



VEGETATION MANAGEMENT PLAN **KINGSWOOD CAMPUS**

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ENVIRONMENTAL SUSTAINABILITY, DIVISION OF OPERATIONS AND COMMERCIAL

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1. INTRODUCTION

Western Sydney University's Kingswood campus is situated in the heart of Greater Western Sydney (approx. 50km from the Sydney CBD) and is approx. 10.5 ha in size (Figure 1 – Site Location).

The campus has a small, linear patch of remnant/revegetated vegetation, that follows an unnamed creek line (that runs north into Werrington Creek) and is surrounded by urban housing and open amenity areas.

The area has been assessed previously by both Greening Australia (2010) and AMBS (2021). The most recent mapping undertaken by AMBS (Figure 2 – Ecological Community Mapping) indicated that the area has characteristics consistent with both Cumberland Plain Woodland in the Sydney Basin Bioregion/Cumberland Shale Plains Woodland and River-Flat Eucalypt Forest on Coastal Floodplains/Cumberland River Flat Forest

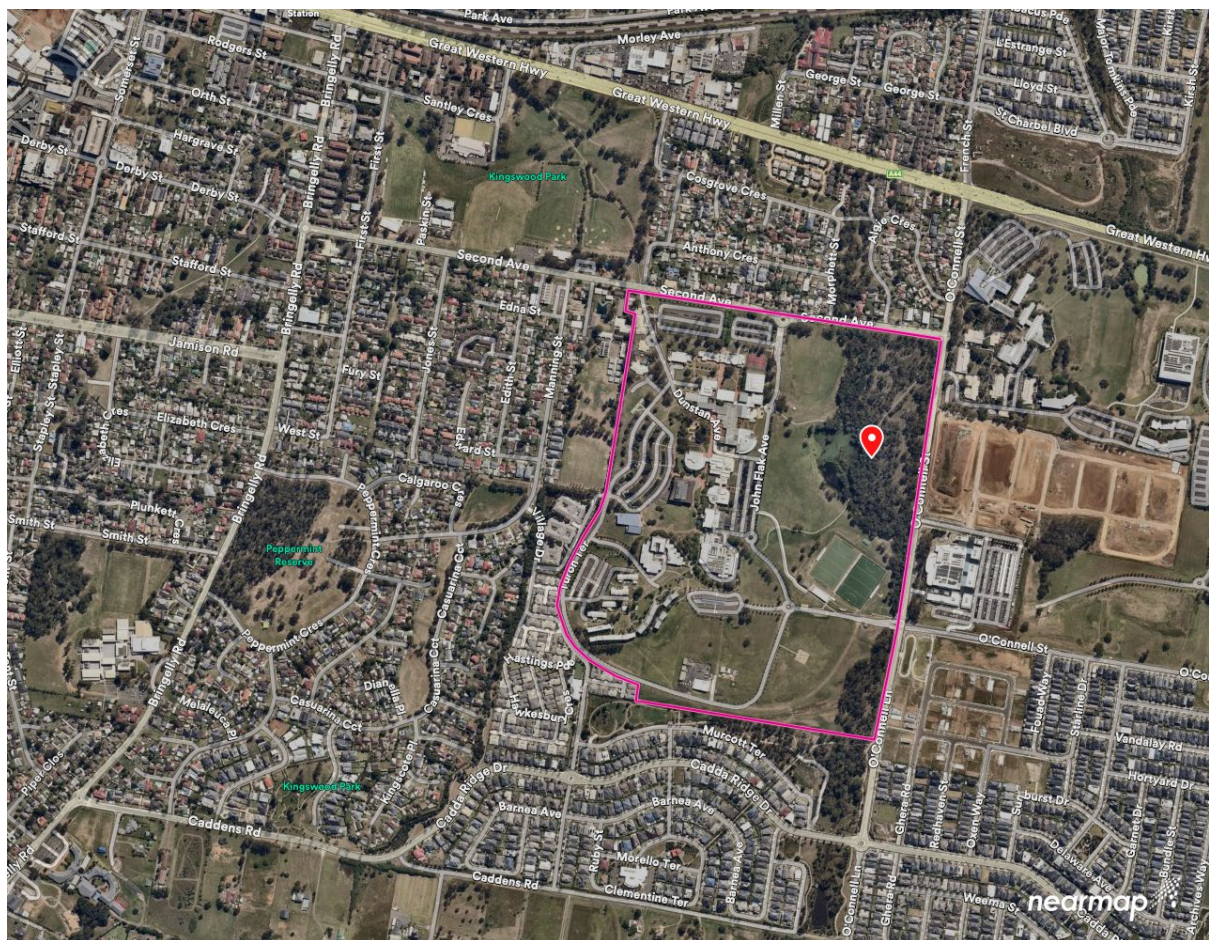


Figure 1: Kingswood campus – showing bushland location on the campus.

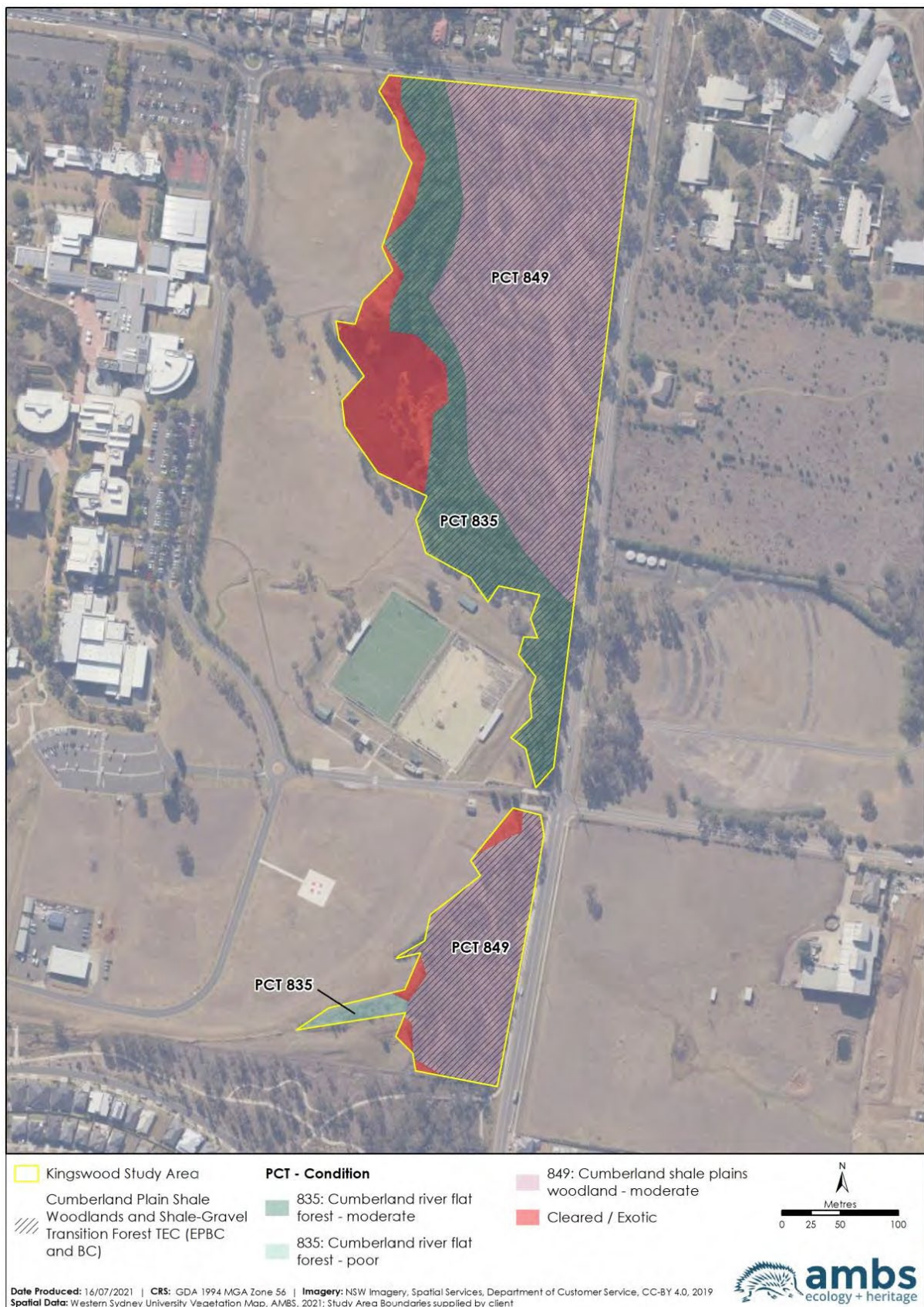


Figure 2: Ecological Community identification on Kingswood campus

2. SITE DESCRIPTION

2.1. Cumberland Plain Woodland in the Sydney Basin Bioregion/Cumberland Shale Plains Woodland

The area identified as Cumberland Plain Woodland has a canopy cover of approx. 20% and dominated by *Eucalyptus moluccana* (Grey Box) with occurrences of *Eucalyptus tereticornis* (Forest Redgum) and *Corymbia maculata* (spotted Gum), which may have been planted. Tree size is variable and there is some canopy regeneration.

The native shrub cover is low at approx. 0.1% and is primarily made up of *Bursaria spinosa* (Blackthorn).

Ground cover is estimated to be approx. 90% and is dominated by native grasses such as *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Sporobolus crebra* (Western Rat-tail Grass), *Aristida vagans* (Three awned Speargrass), *Cymbopogon refractus* (Barbed Wire Grass), *Chloris ventricose* (Plump Windmill Grass) and *Eragrostis brownii* (Brown's Lovegrass). In terms of native species *Tricoryne elatior* (Yellow Autumn Lily), *Wahlenbergia gracilis* (Sprawling Bluebell), *Oxalis perennans*, *Asperula conferta* (Common Woodruff), *Brunoniella australis* (Blue Trumpet), *Cyanthillium cinereum* var. *cinereum* (syn. *Vernonia cinerea*), *Phyllanthus virgatus*, *Glycine tabacina*, *Lomandra filiformis* subsp. *filiformis* (Wattle Matt Rush) and *Cheilanthes sieberi* subsp. *sieberi* (Poison Rock Fern) where observed. The functional litter cover is approx. 37%.

Exotic species are common but sporadic and include *Eragrostis curvula* (African Lovegrass), *Ligustrum sinense* (Small Leaved Privet), *Seteria parviflora*, *Asparagus asparagoides* (Bridal Creeper), *Hypochaeris radicata* (Catsear), *Conyza bonariensis* (Flaxleaf Fleabane), *Sida rhombifolia* (Paddy's Lucerne), *Araujia sericifera* (Moth Vine), *Bidens pilosa* (Cobblers Peg) and *Senecio madagascariensis* (Fireweed).

2.2. River-Flat Eucalypt Forest on Coastal Floodplains/Cumberland River Flat Forest

The second ecological community on Kingswood - River Flat Forest, has a canopy cover of approx. 80%, and is dominated by *Casuarina glauca* (Swamp Oak) and *Eucalyptus moluccana* (Grey Box). The tree size in this area is considered small and is consistent with regeneration.

The shrub cover is low at approx. 2% and dominated by *Bursaria spinosa* (Blackthorn) and *Casuarina glauca* (Swamp Oak).

The ground layer is sparse with a native species cover of approx. 2%, and dominated by *Cynodon dactylon* (Couch Grass) with occasional occurrences of *Paspalidium distans*, *Rytidosperma tenuior* and *Chloris ventricosa* (Plump Windmill Grass). Native forbs recorded include *Eremophila debilis* (Winter Apple), *Rumex brownii* (Swamp Dock), *Fimbristylis dichotoma* and *Commelina cyanea*. The functional litter cover is high at around 64%.

There is a significant proportion of exotic species recorded at this site, including *Juncus acutus* (Sharp Rush), *Chloris gayana* (Rhodes Grass). Other exotics include *Asparagus asparagoides* (Bridal creeper), *Ehrharta erecta* (Panic Veldtgrass), *Senecio madagascariensis* (Fireweed), *Olea europaea* subsp. *cuspidata* (African Olive), *Bryophyllum delagoense* (Mother-of-millions) and *Eragrostis curvula* (African Lovegrass).



Figure 3: Typical view of Kingswood campus Cumberland Plain Woodland/Cumberland Shale Plains Woodland.



Figure 4: Typical view of Kingswood campus River-Flat Eucalypt Forest / Cumberland River Flat Forest.

3. THREATENED FLORA AND FAUNA

The Bionet Atlas of NSW Wildlife lists 10 flora and 32 fauna species as vulnerable/endangered within a 10km radius of the site, as shown in Appendix 1.

A fauna survey has not been conducted and therefore it is unknown whether threatened fauna inhabit the bushland. It is likely that some of the larger trees may be used by bird or bat species while transiting from adjacent areas. It is suspected that the Cumberland Plain Land snail may also be present as the habitat is suitable for this species but has yet to be detected.

No threatened plant species have been observed on-site during either Greening Australia or AMBS's assessments.

NSW SEED mapping does not indicate any vulnerable/threatened/endangered species have been observed on Kingswood campus (Figure 5).

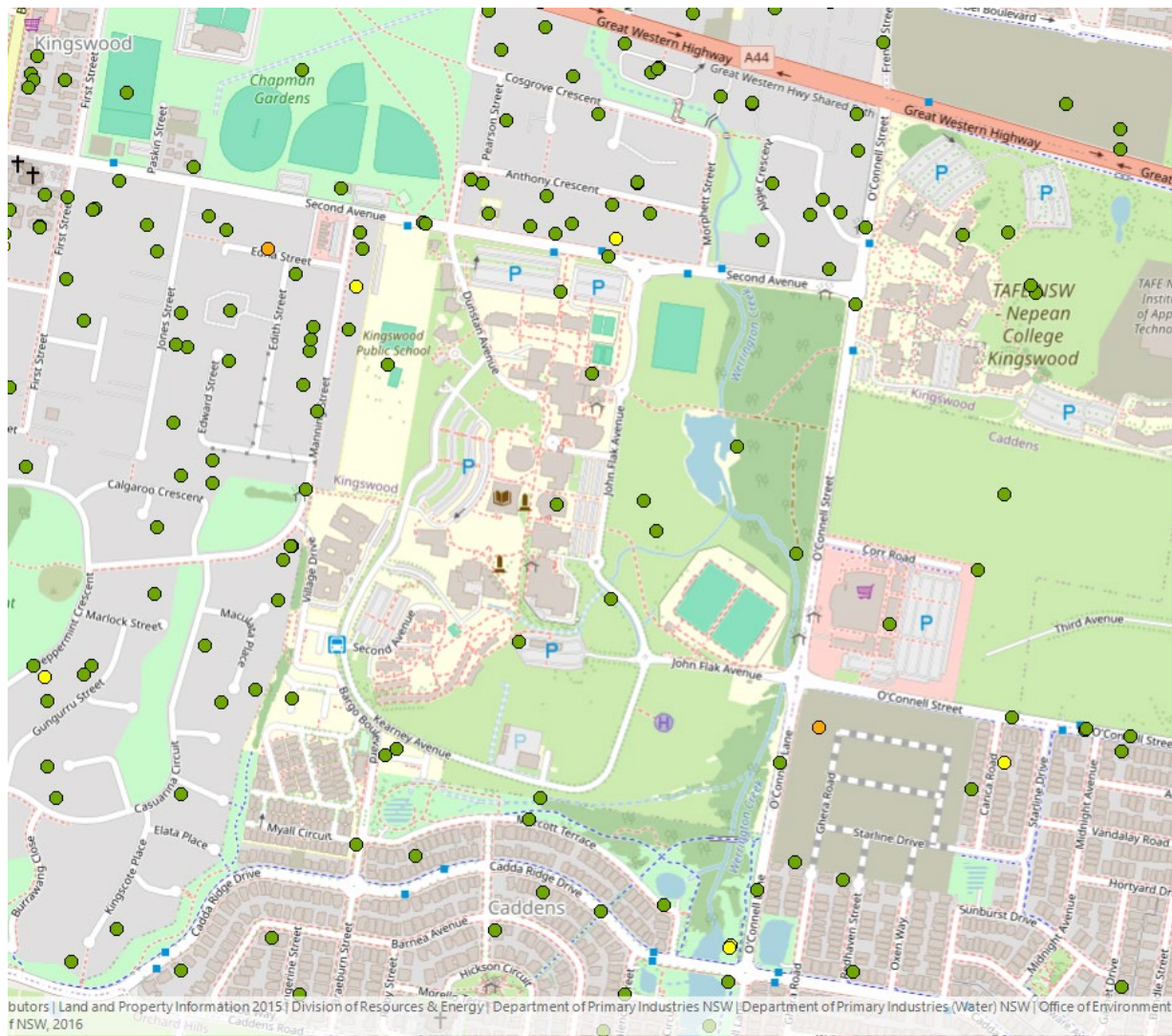


Figure 5: NSW SEED mapping of species siting indicate that there have been no previous reports of vulnerable/threatened/endangered species on the Kingswood campus.

4. SITE MANAGEMENT

Before commencing work within the site, the area should be re-examined to locate, tag and map any endangered/vulnerable/threatened flora species within the site that may not have been discovered during previous assessments. If any are found, then a separate plan detailing how they will be protected during bush regeneration activities will be prepared.

5. WEED MANAGEMENT

Weed management will aim to free up available resources such as light, soil moisture and nutrients required by native plants to commence regeneration of the area. In areas adjacent to bushland good weed management will help prevent the spread of these weeds.

Weed control should be targeted; with resources allocated to where the greatest benefit can be achieved. It should be undertaken in a methodical way, recognising that some weeds are utilised by small native mammals, reptiles and birds as protective habitat. Weed species not impinging upon the ecological structure and function of the site should be controlled to allow for natural regeneration.

Weed control should focus upon:

- Control of weeds of national significance and habitat changing environmental weeds such as Blackberry and Lantana
- Control of weed species that impeded the recruitment and establishment of native species
- Reducing the quantity of weed seed in the soils seed bank and restricting further recruitment.

To ensure effective weed management can be undertaken within the site primary weed control has been employed across the site and treatment of those weeds that met the above criteria has been undertaken.

Follow up weed control will commence 3 to 12 months after primary weeding. This will involve the repeated treatment of any surviving or regenerating weeds, over a five-year period.

Weed management is undertaken utilising the methods in Table 1.

Table 1: Weed Management Techniques

VEGETATION TYPES	APPROVED METHOD OF WEED CONTROL	
Tree and shrub weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Frill/chip and paint stem with systemic herbicide	Small Plants • Stem injection with systemic herbicide • Hand pull • Burn or steam weed • Spray foliage with systemic herbicide
Vine weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Spray foliage with systemic herbicide • Crown, dig or lever	Small Plants • Hand pull • Burn or steam weed • Spray foliage with systemic herbicide • Crown, dig or lever
Grass, grass like & forb weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Rope or wick wiper application of systemic herbicide • Slash/mow and apply systemic herbicide to regrowth • Burn and apply systemic herbicide to regrowth • Steam weed and apply systemic herbicide to regrowth • Spray foliage with systemic herbicide • Crown, dig or lever	Small Plants • Hand pull • Rake/roll and spray with systemic herbicide • Crown, dig or lever • Burn or steam weed • Spray foliage with systemic herbicide
Other weeds	Large Plants • Cut stem and paint with systemic herbicide • Scrape stem and paint with systemic herbicide • Frill/chip and paint stem with systemic herbicide • Frill/chip and paint stem with systemic herbicide • Spray foliage with systemic herbicide • Crown, dig or lever	Small Plants • Hand pull • Crown, dig or lever • Burn or steam weed • Spray foliage with systemic herbicide

6. ASSISTED REGENERATION

The preference in all areas is for endemic species to be allowed to regenerate naturally. However, it may be necessary to undertake replanting in those areas where regeneration efforts have been unsuccessful.

If replanting is required, the following will be observed:

- Plants used must be obtained from locally collected provenances, unless there are reasons to do otherwise (e.g., to ensure genetic variability or for adaptation to climate change).
- Planting must be undertaken during the months of March, April and/or May.
- Planting sizes should be tubestock or hiko cells unless otherwise stated.
- Plants must be installed by hand or auger with native fertiliser applied to the hole.
- Plantings should be watered at least twice, once immediately after planting. Planting can be scheduled immediately before rain events to satisfy this condition.
- It is expected that an 80% survival rate of new plants is maintained.

7. SEED COLLECTION

If required, collection techniques, seed preparation, and growing should be as per Florabank Best Practice Guidelines (<https://www.florabank.org.au/guidelines/>).

8. MONITORING AND EVALUATION

Monitoring is critical and regular monitoring can quickly highlight and avert negative impacts on the site, as well as the success of natural regeneration.

8.1. Photo Point Monitoring

Prior to weed management commencing photo points need to be established throughout the site; uniquely named; their coordinates recorded/mapped; and high resolution before photos taken. These should be taken in all directions (360°) using each photo point as the centre. Photos will be dated and labelled with the location details.

Each photo point will be re-photographed annually as above and ensuring they are taken in the same spot with the same starting direction and direction of the sweep. The camera should be held at the same height and angle and show the same field of view.

8.2. Vegetation Integrity Survey Plots

Utilising photo points as the centre 10 by 10m survey plots will be established and these will be used to monitor weed reduction and regeneration of endemic species. Monitoring will be undertaken annually.

APPENDIX 1

Table 2: Fauna – Blonet Atlas results showing vulnerable/endangered species observed within 10km of Kingswood campus.

SCIENTIFIC NAME	COMMON NAME	STATUS – NSW	STATUS - COMMONWEALTH
<i>Litoria aurea</i>	Green and Gold Bell Frog	Endangered	Vulnerable
<i>Hoplocephalus bungaroides</i>	Broad-Headed Snake	Endangered	Endangered
<i>Stictonetta naevosa</i>	Freckled Duck	Vulnerable	
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	Endangered	
<i>Ixobrychus flavicollis</i>	Black Bitten	Vulnerable	
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Vulnerable	
<i>Hieraaetus morphnoides</i>	Little Eagle	Vulnerable	
<i>Lophoictinia isura</i>	Square-tailed Kite	Vulnerable	
<i>Burhinus grallarius</i>	Brush Stone-curlew	Endangered	
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo	Vulnerable	Vulnerable
<i>Glossopsitta pusilla</i>	Little Lorikeet	Vulnerable	
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Critically Endangered
<i>Ninox strenua</i>	Powerful Owl	Vulnerable	
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Vulnerable	Vulnerable
<i>Chthonicola sagittata</i>	Speckled Warbler	Vulnerable	
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vulnerable	
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vulnerable	
<i>Petroica boodang</i>	Scarlet Robin	Vulnerable	
<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	Vulnerable
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Vulnerable	Endangered
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Vulnerable	
<i>Petaurus australis</i>	Yellow-bellied Glider	Vulnerable	Vulnerable
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Vulnerable
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Vulnerable	
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	Vulnerable	
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Vulnerable	
<i>Myotis macropus</i>	Southern Myotis	Vulnerable	
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Vulnerable	
<i>Miniopterus australis</i>	Little Bent-winged Bat	Vulnerable	
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Vulnerable	
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	Endangered	

Table 3: Flora – Bionet Atlas results showing vulnerable/endangered species observed within 10km of Kingswood campus.

SCIENTIFIC NAME	COMMON NAME	STATUS – NSW	STATUS - COMMONWEALTH
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>		Endangered	
<i>Senna acclinis</i>	Rainforest Cassia	Endangered	
<i>Dillwynia tenuifolia</i>		Vulnerable	
<i>Pultenaea parviflora</i>		Endangered	Vulnerable
<i>Acacia pubescens</i>	Downy Wattle	Vulnerable	Vulnerable
<i>Micromyrtus minutiflora</i>		Endangered	Vulnerable
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Endangered	Vulnerable
<i>Grevillea juniperina</i> subsp. <i>juniperina</i>	Juniper-leaved Grevillea	Vulnerable	
<i>Persoonia nutans</i>		Endangered	Endangered
<i>Pimelea spicata</i>	Spiked Rice-flower	Endangered	Endangered

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