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4 August 2017

Re: Ecological Constraints Assessment and Site Compatibility Certificate, Lot 1 // DP 201384 and Lot 2 DP // 538508, 154 - 156 Elanora Road, Elanora Heights.

Dear Sarah,

Ecoplanning was commissioned by Urbis Pty Ltd to undertake a Constraints Assessment of a site on Elanora Road, Elanora Heights. The proposal involves the establishment of a Seniors Living Facility in the eastern portion of the site and requires an approved Site Compatibility Certificate prior to the submission of a Development Application.

Please find below the summary of observations and recommendations based on recent desktop review and field assessment conducted by Lucas Mckinnon (Director and Principal Ecologist, Ecoplanning) and Thomas Hickman (Ecologist, Ecoplanning) at Lot 1 // DP 201384 and Lots 2 DP // 538508(154 – 156 Elanora Road), Elanora Heights, NSW (**Figure 1**).

If you would like to discuss any of the above comments and recommendations further, please contact me on the below details.

Yours sincerely,

p.p.

Lucas Mckinnon

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Background and site context

Urbis proposes to develop a seniors living facility at 154 – 156 Elanora Heights (Lot 1 // DP 201384 and Lots 2 DP // 538508) (the 'study area', **Figure 1**). The development will consist of 46 units with several access roads, and is limited to the eastern portion of the study area (the 'subject site'). Direct impacts to native vegetation have been categorised as 'partial' and 'full'. The partial impacts are specific to the APZ minimum setback Inner Protection Area (IPA), whereas the full impacts are specific to the proposed building envelope, including the units access road and tracks.

The study area is in the Northern Beaches Council (formerly Pittwater) Local Government Area (LGA), within an area zoned as RE2 – Private Recreation. The surrounding land zoning consist of E1 – National Parks and Nature Reserves and E2 – Environmental Conservation to the south, R5 – Large Lot Residential to the west and a combination of R2 – Low Density Residential, E4 – Environmental Living and RU2 – Rural Landscape to the east and the north (**Figure 2**). To the south and west of the study area is native vegetation which retains direct connectivity with the study area (**Figure 3**).

The study area consists of golf greens, dams, parking areas, native vegetation, buildings and native/planted vegetation. The proposed development area is situated in the eastern part of the study area and is referred to as the subject site (i.e. area to be directly impacted by the proposal). The majority of the subject site consists of intact native vegetation. However, a strip of cleared land is established along the east and south eastern boundary, which is managed as a fire break. The vegetation along the northern perimeter of the subject site occurs in a modified condition. The vegetation in the north has been subject to vegetation clearing and edge effects, thus contains a higher abundance and cover of exotic species.

Purpose of this report

The purpose of this assessment is to identify the ecological values and constraints of the study area and provide advice regarding the compatibility of these ecological values with seniors living. This report will inform part of a Site Compatibility Certificate (SCC) for the proposal. It is a requirement under the State Environmental Planning Policy (Housing for Seniors and People with a Disability) 2004 that a SCC is lodged for senior living developments, unless the use of the land for seniors housing was authorised prior to the implementation of the SCC process. The land subject for development must be compatible with the surrounding land environment and current zoning in the locality.

Figure 1: Subject site and study area.

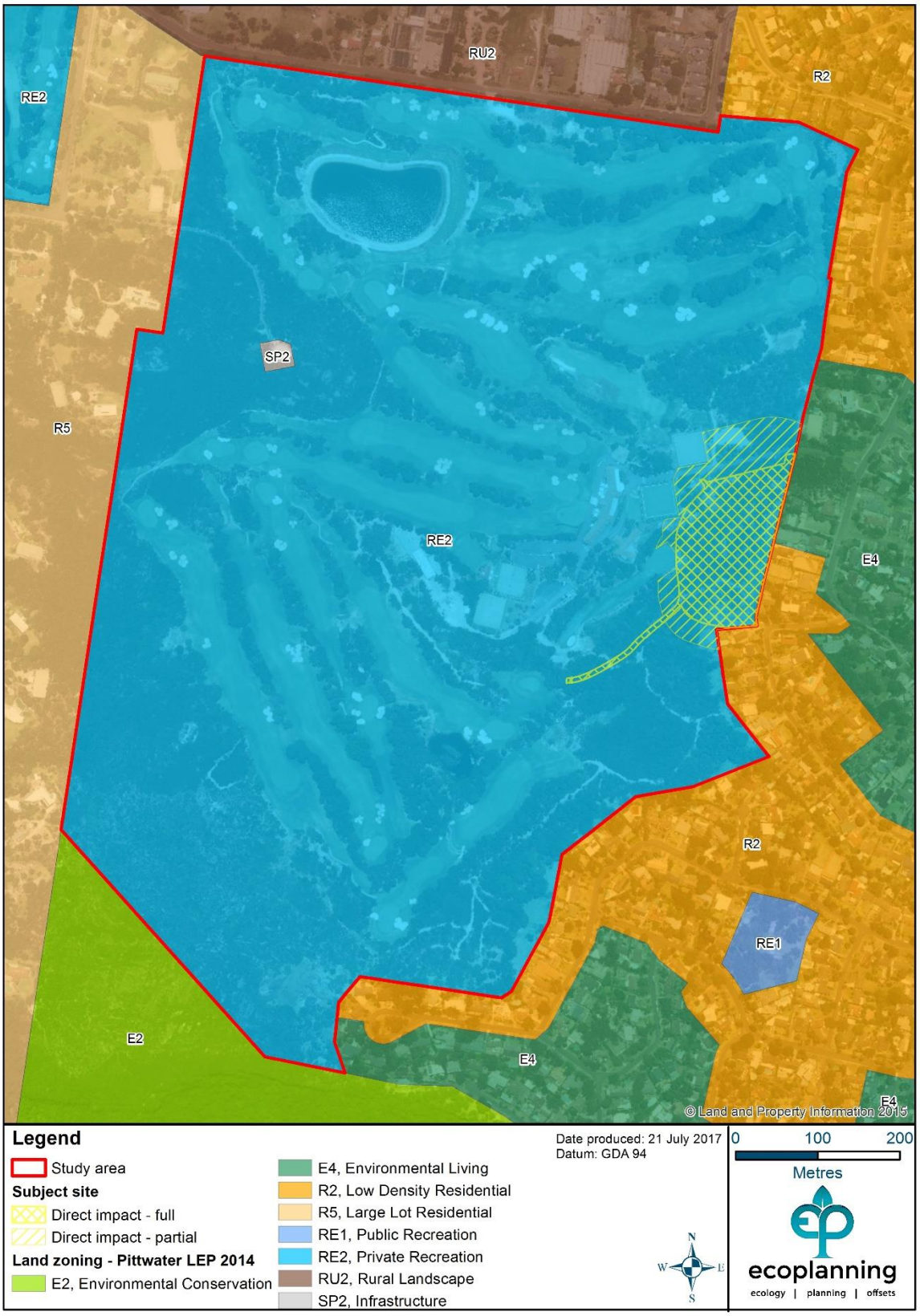

Figure 2: Land zoning of the study area and surrounds (DPE 2017).

Figure 3: Native vegetation in the locality (OEH 2013).

Method

The ecological values and constraints on the site were identified through a review of selected literature and data, a site inspection and targeted survey for some fauna. Information reviewed included:

- BioNet Atlas of NSW Wildlife (NSW Office of Environment and Heritage 2016a)
- Protected Matters Search Tool (Commonwealth Dept. of the Environment 2016)
- The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area (OEH 2013a).

Field assessment was conducted across the subject site and in parts of the study area directly adjacent to the subject site. Searches were conducted in appropriate habitat for threatened flora and fauna species conducted using the random meander technique (Cropper 1993) and targeted surveys for some fauna species. Surveys also aimed to identify potential Threatened Ecological Communities (TEC) occurring within the subject site. Field assessment was conducted in September, on October 14th and November 2nd 2016. Conditions during the survey were considered warm – hot, with clear skies.

Eastern Pygmy Possum

Eight nesting boxes for *Cercartetus nanus* (Eastern Pygmy Possum) were installed along four transects within the eastern portion of the study area (transect 4 contained seven), one of which was in the subject site (transect 3). 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 6 weeks, and were checked on two separate occasions on October 14th and November 2nd 2016. One remote camera was installed on trap 3 of transect 3 and trap 5 of transect 2 (see **Figure 4**).

Limitations

The assessment is not intended to provide an inventory of all species present across the study area but instead a preliminary assessment of the ecological values of the subject site with particular emphasis on threatened species, endangered ecological communities and key fauna habitat features. It is important to note that some species may not be detected on the site during the inspection as they may be cryptic or seasonal and only detectable during flowering or during breeding. In this case, the likelihood of their occurrence on site was assessed based on the presence of potential habitat. It is understood that a formal site survey will be undertaken following the approval of the SCC.

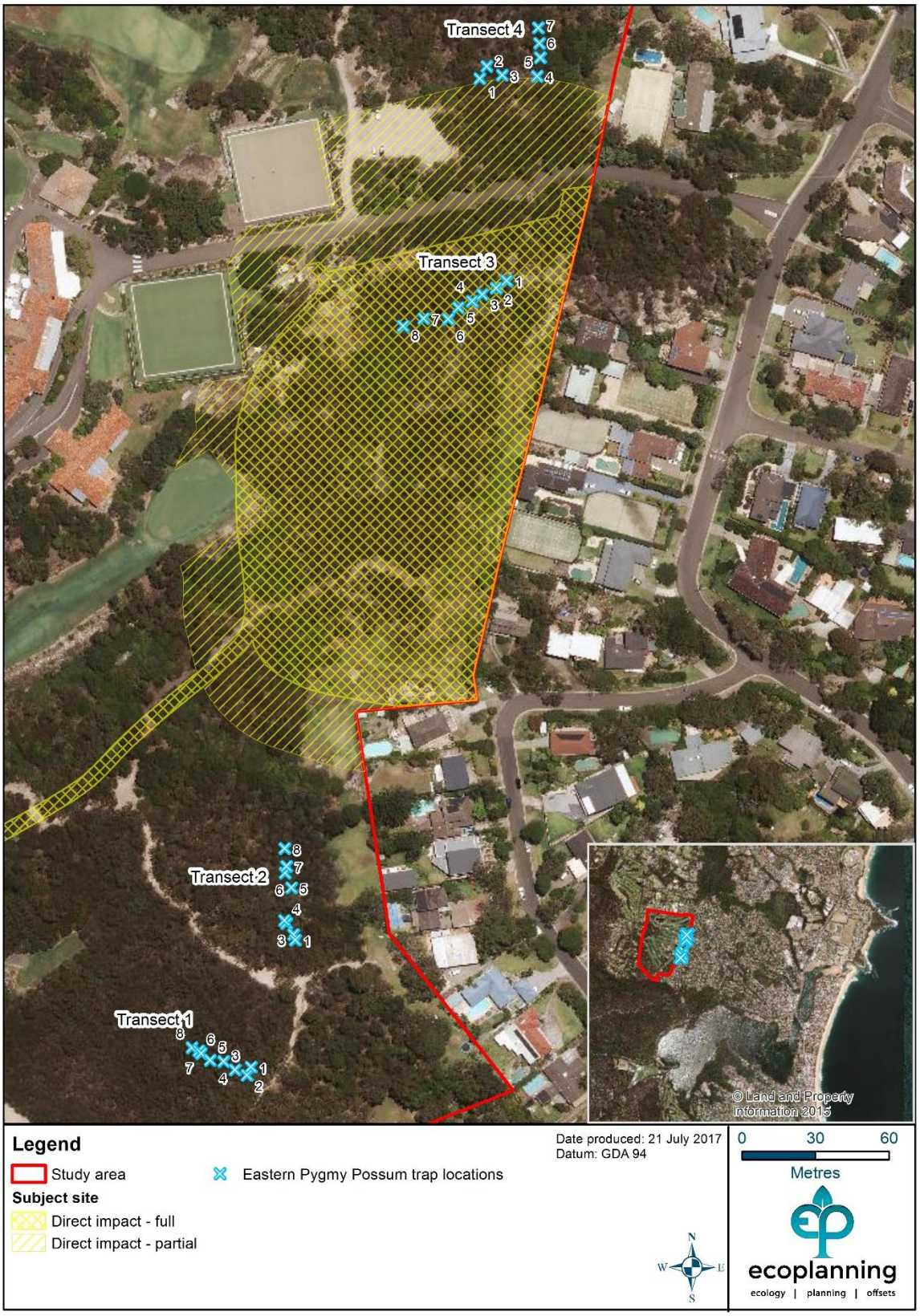

Figure 4: Survey effort for Eastern Pygmy Possum in the study area and subject site.

Results

Threatened species

Threatened species, populations and migratory species recorded within 5 km of the study area in a search of the Atlas of NSW Wildlife (OEH 2017) were consolidated 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 study area 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 study area. 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 study area within the past 5 years
- "High" = species has previously been recorded in the study area (>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 study area

A total of 50 threatened species were recorded within a 5 km radius of the study area, including 12 threatened flora and 38 threatened fauna species (OEH 2017) (**Figure 5** and **Appendix A**). Field survey identified three of these species within the study area, including *Varanus rosenbergi* (Rosenberg's Goanna) (**Figure 6**), Eastern Pygmy-possum (**Figure 7**) and *Lophoictinia isura* (Square-tailed Kite). All three threatened species were detected during a single site visit on 2nd of November 2016 and were recorded within close proximity of each other (**Figure 8**). The Eastern Pygmy Possum was found in one of the habitat boxes on transect 8 and was identified as a male. Male Eastern Pygmy Possums are known to have a mean home range of 0.68 ha, although have been found to occur over 1.68 ha (Ward 1990). None were recorded directly within the subject site although it is likely that they are present within this area also.

No additional threatened fauna records were made during field survey. However, several threatened fauna records were noted during desktop review and have been assessed as having a 'moderate' or 'high' likelihood of occurring in the study area (**Appendix A**), including:

- *Heleioporous australiacus* (Giant Burrowing Frog) recorded approximately 1.6km from the study area on the 23/10/2015.
- *Pseudophryne australis* (Red-crowned Toadlet) recorded approximately 3.6km from the study area on the 6/02/2016. 59 records for the species in the locality.
- *Ninox strenua* (Powerful Owl), recorded approximately 600 m from the study area at 13 Lumeah Avenue on the 17/07/2016.
- *Dasyurus maculatus* (Spotted-tailed Quoll), recorded approximately 1km from the study area on the 10/07/2014 in Deep Creek Reserve.
- *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat) recorded approximately 1.9km from the study area on the 28/04/2016. 79 records for the species in the locality.

The study area provides potential foraging, nesting and roosting habitat for a range of other threatened bird, amphibian and mammal species, particularly those species assessed as having a 'moderate' or 'high' likelihood of occurrence, as outlined in **Appendix A**. Extensive survey was not conducted in the south west or west of the study area. The overall significance of the study area vegetation for threatened fauna species is 'moderate' – 'high', due to the connectivity to large expanses of bushland to the south and west.

No threatened flora was recorded in the subject site, however may occur in other sections of the study area. Further targeted surveys for threatened flora are likely to be required at the Development Application (DA) to cover unsurveyed areas and also survey for cryptic species that may only be detectable at certain times of the year (e.g. Orchids) or when in flower.

Fauna habitat

Fauna habitat present within the subject site included:

- Hollow-bearing trees
- Stags
- Rock outcrop
- Leaf litter
- Trees with defoliating bark
- Winter flowering eucalypts

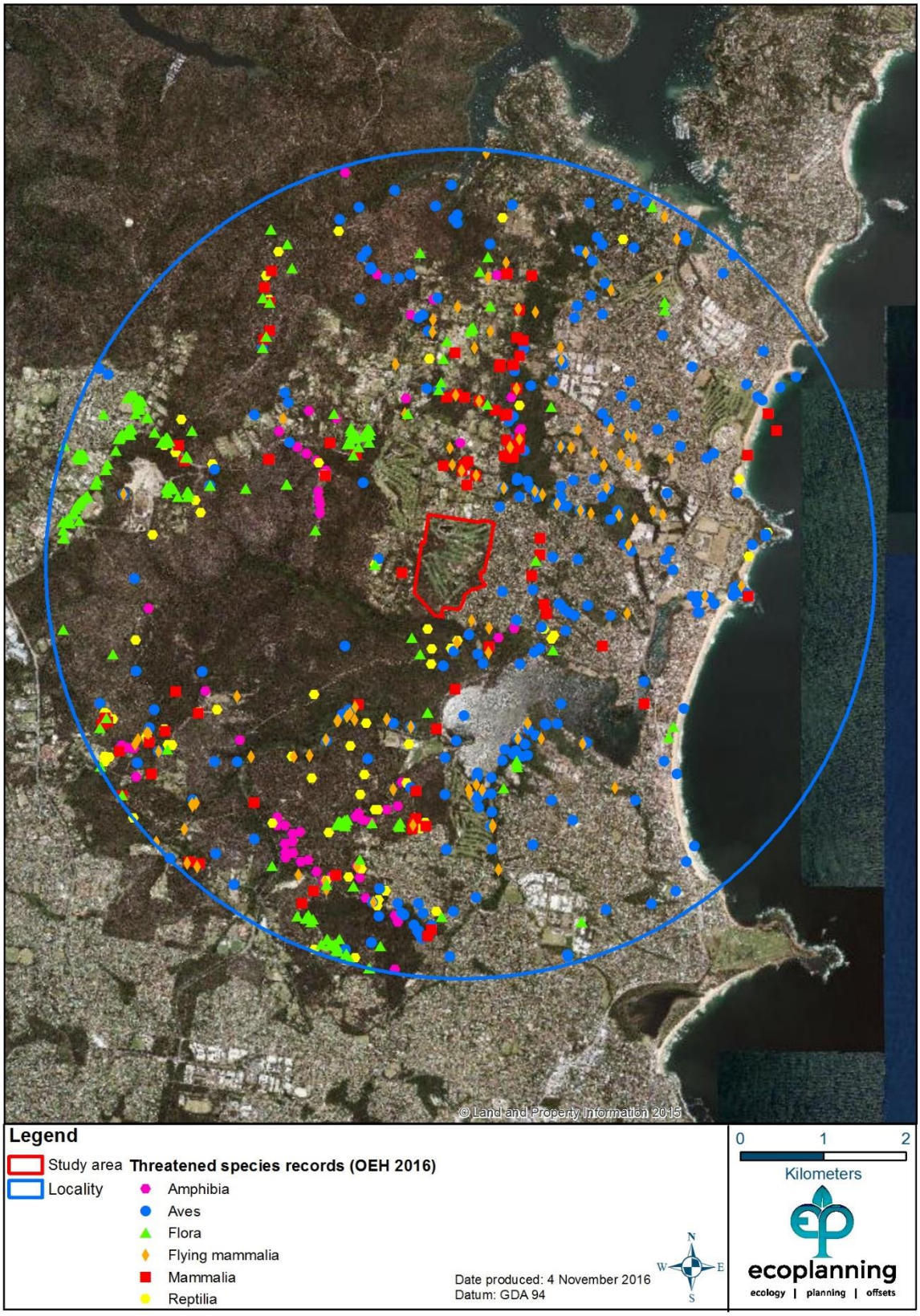

Figure 5: Threatened species in the locality (OEH 2017).

Figure 6: Rosenberg's Goanna in a *Corymbia gummifera* (Red Bloodwood) in the south of the study area.

Figure 7: Eastern Pygmy Possum found in a transect 2 nest box , approximately 300m to the south of the subject site.

Figure 8: Threatened species recorded in the study area.

Vegetation mapping

The study area has been mapped under the Sydney Metropolitan Catchment Management Authority vegetation mapping (OEH 2013). Three native vegetation communities have been mapped within the study area, as well as other vegetation, such as exotics and non-indigenous planted vegetation (Figure 9). The vegetation units mapped within the study area include:

Native vegetation:

- Coastal Sandstone Gully Forest (S_DS509)
- Coastal Sandstone Heath-Mallee (S_HL08)
- Sydney North Exposed Sandstone Woodland (S_DSF11)

Other vegetation

- Regenerating Shrubs
- Urban Exotic/Native
- Weeds and Exotics
- Cleared
- Plantation (native and/or exotic)

Of the communities mapped by OEH (2013) in the study area, the native vegetation communities Coastal Sandstone Gully Forest and Coastal Sandstone Heath Mallee have been mapped within the subject site. Coastal Sandstone Heath Mallee occurs on exposed skeletal soils on narrow ridges and exposed slopes of the Woronora and Hornsby Plateaus. This community is dominated by *Banksia ericifolia* subsp. *ericifolia* (Heath-leaved Banksia), which is accompanied by a diversity of other shrubs banksias, tea-trees, hakeas, wattles, grevillea and geebungs (OEH 2013). Several diagnostic species of this community were identified during field survey, including *Acacia suaveolens* (Sweet Wattle), *Allocasuarina distyla* (Scrub She-oak), *Angophora hispida* (Dwarf Apple)*, B. ericifolia* subsp. *ericifolia, Banksia serrata* (Old-man Banksia), *Banksia oblongifolia* (Fern-leaved Banksia), *Cyathochaeta diandra*, *Dampiera stricta* and *Xanthorrhoea media* (Grass Tree).

Coastal Sandstone Gully Forest occupies the eastern portion of the Sydney sandstone plateaus in areas that receive >1000 mm of mean annual rainfall. The dominant canopy species include *Eucalyptus piperita* (Sydney Peppermint), and *Angophora costata* (Smooth-barked Apple). The understorey consists of a diverse mix of heath and shrub species, including banksias, tea-trees and wattles (OEH 2013). Diagnostic species of this community recorded during field survey included *A. costata*, Lepidosperma *laterale*, *Leptospermum polygalifolium*, *Grevillea linearifolia* (Linear-leaf Grevillea), *Grevillea buxifolia* (Grey Spider Flower), *Epacris longiflora* (Fuschia Heath), *Hakea dactyloides* (Broad-leaved Hakea) and *Allocasuarina littoralis* (Black She-oak).

Coastal Sandstone Gully Forest corresponds to PCT1250 (ME012), whereas, Coastal Sandstone Heath Mallee corresponds to PCT1824 (ME100). The exact extent of these communities was not mapped during the survey, although their presence was verified. Further field survey will be required to confirm the extent and validity of these two

communities within the subject site at the DA stage. Regenerating shrubs and cleared land have also been mapped in the subject site.

Threatened ecological communities

The results of field survey and desktop review found none of the vegetation types in the subject site to be listed as threatened under the Commonwealth *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act) or the NSW *Threatened Species Conservation Act 1995* (TSC Act). However, further survey is necessary to validate the community types in the remainder of the study area

Riparian corridors

Desktop review and field assessment determined that no mapped watercourse occur within the study area. Several moderate – large constructed dams are located in the north of the study area. However, these waterbodies are not associated with any mapped watercourses.

Connectivity

The study area retains good connectivity to bushland situated to the south and west of the site. This includes all bushland confined by the Wakehurst Parkway to the south, Forest Way to the west and Mona Vale Road to the north. Mona Vale Road dissects the bushland in the north, which would otherwise have direct connectivity with Ku-ring-gai Chase National Park. Similarly, the Wakehurst Parkway dissects an area of bushland to the south east of the study area which would otherwise incorporate the area of bushland extending from the southern tip of Narrabeen Lagoon to the suburb of Narraweena.

It is likely that the threatened fauna observed within the study area would also utilise the subject site and connected surrounding native vegetation. This is exemplified by the records of Eastern Pygmy Possum and Rosenberg's Goanna within the study area. However, it is noted that the study area does not act as a corridor between two or more larger intact areas of native vegetation. Instead, it occurs as a strip of vegetation confined by Elanora Country Club to the west and the R2 – Low Density Residential zoned land to the east.

State Environmental Planning Policy 44

State Environmental Planning Policy 44 – Koala Habitat (SEPP 44) applies to the Pittwater LGA. *Eucalyptus punctata* has been recorded within the study area and is as a Schedule 2 Koala Feed trees species. However, there are no recent records for this species within a 5 km radius of the site and many records for this species within the LGA are historic. Therefore, this species is considered unlikely to occur and further consideration of SEPP 44 is unlikely to be required.

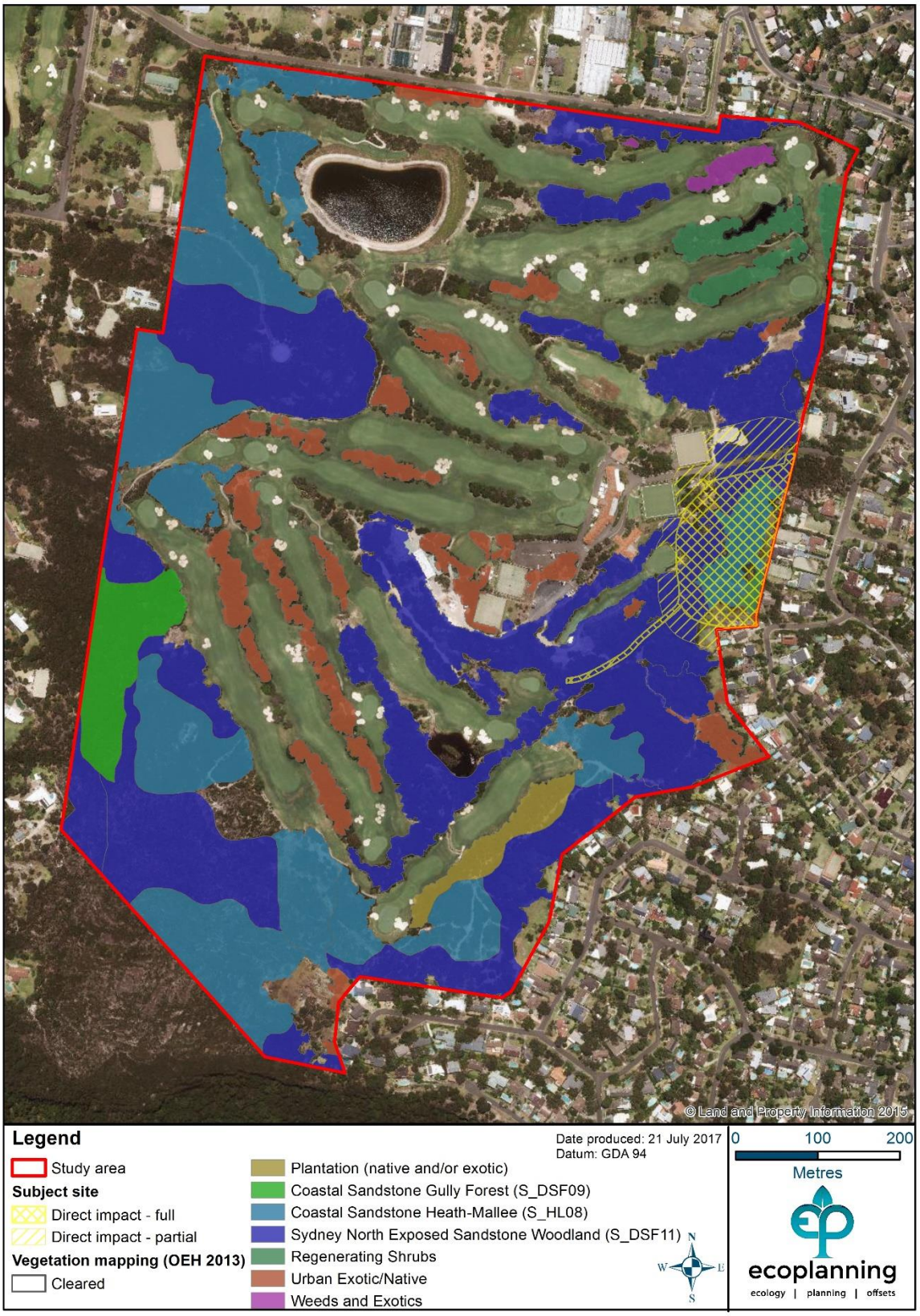

Figure 9: Vegetation communities in the study area, with direct and indirect impacts in the subject site (OEH 2013).

Conservation values in the study area

The current concept plan is situated along the eastern boundary of the study area, and consists of 46 units with several access roads. A majority of the vegetation in the subject site consists of land mapped as Coastal Sandstone Gully Forest and Coastal Sandstone Heath Mallee, with a small area of regenerating shrubs and cleared land. The two native vegetation communities occur in a mostly intact condition, with a low cover and abundance of exotics species occurring along the road edge in the north of the subject site. The vegetation in the subject site is not listed as a TEC under the EPBC or TSC Acts. However, it constitutes threatened species habitat, given that Eastern Pygmy Possum, Rosenberg's Goanna and Square-tailed Kite where all recently recorded within the study area and there is the potential for other threatened species to occur based on the habitat present. Survey effort was focussed on the south east of the study area, within the vicinity of the subject site. Therefore, it is not possible to eliminate the potential for additional threatened flora or fauna may to occur in the broader study area without further survey.

Conclusions and recommendations

Desktop analysis and field survey found the subject site and study area to contain a range of ecological values. Areas of high conservation value include native vegetation, hollow bearing trees and known threatened species habitat. Chapter 3, Part 1A, Clause 25 of the Housing for Seniors or People with a Disability SEPP (2004) specifies the following environmental matters in relation to an application for a SSC:

The Director-General must not issue a site compatibility certificate unless the Director-General:

(b) is of the opinion that the proposed development is compatible with the surrounding land uses having regard to (at least) the following criteria:

> *(i) the natural environment (including known significant environmental values, resources or hazards) and the existing uses and approved uses of land in the vicinity of the proposed development,*

(6) Without limiting subclause (4) (a), the Director-General may refuse to issue a certificate if the Director-General considers that the development is likely to have an adverse effect on the environment.

Based on the provided layout, the proposal is likely to have an adverse impact on three threatened species listed under the TSC Act, including Rosenberg's Goanna, Eastern Pygmy Possum and Square Tailed-kite and potential habitat for a number of other threatened species

The proposed development is likely to be compatible with a seniors living development, only if the impacts to these species are quantified and assessed. Given the significance of the likely impacts two NSW approval pathways could be considered and include:

- Development Application including preparation of a Species Impact Statement (SIS)
- Preparation of a Biobanking Statement

Biobanking Statement

The preparation of a BioBanking Statement, with onsite (retained vegetation) and/or offsite (biodiversity credits) conservation measures to compensate for the removal of threatened species habitat could be considered. In this instance, onsite offsets are likely to be the most cost effective option, which would also reduce the complication of sourcing the necessary credits elsewhere. Further, the credits may not be available on the market at this stage. An approximation of the credits required for threatened species recorded in the study area is provided in **Table 1**. This is based on a worst-case scenario (i.e. all impacts have been calculated as direct impacts). Ecosystem credits have been calculated based on an average of approximately 40 credits being required per hectare of impact.

Table 1: Threatened species identified in the study area likely to be impacted by the proposed development with approximate credit offset requirements.

Species	TSC Act (Y/N)	EPBC Act (Y/N)	Credit Type	Impact area (ha)	Credits required (approx.)
Eastern Pygmy Possum	Y	N	Species	2.33	46 (total)
Rosenberg's Goanna	Y	N	Species	2.33	58 (total)
Square Tailed-kite	Y	N	Ecosystem	2.33	40 / ha (93 total)

The credit calculations provided above should be treated as approximations, and are likely to change subject to assessment under the BBAM (2014). The offset requirements for Eastern Pygmy Possum and Rosenberg's Goanna are dependent on the area of native vegetation being impacted. This is unlikely to change significantly unless alterations are made to proposed development footprint, or areas of native vegetation are deemed 'unlikely' habitat for these species. The offset requirements for Square Tailed-kite are dependent on the quality of the vegetation (scored out of 100), which is achieved by conducting Biometric plots. Therefore, these numbers will be refined following formal Biobanking calculations. The number of plots required for each vegetation zone is dependent on the size and condition of the vegetation zone, with zones in low condition requiring less plots than those in moderate to good condition. Additional plots are required when a given vegetation zone is > 2 ha in size.

Should a Biobanking Statement be prepared, survey for species credit species will be required during the period specified by the BBAM. Whilst the current surveys would cover some species, additional survey is likely to be necessary for others.

Species Impact Statement

The preparation of a Species Impact Statement (SIS) is the alternative approval pathway, given that the impacts to the three threatened species will be assessed as 'significant' under Section 5A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Prior to the preparation of a SIS, a request for Director-General's requirements must be forwarded to the relevant OEH Office. The SIS must be prepared in accordance with section 109 and 110 of the TSC Act and must comply with any requirements notified by the Director-General of OEH. Further survey would be required should an SIS be the preferred approval pathway.

Matters of National Environmental Significance

The proposal is likely to have an impact of habitat for threatened and migratory species listed under the EPBC Act. Significance Assessments would need to be completed at the DA stage in order to determine whether preparation of a Referral to the Commonwealth is required. Species for which assessment would be required include (but are not limited to):

- Spotted-tailed Quoll
- Giant Burrowing Frog
- Large-eared Pied Bat
- *Apus pacificus* (Fork-tailed Swift)
- *Hirundapus caudacutus* (White-throated Needletail)

References

Commonwealth Dept. of the Environment (DoE) (2015). Protected Matters Search Tool. Accessed at: http://www.environment.gov.au/epbc/protected-matters-search-tool

Cropper (1993). Management of Endangered Plants. CSIRO Australia, Melbourne.

NSW Office of Environment and Heritage (OEH) (2013). The Native Vegetation of the Sydney Metropolitan Areas. Volume 2: Vegetation Community Profiles (Version 2.0). Accessed at: http://www.environment.nsw.gov.au/surveys/VegetationSydMetro.htm

NSW Office of Environment and Heritage (OEH) (2017). NSW BioNet: Atlas of NSW Wildlife. Accessed at: http://www.bionet.nsw.gov.au/

Ward, S. J. 1990, 'Life History of the Eastern Pygmy-possum *Cercartetus nanus* (Burramyidae:Marsupalia), in south-eastern Australia', *Australian Journal of Zoology*, vol. 38, pp. 287-304.

Appendix A – Threatened species likelihood table

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
KINGDOM: Animalia; CLASS: Amphibia						
Heleioporus australiacus Giant Burrowing Frog	EPBC Act: V TSC Act: V	16	1.53km (1/01/1997)	23/10/2015 (1.64km)	Moderate	Moderate
Litoria aurea Green and Golden Bell Frog	EPBC Act: V TSC Act: E	2	1.53km (1/01/1997)	1/01/1997 (1.53km)	Low	Low
Pseudophryne australis Red-crowned Toadlet	TSC Act: V	59	1km (29/12/1995)	6/02/2016 (3.63km)	High	Moderate
KINGDOM: Animalia; CLASS: Aves						
Anthochaera phrygia Regent Honeyeater	EPBC Act: CE TSC Act: E	10	1.53km (1/01/1997)	18/06/2014 (3.04km)	Moderate	Low
Apus pacificus Fork-tailed Swift	EPBC Act: C, J, K	1	1.42km (18/02/2005)	18/02/2005 (1.42km)	Moderate	Moderate
Ardea ibis Cattle Egret	EPBC Act: C, J	5	1.53km (6/08/2003)	17/05/2014 (2.15km)	Low	Low
Artamus cyanopterus cyanopterus Dusky Woodswallow	TSC Act: V	1	3.53km (3/04/1993)	3/04/1993 (3.53km)	Low	Low
Botaurus poiciloptilus Australasian Bittern	EPBC Act: E TSC Act: E1	2	1.62km (6/07/2012)	6/07/2012 (1.62km)	Low	Low
Burhinus grallarius Bush Stone-curlew	TSC Act: E1	8	1.53km (1/01/1997)	18/12/2008 (4.89km)	Low	Low

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
Callocephalon fimbriatum Gang-Gang Cockatoo	TSC Act: V	2	1.7km (18/04/1992)	2/11/2004 (3.46km)	Moderate	Low
Calyptorhynchus lathami Glossy Black-Cockatoo	TSC Act: V	55	1.22km (1/01/1997)	5/04/2016 (3.6km)	High	Moderate
Daphoenositta chrysoptera Varied Sittella	TSC Act: V	5	2km (1/06/2012)	1/06/2012 (2km)	Low	Low
Gallinago hardwickii Latham's Snipe	EPBC Act: C, J K	1	2km (3/02/2016)	3/02/2016 (2km)	Moderate	Low
Glossopsitta pusilla Little Lorikeet	TSC Act: V	7	1.86km (3/09/2008)	18/06/2014 (3.04km)	Moderate	Moderate
Haliaeetus leucogaster White-bellied Sea-Eagle	TSC Act: V	29	1.06km (1/01/2007)	29/09/2015 (1.4km)	Moderate	Low
Hieraaetus morphnoides Little Eagle	TSC Act: V	7	1.81km (15/10/2013)	3/03/2015 (3.43km)	Moderate	Moderate
Hirundapus caudacutus White-throated Needletail	EPBC Act: C, J, K	7	1.57km (21/03/2007)	2/12/2013 (2.52km)	Moderate	Moderate
Ixobrychus flavicollis Black Bittern	TSC Act: V	13	1.06km (1.06km)	17/10/2014 (1.06km)	Moderate	Low
Lathamus discolor Swift Parrot	EPBC Act: CE TSC Act: E1	7	1.53km (1/01/1997)	24/05/2015 (3.71km)	Moderate	Low
Lophoictinia isura Square-tailed Kite	TSC Act: V	1	3.99km (3/05/2016)	3/05/2016 (3.99km)	Moderate	Recent Record
Melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	TSC Act: V	1	3.52km (1/08/2015)	1/08/2015 (3.52km)	Low	Low

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
Ninox connivens Barking Owl	TSC Act: V	13	1.9km (1/01/2013)	9/03/2014 (3.02km)	Moderate	Moderate
Ninox strenua Powerful Owl	TSC Act: V	127	0.61km (17/07/2016)	17/07/2016 (0.61km)	High	High
Pandion cristatus Eastern Osprey	TSC Act: V	15	1.06km (1/01/2008)	20/11/2012 (3.31km)	Moderate	Low
Tyto novaehollandiae Masked Owl	TSC Act: V	3	1.53km (1/01/1997)	22/05/2015 (3.93km)	Moderate	Low
Tyto tenebricosa Sooty Owl	TSC Act: V	2	3.59km (27/04/2012)	27/04/2012 (3.59km)	Low	Low
KINGDOM: Animalia; CLASS: Mammalia						
Cercartetus nanus Eastern Pygmy-possum	TSC Act: V	99	0.71km (21/01/2016)	21/01/2016 (0.71km)	High	Recent Record
Chalinolobus dwyeri Large-eared Pied Bat	TSC Act: V EPBC Act: V	9	1.13km (30/03/2012)	28/04/2016 (1.93km)	Moderate	Moderate
Dasyurus maculatus Spotted-tailed Quoll	TSC Act: V EPBC Act: E	12	0.88km (9/05/1993)	10/07/2014 (1.06km)	Moderate	Moderate
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern)	TSC Act: E1 EPBC Act: E	9	1.13km (19/04/2000)	7/05/2008 (3.63km)	Low	Low
Miniopterus australis Little Bentwing-bat	TSC Act: V	30	0.85km (22/11/2008)	28/04/2016 (2.82km)	High	Moderate
Miniopterus schreibersii oceanensis Eastern Bentwing-bat	TSC Act: V	79	0.69km (21/11/2008)	28/04/2016 (1.93km)	High	High

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
Mormopterus norfolkensis Eastern Freetail-bat	TSC Act: V	6	1.53km (1/01/1997)	28/04/2016 (1.93km)	Moderate	Moderate
Myotis macropus Southern Myotis	TSC Act: V	31	0.95km (7/02/2013)	28/04/2016 (2.82km)	Moderate	Moderate
Pteropus poliocephalus Grey-headed Flying-fox	TSC Act: V	42	1.06km (22/05/2003)	5/02/2016 (2km)	High	Moderate
Scoteanax rueppellii Greater Broad-nosed Bat	TSC Act: V	4	1.12km (3/03/1996)	20/01/2012 (2.67km)	Low	Low
Petaurus norfolcensis Squirrel Glider	TSC Act: V	1	2.22km (1/01/1997)	1/01/1997 (2.22km)	Low	Low
KINGDOM: Animalia; CLASS: Reptilia						
Varanus rosenbergi Rosenberg's Goanna	TSC Act: V	75	0.87km (31/10/2004)	28/01/2016 (2.26km)	High	Recent record
KINGDOM: Plantae						
Acacia terminalis subsp. *terminalis* Sunshine Wattle	EPBC Act: E TSC Act: E1	1	4.71km (12/08/2002)	12/08/2002 (4.71km)	Low	Low
Callistemon linearifolius Nettled Bottle Brush	TSC Act: V	3	1.07km (6/03/1992)	26/09/2014 (1.95km)	Moderate	Low
Chamaesyce psammogeton Sand Spurge	TSC Act: E1	2	3.23km (31/03/2009)	31/03/2009 (3.23km)	Low	Low
Epacris purpurascens var. *purpurascens*	TSC Act: V	4	0.92km (20/10/1994)	14/02/2000 (4.57km)	Low	Moderate

Scientific Name Common Name	Legal Status	Number of records	Closest record and date	Most recent and proximity	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
Eucalyptus camfieldii Camfield's Stringybark	TSC Act: V EPBC Act: V	10	1.84km (30/05/1997)	9/10/2010(3.43km)	Low	Low
Grevillea caleyi Caley's Grevillea	TSC Act: E4A EPBC Act: E	423	1.83km (14/02/2000)	7/06/2016 (4.74)	High	Low
Microtis angusii Angus's Onion Orchid	TSC Act: E1 EPBC Act: E	81	2.11km (25/09/2014)	26/09/2014 (2.3km)	High	Low
Persoonia hirsuta Hairy Geebung	TSC Act: E1 EPBC Act: E	24	3.77km (27/09/2011)	19/04/2007 (4.81km)	Moderate	Low
Pimelea curviflora var. *curviflora*	TSC Act: V EPBC Act: V	17	1.84km (7/09/1995)	15/12/2011 (4.26km)	Moderate	Low
Prostanthera marifolia Seaforth Mintbush	EPBC Act: CE TSC Act: E4A	1	4.29km (3/10/2002)	3/10/2002 (4.29km)	Low	Low
Syzygium paniculatum Magenta Lilly Pilly	TSC Act: E EPBC Act: V	6	1.53km (24/10/2012)	24/10/2012 (1.53km)	Low	Low
Tetratheca glandulosa	TSC Act: V	73	1.03km (5/12/2004)	15/11/2011 (4.19km)	High	Moderate

Appendix B – Flora

Family	Scientific name	Common name	Native/Exotic	Growth form
Apiaceae	*Actinotus minor*	Lesser Flannel Flower	Native	Forb
Apiaceae	*Centella asiatica*	Pennywort	Native	Forb
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	Exotic	Forb
Apiaceae	*Hydrocotyle bonariensis*	Kurnell Curse	Native	Forb
Apiaceae	*Platysace linearifolia*		Native	Shrub
Apiaceae	*Xanthosia pilosa*		Native	Forb
Apiaceae	*Xanthosia tridentata*		Native	Forb
Apocynaceae	*Araujia sericifera*	Moth Vine	Exotic	Climber/scrambler
Araceae	*Zantedeschia aethiopica*	Arum Lily	Exotic	Forb
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax	Native	Shrub
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	Exotic	Forb
Asteraceae	*Ageratina adenophora*	Crofton Weed	Exotic	Shrub
Asteraceae	*Ageratina riparia*	Mist Flower	Exotic	Shrub
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	Exotic	Forb
Asteraceae	*Cirsium vulgare*	Spear Thistle	Exotic	Forb
Asteraceae	*Conyza bonariensis*	Fleabane	Exotic	Forb
Asteraceae	*Cotula australis*	Common Cotula	Native	Forb
Asteraceae	*Gamochaeta* sp.		Exotic	Forb
Asteraceae	*Sonchus asper*		Exotic	Forb
Asteraceae	*Tagetes minuta*	Stinking Roger	Exotic	Forb
Brassicaceae	*Cardamine hirsuta*	Common Bittercress	Exotic	Forb
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	Exotic	Climber/scrambler

Family	Scientific name	Common name	Native/Exotic	Growth form
Caryophyllaceae	*Cerastium glomeratum*	Mouse-ear Chickweed	Exotic	Forb
Casuarinaceae	*Allocasuarina distyla*	Scrub She-oak	Native	Shrub
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	Native	Small tree
Commelinaceae	*Commelina cyanea*		Native	Forb
Cunoniaceae	*Callicoma serratifolia*	Black Wattle	Native	Small tree
Cyperaceae	*Caustis flexuosa*	Curly Wig	Native	Rush
Cyperaceae	*Caustis pentandra*	Thick Twist Rush	Native	Rush
Cyperaceae	*Cyathochaeta diandra*		Native	Graminoid
Cyperaceae	*Cyperus eragrostis*		Exotic	Sedge
Cyperaceae	*Lepidosperma laterale*		Native	Sedge
Cyperaceae	*Schoenus imberbis*	Beardless Bogrush	Native	Rush
Cyperaceae	*Schoenus melanostachys*	Black Bog-rush	Native	Rush
Dilleniaceae	*Hibbertia linearis*		Native	Shrub
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash	Native	Small tree
Elaeocarpaceae	*Tetratheca ericifolia*		Native	Forb
Ericaceae - Epacridoideae	*Epacris longifolia*	Fuschia Heath	Native	Shrub
Ericaceae - Epacridoideae	*Epacris microphylla*	Coral Heath	Native	Shrub
Ericaceae - Epacridoideae	*Styphelia longifolia*	Long-leaf Styphelia	Native	Shrub
Ericaceae - Epacridoideae	*Woollsia pungens*		Native	Shrub
Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart	Native	Shrub
Fabaceae - Caesalpinioideae	*Senna pendula var. glabrata*		Exotic	Shrub
Fabaceae - Faboideae	*Dillwynia floribunda*		Native	Shrub
Fabaceae - Faboideae	*Dillwynia retorta*		Native	Shrub
Fabaceae - Faboideae	*Glycine microphylla*		Native	Climber/scrambler

Family	Scientific name	Common name	Native/Exotic	Growth form
Fabaceae - Faboideae	*Gompholobium grandiflorum*	Large Wedge Pea	Native	Shrub
Fabaceae - Faboideae	*Kennedia rubicunda*	Dusky Coral Pea	Native	Climber/scrambler
Fabaceae - Faboideae	*Mirbelia rubifolia*	Heathy Mirbelia	Native	Forb
Fabaceae - Faboideae	*Phyllota grandiflora*	Heath Phyllota	Native	Shrub
Fabaceae - Faboideae	*Pultenaea stipularis*	Handsome Bush Pea	Native	Shrub
Fabaceae - Faboideae	*Zornia dyctiocarpa*	Zornia	Native	Forb
Fabaceae - Mimosoideae	*Acacia elata*		Native	Small tree
Fabaceae - Mimosoideae	*Acacia longifolia* subsp. *longifolia*	Sydney Golden Wattle	Native	Shrub
Fabaceae - Mimosoideae	*Acacia oxycedrus*	Spike Wattle	Native	Shrub
Fabaceae - Mimosoideae	*Acacia parramattensis*	Parramatta Wattle	Native	Small tree
Fabaceae - Mimosoideae	*Acacia saligna*	Golden Wreath Wattle	Exotic	Shrub
Fabaceae - Mimosoideae	*Acacia suaveolens*	Sweet Wattle	Native	Shrub
Fabaceae - Mimosoideae	*Acacia terminalis*		Native	Shrub
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses	Native	Shrub
Gentianaceae	*Centaurium erythraea*	Common Centaury	Exotic	Forb
Goodeniaceae	*Dampiera stricta*		Native	Forb
Haloragaceae	*Gonocarpus teucrioides*		Native	Forb
Iridaceae	*Patersonia sericea*	Silky Purple-flag	Native	Forb
Lauraceae	*Cassytha pubescens*		Native	Climber/scrambler
Lindsaeaceae	*Lindsaea linearis*	Screw Fern	Native	Fern
Loganiaceae	*Mitrasacme polymorpha*		Native	Forb
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*		Native	Graminoid
Lomandraceae	*Lomandra glauca*	Pale Mat-rush	Native	Graminoid
Lomandraceae	*Lomandra longifolia*	Spiny-headed Matt-rush	Native	Graminoid

Family	Scientific name	Common name	Native/Exotic	Growth form
Lomandraceae	*Lomandra obliqua*		Native	Graminoid
Lomariopsidaceae	*Nephrolepis cordifolia*	Fishbone Fern	Exotic	Fern
Malvaceae	*Brachychiton acerifolius*	Flame Tree	Native	Small tree
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	Exotic	Forb
Moraceae	*Morus alba*	Mulberry	Exotic	Small tree
Myrsinaceae	*Anagallis arvensis*	Scarlet Pimpernel	Exotic	Forb
Myrtaceae	*Angophora costata*	Smooth-barked Apple	Native	Tree
Myrtaceae	*Angophora hispida*	Dwarf Apple	Native	Small tree
Myrtaceae	*Corymbia gummifera*	Red Bloodwood	Native	Tree
Myrtaceae	*Eucalyptus globoidea*	White Stringybark	Native	Tree
Myrtaceae	*Eucalyptus punctata*	Grey Gum	Native	Tree
Myrtaceae	*Eucalyptus racemosa*	Narrow-leaved Scribbly Gum	Native	Tree
Myrtaceae	*Kunzea ambigua*	Tick Bush	Native	Shrub
Myrtaceae	*Leptospermum laevigatum*	Coast Tea-tree	Native	Small tree
Myrtaceae	*Leptospermum polygalifolium* subsp. *polygalifolium*		Native	Small tree
Myrtaceae	*Leptospermum squarrosum*	Peach Blossom Tea-tree	Native	Shrub
Ochnaceae	*Ochna serrulata*	Micky Mouse Plant	Exotic	Shrub
Oleaceae	*Ligustrum lucidum*	Large-leaved Privett	Exotic	Small tree
Orchidaceae	*Calochilus campestris*	Copper Beard Orchid	Native	Forb
Orchidaceae	*Cryptostylis subulata*	Large Tongue Orchid	Native	Forb
Passifloraceae	*Passiflora subpeltata*	White Passionfruit	Exotic	Climber/scrambler
Phormiaceae	*Dianella caerulea var. producta*		Native	Graminoid
Phyllanthaceae	*Glochidion ferdinandi var. ferdinandi*	Cheese Tree	Native	Small tree
Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry	Native	Climber/scrambler

Family	Scientific name	Common name	Native/Exotic	Growth form
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	Native	Small tree
Pittosporaceae	*Rhytidosporum procumbens*		Native	Forb
Poaceae	*Anisopogon avenaceus*	Oat Speargrass	Native	Grass
Poaceae	*Cynodon dactylon*	Couch Grass	Exotic	Grass
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	Exotic	Grass
Poaceae	*Entolasia stricta*	Wiry Panic	Native	Grass
Poaceae	*Imperata cylindrica*	Blady Grass	Native	Grass
Poaceae	*Poa affinis*		Native	Grass
Poaceae	*Setaria italica*	Foxtail Millet	Exotic	Grass
Proteaceae	*Banksia ericifolia* subsp. *ericifolia*	Heath-leaved Banksia	Native	Small tree
Proteaceae	*Banksia oblongifolia*	Fern-leaved Banksia	Native	Shrub
Proteaceae	*Banksia serrata*	Old Man Banksia	Native	Small tree
Proteaceae	*Banksia spinulosa*		Native	Shrub
Proteaceae	*Grevillea buxifolia* subsp. *buxifolia*	Grey Spider Flower	Native	Shrub
Proteaceae	*Grevillea linearifolia*	Linear-leaf Grevillea	Native	Shrub
Proteaceae	*Grevillea speciosa*	Red Spider Flower	Native	Shrub
Proteaceae	*Hakea dactyloides*	Broad-leaved Hakea	Native	Shrub
Proteaceae	*Hakea teretifolia*	Needlebush	Native	Shrub
Proteaceae	*Isopogon anethifolius*	Narrow-leaf Drumsticks	Native	Shrub
Pteridaceae	*Pteridium esculentum*	Bracken Fern	Native	Fern
Restionaceae	*Empodisma minus*	Wire Rush	Native	Rush
Restionaceae	*Lepyrodia scariosa*		Native	Rush
Rhamnaceae	*Pomaderris intermedia*		Native	Shrub
Rubiaceae	*Opercularia* sp.		Native	Forb

Family	Scientific name	Common name	Native/Exotic	Growth form
Rutaceae	*Boronia pinnata*		Native	Shrub
Rutaceae	*Phebalium squamulosum* subsp. *squamulosum*	Forest Phebalium	Native	Shrub
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop Bush	Native	Shrub
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	Native	Climber/scrambler
Solanaceae	*Solanum chenopodioides*	Whitetip Nightshade	Exotic	Forb
Solanaceae	*Solanum mauritianum*	Wild Tobacco	Exotic	Shrub
Verbenaceae	*Verbena bonariensis*	Purpletop	Exotic	Forb
Vitaceae	*Cayratia clematidea*	Native Grape	Native	Climber/scrambler
Xanthorrhoeaceae	*Xanthorrhoea media*	Grass Tree	Native	Xanthorrhoea