HABITAT SOLUTIONS

Environmental Impact Assessment
Winten Property Group

177-183 Greenwich Rd, Greenwich NSW 2065
July 2024

Document Control

Revision/Version No.	Date	Revised by
Draft 1	10th July 2024	D Pisani & W Thurston
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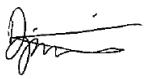
Authorised

		Signature	Date
Author	Daniel Pisani		25th July 2024
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Distribution

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Draft 1	10th July 2024	Winton Property Group
Draft 2	25th July 2024	Winton Property Group

Contents

1 Site Description

The subject site(s) are Lot 1 DP 100205, Lot 1 DP 1164656, Lots 1 & 2 DP 1144468, Lot 1 DP 329254, Lot 100 DP 1181414, Lot 1 DP 701766, situated within the Local Government Area (LGA) Lane Cove Council. The site is bound by Greenwich Rd to the East & the Lane Cove River to the West, Jago Street Reserve is to the North and Greenwich Point Reserve to the South. As can be seen in Figures 1 and 2.

Figure 1: Site location

Figure 2: Subject site Illustrating lot boundaries

2 Zoning

In accordance with the Lane Cove Local Environmental Plan 2009 (2010 EPI49) - current version for 10 November 2023 to date (accessed 10 July 2024) the subject site has been divided into two (2) Zones (figure 3):

- Zone R4 High Density Residential
- Zone C2 Environmental Conservation

2.01 Zone 1: R4 High Density Residential

1 Objectives of zone.

- To provide for the housing needs of the community within a high-density residential environment.
- To provide a variety of housing types within a high-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To provide for a high concentration of housing with good access to transport, services and facilities.
- To ensure that the existing amenity of residences in the neighbourhood is respected.
- To avoid the isolation of sites resulting from site amalgamation.
- To ensure that landscaping is maintained and enhanced as a major element in the residential environment.

2 Permitted without consent.

Nil

3 Permitted with consent.

Bed and breakfast accommodation; Boarding houses; Centre-based childcare facilities; Community facilities; Exhibition homes; Group homes; Home businesses; Home industries; Hotel or motel accommodation; Local distribution premises; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Recreation areas; Residential flat buildings; Respite day care centres; Restaurants or cafes; Roads; Shop top housing; Signage

4 Prohibited.

Any development not specified in item 2 or 3.

2.02 Zone 2: C2 Environmental Conservation

1 Objectives of zone

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

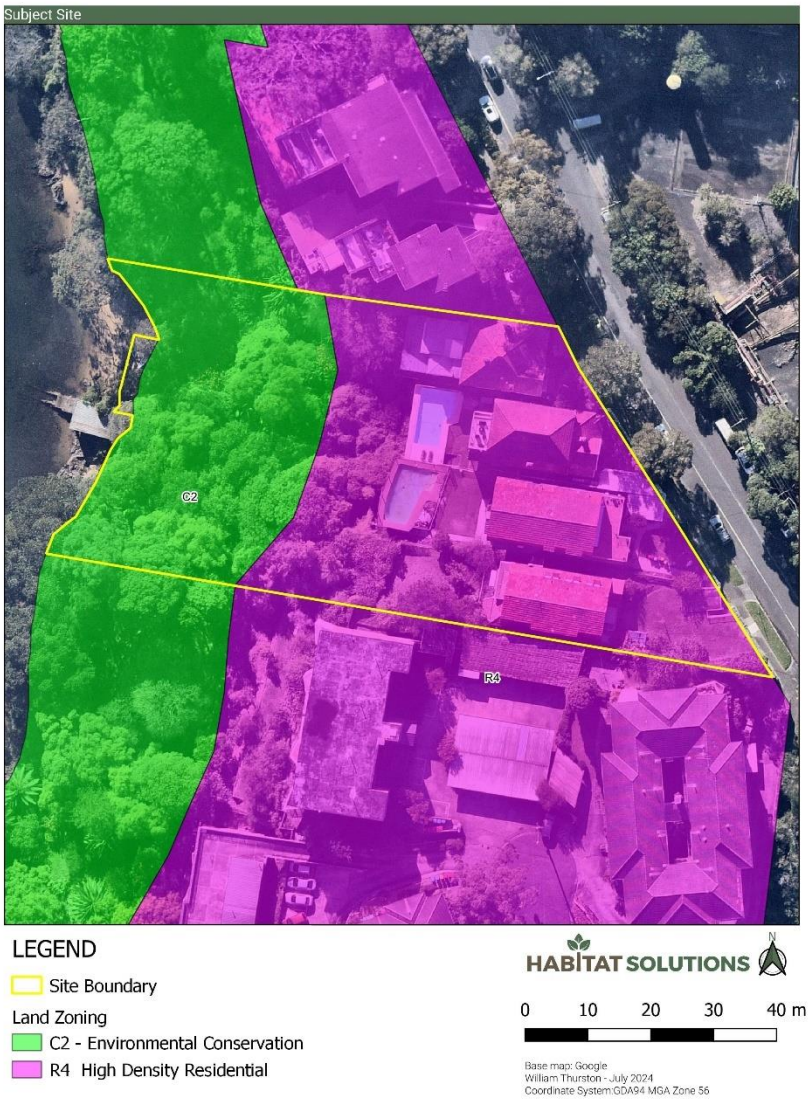
2 Permitted without consent

Environmental protection works

3 Permitted with consent
Environmental facilities; Oyster aquaculture; Roads

4 Prohibited
Business premises; Hotel or motel accommodation; Industries; Local distribution premises; Multi dwelling housing; Pond-based aquaculture; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Senior's housing; Service stations; Tank-based aquaculture; Warehouse or distribution centres; Any other development not specified in item 2 or 3

Figure 3: Land Zoning.



3 Legislative Context

3.1 Threatened species likelihood of occurrence assessment

A study was conducted to assess the likelihood of the Subject Site to support threatened species, populations or endangered ecological communities, or their habitats. All records of all threatened species and populations within 5km of the Subject Site (10km locality search) were obtained from the Department of Planning and Environment (DPE) BioNet Wildlife Atlas database (DPE, 2023a), and the Federal Department of Environment Protected Matters Search Tool (PMST). Recent vegetation mapping was used to determine the likelihood of any nearby areas of endangered ecological communities and included database searches from the State Vegetation Type Map (SVTM) (DPE 2022) and the BioNet Vegetation Classification System (DPE 2023d)

After reviewing the list of threatened species records, additional matters were considered in assessing which threatened species are likely to occur within the Subject Site. This included information such as the number of records within the 5 km of the Subject Site, the dates of these records, the likelihood of detecting the species during a survey, the preferred species habitat requirements and whether the Subject Site contained suitable habitat for the species.

The determination of species for likelihood assessment requires the exclusion of those species that are not relevant to the Subject Site including species that either have not been recorded on the Subject Site during the field investigations and/or are unlikely to be present on the Subject Site due to the absence of suitable habitats (i.e., Extremely Low category). These assessments can be found in Appendix E & F.

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

The Environmental Planning and Assessment Act 1979 (EP&A Act) and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) provide the framework for development and environmental assessment in NSW.

This proposal is subject to the environmental impact assessment and planning approval requirements of Division 4.1 of the EP&A Act. Division 4.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by private developers which require development consent.

This Ecological Impact Assessment gives input into the environmental impact assessment process by providing assessment specific to matters of biodiversity in relation to the BC Act and the Environmental Planning and Biodiversity Conservation Act 1999 (EPBC Act).

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

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places which are considered Matters of National Environmental Significance (MNES). Under the EPBC Act, approval is required for actions that have, would have, or are likely to have a significant impact on MNES.

No threatened flora or fauna under the EPBC Act were observed within the Subject Site during the site survey. One threatened species the Grey-headed Flying-fox (*Pteropus poliocephalus)* – Vulnerable under the EPBC Act was determined to have a medium likelihood of occurrence within the Subject Site. However, due to the high mobility and no feed trees or potential habitat for the Grey-headed Flying-fox (*Pteropus poliocephalus)* no Assessments of Significant Impact Criteria are required. The area zoned as R4 land is highly degraded that there are no native species to align to a Plant Community Type and is classified as Exotic Vegetation. As such, no referral to the Australian Government Minister for the Environment (the Minister) is required.

3.4 Biodiversity Conservation Act 2016 (BC Act)

The Biodiversity Conservation Act 2016 (BC Act) seeks to conserve biological diversity and promote ecologically sustainable development, to prevent extinction and promote recovery of threatened species, populations, and ecological communities and to protect Areas of Outstanding Biodiversity Value.

No threatened fauna species under the BC Act were observed during the survey. Five (5) threatened fauna species under the BC Act were determined to have a medium likelihood of occurring on the Subject Site.

- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable under the BC Act and EPBC Act.
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) - Vulnerable under the BC Act.
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – Vulnerable under the BC Act.
- Southern Myotis (*Myotis macropus*) - Vulnerable under the BC Act.
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) - Vulnerable under the BC Act.

However, as the above listed species are highly mobile and no trees or habitat for these species are expected to be impacted by the proposal no Assessment of Significance (5 Part-test) under s7.3 of BC Act is required.

Figure 4: Bionet fauna records with 5km radius.

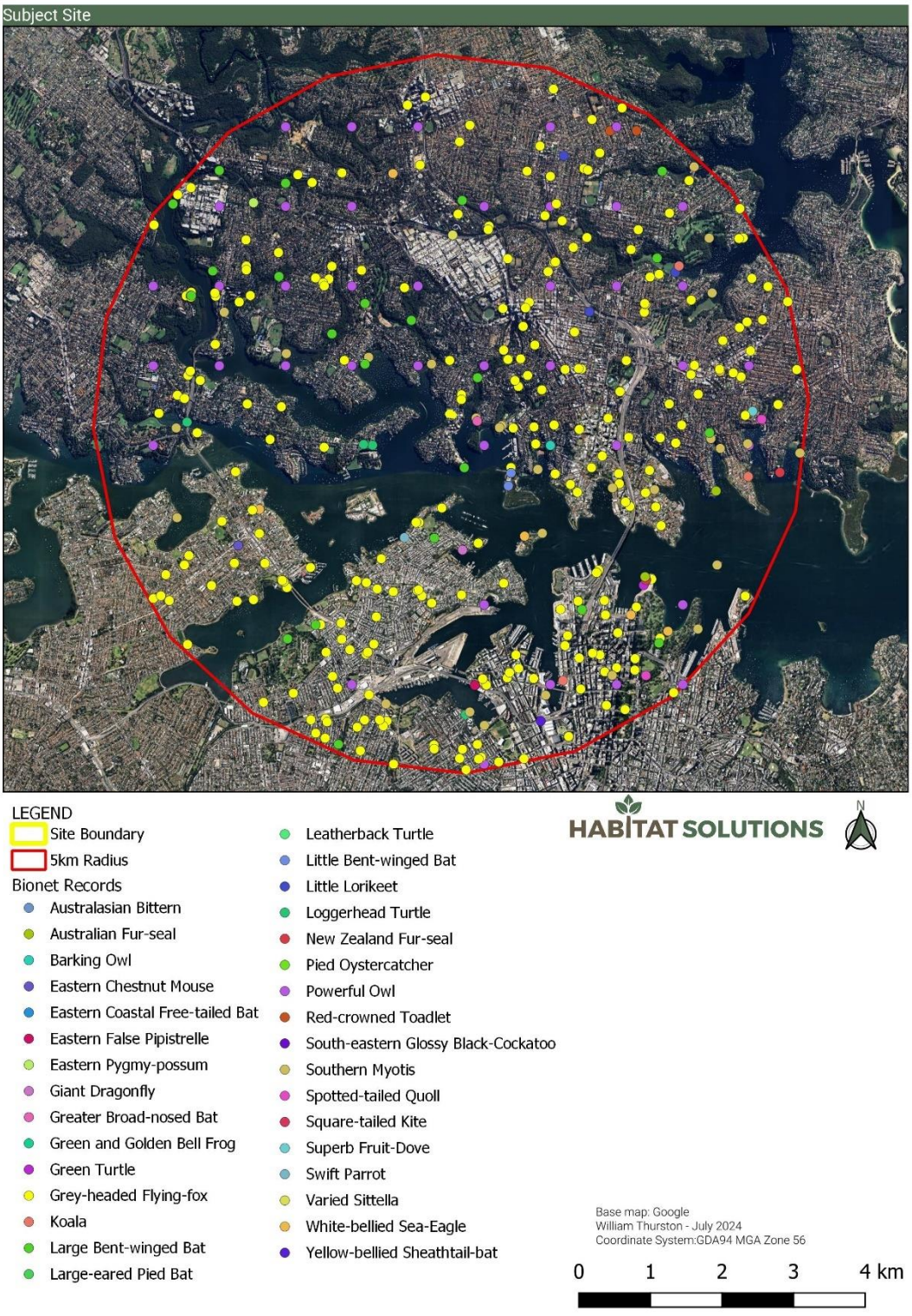
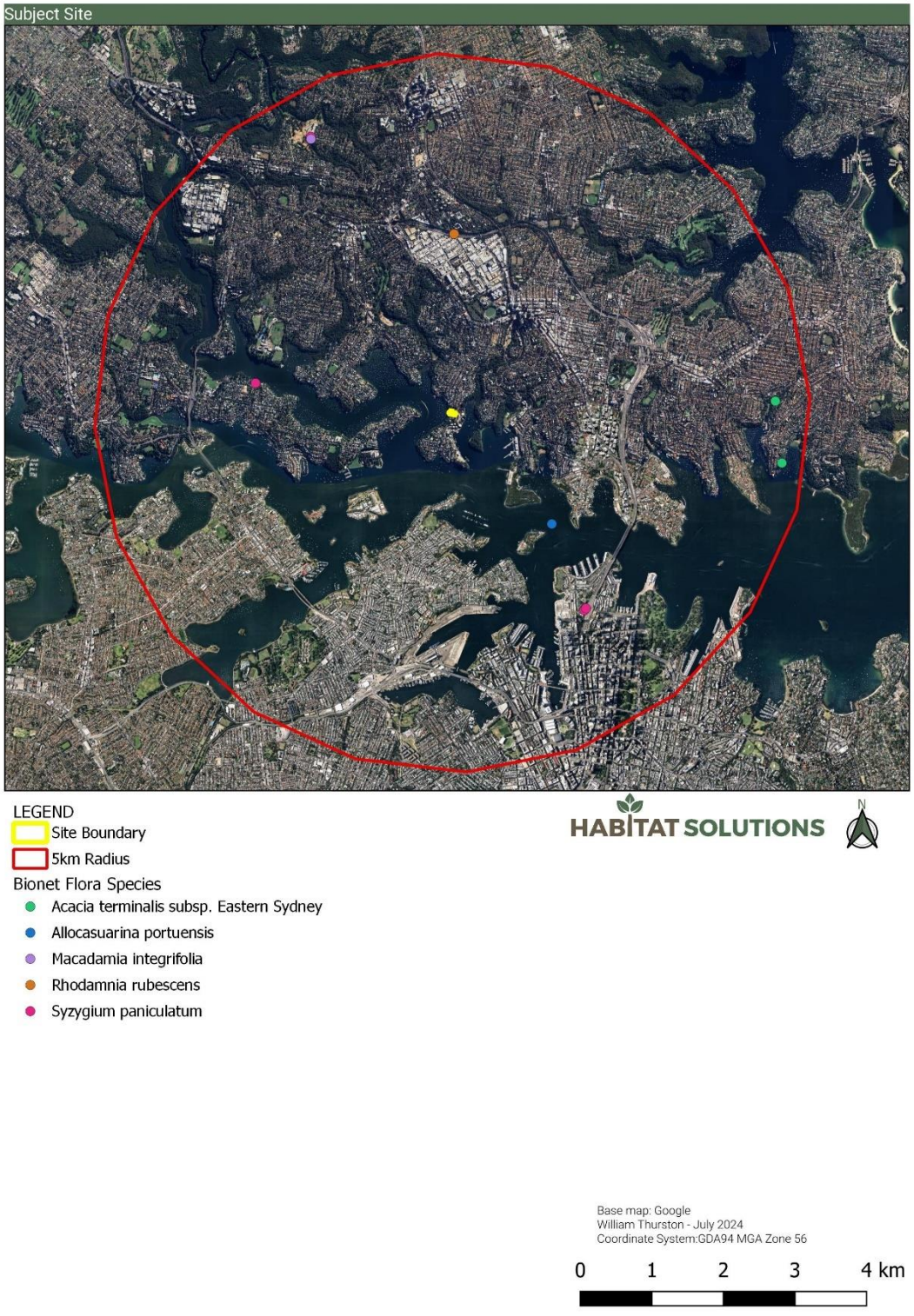


Figure 5: Bionet flora records with 5km radius.



4 Biodiversity Offset Scheme

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal in accordance with the Biodiversity Conservation Act 2016. In accordance with the Arboricultural Assessment Report by Bradshaw Consulting Arborists dated 13th April 2024 there are no native trees nominated for removal. The site does not fall within the Biodiversity Value mapping or meet the clearing threshold and therefore does not trigger the BOS.

Figure 6: Biodiversity Values Map

5 Plant Community Type

Based on a desktop review of the NSW State Vegetation Map, BioNet records and site inspection conducted on the 5th June 2024. The native vegetation within the site has been identified as the following Plant Community Type (PCT):

- PCTID 3594 Sydney Coastal Sandstone Foreshores Forest

Which is described by the NSW Government as a tall, occasionally very tall, sclerophyll open forest with a mixed understorey of dry shrubs and mesic small trees found along the foreshores of major waterways and coastal escarpments of Sydney. The tree canopy is very frequently dominated by Angophora costata with occasional local stands of Eucalyptus botryoides or rarely other eucalypt species. A sparse taller layer in the mid-stratum commonly includes Banksia integrifolia or Allocasuarina littoralis and occasionally Ficus rubiginosa.

A combination of hardy mesic small trees including Pittosporum undulatum, Glochidion ferdinandi and Elaeocarpus reticulatus are almost always present with Notelaea longifolia also common. In the suburban environment, the proliferation of these mesic species in the understorey at long unburnt sites has generated considerable debate, particularly as there appears to be strong correlation between time since fire and their density. Our data suggests these species are also more common in these littoral zones than other sheltered sandstone forests situated further away from the coast. Sclerophyll shrubs are less frequent however include Acacia longifolia, Acacia suaveolens, Breynia oblongifolia and Monotoca elliptica.

The ground layer is characterised by a mid-dense cover of ferns, graminoids, climbers and grasses. The low elevations adjoining major waterways expose the vegetation to a maritime influence brought by salt laden southerly winds. This PCT is mainly distributed between the Hacking River and Pittwater. With increased elevation and distance from waterways this community typically grades into PCT 3592.

The site is very degraded however it aligns with this PCT due to the presence of the following species within the site.

- *Allocasuarina torulosa*
- *Angophora costata*
- *Eucalyptus saligna*
- *Ficus macrophylla*
- *Glochidion ferdinandi*
- *Melaleuca quinquenervia*
- *Pittosporum undulatum*

Figure 7: NSW State Vegetation Map

6 Bushland Condition Mapping

The subject site has been mapped in accordance with methods designed by the National Trust, based on the site inspection which was on 5th June 2024. When Bushland Condition Maps are created at the beginning and end of a contract period it enables the ability to highlight changes of weed density, native resilience, and biodiversity. The following table illustrates how the percentage of weed is stratified.

Table 1: Bushland Condition Mapping

% Weed Biomass	Colour Code	Bushland Condition	Description
>80	Red	Very Poor	Areas where bushland has been completely replaced by exotic plant species. OR Bushland where only mature specimens of the dominant highest stratum of the pre-urban plant community remain and seedlings and/or saplings of those dominants are absent due to the infestation of the understorey by exotics or by invading native plant species.
40 - 80	Orange	Poor	Areas where bushland is severely infested by exotics and/or invading native plant species. AND / OR Where the regeneration of the dominant species of the plant community is being significantly suppressed (has poor resilience and one of the levels has most probably gone).
10 - 40	Blue	Fair	Areas of bushland with minor infestations of exotics and/or invading native plant species (has good resilience and regeneration is happening).
<10	Green	Good	Areas of bushland virtually free of exotic plants where the native communities display the structure and species composition and diversity typical of those communities in non-urban situations.

Figure 8: Bushland Condition Map

7 Management Zones

With a focus on vegetation management, the site has been broken up into two (2) Management Zones (Figure 9) based on their use, condition and floristic assemblage. During the site inspection on 5th June 2024 sixty-six (66) flora species were identified on site, of which seven (7) are native species and sixty (60) are exotic (Appendix B - Flora List).

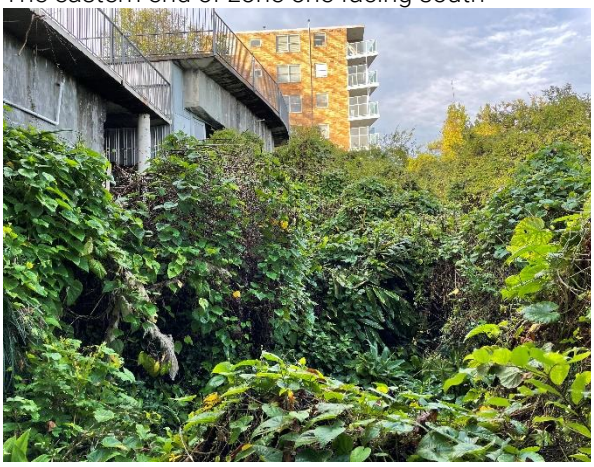
Figure 9: Management Zones

7.01 Zone 1: R4 High Density Residential

The urban - bushland interface is the source of the majority of weed species present on the subject site, of the sixty (60) recorded species, Thirty-four (34) are present in this Zone. The private property boundaries do not exhibit a natural soil profile and is the source of the weeds in this zone including many garden variety weeds and dense exotic vine growth.

The western end of zone one facing east

The eastern end of zone one facing south



7.02 Zone 2: C2 Environmental Conservation

The bushland is in poor condition, of the sixty (60) recorded species, Thirty-three (33) are present in this Zone. The bushland is steep in areas continuing from the interface zone down to the shoreline. Majority of the area is dominated by exotic grasses and vines.

The Southern end of zone two facing south

The Northern end of zone two facing north

Table 2: Weed species present per Management Zone.
Zone 1: R4 High Density Residential

Scientific Name	Family	Common Name
Agapanthus praecox	Amaryllidaceae	Agapanthus
Agave spp.	Asparagaceae	Agave
Asparagus aethiopicus	Asparagaceae	Asparagus Fern
Aucuba japonica	Garryaceae	Gold Dust Plant
Azalea spp.	Ericaceae	Azalea
Bougainvillea spp.	Nyctaginaceae	Bougainvillea
Camellia sasanqua	Theaceae	Sasanqua Camellia
Canna indica	Cannaceae	Canna Lily
Cardiospermum grandiflorum	Sapindaceae	Balloon Vine
Celtis australis	Ulmaceae	European Hackberry
Cinnamomum camphora	Lauraceae	Camphor Laurel
Citrus trifoliata	Rutaceae	Trifoliate Orange
Crinum asiaticum	Amaryllidaceae	Crinum Lily
Dietes spp.	Iridaceae	Dietes
Euphorbia pulcherrima	Euphorbiaceae	Poinsettia
Geranium spp.	Geraniaceae	Geranium
Hedera canariensis	Araliaceae	Canary Ivy
Hedychium gardnerianum	Zingiberaceae	Ginger Lily
Ilex aquifolium	Aquifoliaceae	Holly
Ipomoea purpurea	Convolvulaceae	Morning Glory
Juniperus chinensis	Cupressaceae	Chinese Juniper
Lagerstroemia indica	Lythraceae	Crape Myrtle
Magnolia grandiflora	Magnoliaceae	Little Gem Magnolia
Magnolia × soulangeana	Magnoliaceae	Saucer Magnolia
Monstera deliciosa	Araceae	Monstera
Murraya paniculata	Rutaceae	Orange Jessamine
Musa spp.	Musaceae	Banana
Nephrolepis cordifolia	Lomariopsidaceae	Fishbone Fern
Nerium oleander	Apocynaceae	Oleander
Cortaderia selloana	Poaceae	Pampas Grass
Parietaria judaica	Urticaceae	Asthma Weed
Persea americana	Lauraceae	Avocado
Phormium tenax	Asphodelaceae	New Zealand Flax
Plumeria spp.	Apocynaceae	Frangipani

Zone 2: C2 Environmental Conservation

Scientific Name	Family	Common Name
Agapanthus praecox	Amaryllidaceae	Agapanthus
Ageratina adenophora	Asteraceae	Crofton Weed
Anredera cordifolia	Basellaceae	Madeira Vine
Asparagus aethiopicus	Asparagaceae	Asparagus Fern
Callisia fragrans	Commelinaceae	Inch Plant
Canna indica	Cannaceae	Canna Lily
Cardiospermum grandiflorum	Sapindaceae	Balloon Vine
Celtis sinensis	Ulmaceae	Chinese Hackberry
Conyza bonariensis	Asteraceae	Fleabane
Ehrharta erecta	Poaceae	Veldt Grass
Eriobotrya japonica	Rosaceae	Loquat
Euphorbia pulcherrima	Euphorbiaceae	Poinsettia
Hedera helix	Araliaceae	English Ivy
Hedychium gardnerianum	Zingiberaceae	Ginger Lily
Hibiscus rosa-sinensis	Malvaceae	Chinese Hibiscus
Hypochaeris radicata	Asteraceae	Cat's Ear
Ipomoea purpurea	Convolvulaceae	Common morning-glory
Jacaranda mimosifolia	Bignoniaceae	Blue Jacaranda
Lantana camara	Verbenaceae	Lantana
Ligustrum lucidum	Oleaceae	Large Leaved Privet
Ligustrum sinense	Oleaceae	Chinese Privet
Monstera deliciosa	Araceae	Monstera
Ricinus communis	Euphorbiaceae	Castor Oil Plant
Rogiera amoena	Rubiaceae	Rogiera
Parietaria judaica	Urticaceae	Asthma Weed
Phoenix canariensis	Arecaceae	Canary Island Date Palm
Sansevieria trifasciata	Asparagaceae	Mother-in-Law's Tongue
Setaria palmifolia	Poaceae	Palm Grass
Sida rhombifolia	Malvaceae	Paddy's Lucerne
Silybum marianum	Asteraceae	Milk Thistle
Senna pendula var. glabrata	Fabaceae	Cassia
Tetrapanax papyrifer	Araliaceae	Rice Paper Plant
Tradescantia fluminensis	Commelinaceae	Trad

8 Priority Weeds

A Priority Weed is a weed that can have serious economic or environmental impacts with their priority status being determined by the State and Regional Weed Committees, Department of Primary Industry and other advisory or Regulatory Bodies.

All weeds in NSW fall under Section 22 of the Biosecurity Act 2015 General Biosecurity Duty but only weeds that are contained in The Great Sydney Strategic Weed Management Plan are considered Priority Weeds for this site. Under the National Weeds Strategy, 32 introduced plants have been identified as Weeds of National Significance (WONS). These weeds are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

The following table outlines the Priority Weeds and WONS present on site, the treatment method and location, appendix A provides further detail in relation to Biosecurity Categories & Management Actions.

Table 3: Weed treatment list in accordance with the Pesticide Act and Biosecurity Act.

Scientific name	Common name	Treatment method	Biosecurity duty	WONS
Ageratina adenophora	Crofton Weed	Manual removal, cut and paint, spot spray with Glyphosate 360 g/L Rate: 100ml to 10L water. Herbicide use according to PERMIT 9907 Expires 31/03/2025 -Spot spray with Metsulfuron-methyl 600 g/kg Rate: 15g of Metsulfuron-methyl in 100 L water	All of NSW: General Biosecurity Duty Hunter: Regional Recommended Measure	
Anredera cordifolia	Madeira Vine	Dig out tubers of smaller or immature infestations. Skirt and consolidate propagules. Herbicide use according to PERMIT 9907 Expires 31/03/2025 - Stem scrape with neat Glyphosate 360g/l - Spot spray seedlings with Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Rate: 200 mL glyphosate plus 1.5 g metsulfuron-methyl in 10 L of water - Spot spray duing active growth with Fluroxypyr 333 g/L Rate: 300 mL in 100 L of water	All of NSW: General Biosecurity Duty & Prohibition on certain dealings Central tablelands & North West: Regional Recommended Measure.	YES
Asparagus aethiopicus	Asparagus Fern	Crown individuals or spot spay as per PERMIT 9907 expires 31/03/2025 - Glyphosate 360 g/L Rate: 1 part glyphosate to 50 parts water. - Fluroxypyr 333 g/L Rate: 300 to	All of NSW: General Biosecurity Duty	YES

		600 mL in 100 L of water - Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Rate: Tank mix of up to 2 L Glyphosate + 15 g Metsulfuro n-methyl per 100 L water		
Cardiospermum grandiflorum	Balloon Vine	Manual removal, cut and paint canes at ground level with Vigilant II or Glyphosate 360 g/L. Skirt from native vegetation treating vegetation that is on the ground. Spot spray with Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Rate: 200 mL of glyphosate plus 1.5 g of metsulfuron-methyl in 10 L of water as per PERMIT 9907 expires 31/03/2025	All of NSW: General Biosecurity Duty	
Celtis australis	European hackberry	Hand pull seedlings up to 30 cm high. Small isolated plants may be dug out. Cut down larger trees and dig out the stump so that the tree cannot regrow. Plants up to 2 m tall can be sprayed. Apply to all leaves of young plants to the point of visible wetness. PERMIT 9907 Expires 31/03/2025 Glyphosate 360 g/L (Various products) Rate: 1 part glyphosate to 50 parts water Comments: Spray seedlings and coppice shoots. Withholding period: Nil.	All of NSW: General Biosecurity Duty	
Celtis sinensis	Chinese hackberry	Hand pull seedlings up to 30 cm high. Small isolated plants may be dug out. Cut down larger trees and dig out the stump so that the tree cannot regrow. Plants up to 2 m tall can be sprayed. Apply to all leaves of young plants to the point of visible wetness. PERMIT 9907 Expires 31/03/2025 Glyphosate 360 g/L (Various products) Rate: 1 part glyphosate to 50 parts water Comments: Spray seedlings and coppice shoots. Withholding period: Nil.	All of NSW: General Biosecurity Duty. Hunter & North Coast regional recommended measure	

Cortaderia selloana	Pampas Grass	Hand removal of small specimens, Spray using a handgun or knapsack. Treat actively growing plants, before flowering, spring to autumn. Use higher rate on plants over 1 m tall. Large plants may be cut or burnt prior to spraying, but first allow regrowth to reach 1 m. Withholding period: Nil.	All of NSW: General Biosecurity Duty. Greater Sydney, Hunter, Central tablelands & North Coast regional recommended measure.	
Lantana camara	Lantana	Manual removal of small infestations, Cut and paint large specimens with neat Glyphosate 360 g/L or as per PERMIT 9907 expires 31/03/2025 - Splatter gun Glyphosate 360 g/L Rate: 1 part per 9 parts water. - Spot spray Glyphosate 360 g/L Rate: 100ml per 10 L of water during actively growing season avoiding summer stress. - Spot spray Fluroxypyr 333 g/L Rate: 300 - 600 mL in 100 L of water to actively growing plants from October to April. Using lower rate on seedlings or bushes to 1.2 m high, higher rate on bushes over 1.2 m.	All of NSW: General Biosecurity Duty South East: Regional Recommended Measure	YES
Ligustrum sinense	Privet - Narrow Leaf	Hand removal of small specimens, Manual removal of seedlings, cut and paint mature specimens with neat Glyphosate 360g/L. Dence established stands can be Machine trittered and re-growth spot sprayed with Glyphosate 260g/L	All of NSW: General Biosecurity Duty	
Ligustrum lucidum	Privet -Broad Leaf	Hand removal of small specimens, Manual removal of seedlings, cut and paint mature specimens with neat Glyphosate 360g/L. Dence established stands can be Machine trittered and re-growth spot sprayed with Glyphosate 260g/L	All of NSW: General Biosecurity Duty	
Nephrolepis cordifolia	Fishbone Fern	Manual removal of small infestations, Spot spray with Glyphosate 360 g/L with Metsulfuron-methyl 600 g/kg Rate: 200 mL glyphosate plus 1.5 g metsulfuron-methyl per 10 L of	All of NSW: General Biosecurity Duty	

		water PERMIT 9907 expires 31/03/2025		
Tradescantia fluminensis	Trad	Manual removal of small infestations or sport spray Glyphosate 360 g/L Rate: 200 mL per 10 L of water as per PERMIT 9907 expires 31/03/2025 or Fluroxypyr 333 g/L Rate: 90 mL in 10 L of water	All of NSW: General Biosecurity Duty	

9 Management Actions

Table 4: Management Actions

Management Action	Management Zones	Specifications	Performance Indicators/ deliverables
Site Meetings, Inductions and WH&S	Subject Site	Meeting on site with all concerned parties prior to commencement of works. Induction, including environmental inductions undertaken. Review and implementation of site specific WH&S discussion, review and induction for protocols for prevention of pathogen and weed spread.	WH&S documentation Inductions, including environmental inductions completed by all staff, wash down area designated. All staff inducted into work site safety and protocols.
Baseline Survey	All Zones	Establish baseline monitoring photo points and weed density mapping for each management zone. Conduct weed density mapping. An overall assessment of the density of weeds on site is to be conducted by an ecologist or qualified bush regenerator	Baseline photo points, weed densities established, to be incorporated into first progress report (at 6 months from implementation of EMP)
Weed Control	R4 Zone	Treat and remove all priority weeds in R4 zone. Waste removed off-site.	Before and after monitoring photographs.
	C2 Zone	Treat and remove all exotic species. Assisted regeneration techniques such as hand weeding, cut and paint of woody weeds, removal and bagging of any exotic seeding material and propagules. Waste removed off-site.	

Planting and watering	C2 Zone	Tube stock planting to be installed at 4 plants per m^2 in bare areas where weeds have been treated or removed. Native species are to be locally sourced provenance species. See Appendix D for recommended planting list. Plantings are best planted in early Autumn or Spring to maximise plant survival rates. Plants to be watered upon installation and then as required for a minimum of a six (6) week period. Watering events to be skipped if there are heavy rain events during scheduled watering periods.	Monitoring and progress report every 6 months to include monitoring of plant survival rates, to ensure they are maintained at 80% survival rate. Infill planting is required if plant survival rates are below 80% after 12 months from installation. Decisions on infill plantings will be made after each progress report.
Erosion Control	C2 Zone	Jute Matting – Install jute matting and secure with metal pins at a minimum of 4/m² areas of steep incline where sediment erosion is likely to occur. Coir Logs – Install coir logs in areas of steep incline where sediment erosion is likely to occur. Install logs alternating offset along slope.	Before and after monitoring photographs.
Monitoring & Progress Reporting	All Zones	Assess and present monitoring reports to Client to show whether KPIs have been satisfactorily met.	Annual reports provided to client, providing the findings.

10 Roles and Responsibilities

Depending on the complexity of the tasks specified under the EMP, a bush regenerator will generally be required to carry out the works.

The bush regenerator staff implementing the EMP will need to demonstrate the following minimum qualifications and experience:

- a Certificate III in Conservation and Land Management and/or Certificate III in Natural Area Restoration or equivalent.
- a minimum of 100 hours practical bushland regeneration under an experienced supervisor.

Supervisors will need to demonstrate the following minimum qualifications and experience:

- a Certificate III in Conservation and Land Management and/or Certificate III in Natural Area Restoration or equivalent.
- a minimum of 500 hours practical bushland regeneration.
- A Chemcert AQF III or greater is required for persons undertaking chemical application.

Project Ecologist – A suitably qualified project ecologist will be required to oversee some of the works required in this VMP.

Trainees working on this project must be limited to 1 per team of 4 (max) and operating under the guidance of a Supervisor.

11 Recommendations

11.01 Zone 1: R4 High Density Residential

The proposed development within this zone poses no significant impact to native flora or fauna. This zone is highly degraded with no native species to align to a Plant Community Type and is classified as Exotic Vegetation. No threatened fauna species under the BC Act were observed during the survey. Five (5) threatened fauna species under the BC Act were determined to have a medium likelihood of occurring on the Subject Site.

- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable under the BC Act and EPBC Act.
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) - Vulnerable under the BC Act.
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – Vulnerable under the BC Act.
- Southern Myotis (*Myotis macropus*) - Vulnerable under the BC Act.
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) - Vulnerable under the BC Act.

However, as the above listed species are highly mobile and no trees or habitat for these species are expected to be impacted by the proposal no Assessment of Significance (5 Part-test) under s7.3 of BC Act is required and no referral to the Australian Government Minister for the Environment (the Minister) is required for the EPBC listed species. The Proposed Development does not fall within the Biodiversity Value mapping or meet the clearing threshold and therefore does not trigger the BOS in accordance with the BC Act.

It is recommended that all Weeds of National Significance and Priority weeds are treated in accordance with the Biosecurity Act 2015 prior to the construction phase. With ongoing monitoring as required to prevent establishment of these significant weed species into Zone 2: C2 Bushland.

11.02 Zone 2: C2 Environmental Conservation

It is recommended that Zone 2: C2 bushland be retained and rehabilitated to ensure key green corridors are retained. All exotic species should actively manage onsite to prevent the loss of native vegetation to comply with the Biosecurity Act 2015. Exotic species should be targeted over time on a priority basis following the hierarchy below:

1. Weeds of national Significance
2. Priority Weeds
3. Environmental Weeds

Due to lack of native plant cover and site resilience, planting is recommended to increase native biodiversity and abundance. Plants are to be installed at four (4) plants per m^2 (See Appendix D for recommended planting list) in suitable locations once primary weeding is completed. Ongoing watering and monitoring is required to promote native plant growth and prevent weed establishment.

Suitable erosion control measures are to be installed in accordance with the Landcom's Managing Urban Stormwater "The Blue Book" to prevent sediment runoff and aid in bank establishment in areas of steep incline.

Appendix A - Biosecurity Categories & Management Actions

Categories of management under the Greater Sydney Regional Strategic Weed Management Plan 2023-2027 under the NSW Biosecurity Act 2015

Category	Management Action
Prevention (Prevent)	To prevent the weed species arriving and establishing in the Region.
Eradication (Eliminate)	To permanently remove the species and its propagules from the Region, OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.
Containment (Minimise)	To prevent the ongoing spread of the species in all or part of the Region.
Asset Protection (Manage)	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread.
GBD (General Biosecurity Duty)	All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable."
RRM (Regional Recommended Measure)	Specific details for each species included in table.
PoD (Prohibition on Dealings)	Must not be imported into the State or sold.
B Zone (Biosecurity Zone)	Specific details for each species included in table.
PM (Prohibited Matter)	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.

Appendix B - Flora List

Flora species identified during the site inspection conducted on 5th June 2024.

Scientific Name	Family	Common Name	Exotic Species
Agapanthus praecox	Amaryllidaceae	Agapanthus	X
Agave spp.	Asparagaceae	Agave	X
Ageratina adenophora	Asteraceae	Crofton Weed	X
Allocasuarina torulosa	Casuarinaceae	Forest Oak	
Angophora costata	Myrtaceae	Smooth-Barked Apple	
Anredera cordifolia	Basellaceae	Madeira Vine	X
Asparagus aethiopicus	Asparagaceae	Asparagus Fern	X
Aucuba japonica	Garryaceae	Gold Dust Plant	X
Azalea spp.	Ericaceae	Azalea	X
Bougainvillea spp.	Nyctaginaceae	Bougainvillea	X
Brachychiton acerifolius	Malvaceae	Flame bottletree	
Callisia fragrans	Commelinaceae	Inch Plant	X
Camellia sasanqua	Theaceae	Sasanqua Camellia	X
Canna indica	Cannaceae	Canna Lily	X
Cardiospermum grandiflorum	Sapindaceae	Balloon Vine	X
Celtis australis	Ulmaceae	European Hackberry	X
Celtis sinensis	Ulmaceae	Chinese Hackberry	X
Cinnamomum camphora	Lauraceae	Camphor Laurel	X
Citrus trifoliata	Rutaceae	Trifoliate Orange	X
Conyza bonariensis	Asteraceae	Fleabane	X
Cortaderia selloana	Poaceae	Pampas Grass	X
Crinum asiaticum	Amaryllidaceae	Crinum Lily	X
Dietes spp.	Iridaceae	Dietes	X
Ehrharta erecta	Poaceae	Veldt Grass	X
Eriobotrya japonica	Rosaceae	Loquat	X
Eucalyptus saligna	Myrtaceae	Sydney Blue Gum	
Euphorbia pulcherrima	Euphorbiaceae	Poinsettia	X
Ficus macrophylla	Moraceae	Moreton Bay Fig	
Geranium spp.	Geraniaceae	Geranium	X
Glochidion ferdinandi	Phyllanthaceae	Cheese Tree	
Hedera canariensis	Araliaceae	Canary Ivy	X
Hedera helix	Araliaceae	English Ivy	X
Hedychium gardnerianum	Zingiberaceae	Ginger Lily	X
Hibiscus rosa-sinensis	Malvaceae	Hibiscus	X
Hypochaeris radicata	Asteraceae	Cat's Ear	X
Ilex aquifolium	Aquifoliaceae	Holly	X
Ipomoea purpurea	Convolvulaceae	Common morning-glory	X
Jacaranda mimosifolia	Bignoniaceae	Blue Jacaranda	X
Juniperus chinensis	Cupressaceae	Chinese Juniper	X
Lagerstroemia indica	Lythraceae	Crape Myrtle	X
Lantana camara	Verbenaceae	Lantana	X
Ligustrum lucidum	Oleaceae	Large Leaved Privet	X
Ligustrum sinense	Oleaceae	Chinese Privet	X

Lophostemon confertus	Myrtaceae	Brush Box	
Magnolia grandiflora	Magnoliaceae	Little Gem Magnolia	X
Magnolia × soulangeana	Magnoliaceae	Saucer Magnolia	X
Melaleuca quinquenervia	Myrtaceae	Broad-leafed Melaleuca	
Monstera deliciosa	Araceae	Monstera	X
Murraya paniculata	Rutaceae	Orange Jessamine	X
Musa spp.	Musaceae	Banana	X
Nephrolepis cordifolia	Lomariopsidaceae	Fishbone Fern	X
Nerium oleander	Apocynaceae	Oleander	X
Pittosporum undulatum	Pittosporaceae	Sweet Pittosporum	
Ricinus communis	Euphorbiaceae	Castor Oil Plant	X
Rogiera amoena	Rubiaceae	Rogiera	X
Parietaria judaica	Urticaceae	Asthma Weed	X
Persea americana	Lauraceae	Avocado	X
Phoenix canariensis	Arecaceae	Canary Island Date Palm	X
Phormium tenax	Asphodelaceae	New Zealand Flax	X
Plumeria rubra	Apocynaceae	Frangipani	X
Sansevieria trifasciata	Asparagaceae	Mother-in-Law's Tongue	X
Setaria palmifolia	Poaceae	Palm Grass	X
Sida rhombifolia	Malvaceae	Paddy's Lucerne	X
Silybum marianum	Asteraceae	Milk Thistle	X
Senna pendula var. glabrata	Fabaceae	Cassia	X
Tetrapanax papyrifer	Araliaceae	Rice Paper Plant	X
Tradescantia fluminensis	Commelinaceae	Trad	X

Appendix C - Bushland Hygiene Protocols

For vehicles, machinery, equipment, and footwear

In order to prevent the spread of pathogens such as Phytophthora, Myrtle Rust & Chytrid Bushland hygiene protocols should be adhered to for the length of the contract. Visual inspections should be conducted to confirm that vehicles, plant and equipment and footwear, are free of clods of soil and plant material. Designated areas will be nominated which are a hard, well-drained site such as a road away from native Environmental. The procedure is as follows:

The clean down procedure consists of two steps:

1. Dry brushing to remove mud and soil.
    - Remove all mud and soil with a hard brush or other tool.
    - For vehicles, machinery and large equipment, pay particular attention to wheels, mudflaps and undercarriage.
    - Disinfect where possible. Remember to also disinfect brush or tool used to remove mud and soil.

2. Disinfection

Disinfection will kill any pathogen that has not been removed by dry brushing disinfection with a light spray, never wash down with water only.

Footwear, small equipment and hand tools:

- Disinfect the entire sole of your footwear using a spray bottle with disinfectant (methylated spirits (70-100%) or household bleach (1 part bleach to 4 parts water)
- Allow the sole to dry for approximately one minute.
- Step forward to avoid contaminating footwear.
- Repeat steps 1-3 for the other boot.
- Disinfect the brush used to remove soil.

Disinfect small equipment and hand tools using the spray bottle and disinfectant. Footwear can also be disinfected using a footbath containing disinfectant. Ensure soil has been removed from footwear before entering footbath to ensure disinfectant remains activated. Do not leave footbath unattended where children and animals may come in contact with the chemical.

Vehicles, machinery, and large equipment:

Disinfect heavy equipment and vehicles paying particular attention to wheels, mudflaps, undercarriage, and areas that are difficult to access using a pressurised spray unit containing a disinfectant applied at label rates.

The use of a pressurised sprayer is preferred as less water will be used and runoff will be minimised. The disinfectant should be allowed to penetrate for at least one minute before equipment departs.

- Do not drive through washdown effluent.
- Do not allow mud and wash-down effluent to drain into bushland and surface waters, such as rivers, creeks and dams.
- Use vehicles that are easy to clean, such as machines with rubber tyres rather than tracks.

Hygiene Kits contain: 1 bucket, 1 scrubbing brush, 1 spray bottle, 1 bottle tap water, 1 bottle disinfectant.

Table 5: Disinfectants

Disinfectant	Application	Notes
70% methylated spirits in water	Spraying absorbent and non-absorbent materials, including vehicle interiors. Can also be used to disinfect hands.	Store in a closed container to reduce evaporation. Solutions at lower or higher concentrations may be less effective or even completely ineffective. Can be used on clothing
1% sodium hypochlorite in water	Soaking non-absorbent materials	Dilution of household bleach is sufficient. Use only in a well-ventilated area. Do not use on clothing, bleach has a limited shelf life. Degradation increases with exposure to UV light and at higher temperatures. See manufacturer's details for further information.
Benzalkonium chloride	Spraying or soaking materials such as equipment, vehicles, boot-cleaning stations	Some commercial fungicidal products are available such as Phytoclean. Use as per manufacturer's instructions. Avoid contact with skin or items likely to come into contact with skin.
Chloramine and chlorhexidine based products	Disinfecting hands, footwear and equipment	Examples of such products include Halamid, Halasept and Hexifoam. Use as per manufacturer's instructions.

Phytophthora cinnamomi

Phytophthora cinnamomi is a soil-borne water mould that attacks the roots of susceptible plants, destroying the root system and reducing the ability of the plant to conduct water and nutrients, which can sometimes kill the infected plant. Any activity that moves soil or plant matter can spread Phytophthora. Clothing, equipment,
footwear and vehicles that can carry soil are potential vectors for transmission. In most situations, Phytophthora is impossible to eradicate from infested areas, so the current approach to management aims to prevent its introduction to unaffected areas to protect threatened species and ecological communities that are most at risk.

Myrtle rust

Myrtle rust is a disease caused by the fungus *Austropuccinia psidii.* It affects trees and shrubs in the Myrtaceae family by attacking young, soft, actively growing leaves, shoot tips, young stems, fruits and flower parts. The primary vector of myrtle rust at local scale is wind however, myrtle rust spores can quickly spread via people on contaminated clothing, footwear, tools, vehicles and machinery, as well as on animals. While good hygiene practices cannot control the spread of myrtle rust by wind, they can help slow the spread by people to areas that are not yet infested.

Amphibian chytrid fungus

Amphibian chytrid fungus *Batrachochytrium dendrobatidis* is a fungal pathogen that causes the disease chytridiomycosis, which has led to the decline and extinction of frog populations globally and in Australia. Chytridiomycosis has been detected in over 40 species of native Australian frogs. The fungus is transferred by direct contact between frogs and tadpoles or via zoospores in infected water. Humans can spread the disease by contaminated footwear and equipment and by illegally moving frogs from one area to another. *Batrachochytrium dendrobatidis* is listed as prohibited matter under the Biosecurity Act 2015.

Appendix D - Recommended Planting List

Trees

Glochidion ferdinandi	Banksia serrata	Eucalyptus robusta
Angophora costata	Corymbia gummifera	Melaleuca quinquenervia
Notelaea longifolia	Acmena smithii	Acacia parramattensis
Banksia integrifolia	Casuarina glauca	Corymbia maculata
Ficus rubiginosa	Angophora floribunda	Eucalyptus tereticornis
Allocasuarina littoralis	Endiandra sieberi	Allocasuarina torulosa
Eucalyptus botryoides	Eucalyptus punctata	Corymbia eximia

Shrubs

Pittosporum undulatum	Acacia linifolia	Callistemon citrinus
Elaeocarpus reticulatus	Lomatia silaifolia	Pultenaea ferruginea
Dodonaea triquetra	Callicoma serratifolia	Pomaderris ferruginea
Breynia oblongifolia	Ozothamnus diosmifolius	Syzygium oleosum
Acacia longifolia	Banksia oblongifolia	Melaleuca linariifolia
Kunzea ambigua	Westringia fruticosa	Leucopogon ericoides
Pittosporum revolutum	Leptospermum trinervium	Leptospermum squarrosum
Homalanthus populifolius	Lambertia formosa	Leptospermum petersonii
Melaleuca nodosa	Hakea sericea	Epacris microphylla
Persoonia linearis	Callistemon linearis	Bursaria spinosa

Grasses

Lomandra longifolia	Themeda triandra	Aristida vagans
Entolasia stricta	Oplismenus aemulus	Rytidosperma tenuius
Microlaena stipoides	Oplismenus imbecillis	Echinopogon ovatus
Lepidosperma laterale	Lomandra filiformis	Dichelachne micrantha
Imperata cylindrica	Eragrostis brownii	Poa labillardierei
Poa affinis	Echinopogon caespitosus	Ficinia nodosa
Entolasia marginata	Dichelachne crinita	Carex inversa

Other

Dianella caerulea	*Dichondra repens*	*Kennedia rubicunda*
Commelina cyanea	*Smilax glyciphylla*	*Hardenbergia violacea*
Dianella revoluta	*Hibbertia scandens*	*Clematis glycinoides*
Viola hederacea	*Xanthorrhoea arborea*	*Xanthorrhoea australis*

Appendix E: Likelihood of occurrence of threatened flora species.

Likelihood of threatened flora species under the BC Act 2016 and/or the EPBC Act 1999 to occur on the Subject Site.
BC Act Status – V – Vulnerable, E1 Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species.
EPBC Act Status - CE - Critically Endangered, E – Endangered, V – Vulnerable, C – Camba, J – Jamba, K – Rokamba.

Scientific name	Common name	BC Act status	EPBC Act status	Source	No. of records	Distribution	Habitat and Ecology	Likelihood
Acacia bynoeana	Bynoe's Wattle, Tiny Wattle	E1	V	EPBC PMST		Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. The species is currently known from about 30 locations, with the size of the populations at most locations being very small (1-5 plants). It has recently been found in the Colymea and Parma Creek areas west of Nowra.	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Acacia pubescens	Downy Wattle	V	V	Bionet, EPBC PMST		Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon.	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Longevity is unknown, but clonal species have been known to survive for many decades. Flowers from August to October. Pollination of Acacia flowers is usually by insects and birds. The pods mature in October to December. Recruitment is more commonly from vegetative reproduction than from seedlings. The percentage of pod production and seed fall for this species appears to be low.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Acacia terminalis subsp. Eastern Sydney (G.P.Phillips 126)	Sunshine Wattle (Sydney region)	E1	E	BIONET EPBC PMST	2	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. Flowers in autumn but may be through to early winter. Small birds and bees are natural pollinators. Seeds mature in November and are dispersed by ants. Seed viability is high and recruitment occurs mainly after fire. A fire temperature of 60 degrees is required for optimum germination. Although plants are killed by fire, they have been recorded sprouting from the base.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Allocasuarina glareicola		E1	E	EPBC PMST		Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool.	Grows in Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora. Common associated understorey species include Melaleuca nodosa, Hakea dactyloides, Hakea sericea, Dillwynia tenuifolia, Micromyrtus minutiflora, Acacia elongata, Acacia brownei, Themeda australis and Xanthorrhoea minor. Not killed outright by fire but resprouts from the rootstock. Spreads by vegetative means, such that clumps of up to 100s of stems may be a single individual. The time taken for the plants to flower and set seed is not known, but only those plants growing in areas unburnt for some time produced substantial numbers of fruit.	**Low.** Not observed during the current survey and no suitable habitat available on site. Limited geographical range.

Asterolasia elegans		E1	E	EPBC PMST		Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Also likely to occur in the western part of Gosford local government area. Known from only seven populations, only one of which is wholly within a conservation reserve.	Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (Syncarpia glomulifera subsp. glomulifera), Smooth- barked Apple (Angophora costata), Sydney Peppermint (Eucalyptus piperita), Forest Oak, (Allocasuarina torulosa) and Christmas Bush, (Ceratopetalum gummiferum). Ecological knowledge about this species is very limited. The species is considered to be fire sensitive and reliant on seed germination after disturbance to maintain populations. A soil seedbank appears to be established by this species, so for a number of years following fire or other disturbance the species may not be apparent, but be present only as seed in the soil.	**Low.** Not observed during the current survey and no suitable habitat available on site. Limited geographical range.
Caladenia tessellata	Thick-lipped Spider-orchid, Daddy Long-legs	E1,P,2	V	EPBC PMST		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 recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSWborder.	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year. Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	**Low**. Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.

Cryptostylis hunteriana	Leafless Tongue-orchid	V,P,2	V	EPBC PMST		The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at many sites between Batemans Bay and Nowra (although it is uncommon at all sites). Also recorded at Munmorah State Conservation Area, Nelson Bay, Wyee, Washpool National Park, Nowendoc State Forest, Ku-Ring-Gai Chase National Park and Ben Boyd National Park.	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta). On the Central Coast of NSW, populations have been recorded in woodland dominated by Scribbly Gum (Eucalyptus haemastoma), Brown Stringybark (Eucalyptus capitellata), Red Bloodwood (Corymbia gummifera) and also associated with Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta).	**Low.** Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.

Darwinia biflora		V	V	EPBC PMST		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.	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. Longevity is thought to be 15-20 years. Flowering occurs throughout the year but is concentrated in autumn, with mature fruits being produced from May to August. Self-pollination is the usual form of pollination. Flowers and fruit are produced 18 months after germination, though at this stage few reach maturity. Maturation rates are higher for plants older than 5 years. Seed viability is high (up to 99%). Fire is an important factor in the life cycle of this species. Fire kills all plants, but also produces a flush of germination from seed stored in the soil. The number of individuals at a site then declines with time since fire, as the surrounding vegetation develops.	**Low.** Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer

Epacris purpurascens var. purpurascens		V		Bionet		Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South.	Found in a range of habitat types, most of which have a strong shale soil influence. Lifespan is recorded to be 5-20 years, requiring 2-4 years before seed is produced in the wild. Killed by fire and re-establishes from soil- stored seed.	**Low.** Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.
Eucalyptus camfieldii	Camfield's Stringybark	V	V	EPBC PMST		Restricted distribution in a narrow band with the most northerly records in the the Raymond Terrace area south to Waterfall. Localised and scattered distribution includes sites at Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai, Wattamolla and a few other sites in Royal National Park.	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 species frequently include stunted species of E. oblonga Narrow-leaved Stringybark, E. capitellata Brown Stringybark and E.haemastoma Scribbly Gum. Population sizes are difficult to estimate because its extensive lignotubers may be 20 m across. A number of stems arise from these lignotubers giving the impression of individual plants. Flowering period is irregular, flowers recorded throughout the year. Poor response to too frequent fires.	**Low.** Not observed during the current survey and highly disturbed site.

Genoplesium baueri	Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid	E1,P,2	E	EPBC PMST		The species has been recorded from locations between Ulladulla and Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. No collections have been made from those sites in recent years. Currently the species is known from just over 200 plants across 13 sites. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park. May occur in the Woronora, O'Hares, Metropolitan and Warragamba Catchments.	Grows in dry sclerophyll forest and moss gardens over sandstone. Flowers February to March.	**Low.** Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.
Haloragodendron lucasii	Hal	E1	E	EPBC PMST		The known locations of this species are confined to a very narrow distribution on the north shore of Sydney.	Associated with dry sclerophyll forest. Reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below	**Low.** Not observed during the current survey and no
Lasiopetalum joyceae		V	V	EPBC PMST		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.	Grows in heath on sandstone.	**Low.** Not observed during the current survey and no suitable habitat available on site. Limited geographical range.

Leptospermum deanei	Deane's Tea-tree	V	V	EPBC PMST		Occurs in Hornsby, Warringah, Ku-ring-gai and Ryde LGAs.	Woodland on lower hill slopes or near creeks. Sandy alluvial soil or sand over sandstone. 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. Flowers October-November	**Low.** Not observed during the current survey and no suitable habitat available on site
Leucopogon exolasius	Woronora Beard-heath	V	V	EPBC PMST		Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park.	The plant occurs in woodland on sandstone. Flowering occurs in August and September.	**Low.** Not observed during the current survey and no suitable habitat
Melaleuca biconvexa	Biconvex Paperbark	V	V	EPBC PMST		Found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford- Wyong area in the north.	Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	**Low.** Not observed during the current survey and no
Melaleuca deanei	Deane's Melaleuca	V	V	EPBC PMST		Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas.	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.	**Low.** Not observed during the current survey and no suitable habitat available on site.
Persicaria elatior		V	V	EPBC PMST		Tall Knotweed has been recorded in south¬eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	**Low.** Not observed during the current survey and no suitable habitat

						Forests). The species also occurs in Queensland.		available on site.
Persoonia hirsuta	Hairy Geebung	E1,P,3	E	EPBC PMST		Scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue Mountains to the west. Persoonia hirsuta has a large area of occurrence, but occurs in small populations or isolated individuals, increasing the species' fragmentation in the landscape	The Hairy Geebung is found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone. It is usually present as isolated individuals or very small populations Plants are generally killed by all but the lowest intensity fire or partial burning. Fire may promote germination of soil-stored seed, although it may also kill some of the seedbank if it is of high severity. Extreme wet-dry weather cycles may also promote germination of soil-stored seed.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Pimelea curviflora var. curviflora		v	v	EPBC PMST		Confined to the coastal area of the Sydney and Illawarra regions. Populations are known between northern Sydney and Maroota in the north-west. New population discovered at Croom Reserve near Albion Park in Shellharbour LGA in August 2011. Formerly recorded around the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly.	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. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Likely to be fire tolerant species capable of resprouting following fire due to the presence of a tap root. Seedlings have been observed following fire.	**Low.** Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.

Pimelea spicata	Spiked Rice-flower	E1	E	EPBC PMST	2	Once widespread on the Cumberland Plain, the Spiked Rice-flower occurs in two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama).	In both the Cumberland Plain and Illawarra environments this species is found on well- structured clay soils. On the Cumberland Plain sites it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. The co-occurring species in the Cumberland Plain sites are grey box (*Eucalyptus moluccana*), forest red gum (*E. tereticornis*) and narrow-leaved ironbark (*E. crebra*). Blackthorn (*Bursaria spinosa*) is often present at sites (and may be important in protection from grazing) and kangaroo grass (*Themeda triandra*) is usually present in the groundcover (also indicative of a less intense grazing history). Mature plants spread over short distances through underground rhizomes, and this can assist them to recover from disturbances like fire and irregular grazing. However, the age plants must be, and what proportion recover, is largely unknown. Flowers may be self-pollinating, although fruit production is variable. Fruit are not dispersed well, with most seedlings germinating close to the adult (within 30cm or so according to P. Hogbin). A soil seedbank develops and is	**Low.** Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.

Rhizanthella slateri	Eastern Underground Orchid	V,P,2	E	EPBC PMST		Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra.	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	Low. Not observed during the current survey and no suitable habitat available on site. Highly disturbed ground layer.
Rhodamnia rubescens	Scrub Turpentine	E4A	CE	BIONET EPBC PMST	1	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of R. rubescens typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm.	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Low. Not observed during the current survey and no suitable habitat available on site. Obvious species.
Rhodomyrtus psidioides	Native Guava	E4A	CE	EPBC PMST		Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW.	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Low. Not observed during the current survey and no suitable habitat available on site.
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	BIONET EPBC PMST	4	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.	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	Low. Not observed during the current survey and no suitable habitat

							remnant littoral rainforest communities.	available on site.
Thesium australe	Austral Toadflax, Toadflax	V	V	EPBC PMST		Found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region.	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (Themeda australis). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Appendix F: Likelihood of occurrence of threatened fauna species.

Likelihood of threatened flora species under the BC Act 2016 and/or the EPBC Act 1999 to occur on the Subject Site.
BC Act Status – V – Vulnerable, E1 Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species.
EPBC Act Status - CE - Critically Endangered, E – Endangered, V – Vulnerable, C – Camba, J – Jamba, K – Rokamba.

Scientific name	Common name	BC Act status	EPBC Act status	Source	No. of records	Distribution	Habitat and Ecology	Likelihood
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	BIONET EPBC PMST	1	Widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north- west.	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	V,P,2	V	BIONET EPBC PMST	1	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. An isolated population exists on Kangaroo Island, South Australia.	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. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (Casuarina cristata). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Daphoenositta chrysoptera	Varied Sittella	V,P		BIONET PMST	1	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. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	BIONET EPBC PMST	2	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.	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. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		BIONET PMST	2	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania.	Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.	**Low.** Not observed during the current survey and no suitable habitat available on.

Glossopsitta pusilla	Little Lorikeet	V,P		BIONET PMST	3	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. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs.	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 Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina. Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.	**Low.** Not observed during the current survey and no suitable habitat available on.

Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		Bionet	12	Distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways.	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 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. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Lathamus discolor	Swift Parrot	E1,P	CE	BIONET EPBC PMST	2	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.	Migrates to the Australian south-east mainland between February and October. 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. Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana, Blackbutt E. pilularis, and Yellow Box E. melliodora. Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Litoria aurea	Green and Golden Bell Frog	E1,P	V	BIONET EPBC PMST	1	Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Records from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands.	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. The species is active by day and usually breeds in summer when conditions are warm and wet. Males call while floating in water and females produce a raft of eggs that initially float before settling to the bottom, often amongst vegetation. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs. Preyed upon by various wading birds and snakes.	**Low.** Not observed during the current survey and no suitable habitat available on site.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		BIONET PMST	1	Found along the east coast from south Queensland to southern NSW.	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Miniopterus australis	Little Bent-winged Bat	V,P		BIONET PMST	18	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW.	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well- timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (Miniopterus schreibersii) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites /maternity colonies are known in Australia.	**Medium.** May utilise the urban environment for roosting habitat such as the below the pool structure. Not observed during the current survey. .

Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		BIONET PMST	22	Occur along the east and north- west coasts of Australia.	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Hunt in forested areas, catching moths and other flying insects above the tree tops.	**Medium.** May utilise the urban environment for roosting habitat such as the below the pool structure. Not observed during the current survey.
Myotis macropus	Southern Myotis	V,P		Bionet	37	Found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers.	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	**Medium.** May utilise the urban environment for roosting habitat such as the below the pool structure. Not observed during the current survey.

Ninox connivens	Barking Owl	V,P,3		Bionet	1	Found throughout continental Australia except for the central arid regions. Although still common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Extensive wildfires in 2019-20 reduced habitat quality further, burnt many old, hollow-bearing trees needed as refuge by prey species and reduced the viability of some regional owl populations.	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. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch. Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats.	**Low.** Not observed during the current survey and no suitable habitat available on site. Site may be part of a large foraging home range.

Ninox strenua	Powerful Owl	V,P,3		Bionet	316	Endemic to eastern and south- eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south- western Victoria. 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. Now at low densities throughout most of its eastern range, rare along the Murray River and former inland populations may never recover. Recent increases in population density across Sydney and some other semi-urban areas do not seem to be solely due to increased awareness of this flagship species.	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old.	**Low.** Not observed during the current survey and no suitable habitat available on site. Site may be part of a large foraging home range.

Phascolarctos cinereus	Koala	E1,P	E	BIONET EPBC PMST	1	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, Blue Mountains, southern coastal forests, with some smaller populations on the plains west of the Great Dividing Range.	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size.	**Low.** Not observed during the current survey and limited suitable habitat available on site. Limited connection to vegetated areas that are large enough to support a Kolala population.

Pseudophryne australis	Red-crowned Toadlet	V,P		BIONET	3	Restricted distribution. It is 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.	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. Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters. Red-crowned Toadlets have not been recorded breeding in waters that are even mildly polluted or with a pH outside the range 5.5 to 6.5. Eggs are laid in moist leaf litter, from where they are washed by heavy rain; a large proportion of the development of the tadpoles takes place in the egg. Disperses outside the breeding period, when they are found under rocks and logs on sandstone ridges and forage amongst leaf-litter. Red-crowned Toadlets are quite a localised species that appear to be largely restricted to the immediate vicinity of suitable breeding habitat. Red-crowned Toadlets are usually found as small colonies scattered along ridges coinciding with the positions of suitable refuges near breeding sites. Due to this tendency for discrete populations to concentrate at particular sites, a relatively small localised disturbance may have a significant impact on a local population if it occurs on a favoured breeding or refuge site.	**Low.** Not observed during the current survey and no suitable habitat available on site.

Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Bionet, EPBC PMST	704	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. In times of natural resource shortages, they may be found in unusual locations.	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. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.	**Medium.** The site may provide exotic foraging resources for the species. The site is approximately 8 km north west of the Centennial park camp and there are a high number of records within 5km.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		BIONET	10	Wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes.	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. Breeding has been recorded from December to mid- March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	**Medium.** Not observed during the current survey and pool structure may be suitable habitat with low occurrences on Bionet.

Scoteanax rueppellii	Greater Broad- nosed Bat	V,P		BIONET	4	Found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m.	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	**Medium.** Not observed during the current survey and pool structure may be suitable habitat with very low occurrences on Bionet.