Flora and Fauna Assessment for Demo DA

49 Blackbutts Rd & 21A Warili Rd, Frenchs Forest

Prepared by Ecological Consultants Australia Pty Ltd TA Kingfisher Urban Ecology and Wetlands

April 2024

About this document

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Statement of Authorship

This study and report were undertaken by Ecological Consultants Australia for the client. The authors of the report are Geraldene Dalby-Ball with qualifications BSc majoring in Ecology and Botany with over 25 years of experience in this field and Brooke Thompson with qualifications BSc majoring in Conservation Biology.

Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any particular proposal or pre-determined position.

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Distribution:	Sekisui House c/o Willowtree Planning Asher Richardson asher.richardson@willowtp.com.au 0488 010 636 02 9929 6974 Suite 204, Level 2, 165 Walker Street, North Sydney NSW 2060

Signed: Elaway Dalby-Ball – Director of Ecological Consultants Australia Pty Ltd

Summary

Ecological Consultants Australia Pty Ltd trading as Kingfisher Urban Ecology and Wetlands has been engaged by Sekisui House to prepare a **Flora and Fauna Assessment** (FFA) for the demolition of all existing structures on site at 49 Blackbutts Road and 21A Warili Road, Frenchs Forest NSW 2086, legally known as Lot 1 in DP 1298188 and Lot 1 in DP 524083 in the Northern Beaches LGA.

Methods

- On-ground surveys were conducted on the 21st of February by Ecologist Elaway (G. Dalby-Ball).
- Flora and fauna surveys were conducted as a random meander across the subject site and surrounds, whilst recording all visible flora and fauna species and their habitats.
- BioNet searches were performed to identify threatened flora, fauna and endangered populations observed during previous ecological surveys within a 10 km radius surrounding the subject site.
- The proposal was evaluated for actual and potential ecological impacts.
- An assessment of the Biodiversity Offsets Scheme (BOS) threshold triggers was undertaken and found that the proposal does not trigger the area clearing or Biodiversity Values Map threshold. The proposal will see approximately 0.15 ha (overestimate based on full canopy cover and areas between) of vegetation cleared which is under the 0.25 ha threshold for entry into the BOS.

Results

- The site contains no mapped plant community type (PCT). The closest PCT to the subject site is Sydney Coastal Shale-Sandstone Forest (PCT 3259) located on the northern side of Blackbutts Road. PCT 3259 has an associated TEC – Duffys Forest Ecological Community in the Sydney Basin Bioregion (Bionet vegetation classification database).
- No threatened flora or fauna have been previously recorded on-site (Bionet 2024). Records for the local area include the Grey-headed flying-fox, Large and little bent-winged bat, Powerful owl, Swift parrot, White-bellied sea-eagle, Red-crowned toadlet, Caley's grevillea, Bynoe's wattle, Magenta lilly pilly, etc. (see Section 5 of this report). None of the above-threatened species were observed or recorded on-site during the survey.
- On-ground findings are that native canopy is present including locally native species, Spotted Gums (young), and Iron Bark. Native trees are in a cluster and on the road reserve. Most of the site is disturbed by exotic plantings. Jacaranda and similar.
- Tree removal includes:
    - 24 locally native trees
    - 8 possibly planted native or possibly self-sown remnants of the community
    - 25 planted native small trees and shrubs
    - 43 exotic species
- No native midstory will be removed.

Mitigation Measures

If the proposal is approved the following mitigation measures are to be implemented.

- Delineation of work areas
- Preservation of habitat features
- Erosion and sediment control
- Weed control
- Pathogen prevention

See the recommendation section for a detailed explanation as to how these measures improve biodiversity values.

Legislation: Various pieces of legislation apply to this location and the proposed works are in keeping with the objective of the Acts. Key acts are listed below.

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act),
- *Biodiversity Conservation Act 2016* (BC Act),
- *National Parks & Wildlife Act 1974* (NP&W Act), and
- *Biosecurity Act* (superseding the Noxious Weed Act 1993) (NW Act).

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1 Introduction

1.1 Purpose of report

Ecological Consultants Australia Pty Ltd trading as Kingfisher Urban Ecology and Wetlands has been engaged by Sekisui House to prepare a **Flora and Fauna Assessment** (FFA) for the demolition of all existing structures on site at 49 Blackbutts Road and 21A Warili Road, Frenchs Forest NSW 2086, legally known as Lot 1 in DP 1298188 and Lot 1 in DP 524083 in the Northern Beaches LGA.

The site has been assessed as a FFA as the Biodiversity Offsets Scheme (BOS) under the NSW *Biodiversity Conservation Act 2016* (BC Act) is not triggered, given:

1. The proposed development does not trigger the area-clearing threshold.
2. The proposed development does not require the clearing of native vegetation or other biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017 on land identified on the Biodiversity Values (BV) Map and therefore, the BV Map threshold is not triggered.

This FFA assesses the potential impacts of the proposed development, including direct and indirect impacts on threatened species, populations, ecological communities and their habitats, according to Section 5A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Where applicable, the 'test of significance' has been undertaken to determine whether the proposed development is likely to significantly affect threatened species or ecological communities, or their habitats.

The test of significance is set out in s. 7.3 of the BC Act.

1.2 Site description

The site which is the subject of this report is located at 49 Blackbutts Road and 21A Warili Road, Frenchs Forest NSW 2086, legally known as Lot 1 in DP 1298188 and Lot 1 in DP 524083 in the Northern Beaches LGA (see Figures 1.1 and 1.2). The study area includes the site, as well as any additional land traversed during the site survey.

Table 1.1. Site information.

Lot/DP	1/DP1298188	1/DP524083
Address	49 Blackbutts Road Frenchs Forest NSW 2086	21A Warili Road Frenchs Forest NSW 2086
Area	10,112 m²	216 m²
LGA	Northern Beaches	Northern Beaches
Land Zoning	R2 – Low Density Residential	R2 – Low Density Residential

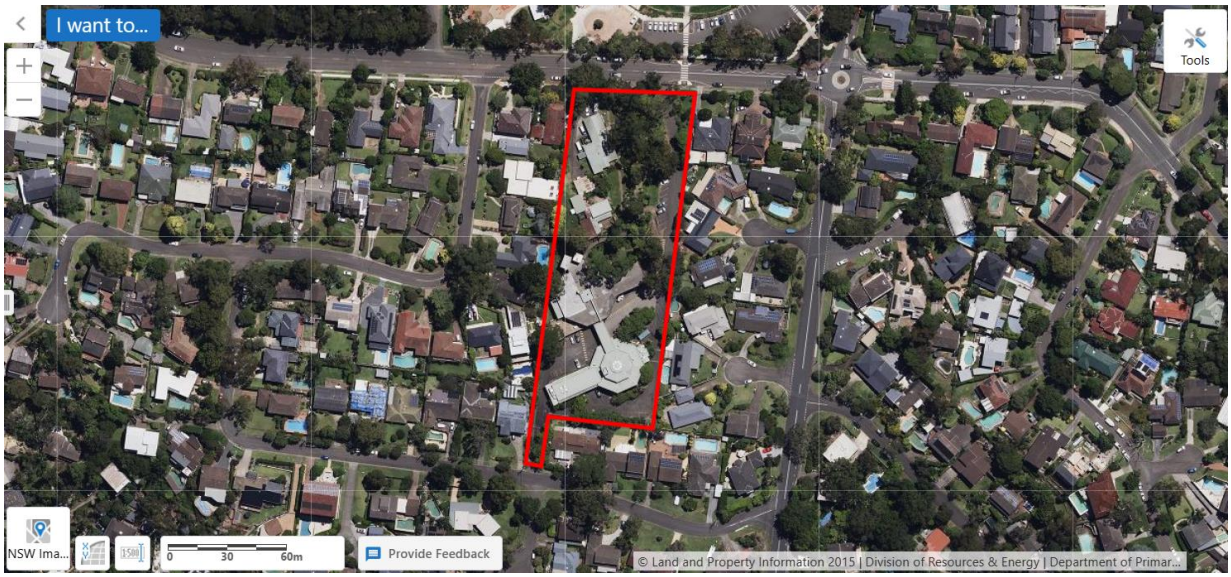


Figure 1.1. Subject site.
Source: SEED NSW Imagery.

1.3 Proposal

The proposal seeks the demolition of all existing structures on site (as shown in Figure 1.3). This constitutes the first development stage of the future low-density residential development on site.

Any trees on site that are within 2 metres of the existing buildings to be demolished and that meet the Northern Beaches Council exempt criteria for tree removal without a permit will be removed.

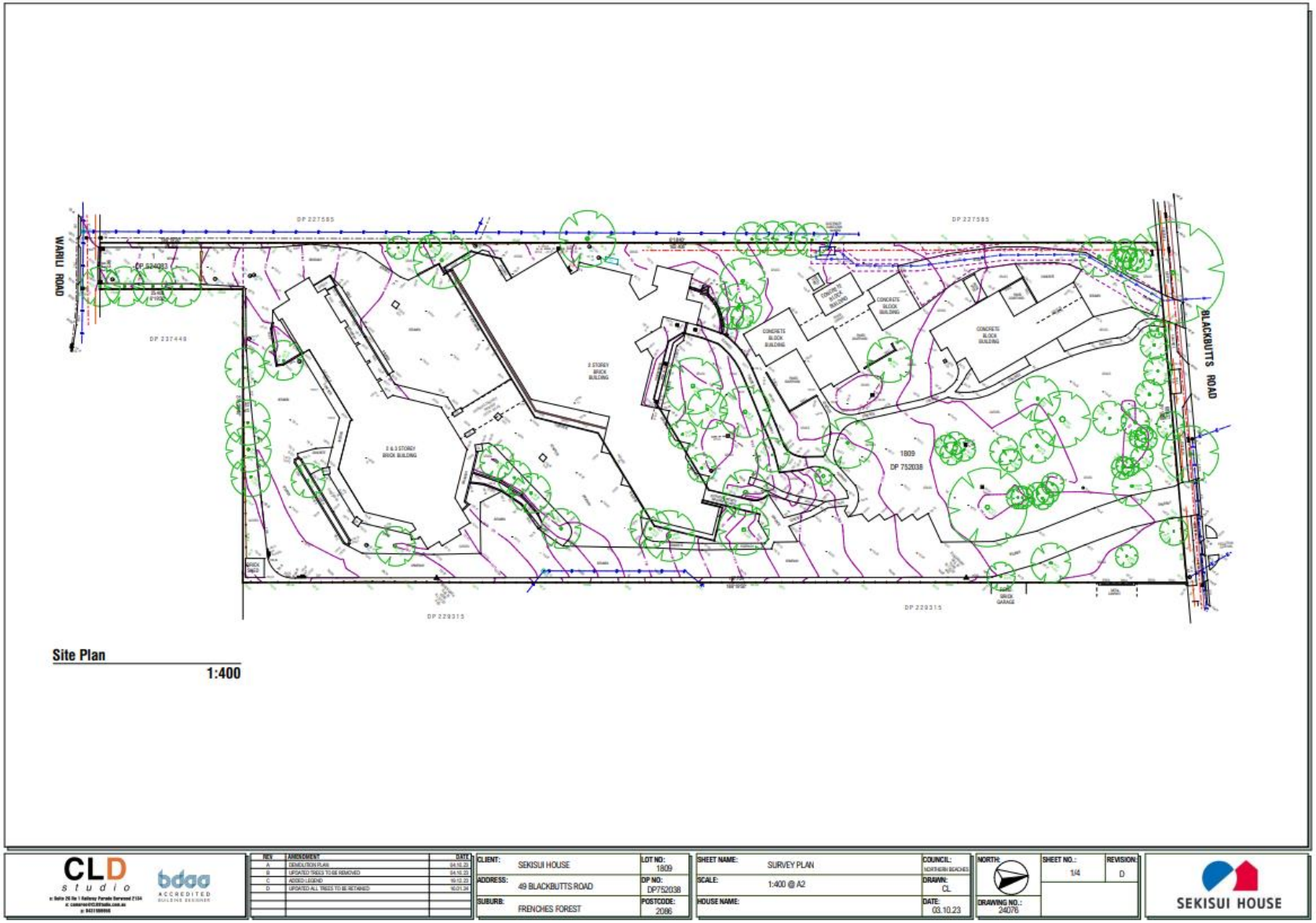


Figure 1.2. Survey Plan.

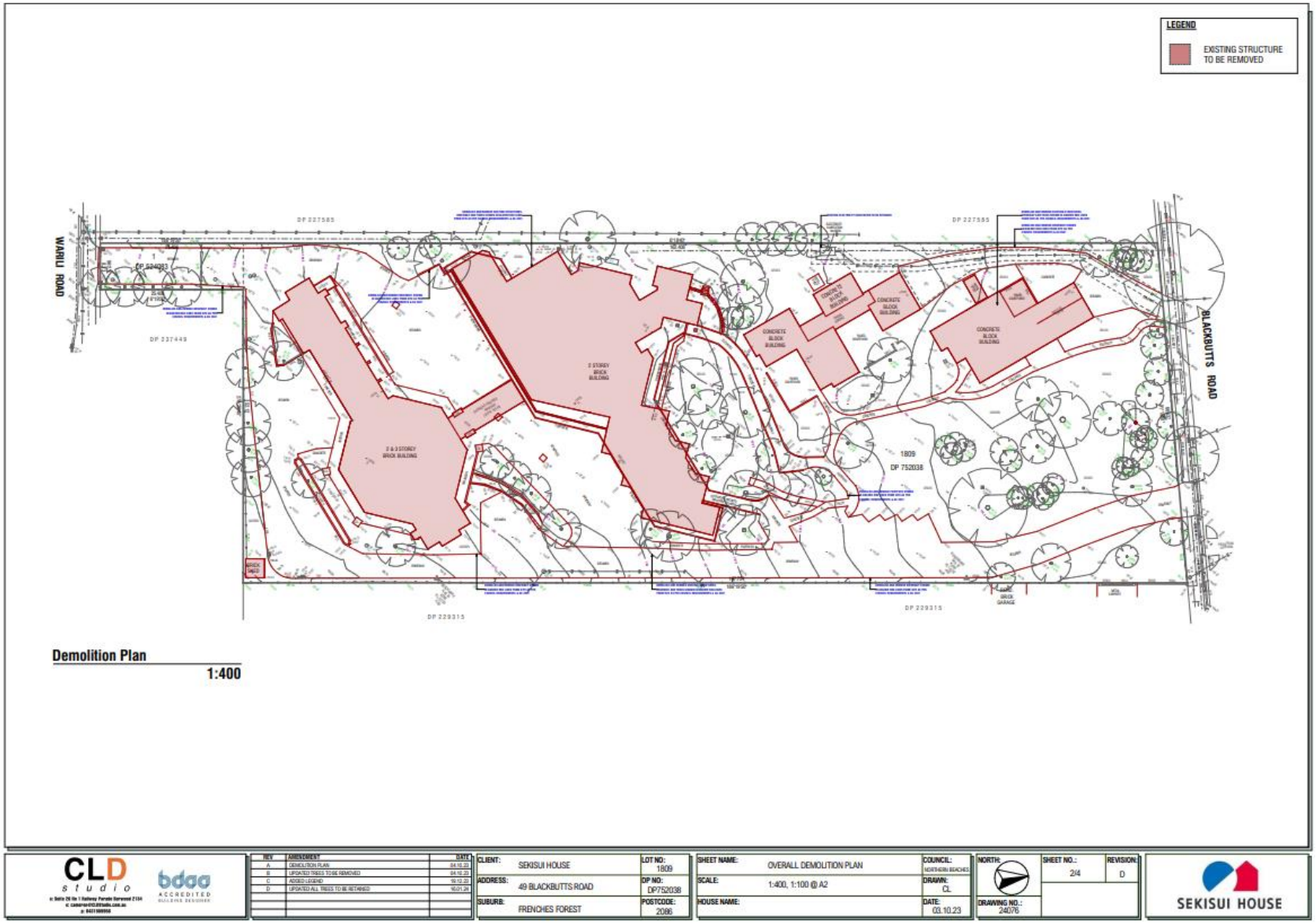


Figure 1.3. Overall Demolition Plan.

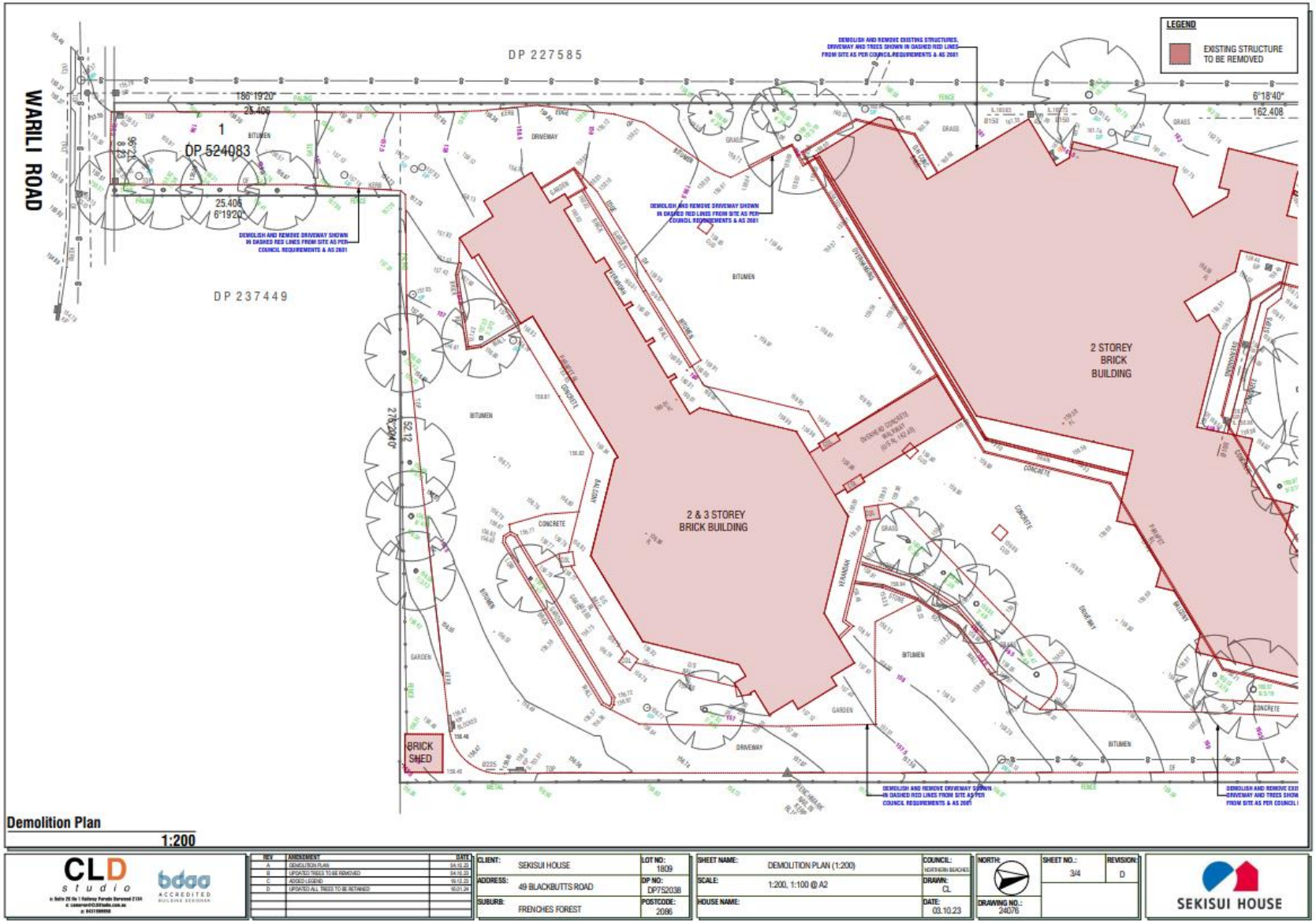


Figure 1.4. Demolition Plan (Sheet 1).

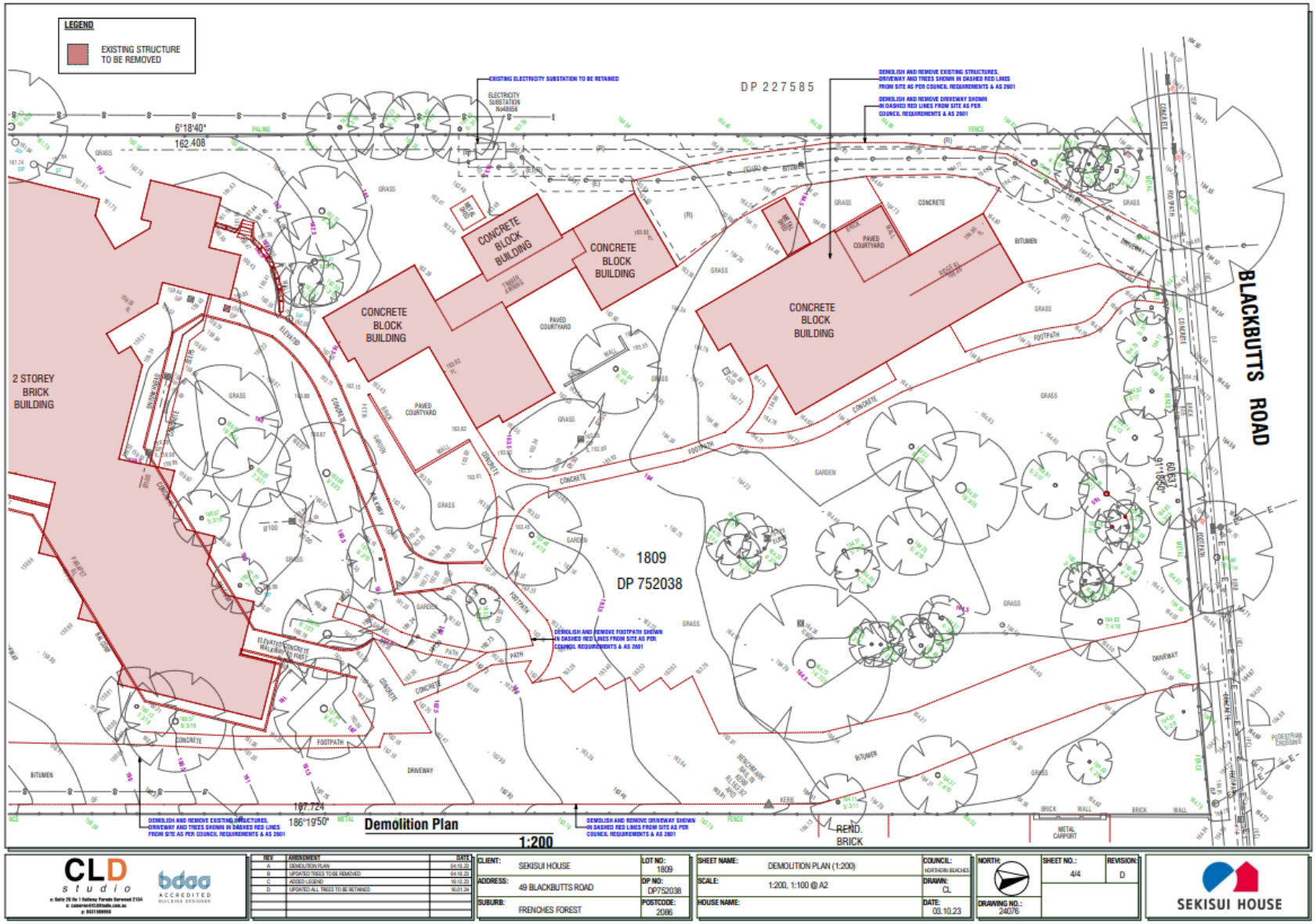


Figure 1.5. Demolition Plan (Sheet 2).

1.4 Legislative framework

Commonwealth and State legislation and policies, and local policies apply to the assessment, planning and management of the environment within the study area. Table 1.2 outlines the relevant legislation, policy and guidelines related to the proposed development.

Table 1.2. Legislative context.

Instrument	Relevance to the proposal
Commonwealth	
Environment Protection and Biodiversity Conservation (EPBC) *Act 1999*	Under the EPBC Act an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.
State	
Environmental Planning and Assessment (EP&A) *Act 1979*	Part 5 of the EP&A Act sets out the environmental assessment scheme that applies to "activities" undertaken by or on behalf of a public authority (including local councils) or that require the approval of such an authority.
Biodiversity Conservation (BC) *Act 2016*	Part 7.3 of the BC Act sets the test for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.
Biosecurity Act 2015	Under the Act, all landholders have a general biosecurity duty to manage any biosecurity risk posed or likely to be posed by priority weeds. Any person who deals with a plant, who knows (or ought to know) of any biosecurity risk, must ensure the risk is prevented, eliminated or minimised.
Local	
Warringah Local Environmental Plan 2011	The proposal must comply with land uses set out in the zoning provisions of the LEP. The site is zoned R2 low-density residential. The objectives of this zone are to: • To provide for the housing needs of the community within a low-density residential environment. • To enable other land uses that provide facilities or services to meet the day-to-day needs of residents. • To ensure that low-density residential environments are characterised by landscaped settings that are in harmony with the natural environment of Warringah. The proposal is keeping within the objectives of the zone.
Warringah DCP	The site is located within the DCP Map – Landscaped Open Space and Bushland Setting in which the requirement is a minimum of 40% landscaped open space.

	Clause E2 Prescribed Vegetation Objectives • To preserve and enhance the area's amenity, whilst protecting human life and property. • To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, stormwater retention, energy conservation and noise reduction. • To provide habitat for local wildlife, generate shade for residents and provide psychological & social benefits. • To protect and promote the recovery of threatened species, populations and endangered ecological communities. • To protect and enhance the habitat of plants, animals and vegetation communities with high conservation significance. • To retain and enhance native vegetation communities and the ecological functions of wildlife corridors. • To reconstruct habitat in non-vegetated areas of wildlife corridors that will sustain the ecological functions of a wildlife corridor and that, as far as possible, represents the combination of plant species and vegetation structure of the original 1750 community. • Promote the retention of native vegetation in parcels of size, condition and configuration which will as far as possible enable plant and animal communities to survive in the long term. Requirements 1. The following is prescribed for clause 5.9(2) of Part 2 of the Vegetation SEPP: All native vegetation identified on: a) DCP Map Threatened and High Conservation Habitat N/A b) DCP Map Wildlife Corridors N/A c) DCP Map Native Vegetation N/A d) known or potential habitat for threatened species, populations or ecological communities as listed under the NSW *Threatened Species Conservation Act 1995* (repealed and replaced by the NSW *Biodiversity Conservation Act 2016*) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. N/A

	2. Development is to be situated and designed to minimise the impact on prescribed vegetation, including remnant canopy trees, understorey vegetation, and ground cover species. This DA retains prescribed vegetation, including remnant canopy trees. Native understorey vegetation and ground cover species are primarily absent. **Clause E6 Retaining unique environmental features** <u>Objectives</u> • To conserve those parts of land which distinguish it from its surroundings. <u>Requirements</u> 1. Development is to be designed to address any distinctive environmental features of the site and adjoining nearby land. 2. Development should respond to these features through location of structures, outlook, design and materials. No significant environmental features are present on-site i.e., caves, rock features, hollow-bearing trees, nests, burrows, etc.

1.5 Biodiversity Offsets Scheme

The Biodiversity Conservation Act 2016 (BC Act 2016) is the key legislation that enables the conservation of biodiversity within the state of NSW. The BC Act 2016 facilitates the assessment and ongoing protection of flora and fauna, including threatened species and ecological communities. The BC Act 2016 outlines assessment and offsetting requirements for activities with the potential to impact threatened species and ecological communities in NSW, and the clearing of native vegetation.

The Biodiversity Conservation Regulation 2017 (BC Reg.) sets out the threshold level for when the Biodiversity Offsets Scheme (BOS) will be triggered. The threshold has two elements:

1. **Whether the amount of native vegetation being cleared exceeds an area threshold**

The proposal does not trigger the area clearing threshold as per the BOS entry requirements as the impact area does not exceed the threshold for clearing, above which BAM and offsets scheme apply (0.25 ha or more) (Table 1.2).

Table 1.2. Minimum lot size and threshold trigger.

Minimum lot size	**600 m^2**
The threshold for clearing, above which the BAM and offsets scheme apply	**0.25 ha or more**
Clearing area	**~0.15 ha (overestimate based on full canopy cover)**

2. **Whether the impacts occur on an area mapped on the Biodiversity Values Map published by the Environment Agency Head**

The BV Map identifies land of high biodiversity value, as defined by clause 7.3(3) of the BC Reg. The BOS applies to the clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BC Reg. on land identified on the BV Map.

The proposed development footprint is located on land identified on the BV Map and therefore does trigger the BV Map threshold (Figure 1.6).

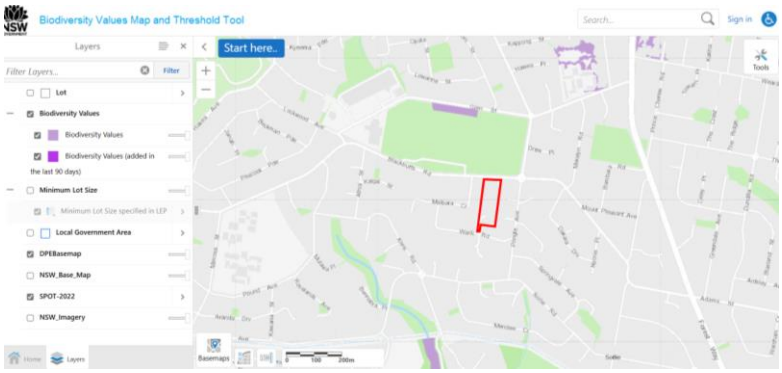


Figure 1.6. Biodiversity Values Map.

Source: Biodiversity Values Map and Threshold (BMAT) Tool
https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

1.6 Information sources

Databases reviewed in the assessment:

- BioNet Vegetation Classification
- BioNet Threatened Biodiversity Data Collection
- NSW BioNet Atlas
- Directory of Important Wetlands in Australia
- Biodiversity Values Map and Threshold tool
- Protected Matters Search Tool
- NSW Planning Portal Spatial Viewer
- SEED
- eSPADE v2.2

Reports and plans related to the proposal:

- Demolition Plans prepared by CLD studio.
- Arboricultural Impact Assessment Report prepared by The Tree Guardian Arboricultural Consultancy.
- Statement of Environmental Effects prepared by Willowtree Planning.
- Northern Beaches Council RFI dated 3 April 2024.

2 Methods

2.1 Database search

A site-specific database search was conducted before undertaking on-ground surveys and the preparation of this report, which included the following sources:

Threatened species database search tools:

- Atlas of NSW Wildlife (Bionet/SEED) 10 km search radius (Accessed March 2024).

Previous vegetation mapping: NSW State Vegetation Type Map (SVTM) C2.0M2.0 (DPE 2023).

Hydroline mapping: Water Management (General) Regulation 2018 Hydro-Line spatial data
https://www.dpie.nsw.gov.au/water/licensing-and-trade/controlled-activity-approvals/waterfront-land-e-tool/hydro-line-spatial-data

2.2 On-ground survey

On-ground surveys were conducted on the 21st Feb 2024 by Ecologist Elaway (G. Dalby-Ball).

2.2.1 Flora

Flora surveys were conducted as a random meander across the subject site and surrounding areas, whilst recording all visible flora species. Habitat searches for threatened flora species were conducted during flora surveys. Flora surveys included the identification of both native and exotic species and the validation of existing vegetation mapping.

2.2.2 Fauna and their Habitat

Opportunistic fauna surveys were conducted for amphibians, aves, reptiles and mammals, and included searches of direct and indirect evidence of occupancy (i.e., scats, urine, scratchings, fur, bones, etc.). Fauna habitat searches were conducted and included searches for hollow-bearing trees, bush rock and rocky outcrops, caves (onsite none however research included covering 2km), crevices and overhangs, burrows, nests, food trees (e.g., *Allocasuarina* sp.), permanent soaks and seepages, and refuge habitats of human-made structures (e.g., evidence of micro-bats in the abandoned buildings).

2.3 Limitations of the study

Limitations of the study may arise where certain cryptic species of plants may occur as soil-stored seed or as subterranean vegetation structures. Some species are identifiable above ground only after environmental circumstances related to factors such as periodic fire frequency, intensity or seasonality, soil moisture regime, biological life-cycle patterns as in the case of small plants such as species of orchids, etc. No specific invertebrate surveys were conducted.

Surveys at one time of the year cannot be expected to detect the presence of all species occurring, or likely to occur, in the study area. This is because some species may (a) occur seasonally, (b) utilise different areas periodically (as a component of a more extensive home range), or (c) become dormant during specific periods of the year. Rather, the survey provides the opportunity to sample the area, search specifically for species likely to be encountered within the available time frame and assess the suitability of habitat for particular species. Considering the size and habitat availability and the Ecologist's deep knowledge of the general area over 20yrs we are confident that this survey is representative of the likely species and vegetation community and that future studies at other times would not change the conclusions in this report.

3 Waterways

The site does not contain any hydrological features. The closest watercourse is Carroll Creek to the southwest (see Figure 3.1).

No natural or created soaks that would be suitable for frogs were observed. Damper areas on-site are those beneath trees near Blackbutts Road. If there were ponds in nearby private gardens then frogs may shelter in this small grassed area as part of a larger habitat area; however, it is unlikely.

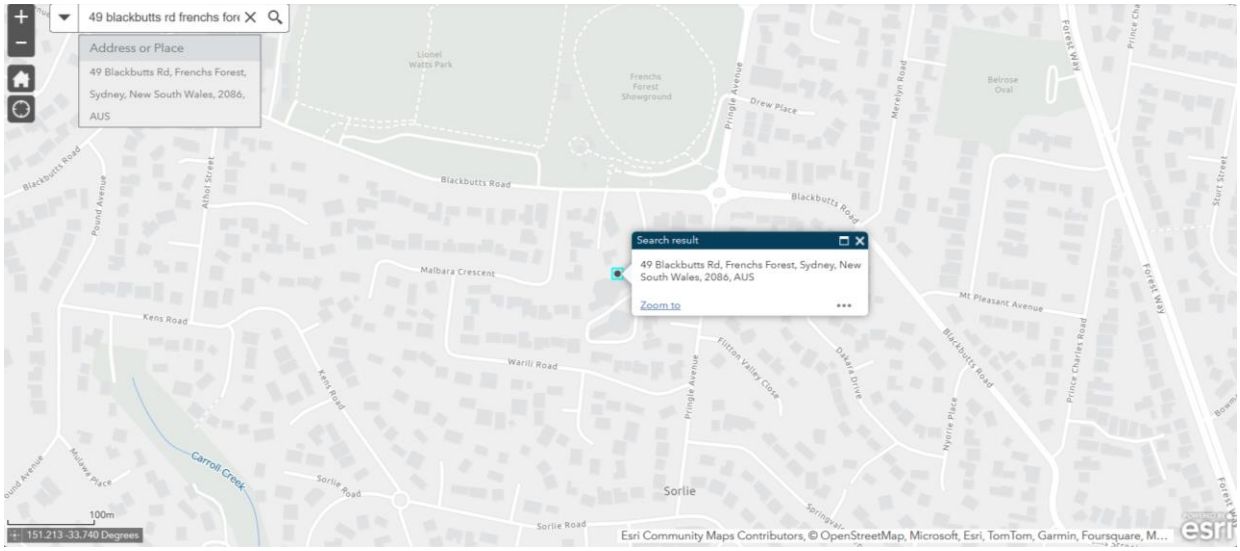


Figure 3.1. Catchment context.
Source: Water Management (General) Regulation 2018 hydroline spatial data 1.0.

4 Native vegetation

4.1 Plant community types

A search of the NSW State Vegetation Type Map (SVTM) (DPE 2023) showed no mapped plant community type (PCT) on the site. The closest mapped PCT is Sydney Coastal Shale-Sandstone Forest (PCT 3259) located on the northern side of Blackbutts Road (Figure 3.2).

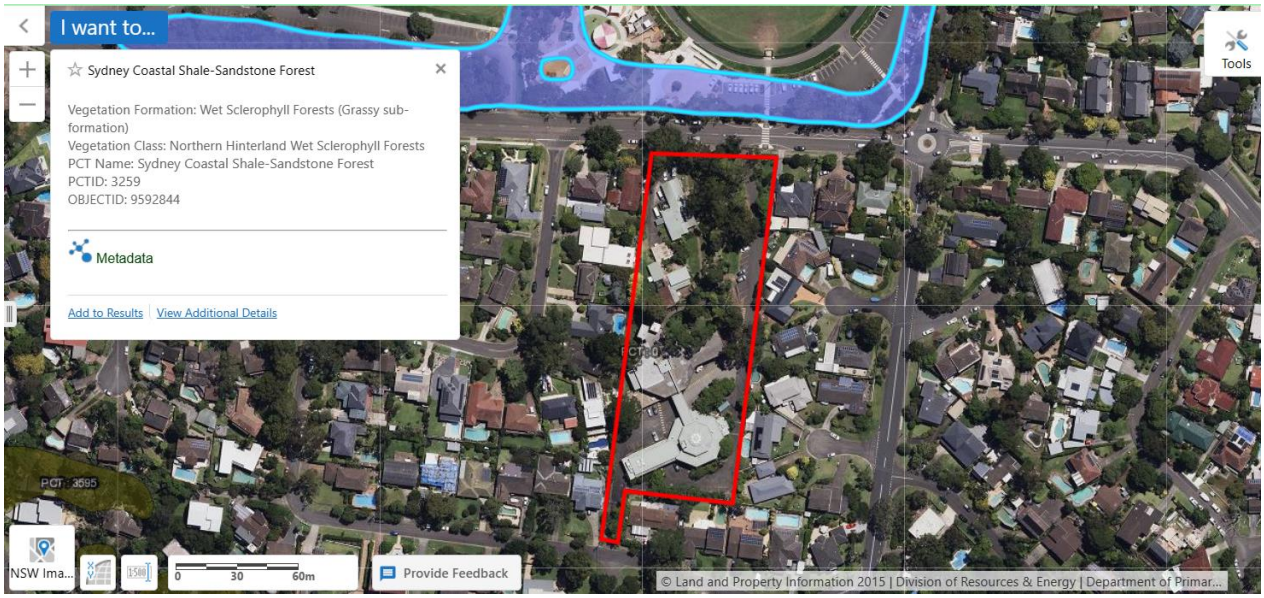


Figure 4.1. PCT mapping.

Sydney Coastal Shale-Sandstone Forest is the most likely PCT to have originally occurred on-site. Remnant trees on-site include *Corymbia gummifera*, *Angophora costata*, *Eucalyptus pilularis* and *E. botryoides*.

Sydney Coastal Shale-Sandstone Forest relates to the endangered ecological community Duffys Forest Ecological Community in the Sydney Basin Bioregion (Bionet vegetation classification database). A 5-part test of significance for this community has been provided in Appendix II.

5 Threatened species

5.1 Threatened flora

Bionet records (2024) within a 10-kilometre radius of the subject site returned a total of 26 threatened flora species records. These species are currently listed as critically endangered, endangered or vulnerable under NSW and/or Commonwealth legislation (Table 3.1). No threatened flora have been recorded to occur on the site.

The likelihood of occurrence assessment for threatened flora occurring on the subject site is presented in Appendix I.

In summary, all species, except the orchids would be identifiable on-site if present. The orchids (Thick Lip Spider, Bauer's Midge and Angus's Onion orchid were surveyed for.

Angus's Onion Orchid would not be present as habitat is not present. The author is familiar with this species and understands its habitat requirements.

The Bauer's Midge Orchid was surveyed (at the optimal time Feb-March) in the only possible place (under the trees) and the species was not present. Its known habitat is dry sclerophyll forest and moss gardens over sandstone and the site is not this.

Thick Lip Spider Orchid (Sept-Nov flowering) doesn't have a habitat on the site and it's noted that this area has been mown and whipper-snipped for years. Habitat is low, dry sclerophyll woodland (for example open Kunzea woodland) with a healthy or sometimes grassy understorey on clay loams or sandy soils (Bernhardt 1993; Bishop 2000; Cross 1995; Fitzgerald 1876).

Targeted species listed below

Syzygium paniculatum	Magenta Lilly Pilly
Caladenia tessellata	Thick Lip Spider Orchid
Genoplesium baueri	Bauer's Midge Orchid
Microtis angusii	Angus's Onion Orchid
Sarcochilus hartmannii	Hartman's Sarcochilus
Grevillea caleyi	Caley's Grevillea

Table 5.1. Threatened flora recorded within a 10-kilometre radius of the subject site.

Family	Scientific name	Common name	Status		Records
			NSW	Cth	
Campanulaceae	*Isotoma fluviatilis subsp. fluviatilis*			X	1
Dilleniaceae	*Hibbertia puberula*		E		1
Dilleniaceae	*Hibbertia superans*		E		1
Elaeocarpaceae	*Tetratheca glandulosa*		V		159
Ericaceae	*Epacris purpurascens var. purpurascens*		V		16

Family	Scientific name	Common name	Status		Records
			NSW	Cth	
Euphorbiaceae	*Chamaesyce psammogeton*	Sand Spurge	E		2
Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E	V	8
Fabaceae (Mimosoideae)	*Acacia terminalis subsp. Eastern Sydney*	Sunshine wattle	E	E	3
Haloragaceae	*Haloragodendron lucasii*		E	E	12
Lamiaceae	*Prostanthera marifolia*	Seaforth Mintbush	CE	CE	870
Malvaceae	*Lasiopetalum joyceae*		V	V	1
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V		12
Myrtaceae	*Darwinia biflora*		V	V	2
Myrtaceae	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V	70
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	2
Myrtaceae	*Leptospermum deanei*		V	V	35
Myrtaceae	*Melaleuca deanei*	Deane's Paperbark	V	V	10
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E	V	15
Orchidaceae	*Caladenia tessellata*	Thick Lip Spider Orchid	E,P	V	3
Orchidaceae	*Genoplesium baueri*	Bauer's Midge Orchid	E,P	E	74
Orchidaceae	*Microtis angusii*	Angus's Onion Orchid	E,P	E	9
Orchidaceae	*Sarcochilus hartmannii*	Hartman's Sarcochilus	V,P	V	1
Proteaceae	*Grevillea caleyi*	Caley's Grevillea	CE	CE	378
Proteaceae	*Macadamia integrifolia*	Macadamia Nut		V	8
Thymelaeaceae	*Pimelea curviflora var. curviflora*		V	V	37

CE = Critically Endangered, E = Endangered, V = Vulnerable, P = Protected, X = Extinct

5.2 Threatened fauna

Bionet records (2024) within a 10-kilometre radius of the subject site returned a total of 50 threatened fauna species records. These species are currently listed as critically endangered, endangered or vulnerable under NSW and/or Commonwealth legislation (Table 3.2). No threatened fauna have been recorded to occur on the site.

The likelihood of occurrence assessment for threatened flora occurring on the subject site is presented in Appendix I.

Table 5.2. Threatened fauna recorded within a 10-kilometre radius of the subject site.

Class	Scientific name	Common name	Status		Records
			NSW	Cth	
Myobatrachidae	*Pseudophryne australis*	Red-crowned Toadlet	V,P		624
Limnodynastidae	*Heleioporus australiacus*	Giant Burrowing Frog	V,P	V	17
Cheloniidae	*Caretta caretta*	Loggerhead Turtle	E1,P	E	7
Varanidae	*Varanus rosenbergi*	Rosenberg's Goanna	V,P		126
Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P		1
Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V,P		5
Apodidae	*Apus pacificus*	Fork-tailed Swift	P	M	1
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	M	21
Diomedeidae	*Diomedea exulans*	Wandering Albatross	E,P	V	1
Procellariidae	*Ardenna carneipes*	Flesh-footed Shearwater	V,P	M	1
Procellariidae	*Ardenna pacifica*	Wedge-tailed Shearwater	P	M	1
Procellariidae	*Ardenna tenuirostris*	Short-tailed Shearwater	P	M	1
Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V,P		7
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		44
Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V,P		3
Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V,P		10
Accipitridae	*Pandion cristatus*	Eastern Osprey	V,P		8
Burhinidae	*Esacus magnirostris*	Beach Stone-curlew	CE,P		1
Charadriidae	*Pluvialis squatarola*	Grey Plover	P	M	2
Laridae	*Sterna hirundo*	Common Tern	P	M	1
Laridae	*Thalasseus bergii*	Crested Tern	P	M	7
Cacatuidae	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P	E	3
Cacatuidae	*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	V,P	V	97

Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P		8
Psittacidae	*Lathamus discolor*	Swift Parrot	E,P	CE	15
Psittacidae	*Neophema pulchella*	Turquoise Parrot	V,P		1
Strigidae	*Ninox connivens*	Barking Owl	V,P		8
Strigidae	*Ninox strenua*	Powerful Owl	V,P		507
Tytonidae	*Tyto novaehollandiae*	Masked Owl	V,P		2
Tytonidae	*Tyto tenebricosa*	Sooty Owl	V,P		4
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	CE,P	CE	1
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V,P		2
Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		6
Petroicidae	*Petroica boodang*	Scarlet Robin	V,P		2
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	19
Peramelidae	*Isoodon obesulus obesulus*	Southern Brown Bandicoot (eastern)	E,P	E	111
Phascolarctidae	*Phascolarctos cinereus*	Koala	E,P	E	18
Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V,P		352
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	361
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		7

CE = Critically Endangered, E = Endangered, V = Vulnerable, P = Protected, M = Migratory

5.3 Endangered populations

Bionet records (2024) show no endangered populations have been recorded within a 10 km radius of the subject site.

Figure 5.1. Bionet threatened species records within proximity to the subject site. Source: Bionet species sightings 2024.

6 On-ground survey

6.1 Native vegetation

The site contains native canopy in the form of *Corymbia maculata, C. gummifera, Eucalyptus saligna, E. resinifera, E. botryoides, E. microcorys* and *E. pilularis.*

Smaller trees/shrubs include *Backhousia myrtifolia, Callistemon viminalis, Leptospermum petersonii, Syzygium australe, S. smithii, Banksia spinulosa, B. integrifolia, Glochidion ferdinandi, Backhousia citriodora* and *Acacia decurrens.*

Cyathea australis (Tree ferns) and *Livistona australis* (Cabbage palms) are also present.

A small patch of *Microlaena stipoides* (20cm x 20cm) was observed; however, all other grassed areas are exotic.

6.2 Weeds

Table 6.1 lists the weeds observed within the study area and surrounds whether they are Weeds of National Significance (WoNS) and the landholder's duty under the *Biosecurity Act 2015*.

Table 6.1. Weeds were observed within the study area and surrounds.

Scientific name	Common name	WoNS	Duty
Ochna serrulata	Mickey Mouse Plant	No	This plant should not be sold in parts of the NSW
Asparagus aethiopicus	Asparagus Fern	Yes	This plant must not be sold anywhere NSW
Senna pendula	Cassia	No	This plant should not be sold in parts of NSW
Ehrharta erecta	Panic Veldt Grass	No	This plant should not be sold in parts of NSW
Agapanthus africanus	Agapanthus	No	This plant should not be sold in parts of NSW
Bidens pilosa	Cobbler's Pegs	No	This plant should not be sold in parts of NSW
Solanum nigrum	Black Nightshade	No	This plant should not be sold in parts of NSW

6.3 Fauna and their habitat

Habitat is limited to exotic and planted native shrubs, low in number and density. Native birds and pollinators could use these for food sources. No threatened species or high reliance due to the low number of plants and previous long-term proximity to people/buildings etc.

Native canopy: The canopy in flower will provide food for nectarivorous birds and bats as well as insects. Insects that will then be fed on by insectivorous birds and microbats. The high diversity of canopy species will result in long local availability as the species flower at different times.

No obvious hollows were observed. It is possible that deep furrows or upper dead wood could have places/hollows large enough for microbats. It is noted that some species have been found under folded bark.

No ponds or pools or damp soaks for frogs.

No areas of primary Lizard/snake habitat. Habitat is present for Common Garden skinks and 'Wall Skinks' on buildings. No weeds with specific features for habitat including nothing particular for Butterflies.

6.4 Photos

Canopy trees along the main road and inside the boundary

Hollows are not present, or not obvious from ground level.

Paved side with exotic turf and exotic mid-story.

The canopy on street – no hollows.


The rear of the property - Jacaranda lined.


Approximately 100m from the property are Blue Gums in the road reserve


Within the property: mown turn and exotic plantings. Caggabge trees are native to NSW, those on-site are not the local variety though the same species. This is not characteristically where they would grow.


Lomandras are mown / whipper snipped or mulched between. Turf is maintained under the trees resulting in low habitat value for fauna. A high level of maintenance is expected to remove any areas for ground Orchids.

Spotted Gums on the site are young. Older trees present are the Blackbutts and on the street Blue Gums.

A few large rocks are in this area. While not habitat for fauna it is best that are retained and used in landscaping or translocated to a nearby reserve, with Coucnils permission.

Jacarandas and Lomandras and hard surface

Turf, exotic plants and hard surface.

	
Largest canopy tree on-site. The smaller trees around this are proposed for removal.	Mid-size trees close to the existing building

7 Impact assessment

This section outlines the anticipated direct and indirect impacts of the proposal on flora and fauna.

7.1 Direct impacts

Table 7.1 provides a summary of tree impacts as identified in the Arboricultural Impact Assessment Report (AIA) prepared by The Tree Guardian Arboricultural Consultancy. See also the key to Table 7.1 below.

Key to Table 7.1

24 locally native trees are proposed for removal including *Corymbia gummifera, Corymbia maculata, , Angophora costata, Eucalyptus botryoides, Eucalyptus pilularis.*
8 possibly planted native or possibly self-sown remnants of the community are proposed for removal including *Acacia decurrens, Callicoma serratifolia, Cyathea australis.*
25 planted small trees and shrubs are proposed for removal including *Callistemon viminalis, Backhousia citriodora, Syzygium australe, Syzygium smithii, Backhousia myrtifolia,* and planted *Livistona australis.*
43 exotic species are proposed for removal

Table 7.1. Tree impact summary.

Tree no.	Total	Species
Tree's 26, 32, 33, 40, 51, 56, 58, 61, 62, 63, 65, 66, 68, 69, 70, 73, 76, 78, 80, 87, 90, 92, 93, 94, 95, 102, 107, 108, 109, 110, 111, 112, 113, 115, 116, 117, 118, 119, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 138 & 139 are all listed as exempt trees which may be removed without Council consent.		
26, 40, 56, 111, 113, 115, 117, 124-136, 138, 139	22	*Jacaranda mimosifolia*
32 (x3), 107, 119	5	*Eucalyptus* sp.
33	1	*Araucaria bidwillii*
51 (x5)	5	*Dicksonia squarrosa* group x 5
58	1	*Cyathea* sp.
61, 65, 66, 80	4	*Archontophoenix cunninghamiana*
62	1	*Buxus sempervirens*
63, 78, 122	3	*Olea europaea* subsp. *cuspidata*
68	1	*Citrus x limon*
69, 112	2	*Persea americana*
70 (x2), 94 (x2)	4	*Callistemon viminalis*
73	1	*Ailanthus altissima*
76, 87	2	*Syagrus romanzoffiana*

Tree no.	Total	Species
90 (x2)	2	*Cyathea australis*
92, 93	2	*Washingtonia robusta*
95	1	*Yucca* sp.
102	1	*Backhousia myrtifolia*
107, 110	2	*Eucalyptus pilularis*
109	1	*Leptospermum petersonii*
116	1	*Syzygium australe*
118	1	*Strelitzia nicolai*
123	1	*Syzygium* hedge
Tree's 64, 83, 84, 85, 86, 88, 89, 91, 96, 97, 98, 99, 100, 101, 103, 104, 105, 106, 114 & 137 are located within the demolition footprint and will require removal to facilitate the works.		
64, 89, 91	3	*Callistemon viminalis*
83, 84, 86, 100	4	*Eucalyptus botryoides*
85, 88, 98, 101	4	*Callicoma serratifolia*
96	1	*Eucalyptus pilularis*
97	1	*Acacia sp.*
99	1	*Livistona australis*
103-106	4	*Syzygium smithii*
114	1	*Syzygium australe*
137	1	*Strelitzia nicolai*
Tree's 10, 23, 28, 59, 60, 72, 74 & 75 are all subject to major TPZ encroachments that cannot be reduced to an acceptable level as per AS4970 and therefore are required to be removed.		
10, 23	2	*Corymbia gummifera*
28, 59	2	*Eucalyptus botryoides*
60	1	*Magnolia x soulangeana*
72, 74	2	*Corymbia maculata*
75	1	*Livistona australis*
Tree's 6, 7, 15, 16, 29, 45, 77 & 121 will not be impacted by the development however, they are in a health or condition that warrants their removal based upon Arboricultural reasons.		
6, 7, 29	3	*Corymbia maculata*
15, 16	2	*Angophora costata*
45	1	*Eucalyptus botryoides*

Tree no.	Total	Species
77	1	*Banksia integrifolia*
121	1	*Acacia decurrens*
TOTAL TREES TO BE REMOVED	**100**	

Table 7.2. Tree landscape significance.

Source: The Tree Guardian Arboricultural Consultancy.

Significance	High	Medium	Low	Insignificant
Tree Number	4, 42, 55, 71, 83 & 119	1, 2, 3, 5, 7, 8, 9, 11, 12, 14, 16, 17, 19, 20, 22, 27, 31, 33, 36, 38, 39, 40, 41, 43, 44, 46, 47, 49, 51, 52, 54, 56, 57, 58, 59, 60, 65, 67, 75, 84, 86, 90, 91, 96, 98, 99, 103, 104, 105, 107, 108, 110, 111, 113, 114, 126, 127, 128, 131, 140, 141, 142, 145 & 147	6, 10, 13, 15, 18, 21, 23, 24, 25, 26, 28, 29, 30, 32, 34, 35, 37, 45, 48, 50, 53, 61, 62, 63, 64, 66, 68, 69, 70, 72, 73, 74, 76, 77, 78, 79, 80, 81, 82, 85, 87, 88, 89, 94, 95, 97, 100, 101, 102, 106, 109, 112, 115, 116, 117, 118, 120, 121, 122, 123, 124, 125, 129, 130, 132, 133, 134, 135, 136, 137, 138, 139, 143, 144, 146, 148 & 149	-

Table 7.3. Tree retention values.

Source: The Tree Guardian Arboricultural Consultancy.

Retention Value	High	Medium	Low
Tree Number	4, 42, 55, 71, 83 & 119	1, 2, 3, 5, 7, 8, 9, 11, 12, 14, 16, 17, 19, 20, 22, 27, 31, 33, 36, 38, 39, 40, 41, 43, 44, 46, 47, 49, 51, 52, 54, 56, 57, 58, 59, 60, 65, 67, 75, 84, 86, 90, 91, 92, 93, 96, 98, 99, 103, 104, 105, 107, 110, 111, 113, 126, 127, 128, 131, 140*, 141*, 142*, 145* & 147*	6, 10, 13, 15, 18, 21, 23, 24, 25, 26, 28, 29, 30, 32, 34, 35, 37, 45, 48, 50, 53, 61, 62, 63, 64, 66, 68, 69, 70, 72, 73, 74, 76, 77, 78, 79, 80, 81, 82, 85, 87, 88, 89, 94, 95, 97, 100, 101, 102, 106, 108, 109, 112, 114, 115, 116, 117, 118, 120, 121, 122, 123, 124, 125, 129, 130, 132, 133, 134, 135, 136, 137, 138, 139, 143*, 144* 146*, 148* & 149*

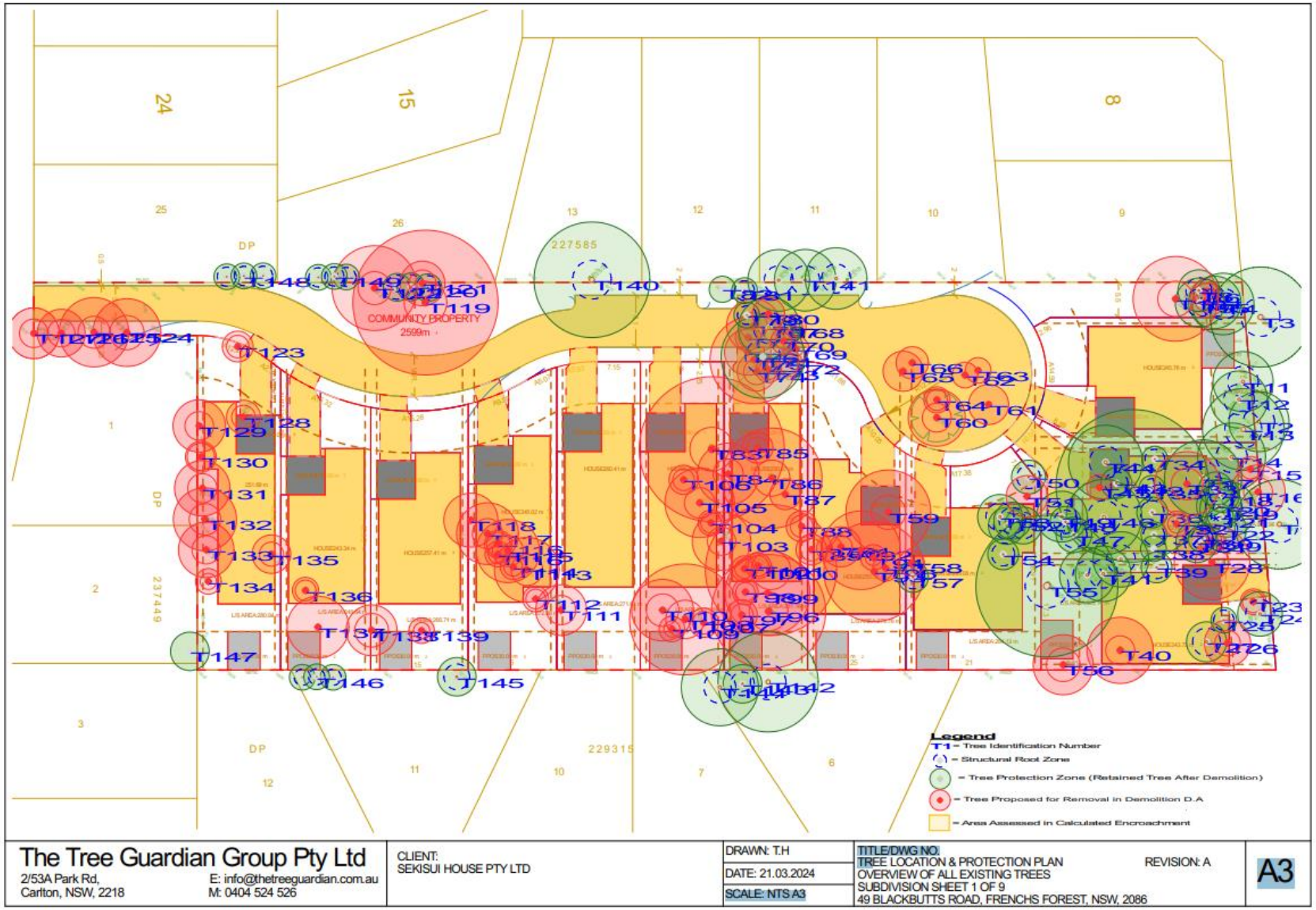


Figure 7.1. Tree location plan.

Source: The Tree Guardian Arboricultural Consultancy.

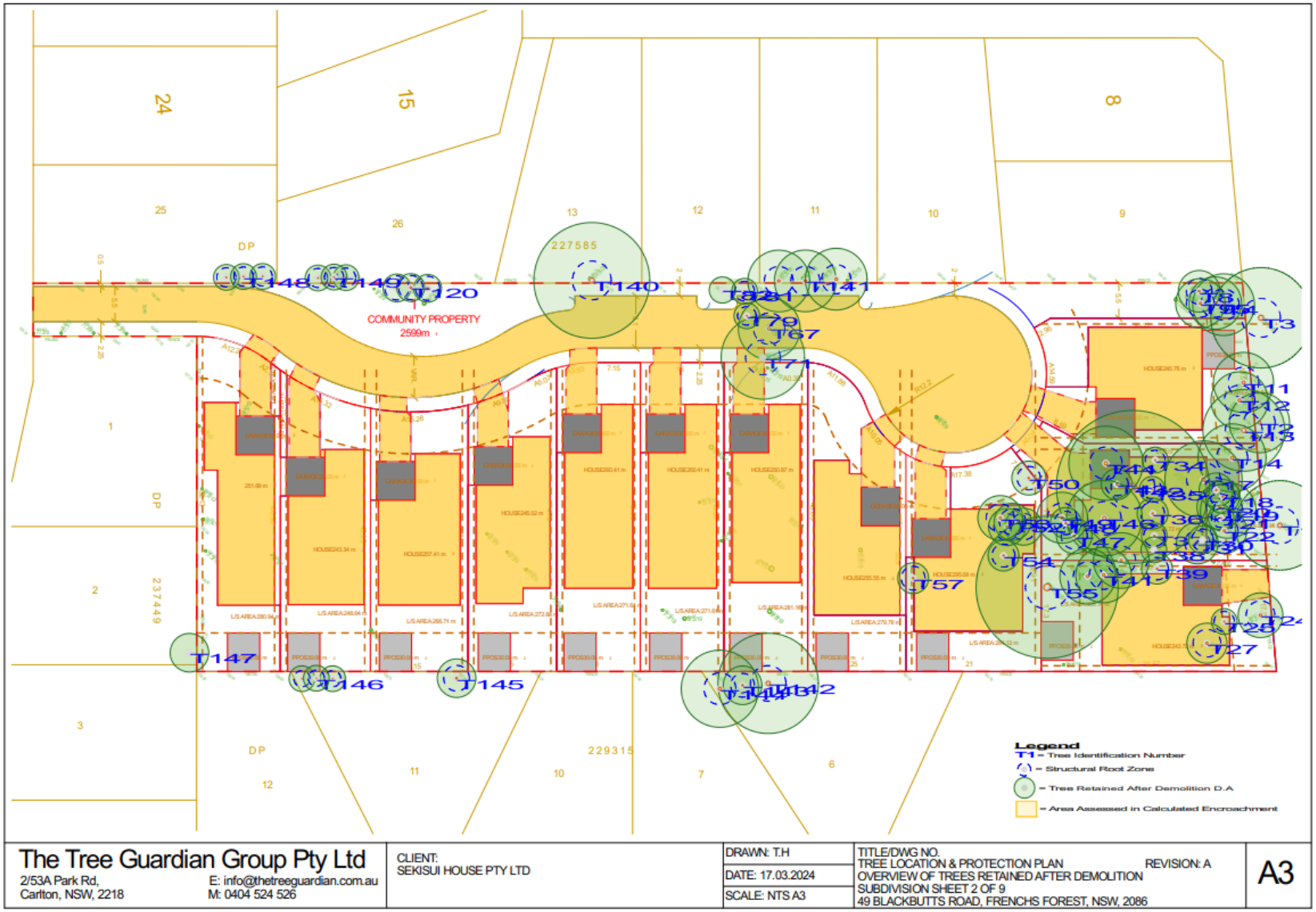


Figure 7.2. Trees retained after demolition.

Source: The Tree Guardian Arboricultural Consultancy.

7.2 Indirect impacts

Table 7.4 identifies indirect impacts that may affect species and communities.

Table 7.4. Indirect impacts.

Indirect impact	Duration	Consequence on biodiversity values

Noise	Short term during construction and long-term during operation	Short-term:
		• All works to be undertaken during standard construction hours, that is:
		  ○ Mon to Fri, 7am to 6pm;
		  ○ Saturday 8am to 1pm; and
		  ○ No work on Sundays or public holidays.
		Construction works will be temporary in nature and the risk of consequence is considered low.
		Long-term:
		• The proposal will not result in a significant increase in noise levels above that which already exists;
		• Resident fauna within the vicinity of the proposed development would already be accustomed to residential noise.
		The consequence of increased noise impacts is considered a low risk.

Light spill	Long-term during operation	The proposal may result in an increase in light levels above that which already exists. However, the proposed amended dwelling is not any different to those in the locality. The consequence of increased light impacts is considered a low risk. Dark Sky lighting should be considered to focus light on areas where needed whilst reducing light spill into surrounding environmentally sensitive areas. This form of light provides the required 'safe lighting' of areas whilst greatly reducing upward escaping light.
Transport of weeds and pathogens to and from the subject land	Construction and operation	Construction activities have the potential to introduce and spread weeds and pathogens on machinery, equipment and clothing (e.g., boots). The condition of retained and neighbouring vegetation could be decreased.

Indirect impact	Duration	Consequence on biodiversity values
Increased erosion and sedimentation	Short term during construction	Vegetation clearing and earthworks can expose soils and subsoils, which following rainfall may erode and mobilise soils in runoff, potentially smothering ground layer vegetation (in turn affecting health through a decrease in photosynthesis).

8 Conclusions and Recommendations

8.1 Management actions

8.1.1 Delineation of work areas

During the development, impacts to the site and the vegetation to be retained should be minimised by the delineation of work areas. Access to the site would be best restricted to the development footprint only. An exclusion zone will be established for the vegetation outside the work areas.

8.1.2 Preservation of habitat features

The project should salvage and reuse any existing logs on the ground. Tree trunks can be reused as habitat.

If the project is not able to reuse all suitable hollow and tree trunks, a condition of consent is included that the landholder consults with the local community restoration and rehabilitation groups, Landcare group or other relevant authorities including local councils or Greater Sydney Local Land Services prior to clearing to determine if the trees removed can be reused by others for habitat enhancement and rehabilitation works. Any consultation with community groups and their responses should be documented.

8.1.3 Erosion and sediment control

Where required, erosion and sediment control measures are to be implemented. These include, but are not limited to, sediment fencing, jute mating, crushed sandstone, or coir logs. Erosion and sediment controls measures are to be revised during site inspections and/or after significant rainfall (more than 10mm in 24 hours resulting in site runoff). Control measures must ensure that no settlement of sediment or silt occurs within areas of vegetation to be retained. Sediment fencing should be retained for a long as practicable. If removed, then monitoring is required to ensure flows do not concentrate and cause further erosion. If concentrated flows do occur and/or erosion gullies develop then coir log baffles are required.

8.1.4 Weed control

Weeds must be managed to prevent further spread. There must be continuous maintenance of the vegetation on-site otherwise increase weed growth may result. Weeds will colonize and pioneer on any cleared grounds, therefore must be managed during works as well as ongoing post-works.

It is recommended to seek advice from a qualified bush regenerator or ecologist prior to conducting weed removal works.

All bush regeneration activities requiring the use of chemicals must be performed in accordance with the NSW *Pesticides Act* 1999. Herbicides must not be applied whilst exotic plants are setting seed. The weed removal program aims to be broad in approach and sustained in application to provide the best possible conditions for natural regeneration and to control weeds within the site.

8.1.5 Pathogen prevention

To prevent the introduction of pathogens, Bushland Hygiene Protocols outlined in Appendix III should be followed. The site is considered to be an area that may promote the spread of Phytophthora (a group of fungus-like diseases affecting plants) due to its moist soil and proximity to the drainage channel. It is recommended that Bushland Hygiene Protocols be followed closely.

9 Appendices

9.1 Appendix I – Likelihood of Occurrence

The following assessment identifies the list of threatened flora and fauna species recorded within a 10 km radius of the subject site and compares the habitat, ecology and distribution of these species with the habitats identified on the subject site to assess the likelihood of the species occurring on the subject site using the following criteria:

- UNLIKELY = species highly restricted to certain geographical areas not within the proposal footprint OR species that have specific habitat requirements that are not present on the subject site
- LOW = have not been recorded previously on the subject site/surrounds and for which the study area is beyond the current distribution range OR use specific habitats or resources are not present on the subject site OR are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded
- MODERATE = have infrequently been recorded previously on the subject site/surrounds OR use specific habitats or resources present on the subject site but in a poor or modified condition OR area unlikely to maintain sedentary populations, however may seasonally use resources within the subject site opportunistically or during migration OR are cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded
- HIGH = have frequently been recorded previously on the subject site/surrounds OR use habitat types or resources that are present on the subject site that are abundant and/or in good condition OR are known or likely to maintain resident populations surrounding the subject site OR are known or likely to visit the site during regular seasonal movements or migration

Table 9.1. Threatened flora.

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
Hibbertia puberula		Recent work on this species (Toelken & Miller 2012) and its relatives have shown it to be widespread, but never common. It extends from Wollemi National Park south to Morton National Park and the south coast near Nowra. Early records of this species are from the Hawkesbury River area and Frenchs Forest in northern Sydney, South Coogee in eastern Sydney, the Hacking River area in southern Sydney, and the Blue Mountains. It favours low heath on sandy soils or rarely in clay, with or without rocks underneath (Toelken & Miller 2012). Occurs on sandy soil often associated with sandstone, or on clay. Habitats are typically dry sclerophyll woodland communities, although heaths are also occupied. One of the recently (2012) described subspecies also favours upland swamps.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Hibbertia superans		**Habitat**: The species occurs on sandstone ridgetops often near the shale/sandstone boundary. Occurs in both open woodland and heathland, and appears to prefer open disturbed areas, such as tracksides. **Distribution**: Occurs from Baulkham Hills to South Maroota in the northern outskirts of Sydney, where there are currently 16 known sites, and at one locality at Mount Boss, inland from Kempsey. No populations are known from a formal conservation reserve.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Tetratheca glandulosa		**Habitat**: Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone, with associated soil landscapes such as Lucas Heights, Gymea, Lambert and Faulconbridge. Topographically, the plant occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Stony lateritic fragments are also common in the soil profile on many of these ridgetops. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest. **Distribution**: Restricted to the following Local Government Areas: The Hills Shire, Gosford, Hawkesbury, Hornsby, Ku-ring-gai, Northern Beaches, Ryde and Wyong.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Epacris purpurascens var. purpurascens		**Habitat**: Occurs in sclerophyll forest, scrubs and swamps, from Gosford and Sydney districts in the Central Coast botanical subdivision.	Unlikely. Not recorded on the site via Bionet (2024) or

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		Distribution: The species is currently known from about 30 locations. The size of populations, where known, varies from very small (1-5 plants) to greater than 1000 individuals.	observed during the on-ground survey (2024).
Chamaesyce psammogeton	Sand Spurge	Sand Spurge is found sparsely along the coast from south of Jervis Bay (at Currarong, Culburra and Seven Mile Beach National Park) to Queensland (and Lord Howe Island). Populations have been recorded in Wamberal Lagoon Nature Reserve, Myall Lakes National Park, Moonee Beach Nature Reserve and Bundjalung National Park. Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (*Spinifex sericeus*) and Prickly Couch (*Zoysia macrantha*).	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Acacia bynoeana	Bynoe's Wattle	**Habitat**: 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. **Distribution**: Central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Acacia terminalis subsp. Eastern Sydney	Sunshine wattle	Very limited distribution, mainly in near-coastal areas from the northern shores of Sydney Harbour south to Botany Bay, with most records from the Port Jackson area and the eastern suburbs of Sydney. Recorded from North Head, Middle Head, Dover Heights, Parsely Bay, Nielsen Park, Cooper Park, Chifley, Watsons Bays, Wollstonecraft and Waverley. 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. Most sites are highly modified or disturbed due to surrounding urban development.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Haloragodendron lucasii		**Habitat**: Associated with dry sclerophyll forest. Reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels. **Distribution**: The known locations of this species are confined to a very narrow distribution on the north shore of Sydney.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
Prostanthera marifolia	Seaforth Mintbush	*Prostanthera marifolia* is currently only known from the northern Sydney suburb of Seaforth and has a very highly restricted distribution within the Sydney Basin Bioregion. The single population is fragmented by urbanisation into three small sites. All known sites are within an area of 2x2 km. The sites are within the local government area of Northern Beaches Council. Occurs in localised patches in or in close proximity to 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.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Lasiopetalum joyceae		**Habitat**: Grows in heath on sandstone. **Distribution**: Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest. Seventeen of these are reserved.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Callistemon linearifolius	Netted Bottle Brush	**Habitat**: Grows in dry sclerophyll forest on the coast and adjacent ranges. **Distribution**: Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Darwinia biflora		**Habitat**: Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Associated overstorey species include *Eucalyptus haemastoma*, *Corymbia gummifera* and/or *E. squamosa*. The vegetation structure is usually woodland, open forest or scrub-heath. **Distribution**: Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas. The northern, southern, eastern and western limits of the range are at Maroota, North Ryde, Cowan and Kellyville, respectively.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Eucalyptus camfieldii	Camfield's Stringybark	**Habitat**: Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas. Associated	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		species frequently include stunted species of *E. oblonga* Narrow-leaved Stringybark, *E. capitellata* Brown Stringybark and *E. haemastoma* Scribbly Gum. **Distribution**: Restricted distribution in a narrow band with the most northerly records in the the Raymond Terrace area south to Waterfall.	
Eucalyptus nicholii	Narrow-leaved Black Peppermint	**Habitat**: Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. **Distribution**: This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Leptospermum deanei		Occurs in Hornsby, Warringah, Ku-ring-gai and Ryde LGAs. Occurs in Riparian Scrub - e.g. *Tristaniopsis laurina*, *Baechea myrtifolia*; Woodland - e.g. *Eucalyptus haemstoma*; and Open Forest - e.g. *Angophora costata*, *Leptospermum trinervium*, *Banksia ericifolia*. Woodland on lower hill slopes or near creeks. Sandy alluvial soil or sand over sandstone.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Melaleuca deanei	Deane's Paperbark	**Habitat**: The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. **Distribution**: Deane's Paperbark occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Syzygium paniculatum	Magenta Lilly Pilly	**Habitat**: 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, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. **Distribution**: The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).
Caladenia tessellata	Thick Lip Spider Orchid	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil.	ground survey (2024). Note flowerin is Sept – Oct so not flowering time – not habitat either.
Genoplesium baueri	Bauer's Midge Orchid	**Habitat**: Grows in dry sclerophyll forest and moss gardens over sandstone. **Distribution**: The species has been recorded from locations between Ulladulla and Port Stephens.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024). – not habitat either.
Microtis angusii	Angus's Onion Orchid	All currently known records of the species are located within Northern Beaches LGA. All confirmed records of the species are from disturbed areas, with most individuals recorded in road verges. The Ingleside population occurs on soils that have been modified but were originally those of the restricted ridgetop lateritic soils in the Duffys Forest - Terrey Hills - Ingleside and Belrose areas. These soils support a specific and distinct vegetation type, the Duffys Forest Vegetation Community which is listed as an endangered ecological community under the TSC Act and ranges from open forest to low open forest and rarely woodland. Exists as subterranean tubers during most of the year. Produces leaves and then flowering stems in late winter and spring and flowers from May to October. By summer, the above ground parts have withered leaving no parts above ground. Most Microtis species reproduce vegetatively by the formation of "daughter" tubers from the main tuber.	No habitat
Sarcochilus hartmannii	Hartman's Sarcochilus	From the Richmond River in northern NSW to Gympie in south-east Queensland. Favours cliff faces on steep narrow ridges supporting eucalypt forest and clefts in volcanic rock from 500 to 1,000 m in altitude. Also found occasionally at the bases of fibrous trunks of trees, including cycads and grass-trees.	No habitat
Grevillea caleyi	Caley's Grevillea	Restricted to an 8 km square area around Terrey Hills, approximately 20 km north of Sydney. Occurs in three major areas of suitable habitat, namely Belrose, Ingleside and Terrey Hills/Duffys Forest within the Ku-ring-gai, Pittwater and Warringah Local Government Areas. All natural remnant sites occur within a habitat that is both characteristic and consistent between sites. All sites occur on the ridgetop between elevations of 170 to 240m asl, in association with	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		laterite soils and a vegetation community of open forest, generally dominated by Eucalyptus sieberi and E. gummifera. Commonly found in the endangered Duffys Forest ecological community.	
Pimelea curviflora var. curviflora		**Habitat**: Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowalnd Grassy Woodland habitat at Albion Park on the Illawaraa coastal plain. **Distribution**: Confined to the coastal area of the Sydney and Illawarra regions. Populations are known between northern Sydney and Maroota in the north-west.	Unlikely. Not recorded on the site via Bionet (2024) or observed during the on-ground survey (2024).

Table 9.2. Threatened fauna.

Please note that species whose habitat does not occur on the site have been omitted from the list. Full list included in Section 5 of this report.

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
Pseudophryne australis	Red-crowned Toadlet	**Habitat**: Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter. **Distribution**: Confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains.	**Unlikely**
Heleioporus australiacus	Giant Burrowing Frog	**Habitat**: Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water. **Distribution**: Southeastern NSW and Victoria, and appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria.	**Unlikely**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
Varanus rosenbergi	Rosenberg's Goanna	**Habitat**: Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. **Distribution**: Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Also occurs in South Australia and Western Australia.	**None – too disconnected**
Ptilinopus regina	Rose-crowned Fruit-Dove	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	**None – no habitat**
Ptilinopus superbus	Superb Fruit-Dove	**Habitat**: 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. **Distribution**: The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya.	**None – no habitat**
Ixobrychus flavicollis	Black Bittern	**Habitat**: 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. **Distribution**: Southern NSW north to Cape York and along the north coast to the Kimberley region. Also occurs in the south-west of Western Australia.	**None – no habitat**
Haliaeetus leucogaster	White-bellied Sea-Eagle	**Habitat**: 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 sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of	**Low**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. **Distribution**: Distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin.	
Hieraaetus morphnoides	Little Eagle	**Habitat**: Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. **Distribution**: Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW.	**Low**
Lophoictinia isura	Square-tailed Kite	**Habitat**: Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. **Distribution**: Along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria.	**Low**
Callocephalon fimbriatum	Gang-gang Cockatoo	**Habitat**: In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands,particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground. **Distribution**: Southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes.	**Low**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	**Habitat**: Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. **Distribution**: The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina.	**Low**
Glossopsitta pusilla	Little Lorikeet	**Habitat**: Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora*, *Melaleuca* 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. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. Roosts in treetops, often distant from feeding areas. **Distribution**: The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury.	**Low may feed on canopy blossum**
Lathamus discolor	Swift Parrot	**Habitat**: On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. **Distribution**: Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes.	**Low** **may feed on canopy blossum**
Neophema pulchella	Turquoise Parrot	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals.	**Low** **Not habitat**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		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. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	
Ninox connivens	Barking Owl	**Habitat**: Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. **Distribution**: Throughout continental Australia except for the central arid regions.	**None – too disturbed**
Ninox strenua	Powerful Owl	**Habitat**: 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. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. **Distribution**: In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains suggesting occupancy prior to land clearing.	**Low** **In the general area though and may forage over he site for Ring tail possums**
Tyto novaehollandiae	Masked Owl	**Habitat**: Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	**None – too disturbed**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		Distribution: Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution.	
Tyto tenebricosa	Sooty Owl	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (Pseudocheirus peregrinus) or Sugar Glider (Petaurus breviceps). Nests in very large tree-hollows.	**None – too disturbed**
Anthochaera phrygia	Regent Honeyeater	**Habitat**: 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. **Distribution**: The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia.	**Low** **Possible feeding on blossums**
Daphoenositta chrysoptera	Varied Sittella	**Habitat**: Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. **Distribution**: The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west.	**None – too disturbed**
Artamus cyanopterus cyanopterus	Dusky Woodswallow	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. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed.	**Low**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
Petroica boodang	Scarlet Robin	**Habitat**: 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. **Distribution**: The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes.	**None – too disturbed**
Dasyurus maculatus	Spotted-tailed Quoll	**Habitat**: 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. Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. **Distribution**: The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common.	**None – too disturbed**
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	**Habitat**: They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. **Distribution**: The Southern Brown Bandicoot has a patchy distribution. It is found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River, southern coastal Victoria and the Grampian Ranges, south-eastern South Australia, south-west Western Australia and the northern tip of Queensland.	**None – too disturbed**
Phascolarctos cinereus	Koala	**Habitat**: Inhabit eucalypt woodlands and forests. **Distribution**: The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales, koala populations are found on the central and north coasts, southern highlands, southern and northern tablelands,	**None – too disturbed**

Scientific name	Common name	Habitat requirements	Likelihood of occurrence
		Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.	
Cercartetus nanus	Eastern Pygmy-possum	**Habitat**: Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (e.g. grass-tree skirts). **Distribution**: In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes.	**None – too disturbed**
Pteropus poliocephalus	Grey-headed Flying-fox	**Habitat**: 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. **Distribution**: Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia.	**Moderate**
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	**Habitat**: 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. **Distribution**: The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia.	**Low**

9.2 Appendix II – Test of Significance

9.2.1 Grey-headed Flying-fox (*Pteropus poliocephalus*)

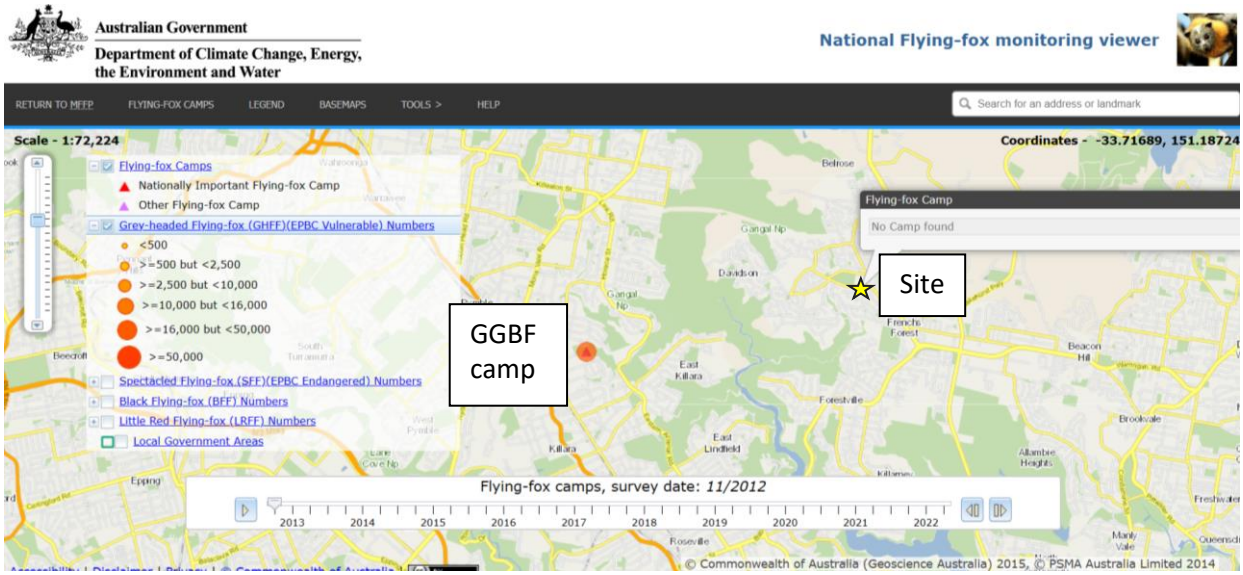
While no Grey-headed Flying Fox were recorded in the study area during the on-ground survey, this species is considered moderately likely to occur based on the presence of suitable foraging habitat and nearby records. The Grey-headed Flying-fox is likely to forage in the trees within the study area.

The factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species or their habitats are outlined below:

(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 Grey-headed Flying-fox (Pteropus poliocephalus) occurs 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 kilometres of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.

No flying-fox camps occur near site and the proposal would not impact on any camp (see image below). As such, the impacts of the proposal to the Grey-headed Flying-fox would be limited to loss of foraging habitat caused by direct clearing or damage to street during the construction phase. Flowering tree resources would be impacted.



Source: https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf

The proposal would remove approximately 24 trees of potential foraging habitat. The proposal will would not act alone in causing impacts to biodiversity, as very large areas of vegetation within the locality have already been removed, predominately for urban and industrial development in the recent past. The proposal would add to the loss of trees in the locality. Foraging habitat mainly comprises nectar resources from planted native trees and shrubs as well as fruit resources from some exotic trees. The affected area of foraging habitat would represent a small percentage of the total extent of foraging vegetation types present within the locality. The study area is not considered an important habitat for this species.

Given the relatively widespread nature of similar planted vegetation in the locality and abundance of higher quality foraging habitat within the feeding range of the camps located near the study area, the project is not expected to significantly affect the life cycle of the species.

(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

(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

(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

(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 potential habitat of the Grey-headed Flying-fox within the study area is limited to foraging habitat and includes all native flowering trees and shrubs. The extent of habitat for the Grey-headed Flying-fox would be reduced by approximately 24 native trees.

Importantly, the proposal would not result in fragmentation of habitat for the Grey-headed Flying-fox. This species is highly mobile and would freely fly long distances (up to 50 kilometres) over open areas including urbanised city centres to move between roost camps and foraging sites. The proposal would not affect the movement of the Grey-headed Flying-fox between habitat patches.

The proposal would not impact on the most important habitats for Grey-headed Flying- fox within the locality. The most important habitats for the local Grey-headed Flying Fox sub- populations are the remnant areas of native vegetation in larger reserves. The foraging habitat within the study area is not of critical importance for the survival of the Grey-headed Flying-fox within 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), There will be no impact on any declared area of outstanding biodiversity value.

(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 proposal involves clearing of native vegetation which is listed as a Key Threatening Process under the BC Act.

Conclusion: The Grey-headed Flying-fox would suffer a small reduction in extent of suitable foraging habitat from the proposal. No camps or other important habitat would be impacted. The proposal is unlikely to reduce the population size of the Grey-headed Flying-fox or decrease the reproductive success of this species. The proposal will remove potential foraging habitat. After consideration of the factors above the proposal is unlikely to result in a significant effect to the Grey-headed Flying-fox.

9.2.2 Duffys Forest Ecological Community in the Sydney Basin Bioregion

While the site does not contain any mapped PCT, Sydney Coastal Shale-Sandstone Forest is the most likely PCT to have originally occurred on-site. Remnant trees on-site include *Corymbia gummifera*, *Angophora costata*, *Eucalyptus pilularis* and *E. botryoides*. Sydney Coastal Shale-Sandstone Forest relates to the endangered ecological community Duffys Forest Ecological Community in the Sydney Basin Bioregion (Bionet vegetation classification database) and thus, a test of significance has been conducted.

The factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species or their habitats are outlined below:

(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

Not applicable.

(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

(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,

Some native trees and shrubs, that represent highly disturbed patches of the Duffys Forest endangered ecological community would be impacted. The extent of this impact is small including 24 locally native trees (some of which could be planted). This small impact will not 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. The site is already significantly modified and mid/ground storey of the community is primarily absent.

The proposal is not 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. The composition of the Duffys Forest to be impacted is already heavily impacted by edge effects and past disturbance which has substantially modified the condition, structure and function of the community and no further impact is expected form the proposal.

(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

(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

(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,

Some native trees and a few shrubs, that represent small highly disturbed patches of the Duffys Forest would be impacted. The extent of this impact is small.

The proposal does not involve breaking apart large high-quality blocks of Duffys Forest, so no further fragmentation or isolation is expected. Quality remnants of this community are mainly located along Mona Vale Road and at St Ives Showground.

These trees and scattered shrubs are not considered to be of importance to the long-term survival of the species or ecological community in the locality. These trees and shrubs are poor quality remnants of vegetation that once was present in the area and provide little value in terms of habitat. There is no recovery potential for the vegetation.

(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),

There will be no impact on any declared area of outstanding biodiversity value.

(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 proposal involves clearing of native vegetation which is listed as a Key Threatening Process under the BC Act.

Conclusion: Due to the very small impact on the Duffys Forest endangered ecological community and the poor quality of the vegetation to be removed there is unlikely to be a significant impact.

9.3 Appendix III – Key Weed Removal Methods

Technique	Method	Equipment
Hand Removal 	Seedlings and smaller weed species where appropriate will be pulled out by hand, without risk of injury to workers. The size that this can occur varies throughout the treatment area. Generally, it ranges from post seed to approximately 300mm in height. Rolling and raking is suitable for larger infestations of Wandering Jew. The weed can be raked and stems and plants parts rolled. The clump of weed material can then be bagged and removed from site.	Tools: Gloves, Rakes, Knife and Weed Bags
Crowning 	Plants that possess rhizomes or bulbs might not respond to various removal techniques and may need to be treated with crowning. A knife, mattock or trowel is to be driven into the soil surrounding the bulb or rhizome at an angle of approximately 45 degrees with surrounding soil, so as to cut any roots that may be running off. This is to occur in 360 degrees around the bulb/rhizome. The rhizome or bulb is to be bagged and removed from the site and disposed of at an appropriate waste recycling facility Soil disturbance is to be kept to a minimum when using this technique.	Tools: Knife, mattock, trowel, impervious gloves, and all other required P.P.E.
Cut and Paint Stems 	Weed species deemed unsuitable for hand removal shall be cut. Those that have persistent of vigorous growth will be cut and painted with Roundup® Biactive Herbicide or equivalent. Juvenile and smaller weed species will be cut with secateurs at base of plant, and herbicide applied via applicator bottle. Stem to be cut horizontally as close to the ground as possible, using secateurs, loppers or a pruning saw. Horizontal cuts to be made on top of stem to prevent the herbicide running off the stump. Apply herbicide to the cut stem immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. Herbicide is not to reach sediment or surrounding non-targeting plants.	Tools: loppers, secateurs, pruning saw, herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide and all other required P.P.E.

Scrape and Painting 	More resilient weed species, where other techniques are less reliable are to be scraped with a knife or chisel and painted with undiluted Roundup® Biactive Herbicide. Works to be carried out by a contractor with a current herbicide license. Weed species will be scraped with a knife or chisel up the length of the trunk, and herbicide applied via applicator bottle. Scrape the trunk from as close to the ground as possible to approximately ¾ of the plant height. Where trunk diameters exceed approximately 5 cm a second scrape shall be made on the other side of the trunk. Apply undiluted herbicide to the cut trunk immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. All care must be taken by the contractor not to spill herbicide onto sediment or surrounding non-targeting plants. Follow up treatment may be required. If plants resprout, scrape and paint the shoots using the same method after sufficient regrowth has occurred.	Tools: knife, chisel, protective clothing, safety glasses herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide, and all other required P.P.E.
Cut with a Chainsaw and Paint 	Larger size weed species, too large for cutting with hand tools, shall be cut with a chainsaw and painted with undiluted Roundup® Biactive Herbicide. Works to be carried out by a contractor with a current chainsaw and herbicide license. Larger weed species will be cut with a chainsaw at base of plant, and herbicide applied via applicator bottle. Cut the stem horizontally as close to the ground as possible, using the chainsaw. Remove upper branches to reduce bulk of plant. If cutting at the base is impractical, cut higher to get rid of the bulk of the weed, then cut again at the base and apply herbicide. Make cuts horizontal to prevent the herbicide running off the stump. Apply undiluted herbicide to the cut trunk immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. Ensure there is no runoff of poison. All care must be taken by the contractor not to spill herbicide into water, onto sediment, or surrounding non-targeting plants. Follow up treatment will be required. If plants resprout, cut and paint the shoots using the same method.	Tools: chainsaw, ear muffs, protective clothing, safety glasses herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide, and all other required P.P.E.

Spot Spraying	Spot spraying involves spraying non-seeding annuals and grasses, and for regrowth of weeds once an area has been cleared or brushcut. Works to be carried out by a contractor with a current herbicide license. Herbicide will be mixed up according to the manufacturer's directions for the particular weed species being targeted. Mixed herbicide shall be applied to the targeted weed species with a backpack sprayer. All care must be taken by the contractor not to spill herbicide onto sediment or surrounding non-targeting plants.	Tools: protective clothing, safety glasses, herbicide sprayer, impervious gloves, Herbicide, and all other required P.P.E.

Flame Weeding

Thermal (flame) weeding is a method where high temperatures are applied to weeds, causing the plant to die. Thermal weeding is particularly useful in situations where conservation or health considerations are high and weed density is low such as waterways where herbicide use is not permitted.

While flame weeding is not suited to most streetscapes due to the fire hazard nor can it be used on materials such as soft fall and similar playground equipment it is noted that 'flame' weeding in waterways allows weed management in areas where herbicides are not permitted.

Also for native vegetation areas thermal weeding, with a flame weeder, has been shown to stimulate germination of native plants while killing the seeds of annual weeds such as Devils Pitchfork, *Bidens pilosa*. Flame weeding is also effective in killing persistent weeds like Mother of Millions.

Best results are obtained when follow up weed control is undertaken 4-6 weeks after treatment. In addition, weed control should be conducted periodically after that for example to control weeds over a period of a year it is likely that between 3-5 applications will be necessary, depending on rainfall and the extent of the weed seed bank. This method is most effective on young annual weeds and least effective on older perennial weeds. In some cases, control of perennial weeds will be ineffective however this depends on the species present and its age.

Images provided by Dragonfly Environmental

Flame weeding should be undertaken outside of the fire seasons. Flame weeding allows for the mimicking of a burn in areas where a control burn could not be undertaken. See native plants regenerating after flame weeding.

9.4 Appendix IV – Bushland Hygiene Protocols for Phytophthora

- Always assume that the area you are about to work in is free of the disease and therefore needs to be protected against infection.
- Always assume that the activity you are about to undertake has the potential to introduce the disease.
- Arrive at site with clean shoes, i.e.: no dirt encrusted on them.
- If you arrive with shoes that are encrusted with dirt, they will have to be completely soaked in metho or disinfectant and allow a few minutes to completely soak in. NEVER scrape untreated dirt off your shoes onto the ground.
- Before you move onto the site spray the bottom of your shoes with 70 % metho. Bleach solution (1% strength) or household/commercial disinfectant (as per label) are also suitable.
- Check all tools and equipment that comes in contact with soil are clean before entering the area (they should have been cleaned on site at the end of the previous work session). If there is any dirt on them, spray them with 70% metho.
- Clean all tools at the end of each work session while still on site ensuring this is done away from drainage lines and adjacent work areas. Knock or brush off encrusted dirt and completely spray with 70 % metho. Replace in storage/transport containers.
- Preferably compost all weed material on site.
- Never drag vegetation with exposed roots and soil through bushland.
- When removing weeds from site, remove as much soil as possible from them in the immediate work area and carefully place vegetative material into plastic bags.
- Try not to get the bag itself dirty; don't put it on/in a muddy area.
- Always work from the lower part of a slope to the upper part.
- Always work in areas known to be free of the pathogen before working in infected areas.
- Minimise activities wherever possible when the soil is very wet.
- Vehicles should not be driven off track or into reserves (unless vehicle decontamination is carried out before and after entering a single work site)
- Only accredited supplies of plants/mulch to be used.

Kit should contain: 1 bucket, 1 scrubbing brush, 1 spray bottle (metho 70% solution), 1 bottle tap water, 1 bottle methylated spirits.

Facts about Phytophthora

Phytophthora cinnamomi (Phytophthora) is a microscopic, soil borne, water-mould that has been implicated in the death of remnant trees and other plants in Australian bushland. Phytophthora is not native to Australia. It is believed to have been introduced sometime after European settlement. Phytophthora is a national problem and is listed as a key threatening process under the Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999.

Symptoms including Dieback

"Dieback" simply means dying or dead plants. There are many causes of dieback; Phytophthora is just one of them. Often dieback is the result of a combination of factors such as changed drainage patterns and nutrient loads (e.g.: increased stormwater run-off) or changed soil conditions (e.g.: dumped fill or excavation of/near root zone). Plants that are stressed are more vulnerable to Phytophthora.
Initial symptoms of Phytophthora include wilting, yellowing and retention of dried foliage, loss of canopy and dieback. Infected roots blacken and rot and are therefore unable to take-up water and nutrients. Severely infected plants will eventually die. Symptoms can be more obvious in summer when plants may be stressed by drought. If you suspect that Phytophthora is on your site, please contact the Bushcare team to collect a soil sample to be lab tested. This is usually done in the warmer months where conditions are optimum for the disease.

Infection

There is no way of visually telling if Phytophthora is present in the soil as its structures and spores are microscopic (invisible to the naked eye). Phytophthora requires moist soil conditions and warm temperatures for infection, growth, and reproduction. Spores travel through moist soil and attach to plant roots. Once Phytophthora has infected a host plant it can grow inside plant root tissue independent of external soil moisture conditions. After infection, Phytophthora grows through the root destroying the tissue which is then unable to absorb water and nutrients.

Expertise of authors

Brooke is a passionate and dedicated ecologist with valuable on ground experience working on bush regeneration projects throughout the Sydney Region. She has worked with various stakeholders across both public and private sectors to deliver sustainable and achievable environmental outcomes. She has worked on major construction contractors as well as smaller contractors to deliver tailored environmental solutions on time and within budget.

Brooke completed her Bachelor of Science at the University of Wollongong and is currently expanding her skills and knowledge undertaking Cert III in Conservation and Ecosystem Management at TAFE.

Brooke has experience conducting fieldwork and preparing a range of reports including the Flora and Fauna Assessment, Vegetation Management Plan (VMP), Biodiversity Development Assessment Report (BDAR), Certification Certification, Construction Environmental Management Plan (CEMP), Review of Environmental Factors (REF), and Environmental Impact Assessment (EIA).

Brooke has exceptional communication and customer service skills and can deliver professional ecological assessments.

Key Projects:

- Threatened species surveys.
- Flora and fauna surveys.
- Fauna spotter and handler.
- Aquatic fauna relocation.

Brooke Thompson
ECOLOGIST

SPECIALISATIONS

- GIS mapping
- Fauna spotting
- Aquatic fauna relocation and handling
- Habitat tree assessment, marking and mapping
- Floristic plot surveys
- Flora and fauna field surveys

CAREER SUMMARY

- **Ecologist**, Ecological Consultants Australia. June 2022-*present*
- **Natural Area Specialist**, Dragonfly Environmental. January 2022-*present*
- **Volunteer**, Microplastic Surveying, University of Wollongong 2021
- **Volunteer**, Frog Surveying, Chad Beranek B EnvSc (Hons) UTS 2016

QUALIFICATIONS AND MEMBERSHIPS

- **BSc Conservation Biology**, University of Wollongong.
- Currently undertaking Cert III Conservation and Ecosystem Management.
- WHS General Induction of Construction Industry NSW White Card.

Geraldene Dalby-Ball
DIRECTOR

With over 25 years wetland and urban ecology experience, a great passion for what she does, and extensive technical and on-ground knowledge make Geraldene a valuable contribution to any project.

Geraldene has over 8 years local government experience as manager of environment and education for Pittwater Council. Geraldene presented papers on the topic at the NSW Coastal Conference, Sydney CMA and Hawkesbury Nepean forums. Geraldene is a Technical Advisor Sydney Olympic Park Wetland Education and Training (WET) panel.

Geraldene has up to date knowledge of environmental policies and frequently provides input to such works. Geraldene was a key contributor to the recent set of Guidelines commissioned by Southeast Queensland Healthy Waterways Water Sensitive Urban Design Guidelines. Geraldene's role included significant contributions and review of the Guideline for Maintaining WSUD Assets and the Guideline for Rectifying WSUD Assets.

Geraldene is a frequent contributor to many community and professional workshops on ecological matters particularly relating to environmental management. She is an excellent Project Manager.

Geraldene is a joint author on the popular book Burnum Burnum's Wildthings published by Sainty and Associates. Author of the Saltmarsh Restoration Chapter Estuary Plants of East Coast Australia published by Sainty and Associates (2013). Geraldene's early work included 5 years with Wetland Expert Geoff Sainty of Sainty and Associates. Geraldene is an expert in creating and enhancing urban biodiversity habitat and linking People with Place.

SPECIALISATIONS

- Urban Ecology – and habitat rehabilitation and re-creation.
- Urban waterway management – assessing, designing and supervising rehabilitation works
- Saltmarsh and Wetland re-creation and restoration – assessment, design and monitoring
- Engaging others in the area of environmental care and connection
- Technical Advisor – environmental design, guidelines and policies
- Sound knowledge and practical application of experimental design and statistics
- Project management and supervision
- Grant writing and grant assessment
- Budget estimates and tender selection
- Expert witness in the Land and Environment Court

CAREER SUMMARY

- **Director and Ecologist**, Ecological Consultants Australia. 2014-*present*
- **Director and Ecologist**, Dragonfly Environmental. 1998-*present*
- **Manager** Natural Resources and Education, Pittwater Council 2002-2010
- **Wetland Ecologist** Sainty and Associates 1995-2002

QUALIFICATIONS AND MEMBERSHIPS

- **Bachelor of Science with 1st Class Honors**, Sydney University
- WorkCover WHS General Induction of Construction Industry NSW White Card.
- Senior First Aid Certificate.
- **Practicing member and vice president** Ecological Consultants Association of NSW