓											
Key	✓ = Surveyed					= Optimum Survey Period						

4.5 Species Polygons

A species polygon was created for one (1) species credit species assumed or considered present within the Subject Land:

- *Myotis macropus* (Southern Myotis): assumed to be present within the Subject Land as it is located within 200m of known habitat. According to Section 5.2.5 of the BAM (DPIE 2020a), where a species is assumed to be present on the Subject Land, the species polygon is to comprise of the entire vegetation zone(s) the species is predicted to occur within. As such, the species polygon for this species is considered to be 0.05ha of vegetation within Zone 1 (**Figure 14**).

No species polygons were created for *Acacia terminalis* subsp. Eastern Sydney or *Syzygium paniculatum* as these individuals are considered to not be naturally occurring and are located outside of the Subject Land and are not expected to be impacted by the proposed development.

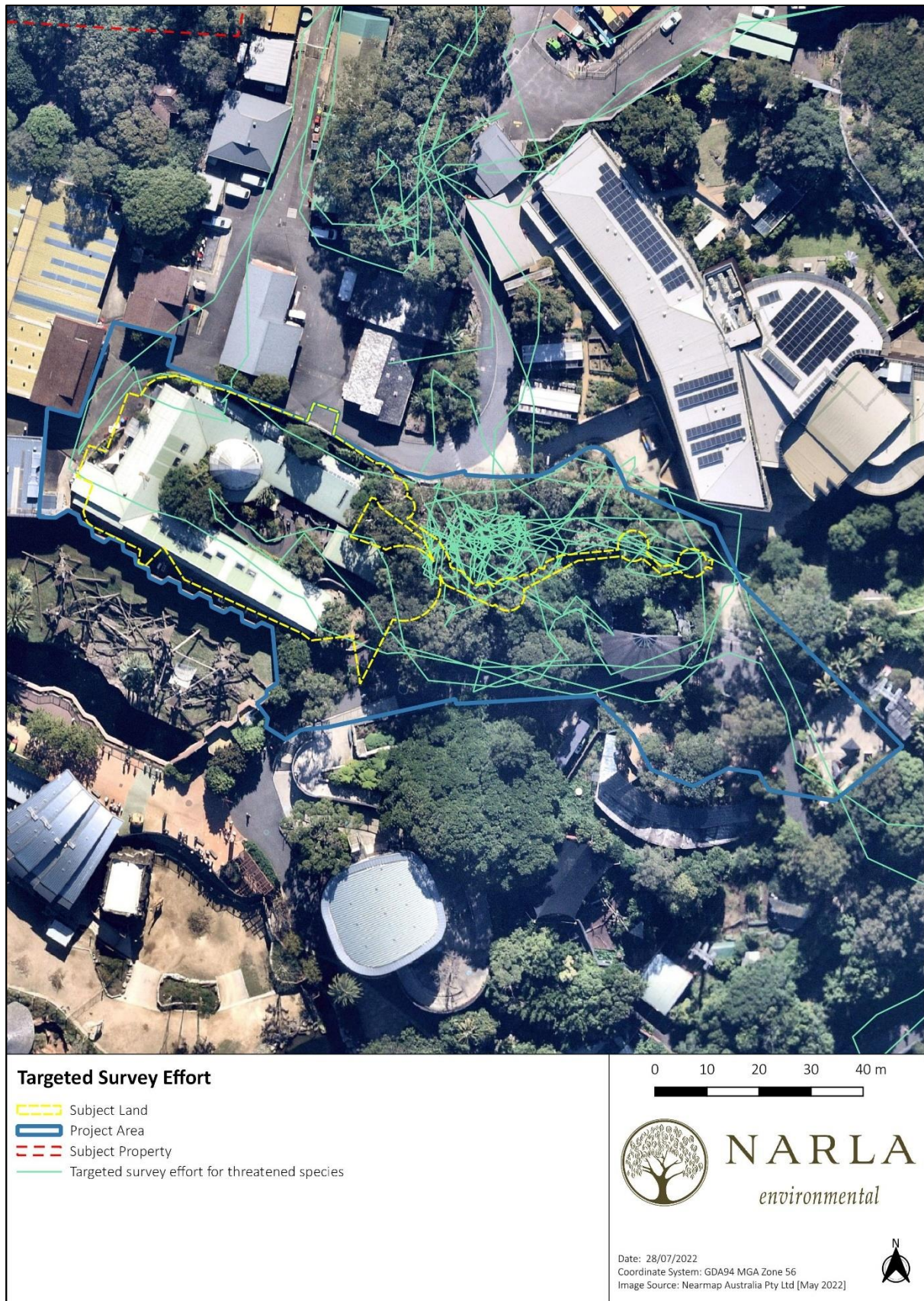


Figure 13. Targeted survey effort for species credit species within the Subject Land.

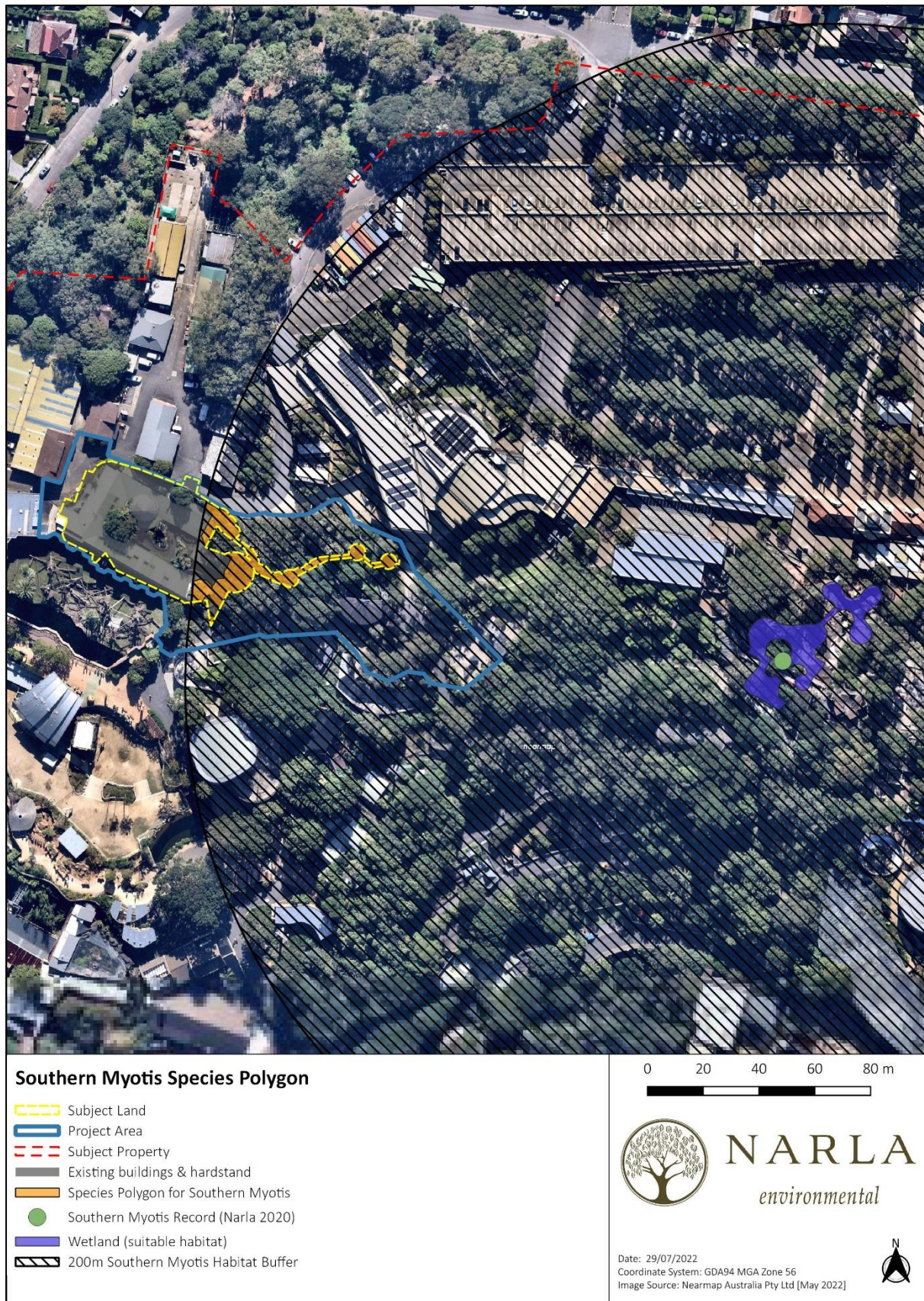


Figure 14. Southern Myotis species polygon.

5. Prescribed Impacts

Certain projects may have impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. For many of these impacts, the biodiversity values may be difficult to quantify, replace or offset, making avoiding and minimising impacts critical. Prescribed biodiversity impacts require an assessment of the impacts of the subdivision on the habitat of threatened species or ecological communities. This is discussed in **Table 12**.

Table 12. Prescribed and uncertain impacts associated with the proposed development.

Will there be impacts on any of the following?	Yes/No	If Yes, Address all of the assessment questions from section 6 of the BAM
Habitat of threatened entities including: ▪ karst, caves, crevices, cliffs, rocks and other geological features of significance, or ▪ human-made structures, or ▪ non-native vegetation	Yes	There are no karsts, caves, crevices, cliffs, rocks and other features of geological significance on or near the Subject Land. Bush rock and rock ledges was identified adjacent to the Subject Land however this will not be impacted by the proposed development. The Subject Land contains existing buildings, that will be demolished as part of the development. A number of threatened microbat species may utilise the roof space for roosting and breeding, including: ▪ <i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle); ▪ <i>Micronomus norfolkensis</i> (Eastern Coastal Free-tailed Bat); ▪ <i>Myotis macropus</i> (Southern Myotis); ▪ <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tail-bat); and ▪ <i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat). Non-native vegetation was present within the Subject Land; however, the removal of this vegetation is not expected to impact any threatened species.

Will there be impacts on any of the following?	Yes/No	If Yes, Address all of the assessment questions from section 6 of the BAM
On areas connecting threatened species habitat, such as movement corridors	No	It is unlikely the proposed development will interrupt connectivity for any threatened species, as areas of habitat connectivity will continue to exist in vegetated areas surrounding the Subject Land.
That affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining)	No	It is not expected that the removal of vegetation within the Subject Land will impact upon any groundwater processes or hydrological processes within the surrounding landscape, particularly as most of the vegetation has been historically planted and largely altered.
On threatened and protected animals from turbine strikes from a wind farm	No	No wind farms are associated with the proposed development.
On threatened species or fauna that are part of a TEC from vehicle strikes.	No	The Subject Land has the potential to support threatened species. However, due to the nature of the proposed development, it is highly unlikely that vehicle strikes will be an issue given the slow speed requirements of vehicles within the property.

6. Avoid and Minimise Impacts

6.1 Impact Mitigation and Minimisation Measures

This section details the measures to be implemented before, during and post construction to avoid and minimise the impacts of the project (Table 13).

Table 13. Mitigation and minimisation of impacts associated with the proposed development.

Action	Outcome	Timing	Responsibility
Avoid and Minimise Impact - Project Location and Design	The proposed development has been strategically positioned to minimise impacts on native vegetation and habitat as much as possible. The proponent has located the proposed works within historically modified areas, mostly situated within the footprint of existing buildings and hardstand areas. Only minor impacts to areas of existing vegetation is anticipated to provide access, with efforts made to retain as many high value trees as possible. Areas of important bush rock and sandstone rock ledges have also been deliberately avoided and retained. Any temporary structures required for construction works should be located within hardstand and cleared areas that have minimal biodiversity values. This will avoid unnecessary impacts on native vegetation and habitat elsewhere within the Subject Property.	Pre-construction phase	Proponent
Preparation of a Construction Management Plan (CMP)	A CMP will be required for the construction phase of the project, and will be prepared as part of the SSDA. The CMP is to include measures for the management of soil erosion and sedimentation; hazardous materials; noise, vibration and dust; and rubbish removal. The proposed mitigation measures would include environmental safeguards for protection of neighbouring properties and nearby waterways in accordance with relevant policy documentation and Government guidelines. In order to address the potential impacts of the proposal on biodiversity, the mitigation and management measures outlined within this table would be implemented as part of the CMP for the site.	Pre-construction phase	Proponent Construction Contractor

Action	Outcome	Timing	Responsibility
Tree Protections	Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970) outlines that a Tree Protection Zone (TPZ) is the principal means of protecting trees on construction sites. It is an area isolated from construction disturbance so that the tree remains viable. Ideally, works should be avoided within the TPZ. A Minor Encroachment is less than 10% of the TPZ and is outside the SRZ. A Minor Encroachment is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. A Major Encroachment is greater than 10% of the TPZ or inside the SRZ. Major Encroachments generally require root investigations undertaken by non-destructive methods or the use of tree sensitive construction methods. Tree protection fencing is to be installed around all trees proposed to be retained prior to the commencement of any construction works.	Pre-construction phase	Proponent Arborist
Assigning a Project Ecologist for vegetation clearing	Prior to construction, the applicant should commission the services of a qualified and experienced Ecologist Consultant (minimum 3 years' experience) with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management. The Ecologist must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act. The Ecologist may be commissioned to: ▪ Undertake an extensive pre-clearing survey, delineating habitat-bearing trees and shrubs to be retained/removed; and ▪ Supervise the clearance of trees and shrubs (native and exotic) in order to capture, treat and/or relocate any displaced fauna.	Prior to and during vegetation clearance works	Proponent Project Ecologist
Relocation of woody debris	Any woody debris (fallen trees and logs) within the Subject Land are to be relocated to areas of native vegetation elsewhere with the Zoo.	Construction phase	Project Ecologist Proponent

Action	Outcome	Timing	Responsibility
			Bush regeneration contractor
Erosion and Sedimentation	Appropriate erosion and sediment control must be erected and maintained at all times during construction in order to avoid the potential of incurring indirect impacts on biodiversity values. As a minimum, such measures should comply with the relevant industry guidelines such as 'the Blue Book' (Landcom 2004).	Construction phase	Proponent Construction Contractor
Erection of temporary fencing	Temporary fencing should be erected around retained native vegetation that may incur indirect impacts on biodiversity values due to the construction works.	Construction phase	Proponent Construction Contractor
Storage and Stockpiling (Soil and Materials)	Allocate all storage, stockpile and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site in order to avoid the potential of incurring indirect impacts on biodiversity values.	Construction phase	Construction Contractors
Stormwater	Potential impacts relating to stormwater and runoff will be managed during construction and operation phases. The CEMP will guide stormwater management during the construction phase of development.	Post-construction phase	Proponent Construction Contractors/ Architect

7. Assessment of Impacts

7.1 Direct Impacts

The proposed development will result in impacts to the following vegetation:

- 0.08ha of vegetation representative of PCT 1778.

The development has been strategically positioned to minimise impacts on native vegetation and habitat as much as possible. The proponent has located the proposed works within historically modified areas, with the majority comprising of existing buildings and hardstand areas.

7.2 Prescribed Impacts

As there is potential for the Subject Land to contain habitat for a number of threatened microbat species in the form of human-made structures, an assessment of this prescribed impact must be undertaken in accordance with Section 8.3 of the BAM (DPIE 2020a). This is discussed in **Table 14**.

Table 14. Prescribed and uncertain impacts associated with the proposed development.

Prescribed Impact	Nature, Extent and Duration	Threatened Species and Their Habitat Likely to be Impacted	Consequences of the Impacts on Threatened Entities
Habitat of threatened entities: ▪ human-made structures.	There is the potential that threatened microbat species use human-made structures (in particular, roof cavities) within the Subject Land for roosting and potentially breeding. The demolition of these structures has the potential to temporarily displace any occurring individuals. These species are highly mobile and there is ample suitable roosting/breeding habitat nearby. It is therefore likely that this prescribed impact will have a low impact of short duration To manage these impacts works should be conducted during warmer months (not winter), with a pre-clearing survey conducted for microbats in the roof space of the building prior to demolition. If any individuals are found to be present, they are to be captured the morning of demolition works, and released at night time into surrounding bushland following demolition works.	▪ <i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle); ▪ <i>Micronomus norfolkensis</i> (Eastern Coastal Free-tailed Bat); ▪ <i>Myotis macropus</i> (Southern Myotis); ▪ <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheath-tail-bat); and ▪ <i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat).	While the demolition of potential roost/breeding sites may temporarily displace local populations of threatened microbats, these species are highly mobile with large areas of habitat continuing to exist in the broader locality, which would provide alternative roost/breeding sites. As such, any impacts would be considered minor and temporary.

7.3 Indirect Impacts

Indirect impacts occur when the proposal or activities relating to the construction or operation of the proposal affect native vegetation, threatened ecological communities and threatened species habitat beyond the Subject Land. Impacts may also result from changes to land-use patterns, such as an increase in vehicular access and human activity on native vegetation, threatened ecological communities and threatened species habitat. The indirect impacts of this proposed development are outlined in **Table 15**.

Table 15. Indirect impacts associated with the proposed development.

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
(a) inadvertent impacts on adjacent habitat or vegetation	There is the potential for minor impacts to vegetation directly adjacent to the Subject Land as a result of the proposed development. However, the vegetation adjacent to the Subject Land is already highly modified and subject to considerable, ongoing human disturbance. It is therefore likely that the proposed works will result in negligible/low inadvertent impacts during or post construction.	One PCT (PCT1778- not a TEC) occurs within the Subject Land. <i>Myotis macropus</i> (Southern Myotis) assumed present within the Subject Land. Threatened flora species (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>) are present within the broader Project Area. Foraging habitat for threatened species may be inadvertently impacted.	While changes to vegetation condition may have a low and localised impact to PCT 1778, threatened species and their habitats, this is not expected to impact on their bioregional persistence. In addition, exclusion fencing, pre-clearing surveys and clearing supervision has been proposed to reduce the risk of indirect impacts to any native vegetation and potentially occurring threatened species adjacent to the Subject Land.

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
(b) reduced viability of adjacent habitat due to edge effects	Due to the highly modified nature of the vegetation adjacent to the Subject Land, as well as the already existing presence of exotic vegetation, it is unlikely that the proposed development will result in a reduction in the viability of adjacent habitat due to edge effects.	One PCT (PCT1778- not a TEC) occurs within the Subject Land. <i>Myotis macropus</i> (Southern Myotis) assumed present within the Subject Land. Threatened flora species (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>) are present within the broader Project Area. There is also potential that threatened species use habitat adjacent to the Subject Land. Such species may be impacted by edge effect leading to a reduced viability in habitat.	While edge effects may have a localised impact to PCT 1778 and threatened species, this is not expected to impact on their bioregional persistence, considering the areas of habitat connectivity surrounding the Subject Land.
(c) reduced viability of adjacent habitat due to noise, dust or light spill	An increase in noise is to be expected during construction, which may impact on species roosting or foraging in habitat adjacent to the site. It is not expected that construction would occur throughout the night, and as such would not impact on nocturnal species that may utilise adjacent habitat, or diurnal	<i>Myotis macropus</i> (Southern Myotis) assumed present within the Subject Land.	While the proposed development may have a localised impact to threatened species, this is not expected to impact on their bioregional persistence, considering

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
	species that roost in adjacent habitat. Post-construction it is expected that noise levels will return to current levels, as the site will be used in a similar manner (i.e., as a zoological park). The construction may increase dust in adjacent habitat. Dust can impact on a plants ability to photosynthesise and may increase plant mortality in the adjacent vegetation. It is however not expected that this would have such an impact to decrease the viability of adjacent habitat. It is expected that the construction would occur during normal working hours, and as such light spill is not expected to affect adjacent habitat.	Threatened flora species (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>) are present within the broader Project Area. There is potential that threatened species use habitat adjacent to the Subject Land. These species may be impacted by an increase in noise within the Subject Land.	large areas of habitat connectivity allowing their movement away from impacted areas.
(d) transport of weeds and pathogens from the site to adjacent vegetation	As previously discussed, the proposed construction may lead to an increase in weed infiltration into adjacent habitat due to enhanced edge effects. It is however not expected that weeds will be transported via human or vehicular traffic into surrounding areas during construction. Temporary fencing will be erected around retained native vegetation to avoid such indirect impacts occurring during construction.	One PCT (PCT 1778) was identified within the Subject Land. Threatened flora species (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>) are present within the broader Project Area.	While weeds and pathogens may have a localised impact to PCTs and threatened species, this is not expected to impact on their bioregional persistence, considering the large habitat connectivity within the surrounding areas.

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
		There is also potential that threatened species use habitat adjacent to the Subject Land. The PCT and threatened species may be impacted by weed and pathogen transportation leading to a reduced viability in habitat.	
(e) increased risk of starvation, exposure and loss of shade or shelter	It is highly unlikely that any threatened fauna would be exposed to increased risks from starvation, exposure, and loss of shade and shelter as a result of the proposed development given the small area of vegetation being removed. No habitat is to be removed beyond the Subject Land, although disturbances from other indirect impacts may deem such habitats unsuitable for certain species. However, due to the areas of habitat connectivity adjoining the Subject Land, it is unlikely that this localised impact will be significant as such habitats will continue to provide food resources and shelter for fauna species.	N/A	N/A
(f) loss of breeding habitats	No breeding habitat features (e.g., hollows, nests caves) were identified immediately adjacent to the Subject Land. It is	N/A	N/A

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
	therefore considered unlikely that the proposed works would result in a loss of breeding habitats.		
(g) trampling of threatened flora species	Although no threatened flora species were recorded within the Subject Land, two (2) threatened flora species were recorded in remnant native vegetation within the broader Project Area (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>). In order to prevent any impacts to these threatened flora species, retained native vegetation areas will be delineated with temporary fencing to avoid such impacts occurring during construction.	Threatened flora species (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>) may be impacted by accidental trampling or impacts.	While the proposed development may result in a localised increase in threatened flora being accidentally trampled or impacted, this is not considered a high risk, and is not expected to impact on their bioregional persistence, considering exclusion fencing has been suggested around all vegetation to be retained.
(h) inhibition of nitrogen fixation and increased soil salinity	It is unlikely that the inhibition of nitrogen fixation will affect vegetation adjacent to the Subject Land. Increased soil salinity may result due to clearing of vegetation leading to the rising of the water table. However, clearing will be limited to the Subject Land and as such is not expected to affect vegetation directly adjacent to the Subject Land.	N/A	N/A
(i) fertiliser drift	This issue is not likely to affect the vegetation surrounding the Subject Land. Although fertiliser may be used in landscaped	N/A	N/A

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
	vegetation, no fertiliser drift is expected to impact on adjacent vegetation.		
(j) rubbish dumping	Large scale rubbish dumping is not considered to be an issue in vegetation adjacent to the Subject Land as it is regularly maintained by Zoo staff. The minor dumping/littering of food resources may provide a food source for fauna, including threatened species. However, this may also encourage invasive species into such habitats.	<i>Myotis macropus</i> (Southern Myotis) assumed present within the Subject Land. Threatened flora species (<i>Acacia terminalis</i> subsp. Eastern Sydney and <i>Syzygium paniculatum</i>) are present within the broader Project Area. There is potential that threatened fauna species use habitat adjacent to the Subject Land. Such species may be impacted by the dumping of rubbish, particularly food resources. This may result in both positive (food source) and negative impacts (increase in predators) to such species.	This impact is expected to be localised and will not have an overall impact on the bioregional persistence of the threatened species.

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
(k) wood collection	Wood collection is not considered to be an issue within the vegetation adjacent to the Subject Land. No wood collection is associated with the proposed development.	N/A	N/A
(l) bush rock removal and disturbance	No bush rock is proposed for removal within the vegetation adjacent to the Subject Land as a result of the proposed development.	N/A	N/A
(m) increase in predatory species populations	It is unlikely that introduced predators have access to the Subject Land as the proposed development is situated within Taronga Zoo Sydney which is surrounded by fencing. The zoo is also known to conduct predatory species trapping and monitoring through the use of wildlife cameras.	N/A	N/A
(n) increase in pest animal populations	There is potential that pest animal populations already inhabit areas surrounding the Subject Land (particularly smaller species which may fit through the chain-link fence). The proposed development is not likely to increase this potential risk.	N/A	N/A

Indirect Impact	Nature, extent and duration	TEC's/PCTs and/or Threatened Species and their habitat likely to be impacted	Consequences of the impacts for the bioregional persistence of the native vegetation, threatened species, threatened ecological communities and their habitats.
(o) increased risk of fire	The vegetation immediately adjacent to the Subject Land is not identified by Mosman Council as occurring within bushfire prone land. It is not expected that the proposed development will alter the bushfire risk of vegetation surrounding the Subject Land.	N/A	N/A
(p) disturbance to specialist breeding and foraging habitat, e.g., beach nesting for shorebirds.	No specialist breeding and foraging habitat was identified adjacent to the Subject Land. It is therefore not expected that the proposed development will disturb any specialist breeding and foraging habitat.	N/A	N/A

8. Thresholds for Assessing and Offsetting

8.1 Impacts on Native Vegetation

The following native vegetation within the Subject Land is proposed to be impacted as a result of the proposed development:

- 0.08ha representative of PCT 1788.

The purchase and retirement of Biodiversity Offset Credits will be required for the following native vegetation within the Subject Land (**Figure 15**):

- 0.08ha within Zone 1, representative of PCT 1778.

8.2 Impacts on Threatened Species

The following threatened species has been assumed present within the Subject Land and will require the purchase and retirement of Biodiversity Offset Credits:

- *Myotis macropus* (Southern Myotis).

8.3 Serious and Irreversible Impacts (SAIL's)

No ecological communities or threatened species at risk of Serious and Irreversible Impacts were identified within or likely to be utilised the Subject Land.

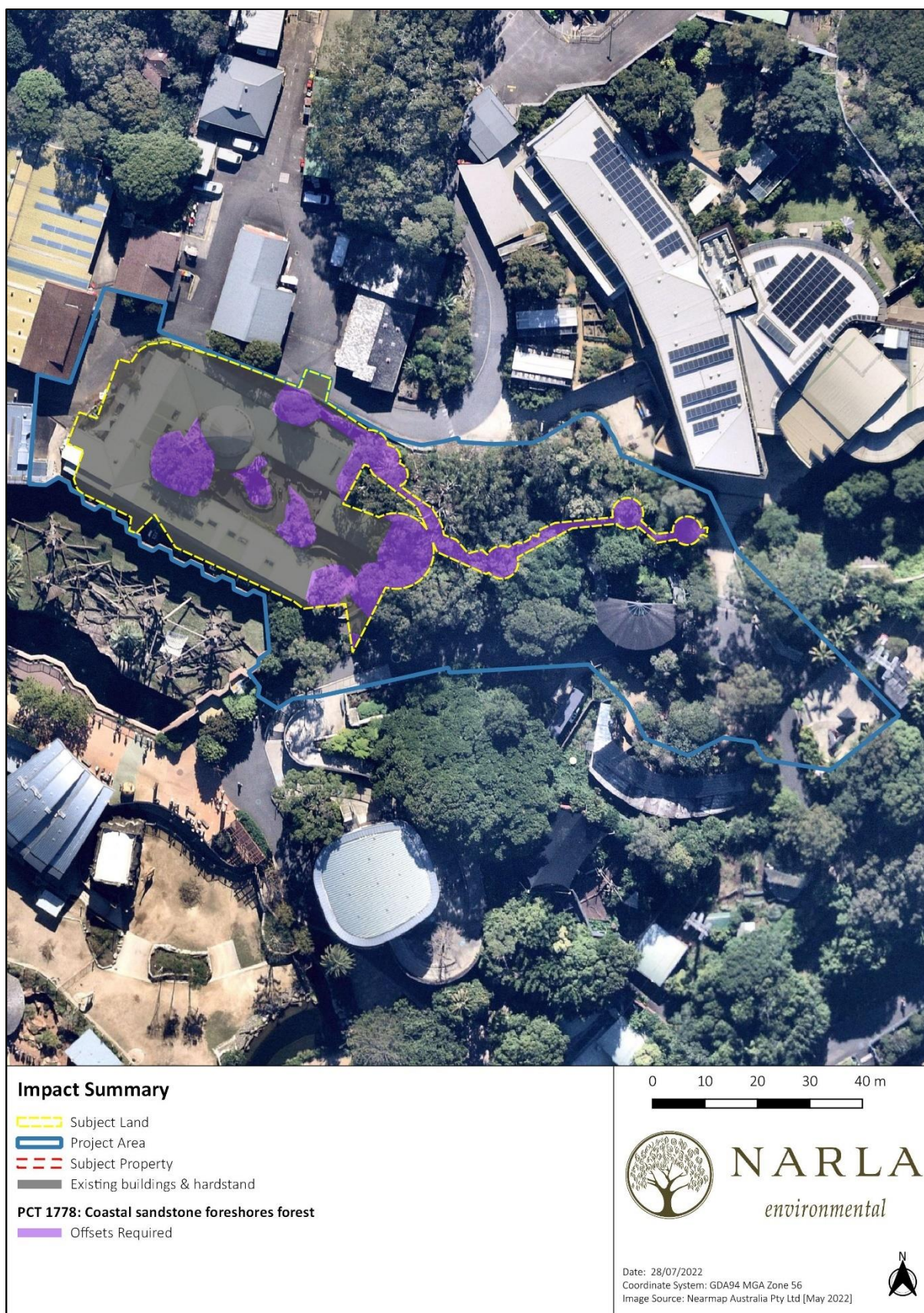


Figure 15. Impacts on native vegetation and offset requirements.

9. Biodiversity Offset Credit Requirements

The preferred approach to offset the residual impacts of the proposal is to purchase and retire the appropriate species credits from registered Biodiversity Stewardship Sites that comply with the trading rules of the NSW BOS in accordance with the 'like for like' report generated by the BAM calculator. If such credits are unavailable, credits would be sourced in accordance with the 'variation report' generated by the BAMC.

A payment to the Biodiversity Conservation Trust (BCT) would be considered as a contingency option if a suitable number and type of biodiversity credits cannot be secured.

Estimated costs to purchase these credits, or alternatively, to allocate offset funds directly into the NSW BCT are available in the NSW Biodiversity Offsets Payment Calculator (DPIE 2021a).

9.1 Offset Requirement for Ecosystem Credits

A total of two (2) ecosystem credit is required to offset the biodiversity impacts of the proposed development (Table 16).

Table 16. Ecosystem credits required to offset the proposed development.

PCT	BC Act Status	Zone	Total Area (ha)	Ecosystem Credits Required
PCT 1778: Coastal sandstone foreshores forest	NA	Zone 1	0.08	2
Total Ecosystem Credits				2

9.2 Offset Requirement for Species Credits

One (1) candidate species credit species will require offsetting through the retiring of biodiversity offset species credits under the BOS as a result of the proposed development (Table 17).

Table 17. Species credits required to offset the proposed development.

Species	BC Act Status	Zone	Total Area (ha)	Species Credits Required
<i>Myotis macropus</i> Southern Myotis	Vulnerable	Zone 1	0.05	1
		Subtotal		1

10. Other Relevant Legislation and Planning Policies

10.1 State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection 2021

This Policy aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. This chapter of the SEPP applies to LGAs that are listed in Schedule 2 ‘Local government areas’ of the SEPP. As Mosman LGA is not included in Schedule 1, this SEPP does not apply to the Subject Land.

10.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 6 Bushland in Urban Areas

This chapter of the SEPP applies to the areas and parts of areas specified in Schedule 5 of the SEPP that adjoin bushland zoned or reserved for public open space purposes. As the Subject Land does not adjoin land zoned or reserved for public open space, this SEPP does not apply to the proposed development.

10.3 State Environmental Planning Policy (Resilience and Hazards) 2021 – Chapter 2 Coastal Manage

Chapter 2 of the SEPP applies to land within the coastal zone. The coastal zone means the area of land comprised of the following coastal management areas:

- the coastal wetlands and littoral rainforests area;
- the coastal vulnerability area;
- the coastal environment area; or
- the coastal use area.

The Subject Land is located within the SEPP’s ‘coastal environment area’ and ‘Coastal Use Area’, however, this clause does not apply to land within the Foreshores and Waterways Area within the meaning of Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. As such, this SEPP is not triggered by the proposed development.

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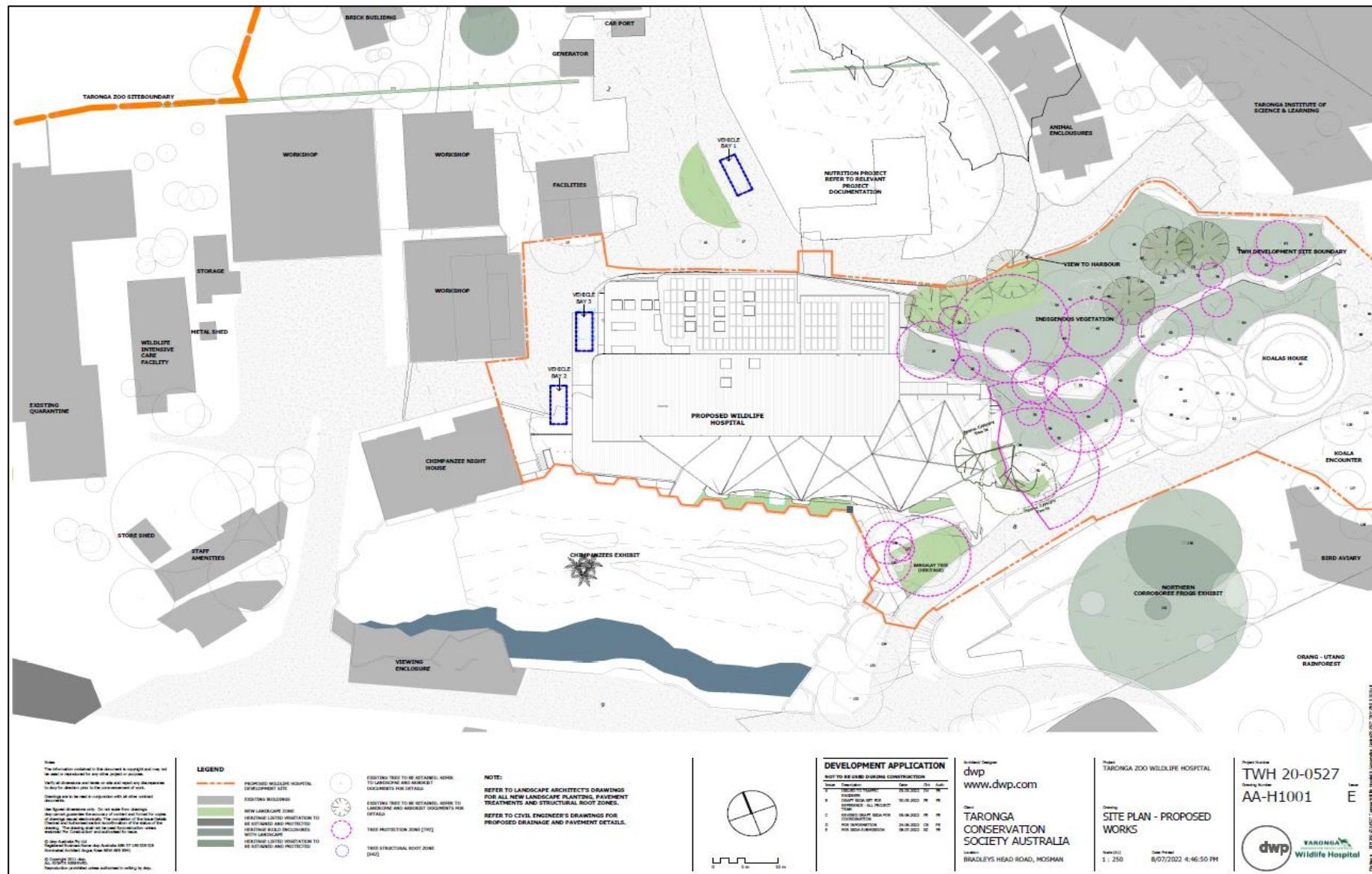
12. Appendices

Appendix 1. Taronga Zoo Wildlife Hospital— Site Plan – Proposed Works: issue E (DWP 2022).

Appendix 2. BAM Site - Field Survey Forma (copied directly from Electronic Data Sheet).

Appendix 3. BAMC Generated Biodiversity Credit Report.

Appendix 1. Taronga Zoo Wildlife Hospital— Site Plan – Proposed Works: issue E (DWP 2022).



Appendix 2. BAM Site - Field Survey Forma (copied directly from Electronic Data Sheet).

BAM Site – Field Survey Form					
Date:	13.01.21	Plot ID:	Plot 1	Photo #:	0
Zone:	56H	Plot Dimensions:	50m x 20m	Easting:	337238.14 m E
Datum:	94	Middle bearing from 0m:	80	Northing:	6253910.32 m S
PCT:	Zone 1: PCT 1778				
Growth Form	Scientific Name		Cover	Abundance	
Shrub (SG)	<i>Acacia linifolia</i>		2	1	
Shrub (SG)	<i>Acacia longifolia</i>		0.1	1	
Shrub (SG)	<i>Allocasuarina distyla</i>		2	3	
Tree (TG)	<i>Angophora costata</i>		1	2	
HTE	<i>Anredera cordifolia</i>		0.3	15	
HTE	<i>Asparagus aethiopicus</i>		0.1	10	
Tree (TG)	<i>Banksia integrifolia</i>		0.1	1	
Shrub (SG)	<i>Breynia oblongifolia</i>		2	10	
Tree (TG)	<i>Casuarina glauca</i>		1	1	
Other (OG)	<i>Cayratia clematidea</i>		0.1	5	
Exotic	<i>Cenchrus setaceus</i>		1	5	
HTE	<i>Cestrum parqui</i>		0.1	1	
Forb (FG)	<i>Commelina cyanea</i>		1	40	
Exotic	<i>Conyza sumatrensis</i>		0.1	10	
Shrub (SG)	<i>Crowea saligna</i>		0.1	1	
Tree (TG)	<i>Cupaniopsis anacardioides</i>		5	10	
Grass & grasslike (GG)	<i>Cyperus laevis</i>		0.1	5	
Forb (FG)	<i>Dianella caerulea</i>		0.5	15	
Grass & grasslike (GG)	<i>Digitaria parviflora</i>		2	30	
HTE	<i>Ehrharta erecta</i>		20	N/A	
HTE	<i>Eragrostis curvula</i>		0.5	5	
Tree (TG)	<i>Eucalyptus botryoides</i>		10	N/A	
Tree (TG)	<i>Eucalyptus punctata</i>		20	N/A	
Tree (TG)	<i>Eucalyptus robusta</i>		15	N/A	
Tree (TG)	<i>Eucalyptus tereticornis</i>		10	N/A	
Tree (TG)	<i>Ficus sp.</i>		0.1	1	
Tree (TG)	<i>Glochidion ferdinandi</i>		5	5	
Other (OG)	<i>Kennedia rubicunda</i>		0.1	2	
HTE	<i>Ligustrum lucidum</i>		0.1	1	
Grass & grasslike (GG)	<i>Lomandra longifolia</i>		0.2	1	
Tree (TG)	<i>Neolitsea dealbata</i>		0.5	1	
Tree (TG)	<i>Notelaea longifolia</i>		0.5	1	
HTE	<i>Olea europaea subsp. cuspidata</i>		0.2	10	
Exotic	<i>Parietaria judaica</i>		0.1	1	
Grass & grasslike (GG)	<i>Paspalidium distans</i>		0.1	1	
HTE	<i>Phoenix canariensis</i>		0.2	1	
Shrub (SG)	<i>Phyllota spp.</i>		0.2	1	
Shrub (SG)	<i>Pittosporum undulatum</i>		10	N/A	

Forb (FG)	<i>Plectranthus parviflorus</i>	0.1	1
Shrub (SG)	<i>Polyscias sambucifolia</i>	3	10
Exotic	<i>Solanum nigrum</i>	0.1	15
HTE	<i>Solanum seaforthianum</i>	1	10
Shrub (SG)	<i>Syzygium paniculatum</i>	0.5	1
DBH		# Tree Stems Count	# Hollow Bearing Trees
80+cm		0	0
50-79cm		1	
30-49cm		Present	
20-29cm		Present	
10-19cm		Present	
5-9cm		Present	
<5cm		Present	
Length of Logs (m)		20	
BAM Attribute (1x1m)		Litter Cover (%)	
1 (5m)		100	
2 (15m)		100	
3 (25m)		45	
4 (35m)		60	
5 (45m)		15	
Average		64	
Growth Form	Composition Data	Structure Data	
	(Count of Native Cover)	(Sum of Cover)	
Tree	12	68.2	
Shrub	9	19.9	
Grass	4	2.4	
Forb	3	1.6	
Fern	0	0	
Other	2	0.2	
High Threat Exotics	9	22.5	



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00034389/BAAS21009/22/00034390	Taronga Wildlife Hospital	16/06/2022
Assessor Name	Assessor Number	BAM Data version *
Christopher Moore	BAAS21009	54
Proponent Names	Report Created	BAM Case Status
	17/08/2022	Finalised
Assessment Revision	Assessment Type	Date Finalised
0	Major Projects	17/08/2022

BOS Threshold: Area clearing threshold

* 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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added

Assessment Id	Proposal Name
00034389/BAAS21009/22/00034390	Taronga Wildlife Hospital

BAM Biodiversity Credit Report (Like for like)

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1778-Coastal sandstone foreshores forest	Not a TEC	0.1	0	2	2

Assessment Id

00034389/BAAS21009/22/00034390

Proposal Name

Taronga Wildlife Hospital

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BAM Biodiversity Credit Report (Like for like)

1778-Coastal sandstone foreshores forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Sydney Coastal Dry Sclerophyll Forests This includes PCT's: 1778	Sydney Coastal Dry Sclerophyll Forests > =90%	1778_Moderate	No	2	Pittwater, Cumberland, Sydney Cataract, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	1778_Moderate	0.1	1.00

Credit Retirement Options

Like-for-like credit retirement options

Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Assessment Id

00034389/BAAS21009/22/00034390

Proposal Name

Taronga Wildlife Hospital

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