Figure 3.3: Smooth-barked Apple - Red Bloodwood open forest 'intact' in the south of the study area.

Table 3.2: VIS plant community type profile (OEH 2017) – Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (ME64; PCT1776).

Plant community type (PCT)	Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast
PCT and BioMetric veg type (BVT) ID	PCT 1776 / BVT: ME64 and HN654
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Upper stratum	***Angophora costata* (Sydney Red Gum)**, ***Corymbia gummifera* (Red Bloodwood)**, ***Eucalyptus piperita* (Sydney Peppermint)**, *Eucalyptus pilularis* (Blackbutt), *Eucalyptus umbra* (Broad-leaved White Mahogany) and *Syncarpia glomulifera* (Turpentine)
Middle stratum	***Allocasuarina littoralis* (Black She-oak), *Banksia serrata* (Old-man Banksia)**, ***Elaeocarpus reticulatus* (Blueberry Ash)**, ***Pittosporum undulatum* (Sweet Pittosporum)**, ***Ceratopetalum gummiferum* (Christmas Bush)**, ***Acacia* ulicifolia (Prickly Mosses)**, ***Leptospermum trinervium* (Slender Tea-tree)**, *Persoonia levis* (Broad-leaved Geebung) and ***Acacia suaveolens* (Sweet Wattle)**
Ground stratum	***Dianella caerulea* (Blue Flax-lily)**, *Entolasia stricta* (Wiry Panic), ***Lomandra longifolia* (Spiny-headed Mat-rush)**, ***Pteridium esculentum* (Bracken)**, ***Smilax glyciphylla* (Sweet Sarsaparilla)** and *Xanthosia pilosa* (Woolly Xanthosia),
Landscape position	-
Profile source	S_DSO4 (OEH 2013)
Full reference details	OEH (2013) The Native Vegetation of the Sydney Metropolitan Area Version 2.0 NSW Office of Environment and Heritage Sydney.
Estimate remaining pre-European extent rounded to nearest 5%	35
TEC Name (Listing status)	TSC Act: Not listed EPBC Act: Not listed

3.1.1 Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (ME67; PCT1782)

This vegetation type is located along the south and the west boundaries of the development site and scattered amongst the buildings in the north. It is characterised by an intact open woodland (**Figure 3.4**) with an established overstorey of *E. haemastoma* and *Corymbia gummifera* (Red Bloodwood). Some sections of the vegetation type contain a low abundance and cover of herbaceous and woody weeds, which mostly occur in the 'underscrubbed' vegetation and where past soil disturbance has occurred (**Figure 3.5**). This vegetation type has been distinguished from other vegetation types onsite (i.e. Smooth-barked Apple - Red Bloodwood open forest) by the presence of *E. haemastoma* and increased abundance and cover of *C. gummifera* and *Allocasuarina littoralis* (Black She-oak). *E. piperita* and *Angophora costata* occur infrequently, and are mostly present in the ecotone between the two mapped communities.

The midstorey is dominated by native shrub species, including *Banksia serrata, Allocasuarina littoralis, Micrantheum ericoides*, *Acacia suaveolens* (Sweet Wattle), *Persoonia levis*, *Dodonaea triquetra* (Large-leaf Hop-bush), *Pimelea linifolia* (Slender Rice Flower)*, Grevillea buxifolia* (Grey Spider Plant) *Isopogon anemonifolius* (Broad-leaf Drumsticks), *Lomatia silaifolia* (Crinkle Bush), *Angophora hispida* (Dwarf Apple), add others. The groundlayer is dominated by native groundcovers, grasses and a diverse sedge layer, including *Actinotus minor* (Lesser Flannel Flower), *Actinotus helianthi* (Flannel Flower), *Anisopogon avenaceus* (Oat Speargrass), *Hibbertia aspera* (Rough Guinea Flower)*, Lepidosperma laterale*, *Entolasia marginata* (Bordered Panic), *Patersonia sericea* (Silky Purple-flag), *Ptilothrix deusta, Caustis flexuosa* (Curly Wig) and *Xanthorrhoea media* (Grass Tree).

This vegetation is remnant, however, some sections have been underscrubbed (i.e. the APZ), or modified to such an extent that they have been mapped separately as plantings 'exotics/non-indigenous'. A range of herbaceous and woody weeds are present through the vegetation type in low quantities, including *Bidens pilosa**, *Asparagus asparagoides** and *Andropogon virginicus** (Whisky Grass).

A summary of the PCT profile for this vegetation type in the Vegetation Information System (VIS) (OEH (2017) is provided in **Table 3.3**. Species recorded onsite within this patch are highlighted in **bold text**.

Figure 3.4: Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland 'intact' in the north of the development site.

Figure 3.5: Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland 'underscrubbed' in the south of the development site.

Table 3.3: VIS plant community type profile (OEH 2017) – Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (ME67; PCT1782).

Plant community type (PCT)	Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney
PCT and BioMetric veg type (BVT) ID	PCT 1782/ BVT: ME67
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Upper stratum	***Angophora hispida*** **(Dwarf Apple)**, ***Eucalyptus haemastoma*** **(Broad-leaved Scribbly Gum)**, ***Corymbia gummifera*** **(Red Bloodwood)** and *Eucalyptus piperita* (Sydney Peppermint)
Middle stratum	***Leptospermum trinervium*** **(Slender Tea-tree)**, ***Allocasuarina littoralis*** **(Black She-oak)**, ***Acacia suaveolens*** **(Sweet Wattle)**, ***Banksia ericifolia*** **subsp. *ericifolia* (Heath-leaved Banksia)**, ***Lambertia formosa*** **(Mountain Devil)**, ***Grevillea buxifolia*** **(Grey Spider Flower)**, ***Banksia serrata*** **(Old-man Banksia)** and *Woollsia pungens*
Ground stratum	***Entolasia stricta*** **(Wiry Panic)**, ***Actinotus minor*** **(Lesser Flannel Flower)**, ***Cyathochaeta diandra***, ***Dianella caerulea*** **(Blue Flax-lily)**, ***Dampiera stricta***, ***Boronia ledifolia*** **(Sydney Boronia)**, *Austrostipa pubescens* and *Lomandra glauca* (Pale Mat-rush)
Landscape position	-
Profile source	S_DSF10 (OEH 2013)
Full reference details	OEH (2013) The Native Vegetation of the Sydney Metropolitan Area Version 2.0 NSW Office of Environment and Heritage Sydney.
Estimate remaining pre-European extent rounded to nearest 5%	25%
EEC Name (Listing status)	TSC Act: Not listed EPBC Act: Not listed

3.1.2 Other vegetation

Three other distinct vegetation assemblages are recorded within the development site, but none are remnant native vegetation types. These vegetation assemblages include:

Cleared land exotics and exotic/non-indigenous plantings

This zone consists of cleared land dominated by exotic grasses and herbaceous weeds, such as *Cenchrus clandestinus** (Kikuyu Grass), *Conyza* sp.* and *Sida rhombifolia** (Paddy's Lucerne) (**Figure 3.6**).

Also included in this zone are areas consisting of non-indigenous plantings and exotic species, which are either planted or have self-recruited (**Figure 3.7**). *E.* grandis* is the dominant canopy species in the zone, however, several large planted *Corymbia maculata** (Spotted Gum) are also present in the south of the zone. Occasional native species representative of Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland are found through the zone, including *E. haemastoma* and *Allocasuarina torulosa*. Dominant exotic and non-indigenous native species in the zone include, *Senna pendula* var. *glabrata**, *Asparagus aethiopicus**, *Ehrharta erecta**, *Acacia saligna** (Golden Wreath Wattle) and *Westringia fruticosa** (Coastal Rosemary). The vegetation in this zone is likely to have historically been representative of Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland prior to disturbance and modification.

Infrastructure 'buildings, roads etc.'

All 'hard' surfaces within the development site, including buildings, roads, parking lots and all additional infrastructure associated with the campus (**Figure 3.8**).

Figure 3.6: Cleared land exotics and exotic/non-indigenous plantings in the south of the development site.

Figure 3.7: Cleared land exotics and exotic/non-indigenous plantings in the south of the development site.

Figure 3.8: Infrastructure 'buildings, roads etc.' in the north-west of the development site.

3.2 Vegetation zones

3.2.1 Condition classes, subcategories and areas

The PCTs identified within the development site were classified into vegetation zones for credit calculation purposes. As described above, three vegetation zones were initially mapped for the *Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney*. The three zones included areas of 'intact' vegetation, in the north east corner of the development site, with 'underscrubbed' vegetation distributed along the western and eastern boundary of the development site. A small patch of 'disturbed/shrubby' vegetation is located at the far southern boundary of the subject site.

An additional vegetation zone was identified for the *Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast* (intact).

The impacts to native vegetation are caused by the construction of a new boundary fence, with a total impact footprint of six metres, and the construction of the COLA. The location of the boundary fence, and associated six metre impact footprint, and the COLA leads to impacts to only two of the vegetation zones identified, being:

- Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (Intact)
- Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (Underscrubbed)

The total fence footprint is 0.56 ha, however, much of the alignment is already mapped as infrastructure or cleared land exotics and exotic/non-indigenous plantings. The total COLA footprint is 0.025 ha, again with some of this area mapped as infrastructure or cleared land exotics and exotic/non-indigenous plantings.

The total impact to native vegetation from the construction of the proposed fence and COLA is 0.22 ha, which includes 0.12 ha to intact Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney and 0.10 ha to underscrubbed Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney.

The total impact is smaller than the minimum vegetation zone size identified in the BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECC 2008), which is 0.25 ha and has been applied to previous FBA assessments (see Ecoplanning 2016). For this reason, the impacts to both zones have been combined and assessed as one vegetation zone. As the largest impact occurs within the intact Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney vegetation zone (0.12 ha of the 0.22 ha impact) this zone has been selected for use in this assessment.

Figure 3.9 shows the spatial arrangement of the vegetation zones within the development site and associated plots and transects. **Figure 3.10** shows those vegetation zones impacted by the proposal. **Table 3.4** describes the zone mapped and total impacts.

Figure 3.9: Vegetation zones and plot and transect locations.

Figure 3.10: Vegetation zones impacted by the proposal.

Table 3.4: Vegetation zones.

Plant community type	Condition	Ancillary code	Total impact on vegetation zone (ha)	Total impact entered into credit calculator (ha)
Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney	Moderate / Good	Underscrubbed	0.10	0.22
		Intact	0.12	

^ Note: due to the total area of impact being than 0.25 ha (total impact is 0.22 ha) both vegetation zones have been combined into a single zone and will be assessed as Intact Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney for credit calculation purposes.

3.2.2 Plots and transects

Three plot and transect surveys were completed on site, however, due to the small amount of clearing only one plot is required to satisfy the requirements of the FBA (see **Appendix A** for field data sheet).

One plot and transect were completed in a central patch of *Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney* for 'intact' and 'underscrubbed' condition classes (**Figure 3.9**).

A further plot was also completed for the *Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast* 'intact' zone. All plots were conducted in accordance with the FBA methodology (**Table 3.5**.).

The plot conducted for *Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney* (intact) was utilised for the assessment (BB03).

Due to the extremely small footprint of the fence line, associated buffer and COLA the plot could not be placed directly within the footprint. The plot was, therefore, placed adjacent to the planned impacts.

Table 3.5: Plot and transect results.

Plot ID	NPS	NOS	NMS	NGCG	NGCS	NGCO	EPC	NTH	OR	FL	Easting	Northing
BB01	34	11	12.5	64	8	16	0	0	1	40	329605	6259544
BB02	43	43.5	0.2	14	2	30	0	7	1	25	329751	6259501
BB03	45	24	17.5	40	18	17	0	0	1	15	329795	6259688

3.2.3 Current and future site value scores

The site value score recorded for the vegetation zone assessed is 71.35 / 100. As the proposed development requires the complete removal of native vegetation within each zone mapped, the default future site value score of 0 has been maintained.

Table 3.6: Site values before and after development.

Plant community type	Vegetation zone	Area impacted (ha)	Site value score before development	Site value score after development
Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney	Intact	0.22	71.35	0

4. Threatened species

4.1 Identifying threatened species for assessment

4.1.1 Ecosystem credit species

Ecosystem credit species are predicted based on habitat surrogates, and a number of ecosystem credit species are predicted on site. The ecosystem credit species predicted on site are provided in **Table 4.1**.

Table 4.1: Ecosystem credit species predicted on site.

Common Name	Scientific Name	TSC Act Status*	EPBC Act Status*
Barking Owl	*Ninox connivens*	V	-
Eastern Freetail-bat	*Mormopterus norfolkensis*	V	-
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	-
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V	-
Little Eagle	*Hieraaetus morphnoides*	V	-
Little Lorikeet	*Glossopsitta pusilla*	V	-
Masked Owl	*Tyto novaehollandiae*	V	-
New Holland Mouse	*Pseudomys novaehollandiae*	-	V
Powerful Owl	*Ninox strenua*	V	-
Scarlet Robin	*Petroica boodang*	V	-
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E
Swift Parrot	*Lathamus discolor*	E	E
Varied Sittella	*Daphoenositta chrysoptera*	V	-

* E- Endangered, V- Vulnerable

4.1.2 Species credit species

Geographic and habitat features

Species credit species are predicted following assessment of geographic and habitat features in the credit calculator, such as site location (IBRA subregion), PCTs and condition, patch size and the area of surrounding vegetation within the 1,000 ha circle. **Table 4.2** provides the answer to each question for the development site. Where the answer is 'yes', the species is retained in the assessment.

Question: *Do any of the following features occur on the area to be assessed? Tick the box wherever the feature occurs, or is likely to occur in the area to be assessed. Leave blank if the feature does not occur*.

Table 4.2: Assessment of geographic/habitat features.

Common name	Scientific name	Feature	Impact?
Rosenberg's Goanna	*Varanus rosenbergi*	Land within 250 m of termite mounds or rock outcrops	yes
Red-crowned Toadlet	*Pseudophryne australis*	Heath or eucalypt forest on sandstone with a build-up of litter or other debris and containing, or within 40 m of, ephemeral or intermittent drainage lines	yes
Large-eared Pied Bat	*Chalinolobus dwyeri*	Land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels	no
Giant Burrowing Frog	*Heleioporus australiacus*	Land within 40 m of heath, woodland or forest with sandy or friable soils	yes
Broad-headed Snake	*Hoplocephalus bungaroides*	Land within 500 m of sandstone escarpments with hollow-bearing trees, rock crevices or flat sandstone rocks on exposed cliff edges and sandstone outcropping	yes

Table 4.3 provides the list of species credit species identified by the Tool as 'candidate species'. In accordance with Section 6.5.1.3(a) of the FBA, each species was assessed to determine whether the species is likely to occupy the site based on habitat features and quality.

To do this threatened species, populations and migratory species recorded within 5 km of the development site (the locality) were obtained from a search of the Atlas of NSW Wildlife (OEH 2017) and their likelihood of occurrence was assessed by:

- review of location and date of recent (<5 years) and historical (>5-20 years) records
- review of available habitat within the development site and surrounding areas
- review of the scientific literature pertaining to each species and population
- applying expert knowledge of each species

The potential for each threatened species, population and/or migratory species to occur was then considered following review of available habitat within the development site. The potential for species to utilise the site and to be affected directly or indirectly by the proposed action were considered as either:

- "Recent record" = species has been recorded in the development site within the past 5 years

- "High" = species has previously been recorded in the development site (>5 years ago) or in close proximity (for mobile species), and/or habitat is present that is likely to utilised by a local population
- "Moderate" = suitable habitat for a species is present onsite but no evidence of a species detected and relatively *high* number of recent records (5-20 years) in the locality or species is highly mobile
- "Low" = suitable habitat for a species is present onsite but limited or highly degraded, no evidence of a species detected and relatively *low* number of recent records in the locality
- "Not present" – suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the development site

The likelihood of occurrence assessment (**Appendix B**) determined some of the candidate species (listed in **Table 4.3**) as "not present" within the development site. This was dependent on several factors, including whether the habitat for the species was absent or substantially modified, whether species were observed a long distance from the development site, occur in relatively low numbers or were not recorded in the locality. This assessment of likelihood corresponds to 6.5.1.4, which states that "*a candidate species that is not considered to be present on the development site in accordance with Paragraph 6.5.1.3 does not require further assessment*". As such, no formal survey was conducted for these candidate species, however, informal survey was opportunistically conducted whilst surveying for other threatened species.

Remaining candidate species were assessed under Step 3 of the FBA (OEH 2014), as detailed in **Table 4.3**. Survey effort within and surrounding the development site is displayed in **Figure 4.1**, which included threatened flora survey in accordance with *NSW Guide to Surveying Threatened Plants* (OEH 2016). A Song Meter (SM3 recording device) was placed onsite over a survey period of two nights, to monitor for microbat activity and determine if additional ecosystem and species credits were present in the subject site, particularly Large-footed Myotis, which is a 'species credit' if breeding habitat is identified. A baited camera trap was installed in the south west of the subject site, which contained a universal bait (oats, peanut butter and tuna). The baited camera trap aimed to determine the presence of *Varanus rosenbergi* (Rosenberg's Goanna), *Dasyurus maculatus* (Spotted-tailed-Quoll) and *Isoodon obesulus obesulus* (Southern Brown Bandicoot (eastern)). Of these three species only Rosenberg's Goanna is a candidate species. However, Southern Brown Bandicoot and Spotted-tailed-Quoll were assessed as having a 'moderate' likelihood of occurring in the subject site prior to field assessment.

Eastern Pygmy Possum

Ten nesting boxes for *Cercartetus nanus* (Eastern Pygmy Possum) were installed along two transects on the southern boundary of the subject site (**Figure 4.1**). Nest boxes were constructed from PVC piping, with the ends sealed by PVC plugs (Ward 1990). An entrance hole was established in the front of the PVC piping, and a strip of Velcro was inserted, to allow access for the animals. Boxes were left onsite for a period of approximately 46 days, and were checked on two separate occasions on 27 March and 5 May 2017. One remote camera was installed on each of the transects.

Table 4.3: Species credit species requiring further assessment.

Common name	Scientific name	TSC Act Status*	EPBC Act Status*	Threatened Species Profile Database survey period	Surveyed required (Y/N)	Survey effort	Survey result
Angus's Onion Orchid	*Microtis angusii*	E	E	May - October	Y	The species was surveyed in the subject site during flowering time in areas of potential habitat. Survey was conducted in accordance with the *NSW Guide to Surveying Threatened Plants* (OEH 2016).	Not present
Broad-headed Snake	*Hoplocephalus bungaroides*	E	V	March - November	Y	Areas of potential habitat were surveyed, particularly in the south of the subject site. Survey included searches of sheltering sites (under rocks or in crevices) during the day.	Not present
Camfield's Stringybark	*Eucalyptus camfieldii*	V	V	All year	Y	The species was surveyed in the subject site during flowering time in areas of potential habitat. Survey was conducted in accordance with the *NSW Guide to Surveying Threatened Plants* (OEH 2016).	Not present
Eastern Pygmy-possum	*Cercartetus nanus*	V	-	January – April and September – December	Y	10 habitat boxes were installed along two transects (n = 20), for a period of 46 days. Habitat boxes were check on the 27/03/17 and the 5/05/17. One remote camera was installed on each of the transect, pointed at the habitat boxes to monitor any activity.	Low

Common name	Scientific name	TSC Act Status*	EPBC Act Status*	Threatened Species Profile Database survey period	Surveyed required (Y/N)	Survey effort	Survey result
Gang-gang Cockatoo population, Hornsby and Ku-ring-gai Local Government Areas	*Callocephalon fimbriatum* population in the Hornsby and Ku-ring-gai Local Government Areas	E	-	All year	N	-	Not present Lies outside Endangered Population area
Giant Burrowing Frog	*Heleioporus australiacus*	V	V	January – May, September - December	N	-	Not present (see section 6.5.1.3 (a) of the *Framework for Biodiversity Assessment* (OEH 2014) and Appendix B
Hibbertia puberula	*Hibbertia puberula*	E	-	January-February and September to-December	N	-	Not present (see section 6.5.1.3 (a) of the *Framework for Biodiversity Assessment* (OEH 2014) and Appendix B
Koala	*Phascolarctos cinereus*	V	V	All year	N	-	Not present (see section 6.5.1.3 (a) of the *Framework for Biodiversity Assessment* (OEH 2014) and Appendix B

Common name	Scientific name	TSC Act Status*	EPBC Act Status*	Threatened Species Profile Database survey period	Surveyed required (Y/N)	Survey effort	Survey result
Netted Bottle Brush	*Callistemon linearifolius*	V	-	September - March	Y	The species was surveyed in the subject site during flowering time in areas of potential habitat. Survey was conducted in accordance with the *NSW Guide to Surveying Threatened Plants* (OEH 2016).	Not present
Red-crowned Toadlet	*Pseudophryne australis*	V	-	January - December	Y	Call playback was conducted over two survey nights. Daylight survey was conducted in areas of potential habitat, including intermittent drainage lines with a build-up of litter or other debris.	Low
Rosenberg's Goanna	*Varanus rosenbergi*	V	-	November - February	Y	A baited camera trap was installed for a total of 39 survey days from the 27/03/17 to the 5/05/17	Not present
Seaforth Mintbush	*Prostanthera marifolia*	CE	CE	All year	N	-	Not present Only known from one population at Manly Dam, approx. 7km from the subject site.

* CE- Critically Endangered; E- Endangered, Ex- Extinct; V- Vulnerable

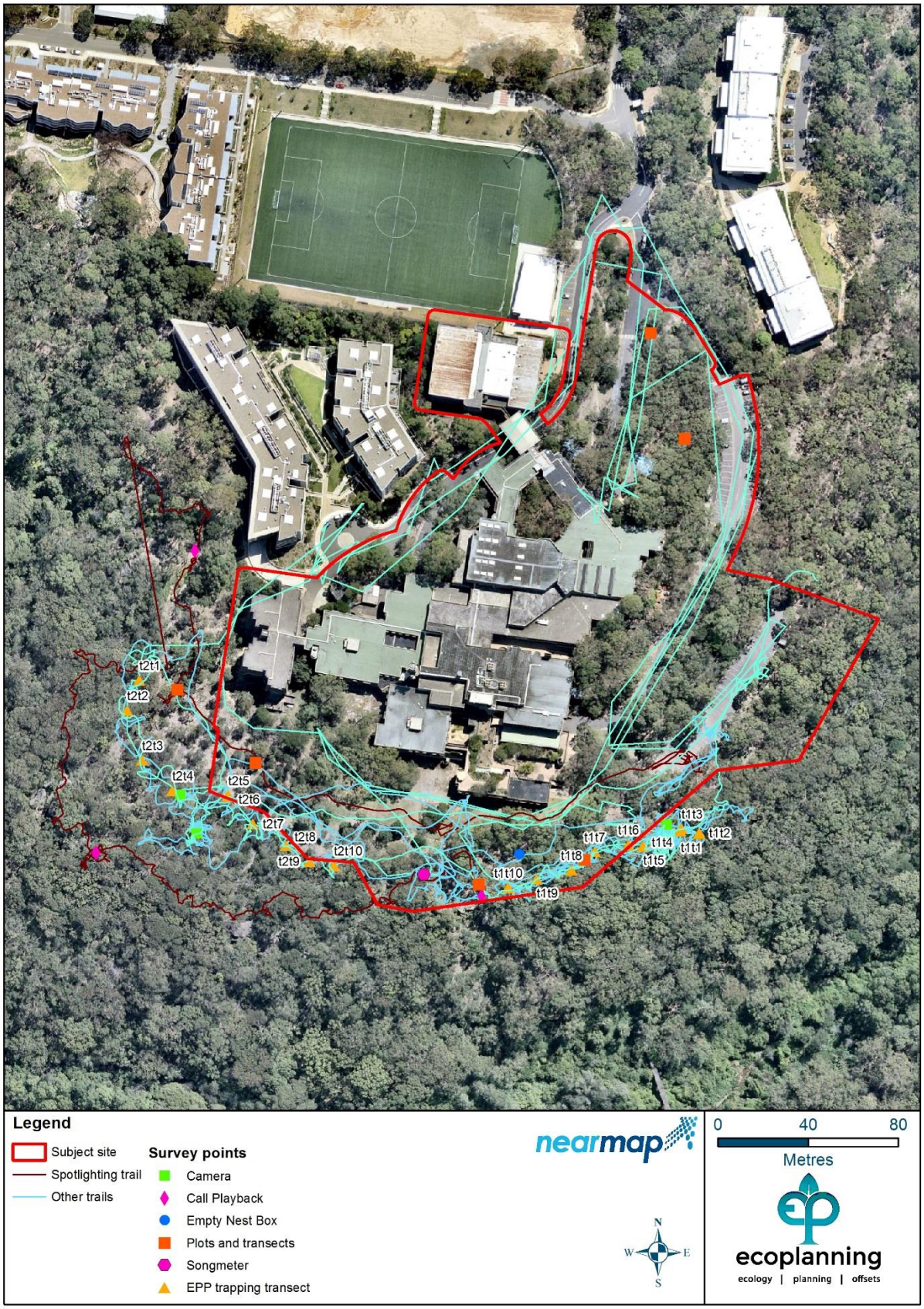

Figure 4.1: Targeted survey effort.

5. Avoid and minimise impacts on biodiversity values

The following section sets out the assessment of direct and indirect impacts on biodiversity values at the development site. This is set out in accordance with Section 8 of the FBA (OEH 2014). The reporting requirements are set out in accordance to Appendix 9 of the FBA (OEH 2014).

5.1 Assessment of direct and indirect impacts

5.1.1 Direct impact – vegetation clearing

The proposed development consists predominantly of a refurbishment of existing buildings and grounds within the subject site. Little impact is proposed to native vegetation, except the installation of a new boundary fence and the construction of a small outdoor learning area (COLA). The construction of the boundary fence, associated vehicle access and the COLA will result in a maximum impact to native vegetation of 0.22 ha. The clearing of 0.22 ha of native vegetation for the proposed development represents just 4.5% of the development site, or 12.9% of the total native vegetation within the subject site.

During construction the alignment of the boundary fence and COLA will be adjusted, where possible, to reduce impacts. The calculated impact of 0.22 ha is, therefore, considered a maximum footprint, with actual impacts likely to be reduced during construction.

All impacts will occur to one mapped native vegetation PCT, being Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (PCT 1782). The impact has been assessed as one vegetation zone as outlined in Section 3.

Table 5.1 Area of each vegetation type directly impacted within the development site.

Vegetation type	Vegetation zone (condition class)	Total area impacted on development site (ha)
Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney	Intact	0.12
	Underscrubbed	0.10
	Total	**0.22**

Completely avoiding impacts to native vegetation within the development site is, in this case, not considered feasible. The boundary fence is placed to secure the facility, and cannot be placed completely outside native vegetation. It is noted that native vegetation occupies only 35% of the total fence footprint, with 0.36 ha of the footprint containing existing infrastructure or non-native vegetation. The placement of the COLA is also not able to be adjusted to completely avoid native vegetation, with very few sites available within the subject site to construct such a facility. It is noted that the total impact caused to native vegetation from the COLA is 0.02 ha.

The impacts caused through the management of native vegetation within an Asset Protection Zone (APZ) has not been calculated as part of this assessment. This is due to a previously approved residential development directly north and west of the subject site, which, as a condition of approval, is required to manage the vegetation within the subject site as an APZ (ELA 2012, Alphitonia 2016, RFS 2012a, RFS 2012b). The APZ has a statutory requirement to be managed in perpetuity. As an existing APZ approval is in place, and the extent of the APZ calculated for the current proposal is less than that previously approved (ABPS 2017), no credits are considered necessary for this aspect of the project.

5.1.2 Direct impact – Loss of fauna habitat

The proposal will remove potential foraging and roosting/sheltering/breeding habitat (small tree hollows and stags) for fauna. The likelihood of threatened fauna utilising the study is generally low based on site assessment, expert opinion and analysis of the likelihood of occurrence from Atlas records over the past 20 years (see **Section 4.1** and **Appendix B**).

5.1.3 Indirect impacts

It is difficult to quantify indirect impacts of the proposed development, but these may include impacts such as noise and/or erosion associated with the construction phase of the project. These impacts will be managed through the development of a Construction Environmental Management Plan.

The site is already predominantly developed with significant areas of buildings, concrete walkways and car parks already in place. As this proposal predominantly involves the refurbishment of existing buildings, and only the construction of the new fence and COLA will impact on native vegetation, indirect impacts are not expected and area considered to be negligible or non-existent.