

Appendix 11

Flora and Fauna Impact Assessment

Flora and Fauna Impact Assessment

Timbrell Park, Five Dock

Prepared by Ecological Consultants Australia Pty Ltd

TA Kingfisher Urban Ecology and Wetlands

23 June 2025



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Document control

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Shortened forms

APZ	asset protection zone
AOBV	area of outstanding biodiversity value
BAM	biodiversity Assessment Method
BAM-C	biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
CEEC	critically endangered ecological community
DBH	diameter at breast height over bark
EC	ecological community listed under the EPBC Act
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EEC	endangered ecological community
HTW	high threat weed
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	local government area
LLS Act	<i>Local Land Services Act 2013 (NSW)</i>
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
PCT	plant community type
SAII	serious and irreversible impact
TBDC	threatened Biodiversity Data Collection
TEC	threatened ecological community
VEC	Vulnerable ecological community

1 Introduction

1.1 Purpose of the report

This Flora and Fauna Assessment has been prepared for Timbrell Park, located at Henley Marine Drive, Five Dock. The purpose of this assessment is to evaluate the subject land's ecological values, identify potential impacts of the proposed development, and ensure compliance with relevant environmental legislation and planning policies.

The assessment follows the guidelines set out in the *Biodiversity Conservation Act 2016* (BC Act), the *Environmental Planning and Assessment Act 1979* (EP&A Act), and the NSW Biodiversity Assessment Method (BAM) where applicable. It also considers local planning controls under the *Canada Bay Local Environmental Plan 2013* and other relevant policies.

A subject land inspection was undertaken to document existing vegetation communities, identify any threatened species or habitat features, and assess the ecological condition of the land. The assessment includes a review of existing databases, field survey results, and an evaluation of potential constraints and mitigation measures.

This report aims to provide an objective ecological assessment to inform the planning and decision-making process while ensuring the protection and management of significant flora and fauna values within the subject land and surrounding landscape.

1.2 Subject land description

The subject land is located at Henley Marine Drive, Five Dock, within the City of Canada Bay Local Government Area (LGA) (refer to subject land details in Table 1.1). The subject land is depicted in Figure 1.1 and 1.2 with its surroundings further highlighted in Figure 1.3.

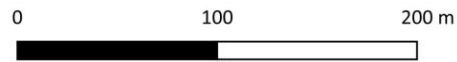
The subject land is a diamond shaped parcel of land situated directly east of the Parramatta River and Iron Cove Creek to the south. It is a public park with several football fields, surrounded by a footpath and trees on the southern and eastern boundaries. The subject land is bordered by Henley Marine Drive to the west and north, Timbrell Drive to the east and Iron Cove Creek to the south.

Currently, the subject land comprises several football fields, amenities buildings, playground, toilet blocks, café, mini mountain bike trail, and walking track.

Table 1.1. Subject land details.

Address	Henley Marine Dr, Five Dock NSW 2046
Local Government Area	City of Canada Bay Council
Lot and DP	Lot 7010 DP 93651 & Lot 1 DP356799*
Subject land Area	11.49 ha
Local Environmental Plan	<i>Canada Bay Local Environmental Plan 2013</i>
Zoning	RE1 - Public Recreation

*The majority of the subject land sits within Lot 7010 DP 93651, part of the subject land is within Lot 1 DP356799, and part of the subject land is not designated to a Lot and DP.



Legend

 Subject land

Timbrell Park, Five Dock

Figure 1.1. Subject Land

Coordinate system: GDA 94 / NSW Lambert
Imagery: Nearmap 20/1/25

Figure 1.1. Subject land.

Source: NSW SIX Maps.

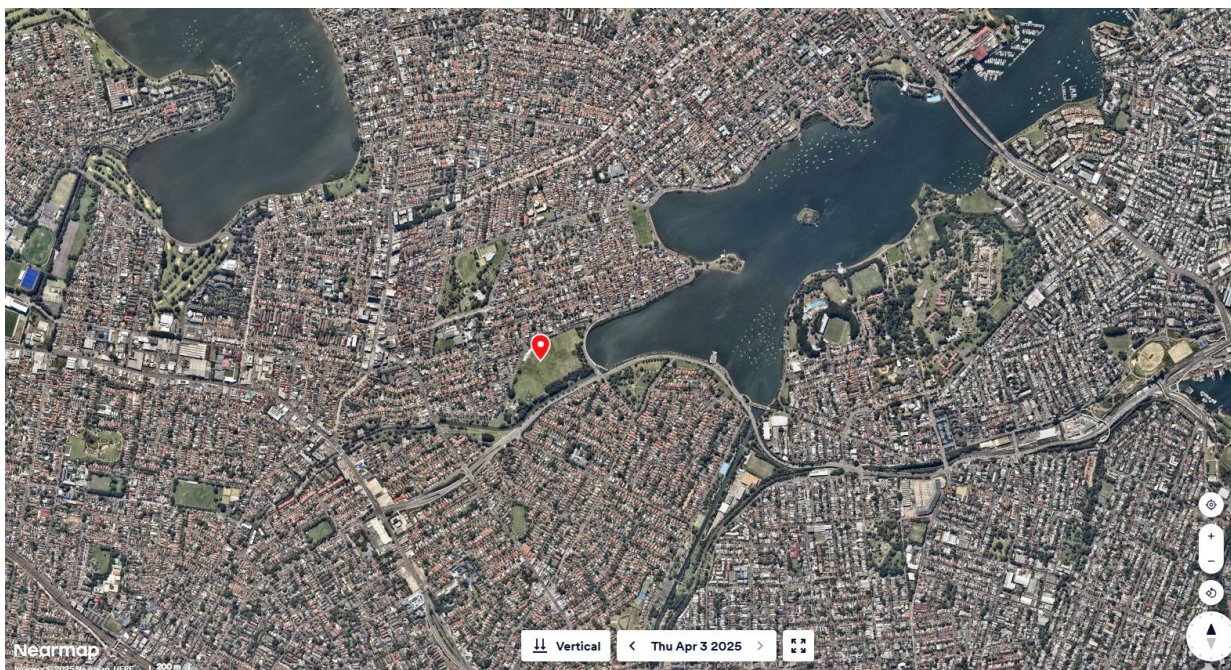


Figure 1.3. Immediate surroundings.

Source: Nearmap 3/4/25.

1.3 Proposed development

The proposed development aims to enhance the lighting infrastructure of the subject land's sporting fields by replacing outdated lighting with modern, energy-efficient LED lighting. This upgrade is intended to improve visibility, reduce energy consumption, and minimise light spill to surrounding areas while ensuring compliance with relevant lighting standards.

The scope of the development has also expanded to include a broader range of upgrades to improve the overall functionality and recreational value of the park. The key components of the proposed development include:

- **Demolition and removal** of ten existing light poles that are no longer fit for purpose.
- **Installation of ten new LED light poles**, designed to provide enhanced illumination with improved energy efficiency and reduced environmental impact.
- **Retention and upgrade of one existing light pole**, which will be modified to accommodate LED luminaires in line with the new lighting system.
- **Parking upgrade along Henley Marine Drive** to improve access and capacity for park users.
- **Regrading of the sports fields** to improve surface quality and drainage, enhancing usability for various sporting activities.

This development is expected to contribute significantly to the functionality and amenity of the park, benefiting both players and spectators by ensuring a well-lit, safe, and versatile environment for recreational and competitive activities.

For further details please refer to Figure 1.4 for details on the lighting upgrades, Figure 1.5 for the sports field layout, Figure 1.6 for the parking layout, Figure 1.7 for the sports field turf design and Figure 1.8 for the draft masterplan.

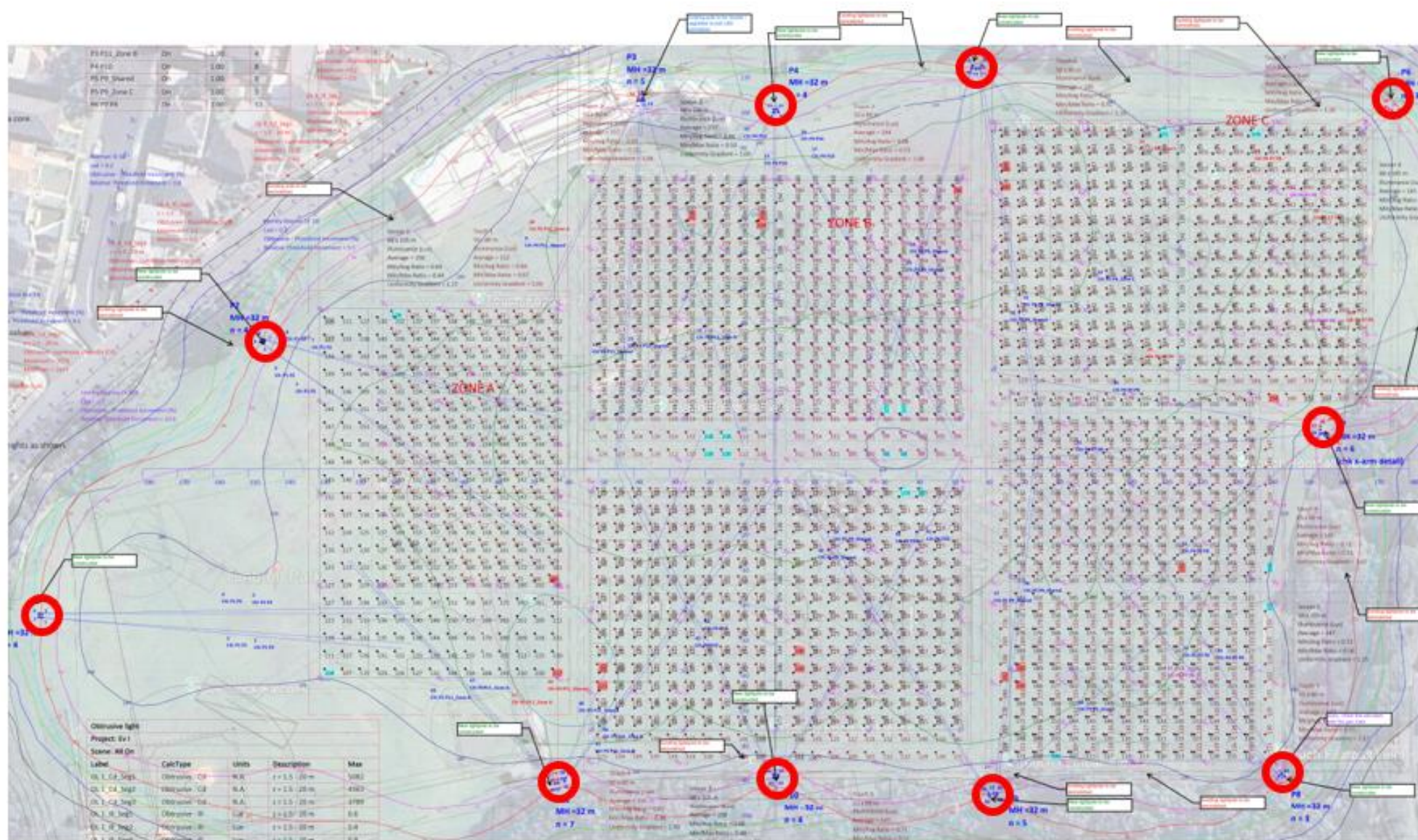


Figure 1.4. Light pole location plan. New light pole to be constructed (circled red).

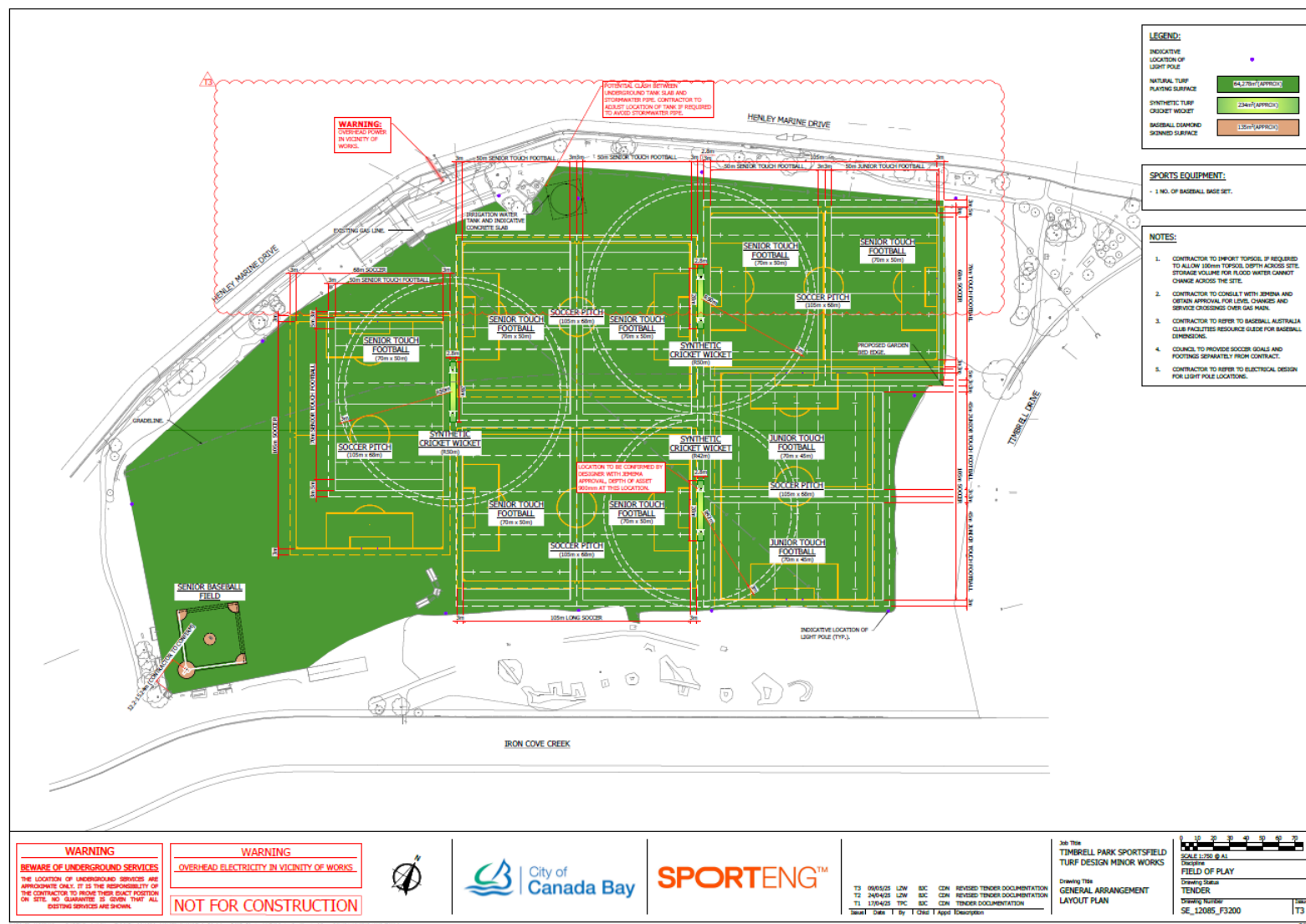


Figure 1.5. Sports field layout.

Source: SportEng 9/5/25

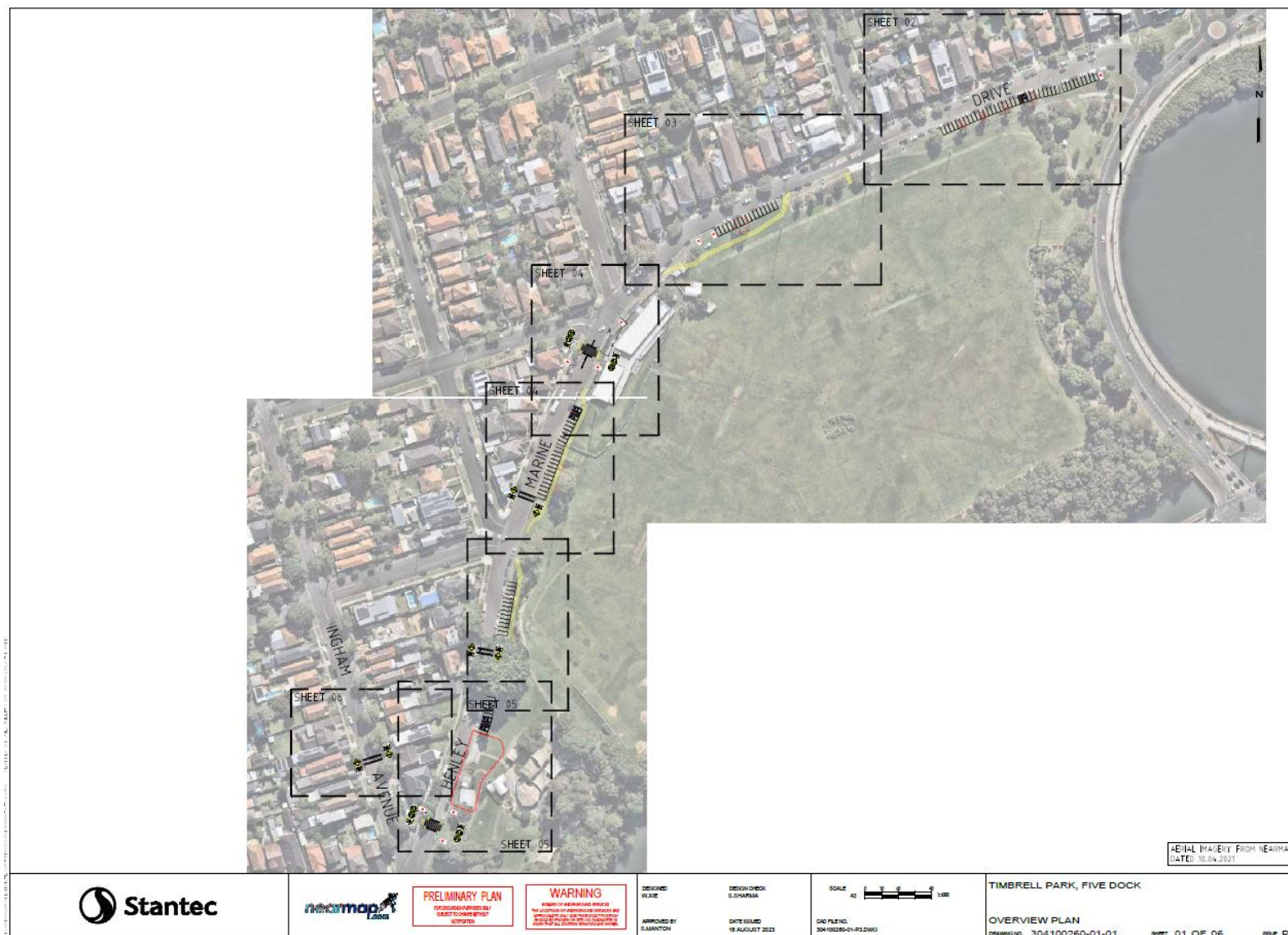


Figure 1.6. Henley Marine Drive parking upgrades.

Source: Stantec 18/8/23



SPORTENG™ PROJECT: TIMBRELL PARK SPORTSFIELD TURF DESIGN



PROJECT NO: 12085 SKETCH TITLE: REFERENCE SEDIMENT AND EROSION CONTROL PLAN

SKETCH NO: SE_12085_SKT_007_20250617 REV: A DATE: 17/06/25 DRAWN BY: TPC SCALE: 1:750 @ A1

Figure 1.7. Timbrell park sports field turf design.

Source: SportEng, 17/06/25



Figure 1.8. Timbrell Park draft masterplan 2025.

1.4 Legislative and Policy Context

Commonwealth and State legislation and policies, and local policies apply to the assessment, planning and management of the environment within the subject land.

1.4.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The Commonwealth EPBC Act provides a framework for the assessment of actions that may have a significant impact on matters of national environmental significance (MNES). MNES include:

- World Heritage areas
- Commonwealth Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and listed ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)

The proposal is not expected to impact any MNES and thus, referral to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) is not required.

1.4.2 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act establishes the framework for environmental impact assessment in NSW. Under Part 4 and Part 5 of the Act, flora and fauna assessments are required to support development applications (DAs) and other planning approvals to ensure ecological considerations are appropriately addressed.

1.4.3 Biodiversity Conservation Act 2016 (BC Act)

The BC Act is the primary legislation for biodiversity conservation in NSW, providing mechanisms for the listing of threatened species, populations, and ecological communities. It also governs the Biodiversity Offsets Scheme (BOS) and the application of the Biodiversity Assessment Method (BAM) for assessing impacts on biodiversity.

1.4.4 Biodiversity Offsets Scheme entry

A Biodiversity Development Assessment Report (BDAR) is required to accompany a development application if the proposed development is likely to 'significantly affect threatened species or ecological communities, or their habitats' and the Biodiversity Offsets Scheme (BOS) will apply.

Section 7.2 of the *Biodiversity Conservation Act 2016* (BC Act) states that a development will 'significantly affect threatened species' if:

- a. it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or
- b. the development exceeds the biodiversity offsets scheme threshold if the BOS applies to the impacts of the development on biodiversity values, or
- c. it is carried out in a declared area of outstanding biodiversity value.

The BOS threshold is established by section 7.2(1)(b) of the BC Act and clause 7.1(1) of the Biodiversity Conservation Regulation 2017 (BC Regulation).

The threshold has two components:

- whether the amount of native vegetation being cleared exceeds a threshold area
- whether the development involves clearing of native vegetation or prescribed impacts on an area mapped on the biodiversity values map published by the Minister for the Environment.

1.4.4.1 Area clearing threshold

The area clearing threshold is one of the thresholds used to determine if a BDAR must accompany a development application.

The area clearing thresholds are set out in clause 7.2(1) of the BC Regulation as per Table 1.2.

The subject land does not have a designated minimum lot size. The proposed development includes the removal of thirty-seven trees/groups of trees, resulting in approximately 635.37m² (0.063ha) of native canopy cover being removed (no native shrub layer or ground cover is being removed), which remains below the area clearing threshold. See Figure 1.9 for the proposed vegetation to be removed.

Table 1.2. Area clearing thresholds.

Minimum lot size associated with the property	Threshold for clearing above which a BDAR is required
Less than 1 hectare	0.25 hectares or more
1 hectare to less than 40 hectares	0.5 hectares or more
40 hectares to less than 1000 hectares	1 hectare or more
1000 hectares or more	2 hectares or more



Figure 1.9. Proposed clearing area (vegetation outlined in pink).

Source: Nearmap 3/4/25.

1.4.4.2 Biodiversity Values Map

Clearing of any native vegetation on an area mapped on the Biodiversity Values (BV) Map will trigger the requirement to prepare a BDAR for a development application under Part 4 of the EP&A Act (local development).

The subject land is not located on the BV Map, as shown in Figure 1.10.



Figure 1.10. Biodiversity Values Map.

1.4.5 Biosecurity Act 2015

This Act imposes a general biosecurity duty to prevent, eliminate, or minimise biosecurity risks, including invasive species that may threaten native flora and fauna. The assessment identifies and recommends control measures for declared priority weeds and pest animals.

1.4.6 Canada Bay Local Environmental Plan 2013 (CBLEP)

1.4.6.1 *Environmentally Sensitive Land*

A small area in the northeast corner of the subject land is mapped as Environmentally Sensitive Land under the CBLEP, as shown in Figure 1.8. As such, any proposed development must comply with the provisions set out in Clause 6.3 of the CBLEP.

The objective of this clause is to protect environmentally sensitive land by:

- Protecting native fauna and flora
- Protecting the ecological processes necessary for their continued existence, and
- Encouraging the conservation and recovery of native fauna and flora and their habitats.

Before granting development consent, the consent authority must consider whether the proposal is likely to:

- Adversely impact the condition, ecological value and significance of the fauna and flora on the land, and
- Adversely impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and
- Fragment, disturb or diminish the biodiversity structure, function and composition of the land, and
- Adversely impact on the habitat elements providing connectivity on the land.

The proposal must include appropriate measures proposed to avoid, minimise, or mitigate the impacts of the development. Development consent will only be granted if the consent authority is satisfied that:

1. The development is designed, subject land and will be managed to avoid any significant adverse environmental impact, or
2. If that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, subject land and will be managed to minimise that impact, or
3. If that impact cannot be minimised—the development will be managed to mitigate that impact.

These requirements ensure that any proposed development at the subject land aligns with biodiversity conservation objectives and maintains the ecological integrity of the area. The measures proposed to avoid, minimise, or mitigate the impacts of the development are addressed in Section 5.

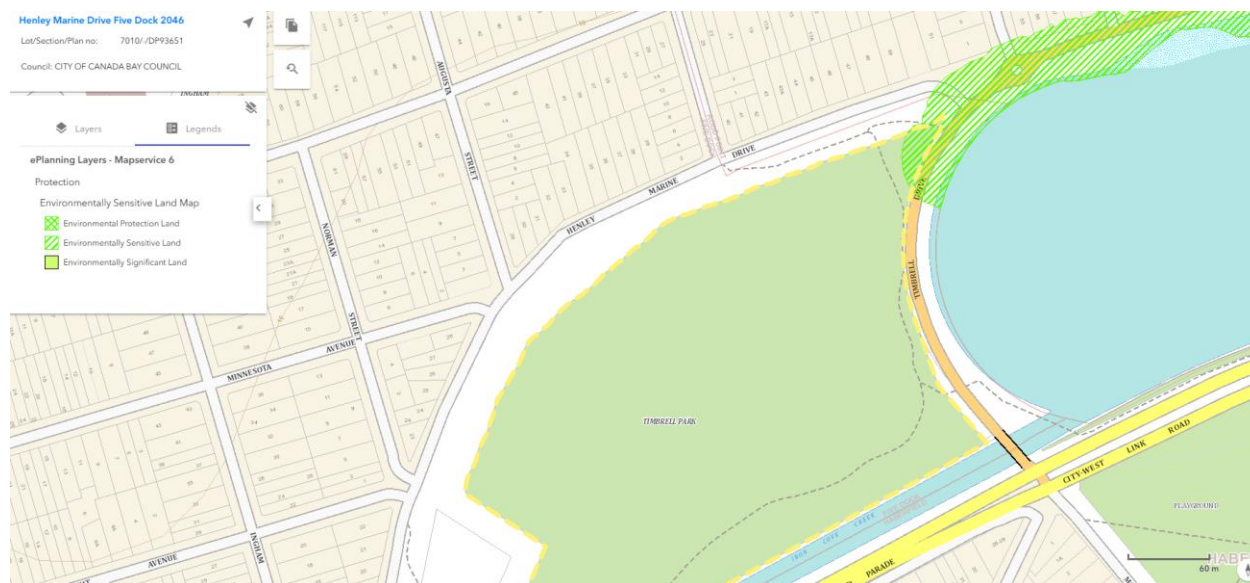


Figure 1.11. Environmentally sensitive land map.

Source: NSW Planning Portal Spatial Viewer.

2 Methods

2.1 Desktop Assessment

The desktop assessment was undertaken to identify potential occurrences of threatened species and ecological communities on-subject land. A combination of publicly available datasets, previous studies, and the author's local knowledge was used to evaluate the likelihood of threatened species and communities occurring within the study area.

The following sources of information were reviewed to assist in this desktop assessment:

- BioNet (Atlas of NSW Wildlife): BioNet records were accessed for a 10 km² area surrounding the subject land, covering data from 1993 to the present. This dataset includes records of flora and fauna, with particular attention to those listed under the NSW BC Act and Commonwealth EPBC Act. Relevant records were examined to determine the likelihood of threatened species and communities occurring within or near the study area.
- NSW Threatened Species Information (DPIE): This resource was consulted to identify threatened species and ecological communities that may be present within the region. The records provide detailed information on the known occurrences of listed species and their habitats, which is critical for assessing potential impacts to biodiversity on the subject land.
- SEED NSW State Vegetation Type Map (SVTM_NSW_Extant_PCT): The SVTM was used to assess the potential vegetation communities present within the study area, with a particular focus on identifying any threatened ecological communities (TECs). This map helps identify the likely vegetation types and ecological contexts relevant to the subject land.
- Water Management (General) Regulation 2018 Hydro Line Spatial Data: The hydro line spatial data was reviewed to assess the proximity of watercourses and associated riparian zones, which are critical habitats for many species, including some that are threatened.
- PlantNET (The Royal Botanic Gardens and Domain Trust 2014): The PlantNET database was consulted for information on plant species within the region, particularly focusing on the presence of any threatened or regionally rare plant species. The database provides comprehensive botanical information, aiding in the assessment of plant diversity and the occurrence of species of conservation concern.
- Protected Matters Search Tool (Australian Government Department of the Environment, EPBC Act): The Protected Matters Search Tool was used to check for the presence of nationally protected species and ecological communities under the Commonwealth EPBC Act. The results of the search are provided in Appendix III.

The information gathered from these sources was reviewed to assess the potential presence of threatened species and ecological communities within the subject land's vicinity.

2.2 Field Survey

A field assessment was conducted on 19 March 2025 by Ecologist Tim Brandt.

The field survey was conducted using opportunistic survey methods in accordance with the NSW Guide to Surveying Threatened Plants and Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (DEC 2004). A random meander survey was carried out across the subject land and adjacent areas to document vegetation types, native and exotic flora species, and fauna presence. Observations were recorded with notes and photographs.

Other management issues such as weed infestations were noted during the site inspection. A list of weeds present on the subject land is provided in Table 3.2.

2.2.1 Flora Survey Methods

Flora surveys involved the identification of native and exotic plant species and an assessment of the surrounding vegetation to characterise the subject land's ecological condition.

2.2.2 Fauna Survey Methods

Fauna assessments included diurnal bird and fauna observations and an evaluation of habitat resources suitable for native and threatened species. Key habitat features assessed included:

- Hollow-bearing trees (potential nesting, roosting, or shelter subject lands)
- Roosting and/or foraging trees
- Fruiting and flowering plants (potential food resources)
- Rock outcrops (potential refuge subject lands)
- Burrows (indicators of ground-dwelling fauna presence)
- Scats (evidence of fauna activity)
- Tree scratchings (evidence of arboreal mammals or birds)
- Loose bark (potential microhabitat for invertebrates and fauna)
- Scrapes or diggings (evidence of foraging activity)
- Dead trees and logs (important for habitat and nutrient cycling)
- Long grass and leaf litter (ground cover for fauna species)
- Waterbodies (potential breeding and foraging subject lands)

No targeted surveys for threatened species were conducted due to the low likelihood of occurrence of threatened species within or adjacent to the proposed development area. An assessment of potential threatened species occurrence is provided in Appendix I, which considers threatened species recorded within a 10 km radius of the subject land.

2.3 Weather conditions

Table 2.1 documents weather conditions on the days of the surveys.

Table 2.1. Environmental conditions during field surveys.

Survey undertaken (e.g., method / targeted species)	Date	Temperature ¹ (min. & max.)	Wind (light, mod...)	Rainfall (mm)	Other conditions relevant to the species
Subject land inspection, compiling species list	19 March 2025	15.2 – 26.9	Light	0	N/A

2.4 Limitations

This assessment is subject to certain limitations, particularly concerning the detection of cryptic flora species. Some plant species may only be present as soil-stored seed banks or subterranean vegetative structures, emerging above ground only in response to specific environmental triggers such as:

- Fire frequency, intensity, or seasonality
- Soil moisture fluctuations
- Life-cycle patterns, particularly for ephemeral species such as orchids

Additionally, no targeted invertebrate surveys were undertaken as part of this assessment.

Surveys conducted at a single point in time cannot comprehensively detect all species that may occur in the study area. The presence of some species may be influenced by:

- a) Seasonal occurrence – species that are active or detectable only during particular times of the year
- b) Habitat utilisation patterns – fauna species that may move between different areas as part of a larger home range
- c) Dormancy periods – species that enter seasonal dormancy or have irregular above-ground growth cycles

This survey provides a representative sample of the subject land's flora, fauna, and habitat values within the constraints of the available survey period. It aims to identify species likely to be encountered and assess habitat suitability for key taxa.

Given the subject land characteristics and available habitat, Kingfisher is confident that the survey results accurately reflect the likely species assemblages and vegetation community. Future surveys conducted at different times of the year are unlikely to significantly alter the conclusions presented in this report.

3 Existing Environment

3.1 Historical land use

The subject land has been used for recreational purposes since before the 1950s. Aerial photographs of the subject land taken in 1955 show the existing roads and bridges were already constructed, and the subject land is completely cleared (Figure 3.1). It wasn't until the early 2000s that vegetation was planted around the site's periphery (Figure 3.2).



Figure 3.1. Aerial of the subject land taken in the 1950s.

Source: Historical Imagery Viewer.



Figure 3.2. Aerial of the subject land taken in 2004.

Source: Historical Imagery Viewer.

3.2 Soils and topography

The subject land is predominately located on the Disturbed Terrain soil type, with the northern portion of the subject land being classified as the GyMEA soil landscape.

The disturbed terrain soil landscape is described as level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Local relief <10 m, slopes <30%. Landfill includes soil, rock, building and waste materials. Original vegetation completely cleared, replaced with turf or grassland. Soil turfed fill areas commonly capped with up to 40 cm of sandy loam or up to 60 cm of compacted clay over fill or waste materials. GyMEA soil landscape is described as undulating to rolling rises and low hills on Hawkesbury Sandstone. Local relief 20–80 m, slopes 10–25%. Rock outcrop <25%. Broad convex crests, moderately inclined side slopes with wide benches, localised rock outcrop on low broken scarps. Extensively cleared open-forest (dry sclerophyll forest) and eucalypt woodland.



Figure 3.3. Soil landscapes.

3.3 Vegetation Communities

The subject land is predominantly cleared and highly modified due to its longstanding use as recreational sports fields. Vegetation is largely restricted to planted trees and landscaped areas around the site's periphery, particularly along the boundary adjacent to Timbrell Drive and Iron Cove Creek. No remnant vegetation remains; the area was likely once mangroves. The tree canopy is a mix of native and non-native species, including, interspersed with exotic ornamental trees. The understorey is generally sparse and dominated by exotic grasses and groundcovers, with occasional plantings of native shrubs. There is no remnant native vegetation or intact ecological communities within the site.

3.3.1 Plant Community Types

A review of the NSW State Vegetation Type Map shows no Plant Community Type (PCT) mapped within the site (refer to Figure 3.4).

3.3.2 Threatened Ecological Communities

A search for threatened ecological communities (TECs) using the Protected Matters Search Tool (within a 10 km buffer around the subject land) identified ten TECs as having the potential to occur within the area and surrounds. These include:

- Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion
- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland ecological community
- Coastal Swamp Sclerophyll Forest of New South Wales and Southeast Queensland
- Coastal Upland Swamps in the Sydney Basin Bioregion
- Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion
- Eastern Suburbs Banksia Scrub of the Sydney Region
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria
- Shale Sandstone Transition Forest of the Sydney Basin Bioregion
- Turpentine-Ironbark Forest of the Sydney Basin Bioregion
- Western Sydney Dry Rainforest and Moist Woodland on Shale

Due to the past levels of disturbance, none of these threatened ecological communities exist on the subject land. All native vegetation present on the subject land has likely been planted, with some possibly self-seeding.



Figure 3.4. State Vegetation Type Map.

3.4 Flora

Table 3.1. Native flora observed within the subject land.

Scientific Name	Common Name
<i>Melaleuca styphelioides</i>	Prickly-leaved Paperbark
<i>Eucalyptus botryoides</i>	Bangalay
<i>Eucalyptus microcorys</i>	Tallowwood
<i>Acacia floribunda</i>	White Sally Wattle
<i>Eucalyptus sp.</i>	Eucalyptus
<i>Eucalyptus robusta</i>	Swamp Mahogany
<i>Casuarina glauca</i>	Swamp Oak
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark
<i>Waterhousea floribunda</i>	Weeping Lilly Pilly
<i>Eucalyptus paniculata</i>	Grey Ironbark
<i>Ficus microcarpa var. hilli</i>	Hill's Weeping Fig
<i>Eucalyptus saligna</i>	Sydney Blue Gum
<i>Syzygium australe</i>	Brush Cherry
<i>Callistemon viminalis</i>	Weeping Bottlebrush
<i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Glochidion ferdinandi</i>	Cheese Tree
<i>Stenocarpus sinuatus</i>	Firewheel Tree
<i>Banksia integrifolia</i>	Coast Banksia
<i>Eucalyptus punctata</i>	Grey Gum

<i>Corymbia citriodora</i>	Lemon-scented Gum
<i>Angophora costata</i>	Sydney Red Gum
<i>Acacia mearnsii</i>	Black Wattle
<i>Angophora floribunda</i>	Rough-barked Apple
<i>Brachychiton acerifolius</i>	Illawarra Flame Tree
<i>Casuarina sp.</i>	Sheoak
<i>Ficus rubiginosa</i>	Port Jackson Fig
<i>Banksia ericifolia</i>	Heath-leaved Banksia
<i>Correa alba</i>	White Correa
<i>Elaeocarpus reticulatus</i>	Blueberry Ash
<i>Leptospermum laevigatum</i>	Coast Tea Tree
<i>Acacia longissima</i>	Long-leaf Wattle
<i>Grevillea banksii x whiteana</i>	Grevillea Moonlight (cultivar)
<i>Grevillea banksii x bipinnatifida</i>	Robyn Gordon Grevillea (cultivar)
<i>Doryanthes excelsa</i>	GyMEA Lily
<i>Macrozamia communis</i>	Burrawang
<i>Lomandra longifolia</i>	Basket Grass
<i>Commelina cyanea</i>	Scurvy Weed

3.5 Weeds

The oval is maintained exotic grassland for recreational purposes. The fringes of the playing fields have several environmental weeds. No state priority weeds exist on the subject land.

The *Biosecurity Act 2015* and regulations provide specific legal requirements for state level priority weeds. Under the Act all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. Specific legal requirements apply to State determined priorities under the Greater Sydney Regional Strategic Weed Management Plan 2023-2027. Of the weeds identified during on-ground surveys, none have been listed as state priority weeds. The weeds present are presented in Table 3.2.

Table 3.2. Weeds observed within the subject land.

Scientific Name	Common Name
<i>Raphiolepis indica</i>	Indian hawthorn
<i>Eragrostis tenuifolia</i>	Elastic grass
<i>Trifolium repens</i>	White Clover
<i>Heptapleurum arboricola</i>	Dwarf umbrella tree
<i>Eleusine indica</i>	Crowsfoot grass
<i>Yucca gigantea</i>	Spineless yucca
<i>Celtis sinensis</i>	Chinese celtis / Hackberry
<i>Ulmus parvifolia</i>	Chinese elm
<i>Parietaria judaica</i>	Spreading pellitory
<i>Erigeron bonariensis</i>	Flax-leaf fleabane
<i>Malva parviflora</i>	Cheeseweed
<i>Cenchrus clandestinus</i>	Kikuyu grass
<i>Cenchrus setaceus</i>	Fountain grass
<i>Bidens pilosa</i>	Cobbler's Pegs
<i>Ehrharta erecta</i>	Panic veldtgrass

<i>Senna pendula</i>	Easter Cassia
<i>Ochna serrulata</i>	Mickey Mouse plant
<i>Prunus persica</i>	Peach / Nectarine
<i>Cupressus arizonica</i>	Arizona Cypress
<i>Syagrus romanzoffiana</i>	Cocos Palm
<i>Paraserianthes lophantha</i>	Cape Wattle / Plume Albizia
<i>Fraxinus sp.</i>	Flowering Ash
<i>Ligustrum lucidum</i>	Broad-leaved Privet
<i>Ficus microcarpa</i>	Curtain Fig
<i>Agonis flexuosa</i>	Willow Myrtle

3.6 Current condition

The subject land is predominately cleared and dominated by introduced turf grasses and weeds. Native ground cover species are almost entirely absent, some understory native vegetation exists on the southern and eastern boundaries of the subject land.

Photo plates 1-12.



Plate 1. Vegetation patch in the southwest corner of the subject land.



Plate 2. Patch of *Casuarina* in the southwest corner



Plate 3. Vegetation next to the playground



Plate 4. Vegetation next to playground



Plate 5 and 6. Vegetation next to Iron Cove Creek.



Plate 7. Vegetation in the southeast corner of the subject land.

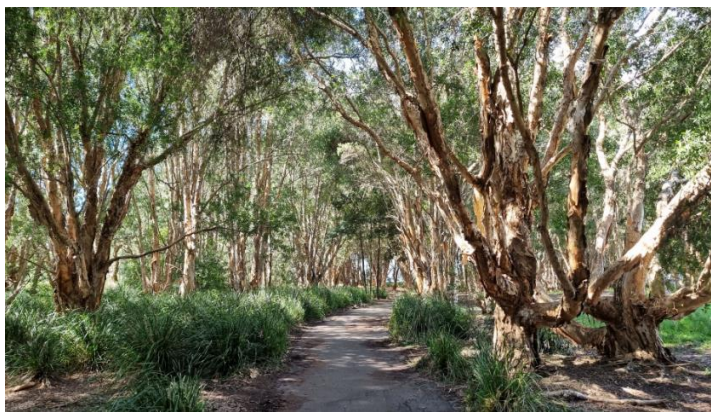


Plate 8. Vegetation next to Iron Cove Creek.



Plate 9. East of Timbrell Drive from the subject land, marked as biodiversity values.



Plate 10. Northern side of subject land on Henley Marine Drive.



Plate 11. Eastern vegetation.



Plate 12. Playing fields, taken from the eastern side next to Timbrell Drive looking west.

3.7 Fauna

Table 3.3. Fauna observed on the subject land.

Class	Scientific name	Common name
Aves	<i>Manorina melanocephala</i>	Noisy miner
Aves	<i>Trichoglossus moluccanus</i>	Rainbow lorikeet
Aves	<i>Vanellus miles</i>	Masked lapwing
Aves	<i>Grallina cyanoleuca</i>	Magpie-lark
Aves	<i>Threskiornis molucca</i>	Australian white ibis
Insecta	<i>Trichilogaster acaciaelongifoliae</i>	Longleaf wattle gall wasp
Insecta	<i>Glycyphana stolata</i>	The brown flower beetle

3.8 Habitat Features

3.8.1 Hollow bearing trees and hollow logs

No hollow bearing trees or fallen hollow logs that could be used as habitat were identified during the field investigation.

3.8.2 Present habitat

Three nest boxes were observed on the subject land. These boxes provide supplementary roosting and nesting habitat for hollow-dependent fauna, particularly in an area where natural tree hollows are limited due to the past vegetation clearing and young canopy age. They can support a range of native species, including birds, possums, and microbats. The occupancy of these boxes is unknown.



Eucalyptus paniculata with deeply furrowed bark that could be used as habitat by microbats.



Nest boxes observed on the subject land. Location of nest boxes are shown in Figure 3.5.



Figure 3.5. Nest boxes observed on the subject land (all nest boxes seen were within the blue area).

3.8.3 Caves, crevices and sandstone rock outcrop

None are present on the subject land.

3.8.4 Habitat connectivity

The subject land demonstrates poor habitat connectivity within a heavily urbanised landscape. The park includes open green space, scattered canopy trees, and an altered Iron Cove Creek, which provides limited connectivity for terrestrial fauna and bird species.

The most ecologically significant features present on the subject land are installed nest boxes in several trees and some foraging resources for wildlife. Connectivity is substantially constrained by surrounding dense residential development and major transport infrastructure, including Henley Marine Drive and Dobroyd Parade, which form barriers to ground-based fauna. While street trees and private gardens may serve as stepping stones for some mobile species, overall habitat remains low.

4 Impact Assessment

4.1 Direct Impacts

4.1.1 Vegetation clearing

The removal of thirty-seven trees/groups of saplings is a direct impact of the proposed Timbrell Park upgrade.

The electrical design for reticulation of the sports field lighting (conduits supplying the electricity to the lights), on the southern side of the fields have been rerouted to reduce the number of trees removed in this area from around forty to three. This was done in consultation with the arborist.

The following vegetation is proposed for removal to accommodate the works:

- Two *Angophora costata* (Sydney Red Gum)
- Four *Banksia integrifolia* (Coast Banksia)
- Three *Brachychiton acerifolius* (Illawarra Flame Tree)
- Seven *Casuarina glauca* (Swamp She-Oak)
- Three *Cupaniopsis anacardioides* (Tuckeroo)
- One *Eucalyptus botryoides* (Bangalay)
- Two *Eucalyptus punctata* (Grey Gum)
- Two *Eucalyptus robusta* (Swamp Mahogany)
- One *Melaleuca linariifolia* (Flax-leaved Paperbark)
- Two *Melaleuca quinquenervia* (Broad-leaved Paperbark)
- Six *Melaleuca styphelioides* (Prickly-leaved Paperbark)
- One *Paraserianthes lophantha* (Cape Wattle)
- Two *Stenocarpus sinuatus* (Firewheel Tree)
- One *Acacia mearnsii* (Black Wattle)

All vegetation removal should be undertaken in accordance with recommendations from a qualified arborist, and any loss of significant vegetation should be offset in accordance with Council policies.

4.1.2 Root damage to nearby trees

Excavation and construction activities associated with the proposed developments, especially if near mature trees, may damage root systems, potentially compromising tree stability or health. Consultation with project arborist required.

4.1.3 Damage to existing habitat features

No trees with nest boxes are marked for removal. Accidental damage to habitat installations like nest boxes or log piles could potentially occur during construction, work will be carried out carefully to avoid damaging existing vegetation that isn't proposed for removal.

4.1.4 Soil Disturbance and Compaction

Increased ground disturbance due to regrading, trail construction, and facility installation may result in soil compaction and loss of soil structure. This can impact root growth, hydrology, and soil-dwelling organisms.

4.2 Indirect Impacts

4.2.1 Human Activity and Disturbance

Increased human activity in the area because of construction, including vehicle traffic and noise, can disturb local wildlife. This may discourage sensitive species from occupying the area or interfere with their normal behaviours, such as feeding, breeding, and roosting.

4.2.2 Introduction of contaminants

The use of machinery and building materials introduces the risk of fuel, oil, sediment, and other pollutant spills. This can impact local soil and water quality, particularly near Iron Cove Creek and adjacent wetland or vegetated areas. Appropriate sediment and erosion controls must be implemented.

4.2.3 Light spill

Reducing light spill into surrounding environmentally sensitive areas such as the seagrass meadows to the east and Iron Cove Creek to the south as well as the vegetated areas is a priority. Artificial lighting can alter the behaviour of nocturnal and crepuscular species (e.g., possums, bats, insects, frogs), leading to reduced foraging, disrupted navigation, or avoidance of lit areas.

Due to advances in LED lighting technology, lighting designers now have the tools to create projects that effectively manage glare and light trespass. The lighting design for Timbrell Park is compliant with AS/NZS 4282 and has prioritised obtrusive light levels above field levels. The obtrusive light levels have been designed to the minimum possible and not to the maximum allowable while maintaining compliant field lighting for the three separate 'zones'. The existing maximum obtrusive light level along Henley Marine Drive is approximately 4.4 lux (streetlights shielded). The proposed lighting system will reduce the initial maximum obtrusive light level to 1.7 lux (street lighting not included). Light spill as a result of the lighting upgrade will therefore be less than before.

4.2.4 Potential Weed Spread

Construction activities often facilitate the introduction or spread of invasive species. Soil disturbance and movement of vehicles and machinery between work areas increase this risk. A weed management plan should be implemented throughout the project duration.

4.2.5 Runoff changes

Regrading of sports fields and construction of impermeable surfaces (e.g. parking expansion, pathways) may alter site hydrology and increase stormwater runoff. This has the potential to affect adjacent vegetation and downstream ecosystems, including Iron Cove Creek and the sea grass meadows or mangroves. Stormwater management measures should be integrated into the design to mitigate against these impacts.

5 Avoidance, Minimise and Mitigation Measures

5.1 Avoidance Measures

To avoid potential impacts, the following avoidance strategies have been implemented by council:

- **Stormwater management:** In the construction of the parking on Henley Marine Drive, avoiding runoff of stormwater entering straight into Iron Cove Creek or the Parramatta River by implementing adequate runoff management measures.

5.2 Minimise Measures

To minimise ecological impact, council has used the following minimisation strategies:

- **Vegetation protection and restoration:** Temporary exclusion zones will be established around retained vegetation during construction to prevent trampling and mechanical damage.
- **Fauna-sensitive lighting design:** Lights will be installed with shielding and directional controls to prevent unnecessary light spill into adjacent habitat areas, especially into the vegetation, towards the creek or towards the sea grass meadow. The lighting system is compliant with AS/NZS 4282, which will be less disruptive to nocturnal wildlife. Lighting operation will also be restricted to scheduled sporting use periods, reducing cumulative light exposure.
- **Sensitive placement of infrastructure:** Light poles where possible have been designated for areas already cleared or previously disturbed to avoid unnecessary removal of native vegetation or disturbance to root zones of established trees. The chosen design has the least impact and least removed vegetation, reduced initially from forty trees to three.
- **Soil and water protection:** Soil compaction and erosion will be minimised by using defined accessways and low-impact machinery. Sediment control measures will be implemented near drainage lines to prevent runoff and waterway contamination.

5.3 Mitigation Measures

Where impacts cannot be fully avoided, council has chosen the following mitigation and management measures to reduce ecological harm:

- **Replacement trees:** Where tree removal is unavoidable, replacement trees will be planted. The ecological condition of the site will aim to be better than pre-removal by replacing trees at a ratio of four to one and replanting more suitable/ecologically significant trees. A table of recommended trees that could be used is supplied in Appendix IV.

6 Conclusion and Recommendations

The proposed upgrades to Timbrell Park, Five Dock, which now encompass lighting improvements, recreational infrastructure, and amenity enhancements, will result in a range of direct and indirect ecological impacts. Direct impacts include the removal of 37 trees, including several mature and semi-mature native trees such as *Melaleuca quinquenervia*, *Casuarina glauca*, *Angophora costata*, and others. This vegetation loss reduces available habitat and foraging resources and contributes to the ongoing fragmentation of urban green space.

Additional direct impacts include root disturbance from excavation works, potential damage to existing habitat features such as nest boxes and ground cover, and compaction or alteration of soil profiles due to regrading, trail construction, and installation of new built elements.

Indirect impacts are expected to be more widespread and include:

- Light spill, which has been minimised and adheres to standard AS/NZS 4282. The light spill as a result of the upgrade will be reduced.
- Elevated human activity levels leading to wildlife disturbance, particularly during construction and peak usage periods.
- Potential introduction and spread of weeds due to soil disturbance and construction vehicle movement.
- Altered drainage and increased runoff from new impervious surfaces, affecting adjacent areas.
- Potential introduction of contaminants.

To mitigate these impacts, a comprehensive suite of avoidance, minimisation, and management measures is recommended. These include:

- Prioritising works in already disturbed areas and minimising vegetation clearing.
- Implementing robust tree protection measures and retaining habitat features wherever possible.
- Applying fauna-sensitive lighting principles, such as targeted light direction to reduce light spill and limiting use to scheduled sporting events.
- Establishing clear boundaries and signage to prevent access into vegetated areas.
- Implementing erosion and sediment controls, weed management plans, and post-construction monitoring to maintain ecological integrity.

In conclusion, while the proposed development will enhance recreational opportunities and park functionality, it introduces a suite of environmental challenges that must be carefully managed. With effective design, implementation of mitigation strategies, and ongoing environmental oversight, the ecological values of Timbrell Park can be retained and supported alongside community use and amenity improvements.

7 Appendices

7.1 Appendix I – Likelihood of occurrence

This appendix outlines the methods and results of the desktop assessment conducted to evaluate the likelihood of occurrence of threatened species within the study area. The purpose of this assessment is to determine which species may require further assessment as they may be impacted by the project, and those that can be reasonably excluded from further consideration because they are unlikely to occur within the study area.

The assessment was conducted using available desktop data and targeted field assessments. It specifically considers species listed as Vulnerable, Endangered, or Critically Endangered under the NSW BC Act and the Commonwealth EPBC Act.

The following process was used to identify threatened species with the potential to occur in the study area:

- Species records were obtained from the NSW BioNet Atlas within a 10 km radius of the study area, as detailed in Table 7.2.
- The likelihood of each threatened species occurring within the study area was assessed based on desktop and field data, considering habitat requirements, distribution, and the number and dates of nearby records.
- Likelihood ratings were assigned according to the criteria outlined in Table 7.1.

Table 7.1. Ratings for the desktop threatened species likelihood of occurrence assessment.

Rating	Definition
HIGH	It is expected that this species occurs within the study area because there is core habitat and recent (post-2000) proximate records or knowledge that the species occurs in the local area.
MEDIUM	Species may occur within the study area because there is suitable habitat; however, there is evidence that lowers its likelihood of occurrence (known range contraction of the species in the region, no recent records within or close to the project area, substantial loss of habitat within the project area since previous records, species is naturally-rare or occurs at a low density etc.).
LOW	Species may occur, as a vagrant, within the study area; only marginally-suitable habitat is expected.
NONE	There is strong evidence that this species will not occur within the study area (i.e. there is no suitable habitat and/or the species is considered to be regionally-extinct)

Key to status:

CE = Critically Endangered

E = Endangered

EP = Endangered Population

V = Vulnerable

M = Migratory

Table 7.2. Desktop threatened species likelihood of occurrence assessment.

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Amphibia	Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog	E,P	V	11	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spike rushes (<i>Eleocharis</i> spp.). Optimum habitat includes waterbodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	None. The subject land does not contain suitable habitat.	NONE
Reptilia	Cheloniidae	<i>Caretta caretta</i>	Loggerhead Turtle	E,P	E	9	Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.	None. The subject land does not contain habitat.	NONE
Reptilia	Elapidae	<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V,P		1	The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Columbidae	<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V,P		7	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn.	None. The subject land does not contain habitat.	NONE
Aves	Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	P	M	2	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. They mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They often occur in areas of updraughts, especially around cliffs.	None. The subject land does not provide suitable habitat.	NONE
Aves	Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail	V,P	V, M	2	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Peninsula and northern Japan June-August. Most often seen in eastern	None. The subject land does not provide suitable habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (e.g. termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needleetails as they feed. More common in coastal areas, less so inland.		
Aves	Procellariidae	<i>Ardenna grisea</i>	Sooty Shearwater	P	M	1	The Sooty Shearwater forages in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters. The species migrates and forages in the North Pacific and Atlantic Oceans during the non-breeding season. Sooty Shearwaters may forage inshore occasionally, especially during rough weather.	None. The subject land does not provide suitable habitat.	NONE
Aves	Procellariidae	<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	P	M	7	The Wedge-tailed Shearwater is a pelagic, marine bird known from tropical and subtropical waters.	None. The subject land does not provide suitable habitat.	NONE
Aves	Procellariidae	<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	P	M	5	It is a migratory species that breeds mainly on small islands in Bass Strait and Tasmania and migrates to the Northern Hemisphere for the boreal summer.	None. The subject land does not provide suitable habitat.	NONE
Aves	Ardeidae	<i>Botaurus poeciloptilus</i>	Australasian Bittern	E,P	E	2	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spike rushes (<i>Eleocharis</i> spp.).	None. The subject land does not provide suitable habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V,P		1	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	None. The subject land does not contain habitat.	NONE
Aves	Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P		23	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.	None. The subject land does not contain habitat.	NONE
Aves	Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle	V,P		1	Occupies open eucalypt forest, woodland or open woodland. She-oak or <i>Acacia</i> woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	None. The subject land does not contain habitat.	NONE
Aves	Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V,P		5	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	E,P		5	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch.	None. The subject land does not contain habitat.	NONE
Aves	Haematopodidae	<i>Haematopus longirostris</i>	Pied Oystercatcher	E,P		5	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish.	None. The subject land does not contain habitat.	NONE
Aves	Charadriidae	<i>Charadrius mongolus</i>	Lesser Sand-plover	V,P	E,M	1	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms.	None. The subject land does not contain habitat.	NONE
Aves	Charadriidae	<i>Pluvialis fulva</i>	Pacific Golden Plover	P	M	14	In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i> , or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and in evaporation ponds in saltworks.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Charadriidae	<i>Pluvialis squatarola</i>	Grey Plover	P	M	3	Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayment's, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	P	M	4	Found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges or rocky shores. During the breeding season in the northern hemisphere, it prefers freshwater lakes and shallow rivers.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Arenaria interpres</i>	Ruddy Turnstone	P	M	4	Mainly found on coastal regions with exposed rock coastlines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	P	M	42	The species utilises fresh and hypersaline environments, feeding along the edge of water on mudflats, coastal and inland wetlands, and sewage ponds.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Scolopacidae	<i>Calidris canutus</i>	Red Knot	P	E,M	3	Occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	CE,P	CE,M	21	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Calidris ruficollis</i>	Red-necked Stint	P	M	8	In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe	V,P	V,M	9	Latham's snipe feed in soft mudflats or shallow water typically at night, early morning.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Limosa lapponica</i>	Bar-tailed Godwit	P	M	34	found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew	CE,P	CE,M	2	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	None. The subject land does not contain habitat.	NONE
Aves	Scolopacidae	<i>Numenius minutus</i>	Little Curlew	P	M	1	Little Curlews may gather in large flocks on coastal and inland grasslands and black soil plains in northern Australia, near swamps and flooded areas. They also feed on playing fields, paddocks and urban lawns.	None. The subject land does not provide suitable habitat.	NONE
Aves	Scolopacidae	<i>Numenius phaeopus</i>	Whimbrel	P	M	1	Found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with	None. The subject land does not	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							mangroves, but also open, unvegetated mudflats.	provide suitable habitat.	
Aves	Scolopacidae	<i>Tringa brevipes</i>	Grey-tailed Tattler	P	M	3	Found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves.	None. The subject land does not provide suitable habitat.	NONE
Aves	Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank	E,P	E,M	1	It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	None. The subject land does not provide suitable habitat.	NONE
Aves	Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	P	M	5	The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline.	None. The subject land does not provide suitable habitat.	NONE
Aves	Laridae	<i>Sterna hirundo</i>	Common Tern	P	M	7	Common Terns are marine, pelagic and coastal. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered	None. The subject land does not provide suitable habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores.		
Aves	Laridae	<i>Sternula albifrons</i>	Little Tern	E,P	M	2	Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.	None. The subject land does not provide suitable habitat.	NONE
Aves	Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E,P	CE	2	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	None. The subject land does not provide suitable habitat.	NONE
Aves	Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot	V,P		1	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter.	None. The subject land does not provide suitable habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Aves	Psittacidae	<i>Parvipsitta pusilla</i>	Little Lorikeet	V,P		6	Forages primarily in the canopy of open <i>Eucalyptus</i> forest and woodland, yet also finds food in <i>Angophora</i> , <i>Melaleuca</i> and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.	None. The subject land does not provide suitable habitat.	NONE
Aves	Strigidae	<i>Ninox strenua</i>	Powerful Owl	V,P		63	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i> , Black She-oak <i>Allocasuarina littoralis</i> , Blackwood <i>Acacia melanoxylon</i> , Rough-barked Apple <i>Angophora floribunda</i> , Cherry Ballart <i>Exocarpus cupressiformis</i> and several eucalypt species.	Low. The subject land does not provide suitable roosting habitat but may hunt over the subject land as indicated by high number of records.	LOW
Aves	Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V,P		1	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but	None. The subject land does not provide suitable habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							often hunts along the edges of forests, including roadsides.		
Aves	Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	CE,P	CE	2	The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	None. The subject land does not provide suitable habitat.	NONE
Aves	Meliphagidae	<i>Grantiella picta</i>	Painted Honeyeater	V,P	V	1	Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> .	None. The subject land does not provide suitable habitat.	NONE
Aves	Meliphagidae	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V,P		1	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>E. albens</i>), Inland Grey Box (<i>E. microcarpa</i>), Yellow Box (<i>E. melliodora</i>), Blakely's Red Gum (<i>E. blakelyi</i>) and Forest Red Gum (<i>E. tereticornis</i>). Also inhabits open forests of	None. The subject land does not provide suitable habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees.		
Aves	Artamidae	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		4	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	None. The subject land does not provide suitable habitat.	NONE
Aves	Petroicidae	<i>Petroica boodang</i>	Scarlet Robin	V,P		2	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	None. The subject land does not contain habitat.	NONE
Aves	Petroicidae	<i>Petroica phoenicea</i>	Flame Robin	V,P		1	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							sparse or dense. Occasionally occurs in temperate rainforest, and in herb fields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.		
Aves	Estrildidae	<i>Stagonopleura guttata</i>	Diamond Firetail	V,P	V	1	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	None. The subject land does not contain habitat.	NONE
Mammalia	Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	1	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Mammalia	Peramelidae	<i>Perameles nasuta</i>	Long-nosed Bandicoot population in inner western Sydney	E,P		26	Shelter mostly under older houses and buildings Forage in parkland and back-yards.	Medium. The subject land could be used for foraging. Known population in the area.	MEDIUM
Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	E,P	E	6	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	None. The subject land does not contain habitat.	NONE
Mammalia	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	1638	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	High. The Grey-headed Flying-fox is highly mobile, with the ability to travel long distances to access foraging resources. Given the presence of eucalypts, occasional fruiting vegetation, riparian elements, and a high number of regional records, the site is likely to	HIGH

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
								be used as foraging.	
Mammalia	Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		10	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low. Possible roosting in nest boxes on the subject land, however lack of foraging in area.	LOW
Mammalia	Molossidae	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V,P		12	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Low. Possible roosting in nest boxes on the subject land, however lack of foraging in area.	LOW
Mammalia	Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	E,P	E	5	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	None. The subject land does not contain habitat.	NONE
Mammalia	Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		5	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows,	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							but has also been found under loose bark on trees or in buildings.		
Mammalia	Vespertilionidae	<i>Myotis macropus</i>	Southern Myotis	V,P		16	Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage.	None. The subject land does not contain habitat.	NONE
Mammalia	Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		1	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings.	None. The subject land does not contain habitat.	NONE
Mammalia	Miniopteridae	<i>Miniopterus australis</i>	Little Bent-winged Bat	V,P		24	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.	None. The subject land does not contain habitat.	NONE
Mammalia	Miniopteridae	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		84	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the treetops.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Mammalia	Muridae	<i>Pseudomys gracilicaudatus</i>	Eastern Chestnut Mouse	V,P		1	In NSW the Eastern Chestnut Mouse is mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps. In the tropics it is more an animal of grassy woodlands. Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously.	None. Subject land does not contain heathland.	NONE
Mammalia	Otariidae	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	V,P		1	Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together. Reported to have bred at Seal Rocks, near Port Stephens and Montague Island in southern NSW. Haul outs are observed at isolated places along the NSW coast.	None. The subject land does not contain habitat.	NONE
Insecta	Petaluridae	<i>Petalura gigantea</i>	Giant Dragonfly	E		1	Live in permanent swamps and bogs with some free water and open vegetation. Adults emerge from late October and are short-lived, surviving for one summer after emergence. Adults spend most of their time settled on low vegetation on or adjacent to the swamp. They hunt for flying insects over the swamp and along its margins.	None. The subject land does not contain swamp habitat.	NONE
Flora	Convolvulaceae	<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia	V		6	This is a species of the margins of salt marshes and lakes. Flowering occurs in spring and summer.	None. The subject land does not contain marsh habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Flora	Elaeocarpaceae	<i>Tetratheca glandulosa</i>		V		1	Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gynea, Lambert and Faulconbridge. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. Vegetation communities correspond broadly to Benson & Howell's Sydney Sandstone Ridgetop Woodland	None. The subject land does not contain habitat.	NONE
Flora	Elaeocarpaceae	<i>Tetratheca juncea</i>	Black-eyed Susan	V	V	15	It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest.	None. The subject land does not contain habitat.	NONE
Flora	Ericaceae	<i>Epacris purpurascens</i> var. <i>purpurascens</i>		V		1	Found in a range of habitat types, most of which have a strong shale soil influence. Grows in swamps and scrubby country.	None. The subject land does not contain habitat.	NONE
Flora	Fabaceae (Mimosoideae)	<i>Acacia bynoeana</i>	Bynoe's Wattle	E	V	2	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Flora	Fabaceae (Mimosoideae)	<i>Acacia pubescens</i>	Downy Wattle	V	V	1	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland.	None. The subject land does not contain habitat.	NONE
Flora	Fabaceae (Mimosoideae)	<i>Acacia terminalis</i> subsp. <i>Eastern Sydney</i>	Sunshine wattle	E	E	5	Coastal scrub and dry sclerophyll woodland on sandy soils. Habitat is generally sparse and scattered. Most areas of habitat or potential habitat are small and isolated.	None. The subject land does not contain habitat.	NONE
Flora	Hygrophoraceae	<i>Hygrocybe austropratensis</i>		E		3	Occurs in gallery warm temperate forests dominated by Lilly Pilly (<i>Acmena smithii</i>), Grey Myrtle (<i>Backhousia myrtifolia</i>), Cheese Tree (<i>Glochidion ferdinandi</i>) and Sweet Pittosporum (<i>Pittosporum undulatum</i>). Associated with alluvial sandy soils of the Hawkesbury Soil Landscapes with naturally low fertility and erodible.	None. The subject land does not contain habitat.	NONE
Flora	Lamiaceae	<i>Prostanthera marifolia</i>	Seaforth Mintbush	CE	CE	1	Occurs in localised patches in or near the endangered Duffys Forest ecological community. Located on deeply weathered clay-loam soils associated with ironstone and scattered shale lenses, a soil type which only occurs on ridge tops and has been extensively urbanised.	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
Flora	Myrtaceae	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	V	V	9	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. Seedling recruitment is common, even in disturbed soils, if protected from grazing and fire. Tends to grow on lower slopes in the landscape.	None. The subject land does not contain habitat.	NONE
Flora	Myrtaceae	<i>Eucalyptus scoparia</i>	Wallangarra White Gum	E	V	7	Found in open eucalypt forest, woodland and heaths on well-drained granite/rhyolite hilltops, slopes and rocky outcrops, typically at high altitudes. At lower elevations can occur in less rocky soils in damp situations.	None. The subject land does not contain habitat.	NONE
Flora	Myrtaceae	<i>Melaleuca deanei</i>	Deane's Paperbark	V	V	7	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Deane's Paperbark occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas.	None. The subject land does not contain habitat.	NONE
Flora	Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	V	V	9	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels,	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.		
Flora	Orchidaceae	<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	V,P	V	2	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year.	None. The subject land does not contain habitat.	NONE
Flora	Orchidaceae	<i>Genoplesium baueri</i>	Bauer's Midge Orchid	E,P	E	4	Grows in dry sclerophyll forest and moss gardens over sandstone. Flowers February to March. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park. May occur in the Woronora, O'Hares, Metropolitan and Warragamba Catchments.	None. The subject land does not contain habitat.	NONE
Flora	Proteaceae	<i>Macadamia integrifolia</i>	Macadamia Nut		V	1	In this region the Macadamia Nut - Sydney Basin is known to be associated with the following vegetation formations and classes. 3035 Northern Ranges Coachwood Warm Temperate Rainforest 3011 Far North Lowland Subtropical Rainforest	None. The subject land does not contain habitat.	NONE

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Habitat Constraints	Likelihood of Occurrence	Likelihood Rating
							3021 Northern Lowland Subtropical Rainforest 3147 Far North Brush Box-Bloodwood Wet Forest 3148 Far North Brush Box-Walnut Wet Forest		
Flora	Proteaceae	<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V	V	1	Found in subtropical rainforest, usually near the coast.	None. The subject land does not contain habitat.	NONE
Flora	Proteaceae	<i>Persoonia hirsuta</i>	Hairy Geebung	E,P	E	3	The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. It is usually present as isolated individuals or very small populations.	None. The subject land does not contain habitat.	NONE
Flora	Thymelaeaceae	<i>Pimelea curviflora</i> var. <i>curviflora</i>		V	V	1	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain.	None. The subject land does not contain habitat.	NONE

7.2 Appendix II – Test of significance

7.2.1 Test of Significance – Grey-headed Flying-fox

The Grey-headed Flying-fox is a highly mobile, nomadic species found within approximately 200 km of the eastern coast of Australia, ranging from Rockhampton in Queensland to Adelaide in South Australia. It primarily inhabits subtropical and temperate regions, utilising a variety of vegetation types including rainforests, tall sclerophyll forests, woodlands, heaths, and swamps. The species has also adapted to urban environments, frequently foraging in gardens and cultivated fruit crops.

GHFF roost in large communal camps, often located in patches of forest near water sources. They feed on the nectar and pollen of native flowering trees, particularly *Eucalyptus*, *Melaleuca*, and *Banksia* species, as well as the fruits of rainforest trees and vines. Foraging flights can extend up to 50 km from roost subject lands, though typical commuting distances are less than 20 km.

Their life cycle includes annual mating, commencing in January, with conception occurring in April or May. A single young is born between October and November. The species relies on a network of habitat patches across the landscape to support its movement and seasonal resource needs.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats—

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

The proposed works involves a lighting upgrade near suitable foraging habitat and removal of some trees. However, these trees are not considered optimal or significant foraging or breeding habitat for the GHFF. While some marginal foraging habitat may be affected, the impact of the lighting upgrade is not facing towards these trees and is not expected to increase the risk of extinction. The GHFF may occasionally or opportunistically visit the subject land to forage on flowering canopy vegetation. Although the subject land is unlikely to play a critical role in the GHFF life cycle, the cumulative loss of canopy cover and impact of light pollution in urban areas contributes to degradation of foraging habitat over time. However, given the highly mobile nature of the species and the availability of other foraging resources in the broader landscape, the lighting upgrade at this subject land is not expected to place the GHFF at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity—

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

Not applicable.

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

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community—

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

The GHFF is a highly mobile species that may access the subject land occasionally or opportunistically for foraging. The trees proposed for removal are unlikely to play a significant role in the species' life cycle, and their removal is not expected to have a substantial impact on available foraging habitat in the region.

Similarly, the lighting upgrade is facing away from the foraging habitat and is not expected to have a substantial impact on available foraging habitat in the region.

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

The broader landscape is already highly fragmented. The proposed works will occur within a relatively minor portion of the extensive home range. The trees proposed for removal are unlikely to be a critical factor in maintaining habitat connectivity for the GHFF, particularly when considered in the context of other existing developments in the area. The lighting upgrade is not expected to increase habitat fragmentation.

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

The trees provide suitable foraging habitat for the GHFF. While the overall importance of these trees to the species is uncertain, they are likely to be of low significance when considered in isolation. This proposal alone is not expected to increase the risk of extinction for the GHFF in the locality.

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

To the east of the subject land, a declared area of outstanding biodiversity value exists as sea grass meadows. The lighting could potentially impact the functioning of this ecosystem, and it is well documented that light pollution is a threat to these ecosystems. The proposal is unlikely to have an impact on the declared area of outstanding biodiversity value as it is not facing the area and light spill is controlled.

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

The removal of native vegetation is a listed KTP. However, the trees proposed for removal are not expected to be a significant factor in the local survival of the GHFF, and their removal is unlikely to contribute meaningfully to the overall impact of this KTP in the region.

Conclusion

The proposed development is not expected to have a significant impact on the GHFF, nor is it likely to place the local population at risk of extinction.

7.2.2 Test of Significance – Long-nosed Bandicoot population in inner western Sydney

The Long-nosed Bandicoot, a marsupial, is a species of bandicoot found in eastern Australia. Around 40 centimetres long, with a long snout. The species is distributed along the eastern coast of Australia from Cape York Peninsula in Queensland to New South Wales and Victoria. It is found in rainforest, moist gullies and grassy woodlands. Long-nosed bandicoots benefit from a mosaic of mixed habitats, including open grassy areas (such as lawns in urban areas) that they forage in at night-time and sheltered areas with undergrowth that they retreat to and nest in.

Long-nosed bandicoots are solitary individuals, interacting little when not mating or parenting.

The long-nosed bandicoot is omnivorous and nocturnal, foraging for insects, such as beetles and beetle larvae (grubs), plants, including the roots of monocots, and fungi. Long-nosed bandicoots spend much of their time digging and often leave characteristic conical holes in the ground where they have foraged looking for grubs in the soil.

Gestation lasts 12.5 days, one of the shortest known of mammal species. The young spend another 50 to 54 days in the mother's pouch before being weaned.

(1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats—

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

The proposed works involves a lighting upgrade near suitable foraging habitat and removal of some trees. However, these trees are not considered optimal or significant foraging or breeding habitat for the Long-nosed Bandicoot. While some marginal ground foraging habitat may be affected, the impact of the lighting upgrade is not facing towards the foraging habitat and is not expected to increase the risk of extinction. The Long-nosed Bandicoot may occasionally or opportunistically visit the subject land to forage on the ground for insects, plants, and fungi. Although the subject land is unlikely to play a critical role in the Long-nosed Bandicoot life cycle, the cumulative loss of habitat and impact of light pollution in urban areas contributes to degradation of foraging habitat over time. However, given the nature of the proposed development and the species ability to exist in an urban landscape that is already heavily fragmented and has high levels of light pollution as well as the availability of other foraging resources in the broader landscape, the lighting upgrade at this subject land is not expected to place the Long-nosed Bandicoot at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity—

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

Not applicable.

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

Not applicable.

(c) in relation to the habitat of a threatened species or ecological community—

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

The Long-nosed Bandicoot may access the subject land occasionally or opportunistically for foraging. The trees proposed for removal are unlikely to play a significant role in the species' life cycle, and their removal is not expected to have a substantial impact on available foraging habitat in the region. Similarly, the lighting upgrade is facing away from the foraging habitat and is not expected to have a substantial impact on available foraging habitat in the region.

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

The broader landscape is already highly fragmented. The proposed works will occur within a relatively minor portion of the extensive home range. The trees proposed for removal are unlikely to be a critical factor in maintaining habitat connectivity for the Long-nosed Bandicoot, particularly when considered in the context of other existing developments in the area. The lighting upgrade is not expected to increase habitat fragmentation.

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

The trees and the ground cover they provide, results in suitable foraging habitat for the Long-nosed Bandicoot. While the overall importance of these trees to the species is uncertain, they are likely to be of low significance when considered in isolation. This proposal alone is not expected to increase the risk of extinction for the Long-nosed Bandicoot in the locality.

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

To the east of the subject land, a declared area of outstanding biodiversity value exists as sea grass meadows. The lighting could potentially impact the functioning of this ecosystem, and it is well documented that light pollution is a threat to these ecosystems. The proposal is unlikely to have an impact on the declared area of outstanding biodiversity value as it is not facing the area and light spill is controlled.

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

The removal of native vegetation is a listed KTP. However, the trees proposed for removal are not expected to be a significant factor in the local survival of the Long-nosed Bandicoot, and their removal is unlikely to contribute meaningfully to the overall impact of this KTP in the region.

Conclusion

The proposed development is not expected to have a significant impact on the Long-nosed Bandicoot, nor is it likely to place the local population at risk of extinction.

7.3 Appendix III - Protected Matters Search Results

A search of the Protected Matters Search Tool (PMST) was conducted to identify Matters of National Environmental Significance (MNES) within a 10 km radius of the site (the search area). The PMST predicts 10 threatened ecological communities, 97 threatened species and 59 migratory species occur within the search area.

One national heritage place, and one world heritage properties, one Ramsar wetland. No Commonwealth marine areas occur within the search area.

Threatened species with potential relevance to the site have been assessed and habitat is not present. Most are marine species (wading birds).

No other EPBC Act matters are of relevance to the site.

Significant impact assessment

Threatened species

The threatened species identified above have been considered in accordance with the significant impact criteria for vulnerable, endangered and critically endangered species in the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE 2013).

When taking into consideration all stages and components of the proposal, and all related activities and infrastructure, there is the potential for impacts, including indirect impacts, on MNES, being mainly loss of a potential foraging habitat. However, it is considered unlikely that any of such species will be adversely impacted by the proposal, because:

- Suitable breeding habitat for most of the species is absent within the site. For those species that could utilise the habitats within the site, there are not likely to be local populations present wholly within the site or reliant on the site for their survival in isolation. Any such populations present within the locality will not be rendered locally extinct by the proposed development. This is based on the large ranges of these species and the small area of habitat, and the nature and condition of the habitats present within the site.
- The site is not assessed as likely to contain habitat critical to the survival of a species.
- The site was not found to support an important population (as defined by DoE 2013) of any threatened species.
- The proposal is situated in an existing cleared area.
- The proposed mitigation measures will mitigate or reduce impacts on threatened species.

With reference to the criteria for vulnerable, endangered and critically endangered species, the proposal is not likely to:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of an important population
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that a species is likely to decline
- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- Introduce disease that may cause a species to decline, or
- Interfere substantially with the recovery of any of these species

The proposed development is highly unlikely to disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of any migratory species. Hence the proposal is not likely to have a significant impact on any listed migratory species under the EPBC Act.

Conclusion

On the basis of this assessment, it is not likely that the proposed development will have a significant impact on any MNES listed under the EPBC Act. Referral of the development application to the Commonwealth Department of Climate Change, Energy, the Environment and Water is not warranted.

7.4 Appendix IV – Recommended trees for replacement

Recommended replacement tree species were sourced from PCT 3594 Sydney Coastal Sandstone Foreshores Forest. Replacing removed trees with species from a nearby Plant Community Type (PCT) is preferred because it supports local ecological integrity, maintains suitable habitat for native fauna, and promotes natural ecosystem functions. These species are adapted to the site's specific soil, climate, and hydrology, making them more resilient and less prone to failure or weed invasion. Using local species also aligns with biodiversity conservation goals, ensuring that restoration efforts meaningfully contribute to the health and resilience of the local ecosystem.

Table 7.3. Recommended tree species for replacement.

Scientific name	Tree size
<i>Glochidion ferdinandi</i>	Small tree
<i>Angophora costata</i>	Canopy tree
<i>Notelaea longifolia</i>	Small tree
<i>Banksia integrifolia</i>	Small tree
<i>Ficus rubiginosa</i>	Small tree
<i>Allocasuarina littoralis</i>	Small tree
<i>Eucalyptus botryoides</i>	Canopy tree
<i>Banksia serrata</i>	Small tree
<i>Corymbia gummifera</i>	Small tree
<i>Eucalyptus piperita</i>	Canopy tree
<i>Ceratopetalum gummiferum</i>	Small tree