ecoplanning

ecology | planning | offsets

Biodiversity Development Assessment Report (BDAR)

Lot 1 // DP 1151370; 1 Sirius Road, Lane Cove West, NSW, 2066

Proposed multi-storey data centre

Prepared for: A W Edwards Pty Ltd on behalf of Greenbox Architecture

10 September 2020

PROJECT NUMBER	2018 - 225			
PROJECT NAME	Biodiversity Development Assessment Report (BDAR) – 1 Sirius Road, Lane Cove West, NSW			
PROJECT ADDRESS	Lot 1 // DP 1151370, 1 Sirius Road, Lane Cove West, NSW			
PREPARED FOR	A W Edwards Pty Ltd on behalf of Greenbox Architecture			
AUTHOR/S	Tammy Paartalu, Tom Hickman, Darren James and Kieren Northam			
REVIEW	**Technical**	**QA**	**Version**	**Date to Client**
	Bruce Mullins, Tammy Paartalu and Brian Towle		1.0 – Draft	18 December 2018
			1.0 – Final	20 December 2018
			2.0 – Draft/Final	04 July 2019
			3.0 – Draft/Final	14 August 2019
			4.0 – Draft/Final	27 August 2019
			5.0 - Draft/Final	10 September 2020
ACKNOWLEDGEMENTS				
BDAR CERTIFICATION	This BDAR has been prepared by Tammy Paartalu, Accredited Assessor no. BAAS17055, in accordance with the BC Act, Reg and BAM.		Tammy Paartalu	

LICENCES	**Scientific Licence**	**SL101557**
	Bionet Sensitive Species Data Licence	1115
	Animal Research Authority Ethics Licence	Fauna Surveys and Monitoring (16/346)
	Scientific Collection - Aquatic	P19/0009-1.0 & OUT19/2602

This report should be cited as: *Ecoplanning (2020). Biodiversity Development Assessment Report – Lot 1 // DP 1151370, 1 Sirius Road, Lane Cove West, NSW, 2066 (v5.0). Prepared for A W Edwards Pty Ltd on behalf of Greenbox Architecture.*

ECOPLANNING PTY LTD | 74 HUTTON AVE BULLI NSW 2516 | M: 0421 603 549

Contents

Figures

Tables

Glossary and abbreviations

Acronym	Description
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Methodology
BC Act	NSW *Biodiversity Conservation Act 2016*
BC Reg	*Biodiversity Conservation Regulation 2017*
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
CBD	Central Business District
CESDF	Coastal Enriched Sandstone Dry Forest
DoEE	Commonwealth Department of the Environment and Energy
DPE	Department of Planning and Environment (DPE)
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	hectare(s)
IBRA	Interim Bioregionalisation of Australia
km	kilometre
LCLEP	Lane Cove Local Environmental Plan
LGA	Local Government Area
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PCT	Plant community type, as defined by OEH (2018)
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TEC	Threatened Ecological Community, listed as vulnerable, endangered or critically endangered under either the BC Act and/or EPBC Act
ToB	Top of Bank
VMP	Vegetation Management Plan
*	Denotes exotic species

1. Introduction

1.1 Background

Greenbox Architecture (the Applicant) is proposing to develop a data centre at Lot 1 // DP 1151370, 1 Sirius Road, Lane Cove West, New South Wales (NSW) (the 'subject land'). The proposal consists of the construction of a multi-storey data centre development with ancillary office premises. The subject land is approximately 3.95 hectares (ha) and is located approximately 9 kilometres (km) north west of the Sydney Central Business District (CBD) on the Lower North Shore of Sydney (**Figure 1.1**).

The project is a State Significant Development (SSD). As such, Secretary's Environmental Assessment Requirements ('SEARs'; SSD 9741) have been issued for the project, which require that biodiversity impacts related to the proposed development are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2017 (BC Act) using the Biodiversity Assessment Method (BAM OEH 2017a) and documented in a Biodiversity Development Assessment Report (BDAR), having regard to the NSW Biodiversity Offsets Scheme (BOS).

As such, this report has been prepared to address the SEARs issued by the Department of Planning and Environment (DPE) in accordance with the BAM (OEH 2017a) and documented in a BDAR in the form required by Section 6.12 of the BC Act and Section 6.8 of the *Biodiversity Conservation Regulation 2017* (BC Reg). This BDAR has been prepared by Tammy Paartalu, an Accredited Assessor (BAAS17055) in accordance with the BC Act and BC Reg. This BDAR describes the outcome of the development assessment case (00013369/BAAS17055/18/00013370) conducted consistent with the BAM.

1.2 Location and site identification

The subject land for this BDAR covers a total area of approximately 3.95 ha and covers a majority of Lot 1 // DP 1151370, 1 Sirius Road, Lane Cove West, NSW 2066. The subject land is situated in the Lane Cove Local Government Area (LGA) and is zoned under Lane Cove Local Environmental Plan 2009 (LCLEP) as IN2 - Light Industrial.

The subject land is situated approximately 9 km north west of the Sydney CBD and 3 km west of Chatswood (**Figure 1.1**). Most of the subject land is cleared of vegetation and consists of exotic grasses and significant weed cover. Two patches of native vegetation are identified within the subject land and are situated in the north eastern corner and along the southern boundary (**Figure 1.2**). Stringybark Creek lies directly to the north of the subject land, with the Lane Cove River approximately 40 m north west of the subject land.

1.3 Proposed development

The proposal consists of the construction of a multi-storey data centre with ancillary office premises (**Figure 1.3**). Access to the site is off Sirius Road and several external parking areas will be situated along the southern perimeter of the data centre. A 4 m wide fire trail and associated turning heads are proposed to run along the northern portion of Lot 1 // DP 1151370. Retained areas within Lot 1 // DP 1151370 will be rehabilitated in accordance with the Vegetation Management Plan for the subject land (Travers Bushfire & Ecology 2019a). This will include weed control within the Asset Protection Zones (APZ) and assisted natural regeneration and revegetation in the retained bushland in the north east and south of the subject land. The irregularly shaped piece of land in the north of the subject land will be revegetated with native indigenous species to assist in visual screening of the proposal.

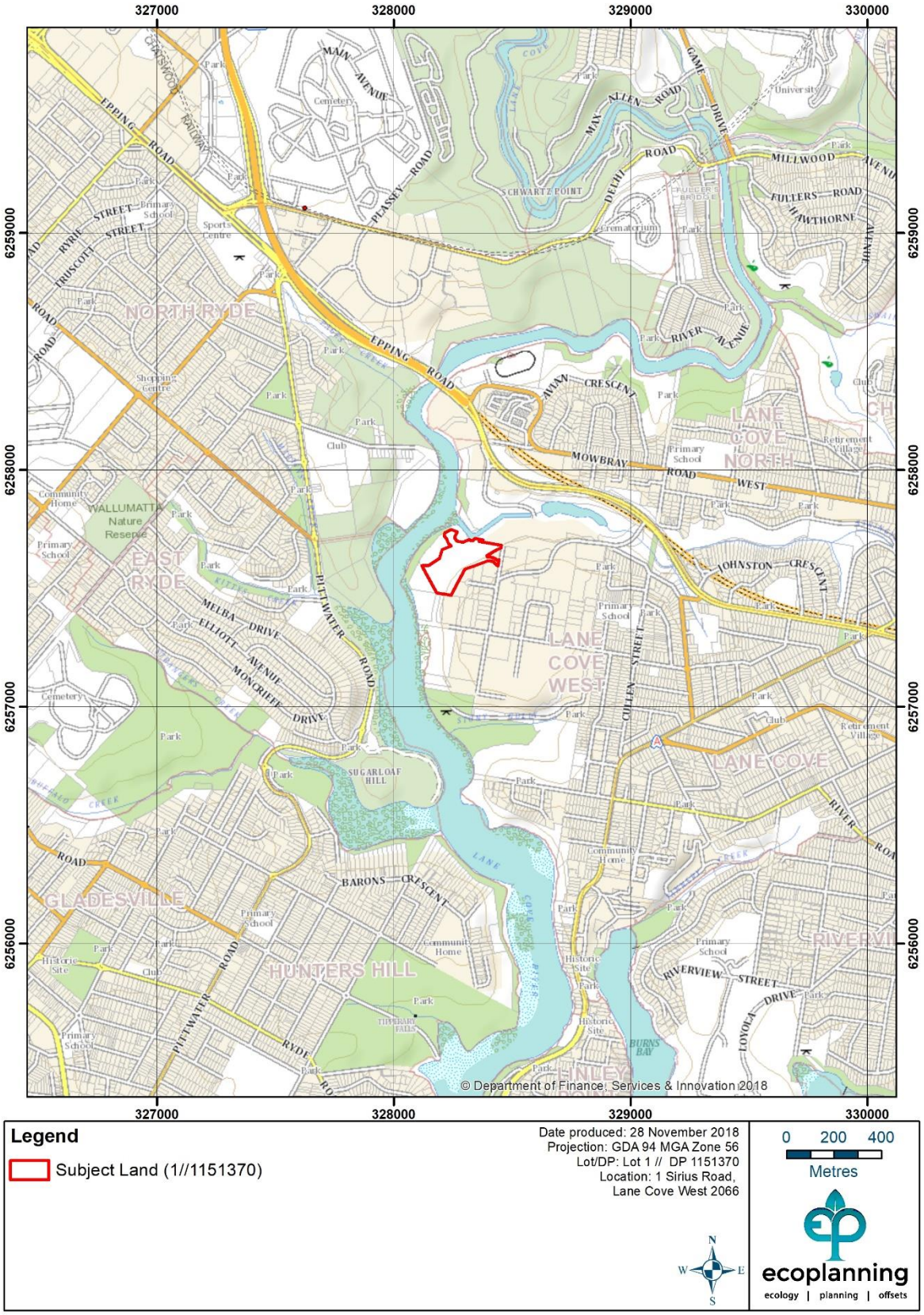

Figure 1.1: Subject land location.

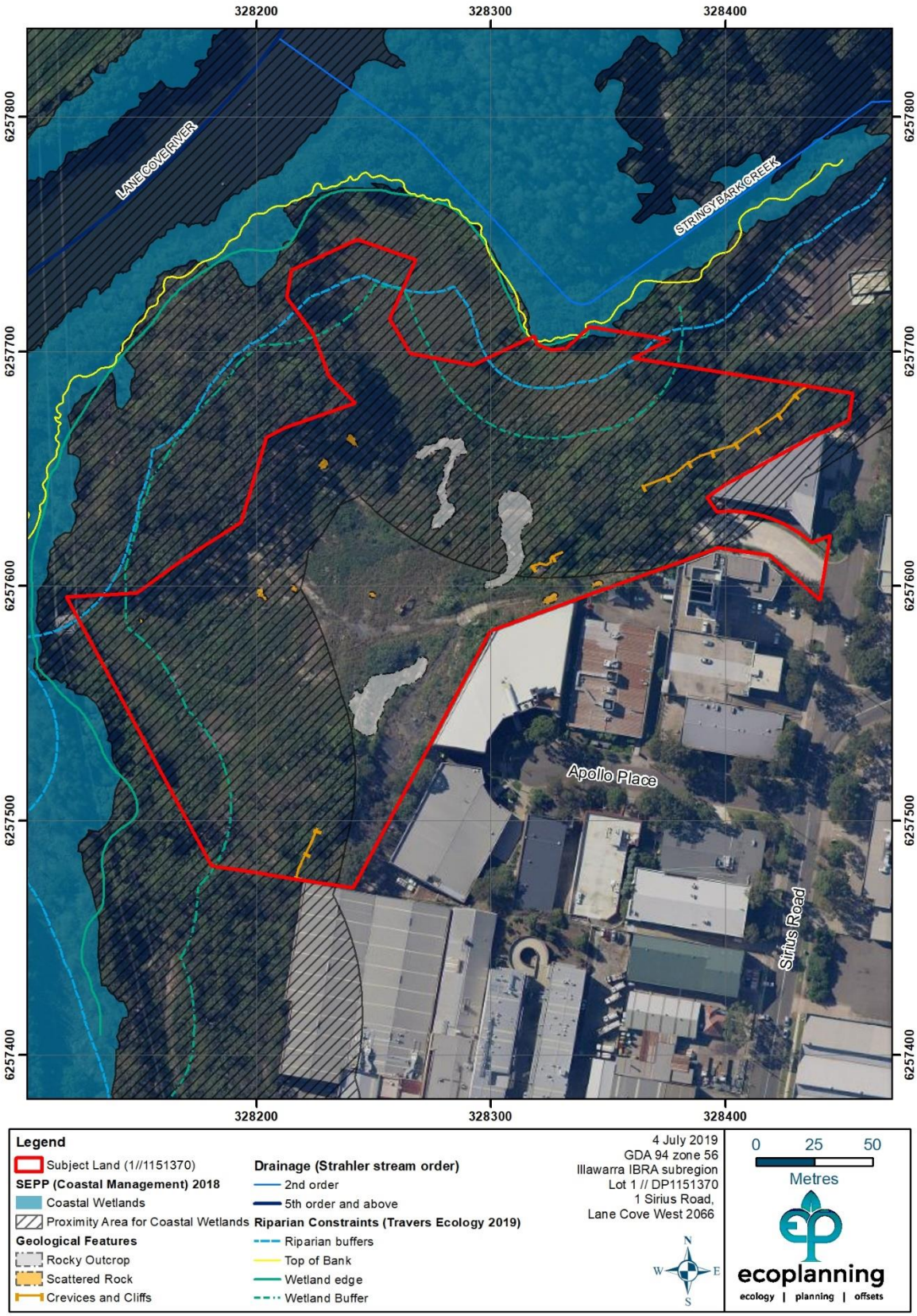

Figure 1.2: Site map.

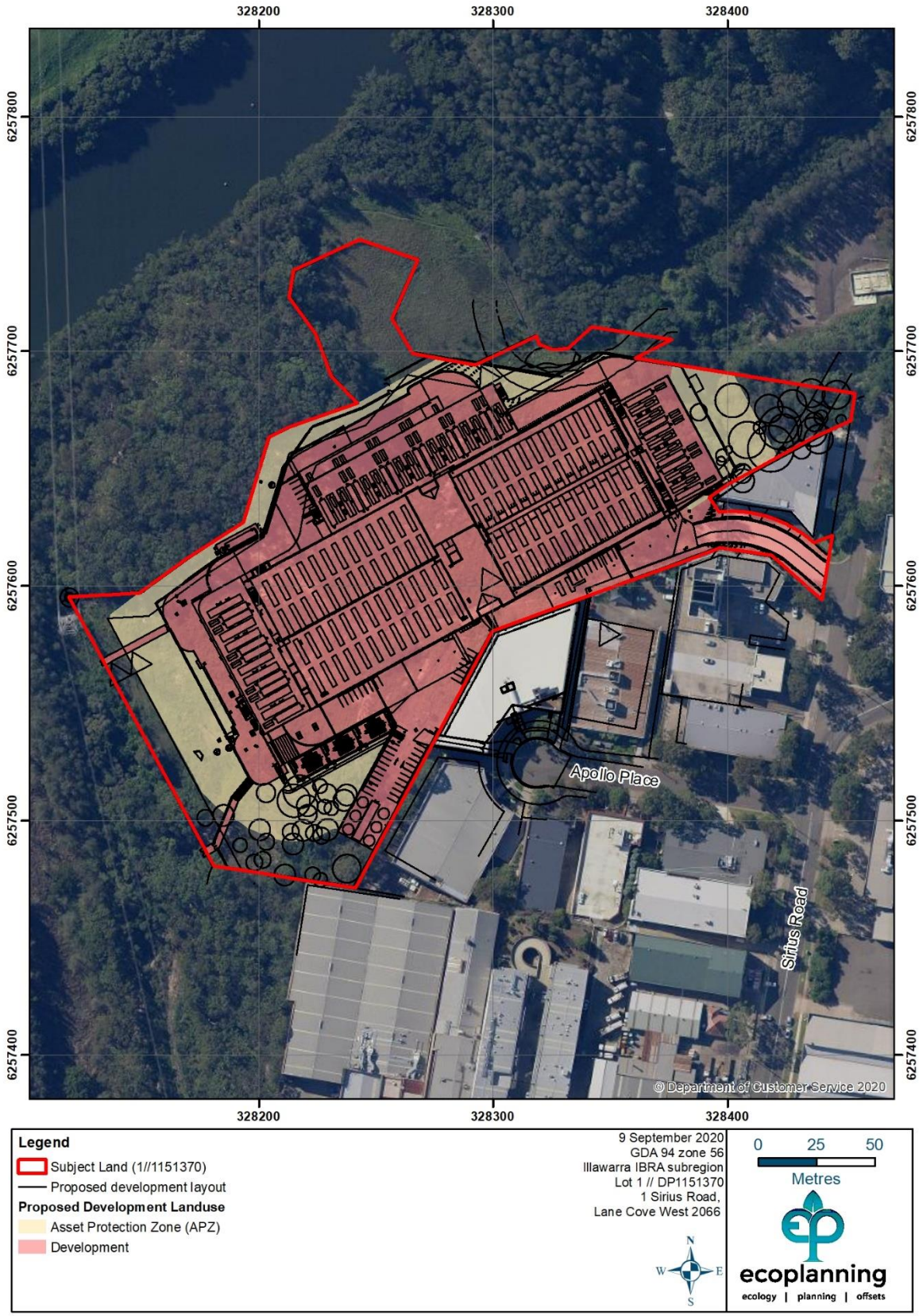

Figure 1.3: Proposed development footprint.

2. Landscape context

2.1 Identify landscape features

In accordance with the BAM, a number of features are assessed within and surrounding the subject land and a 1,500 m buffer around the subject land. These landscape features are used to identify biodiversity values that are important for the subject land and inform the habitat suitability of the subject land for threatened species. Other features, such as rivers, streams, estuaries and wetlands, habitat connectivity, karst areas or areas of outstanding biodiversity value are considered, where appropriate.

2.1.1 IBRA bioregions and IBRA subregions

Interim Biogeographic Regionalisation of Australia (IBRA, DoEE 2012) represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna species present. The subject land is located entirely within the Pittwater subregion (version 7) and within the NSW Sydney Basin IBRA region (version 7).

2.1.2 NSW landscape regions (Mitchell Landscapes)

The subject land occurs in wholly in the '*Port Jackson Basin*' NSW Mitchell Landscape (Mitchell Landscapes V3.1) (**Figure 2.1**). This Mitchell Landscape was entered into the BAM calculator.

2.1.3 Other features

Rivers, streams and estuaries

No drainage lines are mapped within the subject land, although a second order drainage line is mapped directly to the north of the subject land (Stringybark Creek) and the buffer for this drainage line lies within the subject land (**Figure 1.2**). Lane Cove River (a fifth order stream) lies to the west of the subject land. A site assessment to confirm Top of Bank (ToB) and the edge of wetlands has been conducted for Lane Cove River and Stringybark Creek (Travers Bushfire and Ecology 2019) (**Figure 1.2**). The revised mapping and application of riparian buffers is in accordance with the Natural Resource Access Regulator (2018) *Guidelines for controlled activities on Waterfront Land – Riparian Corridors*. The analysis showed that the riparian buffer for Lane Cove River extends into the northern portion of the subject land.

Other tributaries of Lane Cove River are present within the 1,500 m buffer. These include a number of first order streams including Pages Creek, Martins Creek, Strangers Creek and Stony Gully. Two second order streams are also present, which include Kittys Creek and Buffalo Creek. The riparian buffers associated with Lane Cover River and Stringybark Creek (and the other streams in the 1,500 m buffer), calculated in accordance with Appendix 3 of the BAM, are shown in (**Figure 2.1**)

Local and important wetlands

The subject land includes areas mapped as Coastal Wetlands and Proximity Areas for Coastal Wetlands in accordance with the State Environmental Planning Policy (SEPP) (Coastal Management) 2018 (**Figure 1.2** and **Figure 2.1**). SEPP (Coastal Management) 2018 includes the former SEPP 14 (Coastal Wetlands), which is defined as an 'important wetland' in accordance with the BAM.

Habitat connectivity

The subject land is well connected to vegetation both within, and outside of the 1,500 m buffer (**Figure 2.1**). The major connectivity is provided by vegetation adjacent to Lane Cove River, with a largely contiguous (although narrow in places) vegetated corridor extending north and south along the river edges. To the north a vegetated corridor is present to Lane Cove River National Park, while a discontinuous corridor extends approximately 1,500 m to the south of the site with existing urban development encroaching on the habitat corridor.

A vegetated corridor also exists to the east, along Stringybark Creek. This corridor is significantly impeded by the M2 Motorway, and extends approximately 2 km from the subject land.

Areas of geological significance and soil hazard features

The subject land contains areas of geological significance, including exposed Hawkesbury Sandstone outcropping, boulders and minor cliff development. The subject land contains areas of soil hazard features. A portion of land in the north of the subject land has been identified as a potential source of contamination (**Figure 2.2**). Acid Sulphate Soils risk mapping identifies an area of high risk adjacent to the subject land to the north (**Figure 2.2**).

Areas of outstanding biodiversity value

The subject land does not include any areas of outstanding biodiversity value as defined under the BC Act.

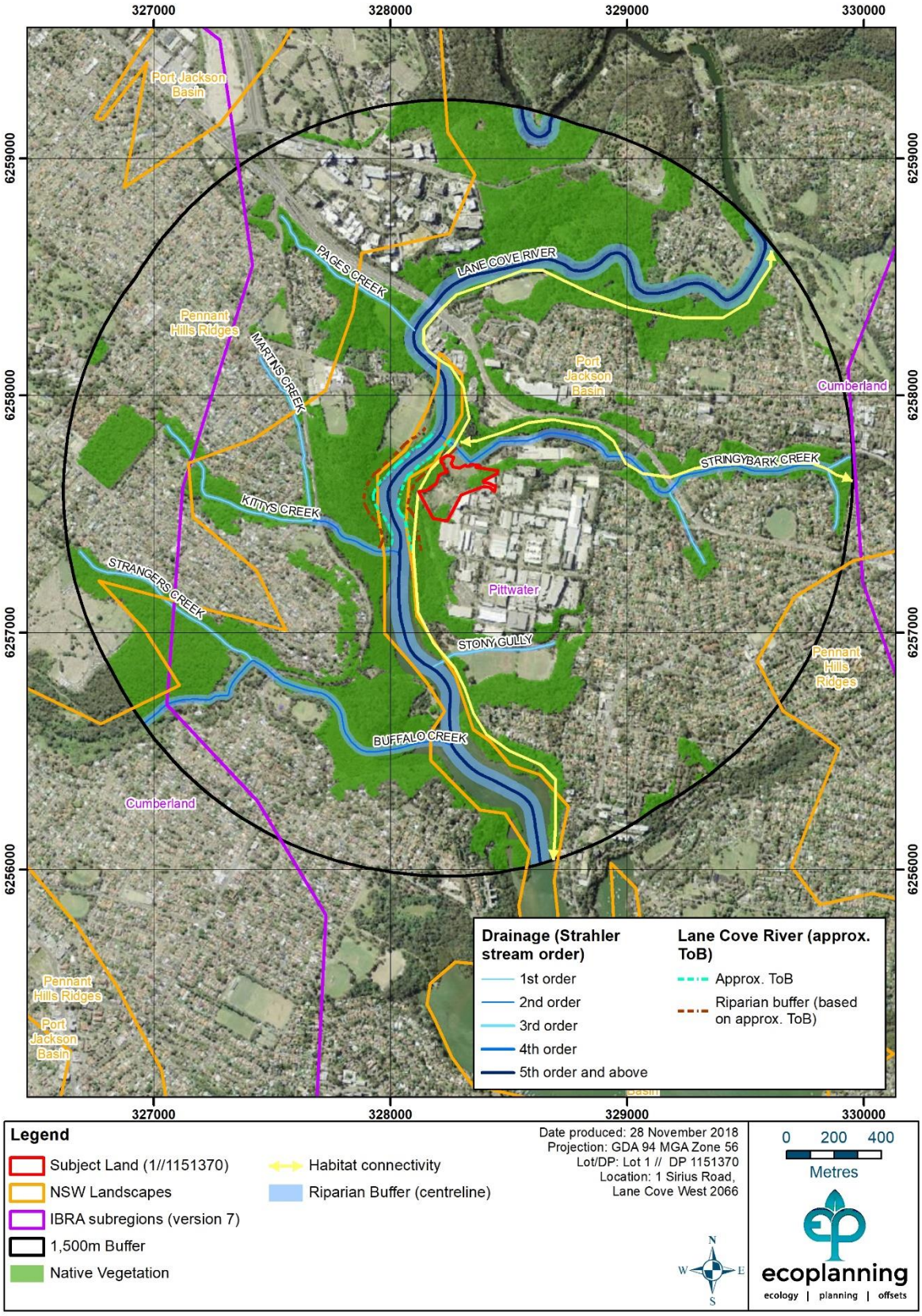

Figure 2.1: Location map.

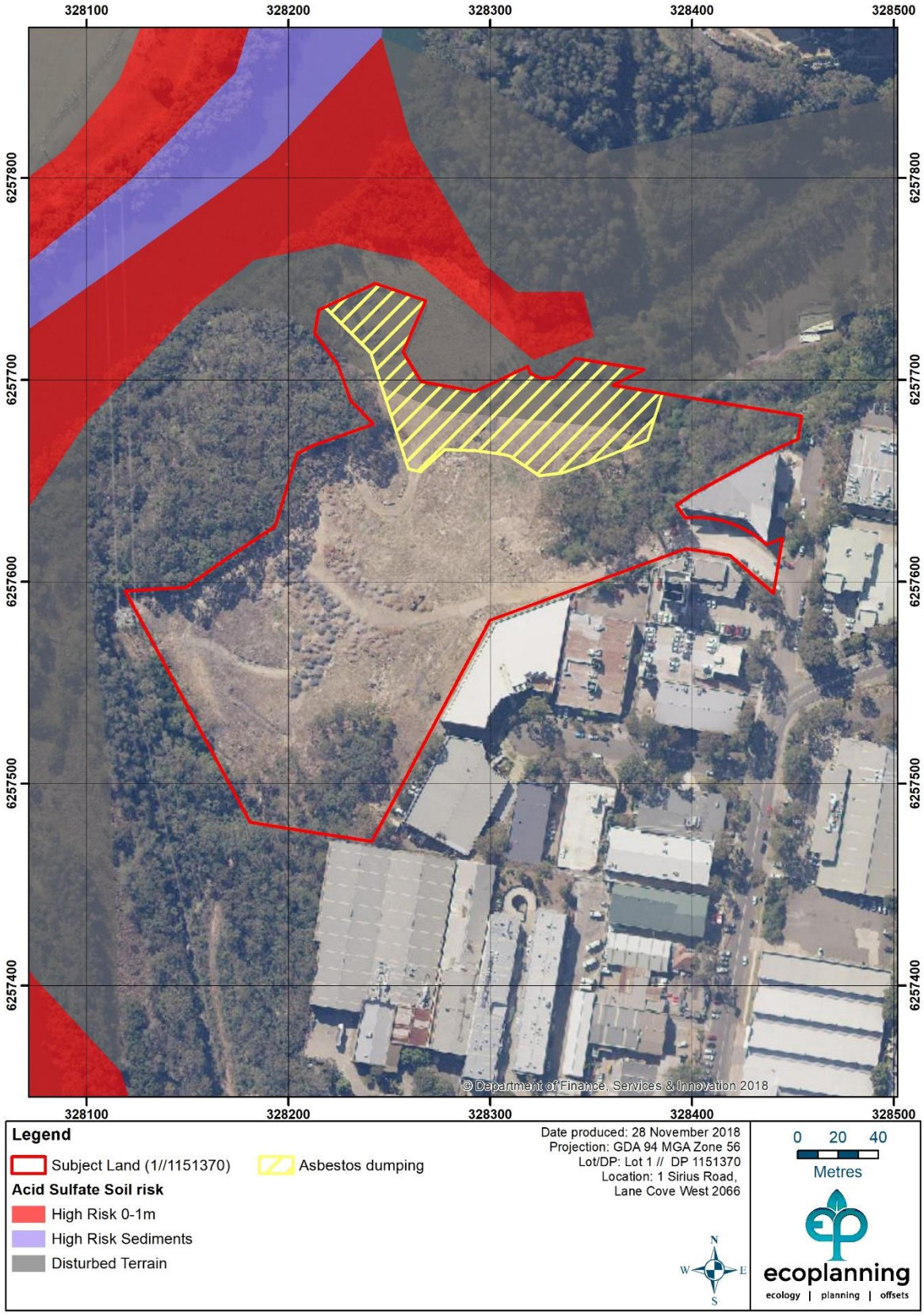

Figure 2.2: Acid sulphate soils risk and potential areas of contamination.

2.2 Determining site context

2.2.1 Assessing native vegetation cover

A layer of native vegetation cover is required for a 1,500 m buffer around the subject land to determine the context of the site. The extent of native vegetation on the subject land and immediate surrounds was mapped using the OEH (2016) as a base, with edits made to the layer where obvious changes to vegetation extent had occurred **Figure 2.1**.

The total area of the 1,500 m buffer around the subject land is 852.4 ha, with the area of vegetation mapped within the buffer being 245.98 ha. This is a native vegetation cover of 28.9% (10-30% class as defined in s4.3.2 of the BAM) and this value was entered into the BAM calculator.

2.2.2 Assessing patch size

Patch size as defined by the BAM as *'an area of native vegetation that:*

> *a) occurs on the development site or biodiversity stewardship site, and*
>
> *b) includes native vegetation that has a gap of less than 100m from the next area of moderate to good condition native vegetation (or ≤30m for non-woody ecosystems).*

Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site.'

In assessing patch size, stands of native vegetation within 100 m (where in a moderate to good condition) but that are separated by hard barriers, including permanent artificial structures, wide roads or other barriers, have been treated as separate patches. These highly modified breaks in vegetation connectivity would significantly alter ecological function of these areas of native vegetation such that these areas warrant recognition as separate patches.

Patch size was calculated for the vegetation on the development site using the field validated map of vegetation types identified and the updated native vegetation extent data layer prepared for the 1,500 m buffer (based on OEH 2016a). Patch size is required to be assessed as one of four classes per vegetation zone mapped, being <5 ha, 5-24 ha, 25-100 ha or >100 ha.

The woody patches of vegetation in the subject land are connected to larger areas of woody vegetation off-site, including to significant connected patches along Lane Cover River and Stringybark Creek (**Figure 2.1**). Therefore, due to the size of these connected patches, the largest patch size (>100 ha) was used for this assessment.

3. Native vegetation

3.1 Plant community types (PCTs) and threatened ecological communities

3.1.1 Regional vegetation mapping

Desktop assessment determined the subject land to contain a number of vegetation communities (OEH 2016a) (**Figure 3.1**), including:

- Coastal Enriched Sandstone Dry Forest (S_DSF04)
- Coastal Sandstone Foreshores Forest (S_DSF06)
- Estuarine Mangrove Forest (S_SW02)
- Coastal Shale-Sandstone Forest (S_WSF06)

Coastal Sandstone Foreshores Forest and Coastal Enriched Sandstone Dry Forest are mapped in the elevated areas along the eastern and southern portions of the subject land. Coastal Shale-Sandstone Forest is mapped within the central portion of the subject land and along the north western boundary. A small amount of Estuarine Mangrove Forest is mapped along the north eastern perimeter of the subject land adjacent to Stringybark Creek. Additional vegetation communities mapped adjacent to the subject land included Estuarine Swamp Oak Forest (S_FoW08) and Estuarine Mangrove Forest (S_SW01), which occur adjacent to the Lane Cove River.

The vegetation communities mapped by OEH (2016) in the subject land do not correspond with any Threatened Ecological Communities (TECs) listed under the BC Act or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Some stands of Coastal Shale-Sandstone Forest (S_WSF06) are described as a variant of the '*Duffys Forest Ecological Community in the Sydney Basin Bioregion'*, an Endangered Ecological Community (EEC) under the BC Act (OEH 2016). However, the species list in the determination for Duffys Forest Ecological Community (NSW SC 2002) does not encompass characteristic species that occur in Coastal Shale-Sandstone Forest, hence, it is not considered a component of the EEC. Furthermore, Duffys Forest Ecological Community has been primarily reported from the Warringah, Pittwater, Ku-ring-gai, Hornsby and Manly LGAs (NSW SC 2002).

Estuarine Swamp Oak Forest (S_FoW08) comprises an EEC under the EPBC Act and the BC Act, namely '*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions'*. This community has not been mapped to occur within the subject land by OEH (2016) or Tozer et al. (2006). Regional vegetation mapping by Tozer et al. (2006) has mapped the subject land to contain Hinterland Sandstone Gully Forest (DSF p.142) (**Figure 3.2**).

3.1.2 Field assessment of vegetation communities

Assessment and mapping of PCTs was undertaken on 14 November 2018 and 6 December 2018 by Tammy Paartalu (Senior Ecologist) and Thomas Hickman (Ecologist). The subject land was traversed to identify the vegetation structure and dominant species within patches of native vegetation. The entire distribution of each patch of vegetation was traversed to sample any spatial variation within each polygon, identify boundaries between vegetation communities

and to identify and map vegetation zones (variation in the broad condition state of vegetation polygons) in accordance with the BAM.

Based upon traverses of the subject land, vegetation communities present were identified, and their boundaries were mapped. The floristics of each of these vegetation communities were then sampled within 20x20 m plot-based floristic vegetation surveys, consistent with Section 5.2.1.9 of the BAM. These are also the location of vegetation integrity plots in accordance with Section 5.3 of the BAM. The location of floristic vegetation plots were based upon randomly sampled areas of each vegetation community, whilst ensuring that the plot-based surveys included representative areas within each community and avoided, where possible, edge effects (i.e. located close to edges of vegetation extent) or ecotones with adjacent vegetation zones.

The identification of PCTs was in accordance with the NSW PCT classification as described in the BioNet Vegetation Classification. Determination of the most appropriate PCTs for vegetation communities within the subject land used the BioNet Vegetation Classification database to identify PCT types which matched the geographic distribution (based upon IBRA subregions), vegetation formation and floristics of vegetation within the subject land. The data for each potential PCT including vegetation formation, descriptive attributes and distribution information were then reviewed to determine the most appropriate PCT for each of the vegetation communities sampled within the subject land. Observations of vegetation structure and composition made during traverses of the subject land as well as adjacent areas also informed the determination of most appropriate PCTs for the vegetation communities within the subject land.

Identification of vegetation communities within the subject land and community nomenclature follows the vegetation classification of OEH (2016). Based on the floristic composition of the vegetation in the subject land one native vegetation community with varying condition classes, and one exotic community was identified, as listed below:

- Coastal Enriched Sandstone Dry Forest (S_DSF04)
- Cleared land ‘exotic grassland’

The Coastal Enriched Sandstone Dry Forest (CESDF) identified in the subject land corresponds with the PCT:

- Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (PCT 1776; HN 654)

A summary of the PCT and vegetation zones within the subject land is in **Table 3.1**. A description of the vegetation community, including justification for the assigned vegetation community and PCT, is provided in the following sections.

Table 3.1: Details of PCTs within the subject land including area of vegetation zones.

Plant Community Types (PCTs)	Vegetation Formation & class	Vegetation zones	Area (ha)*
PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Dry Sclerophyll Forests (Shrubby Sub-formation) Sydney Coastal Dry Sclerophyll Forests	Disturbed	0.54
		Intact	0.37
Total native vegetation			**0.91**
Cleared land 'exotic grassland'	N/A	N/A	3.05
Total exotic vegetation			**3.05**
Total vegetation			**3.95**

* Rounding errors may apply

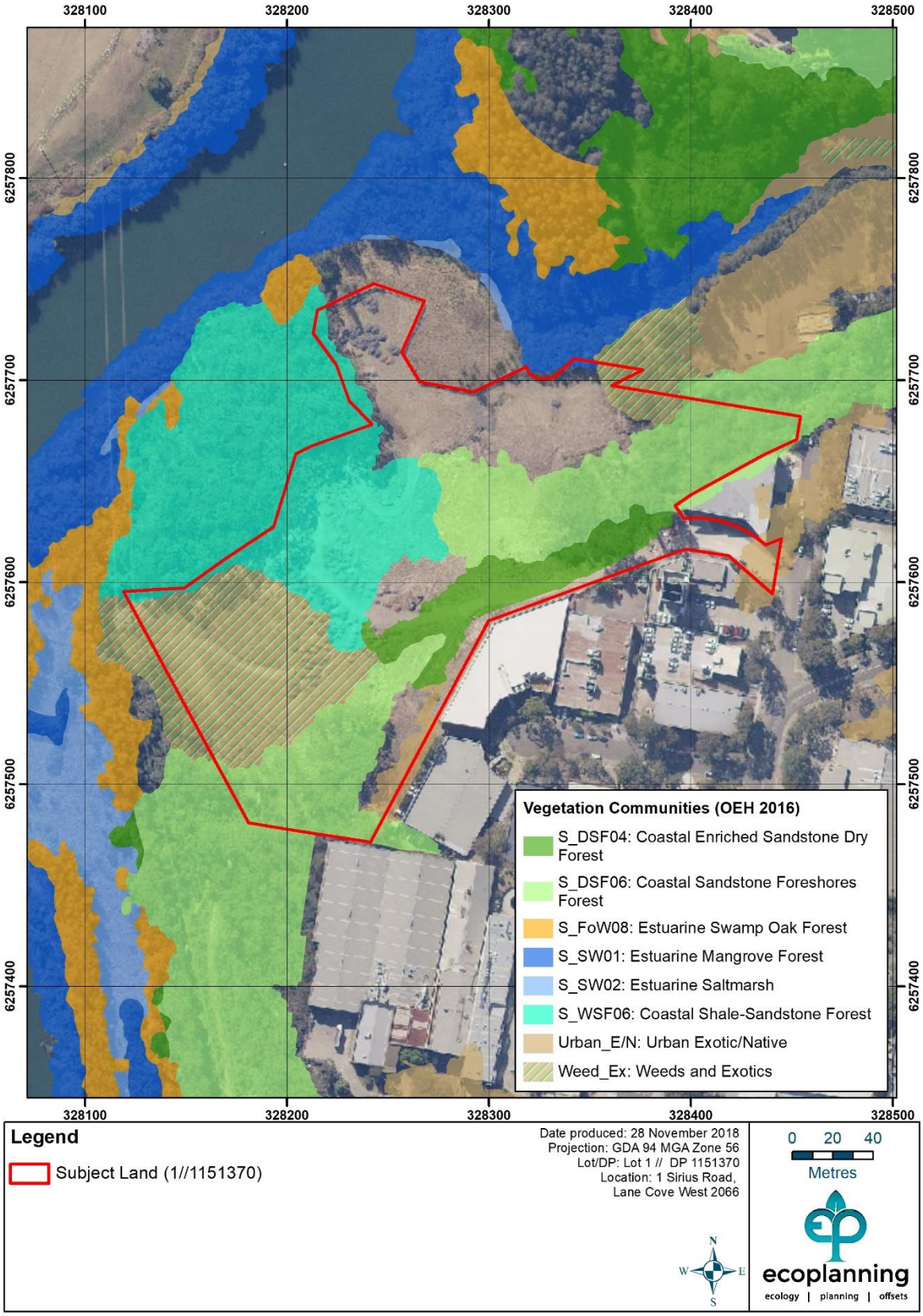

Figure 3.1: Vegetation types (OEH 2016a).

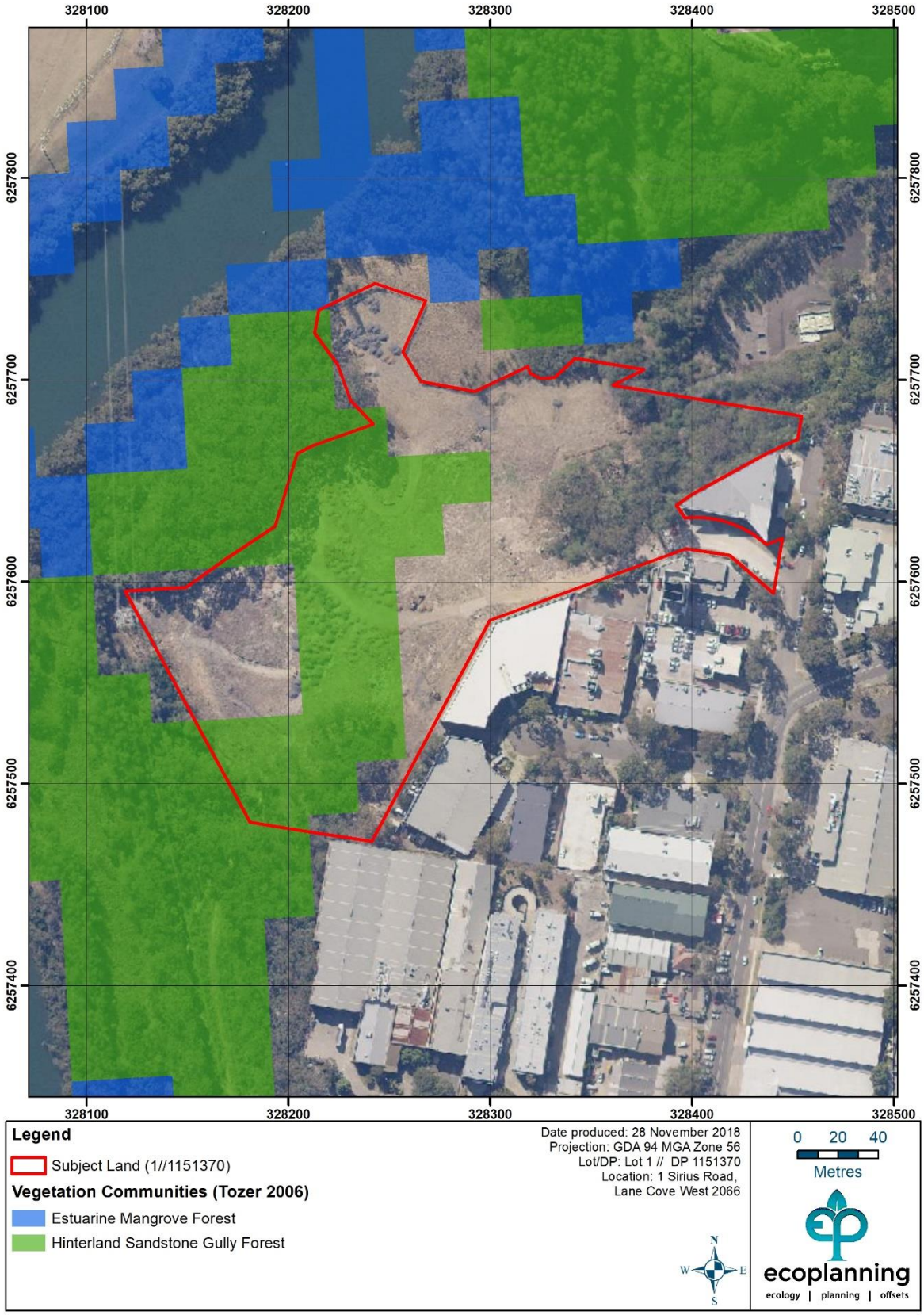

Figure 3.2: Vegetation types (Tozer et al. 2006).

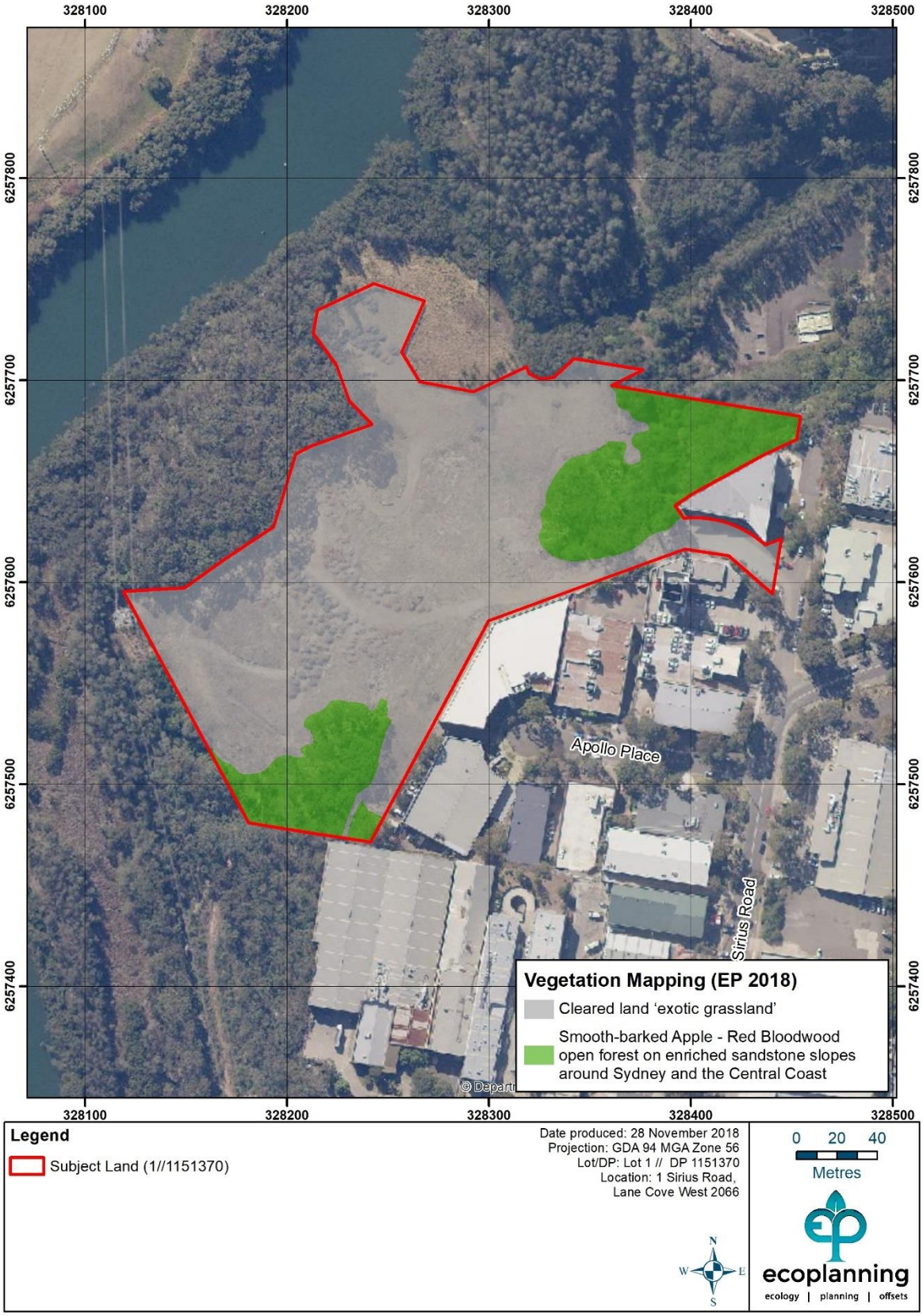

Figure 3.3: Field results and validated vegetation (Ecoplanning 2018).

3.1.3 Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (PCT 1776; HN654).

Field assessment determined the native vegetation in the subject land to consist of Smooth-barked Apple - Red Bloodwood open forest (**Figure 3.3**). The vegetation community occurs in the north eastern and south western corners of the subject land and is an open-forest dominated by *Angophora costata* (Sydney Red Gum), *Eucalyptus piperita* (Sydney Peppermint) and *E. resinifera* (Red Mahogany). *Corymbia gummifera* (Red Bloodwood) and *E. pilularis* (Blackbutt) also occurred sporadically within the vegetation community. The PCT contained an understorey of dry sclerophyll shrubs, with occasional mesic shrub species, including *Elaeocarpus reticulatus* (Blueberry Ash) and *Glochidion ferdinandi* (Cheese Tree). The groundlayer contained a diverse assemblage of native grasses, forbs and sedges.

Dominant native understorey species within the vegetation community included *Acacia suaveolens* (Sweet Wattle), *Allocasuarina littoralis* (Black She-oak), *Dodonaea triquetra* (Large-leafed Hop-bush), *Grevillea buxifolia* (Grey Spider Flower), *Micrantheum ericoides, Notelaea longifolia* (Large Mock-olive), *Woollsia pungens* and *Zieria pilosa* (Pilose-leafed Zieria). The groundlayer contained a high cover and species richness of native grasses, forbs and sedges including *Austrostipa pubescens*, *Entolasia stricta* (Wiry Panic), *Gonocarpus teucrioides* (Raspwort), *Imperata cylindrica* (Blady Grass), *Lepidosperma laterale*, *Lomandra longifolia* (Spiny-headed Mat-rush) and *Lomandra multiflora* subsp. *multiflora* (Many-flowered Mat-rush). Portions of the vegetation community have been underscrubbed, resulting in the thinning, and in some instances the complete removal of the shrub layer. Nevertheless, these areas retain a high cover and species richness of native groundlayer species.

The condition of this vegetation community was variable with some areas being in a relatively undisturbed condition with low levels of exotic species, particularly woody weeds, while other areas have been disturbed, resulting in a high cover of woody weeds, such as *Cinnamomum camphora** (Camphor Laurel), *Ligustrum lucidum** (Large-leaved Privet), *Ligustrum sinense** (Small-leaved Privet) and *Ochna serrulata** (Mickey Mouse Plant). Two vegetation zones (based upon areas in a broadly similar condition state, consistent with section 5.3.1.1 of the BAM) were identified for this PCT, which separated areas with a dense woody weed cover and lower cover of native shrub and understorey species (termed 'disturbed') (**Figure 3.4**) from those areas with a low woody weed cover and a higher density of native shrub and understorey species (termed 'intact') (**Figure 3.5**).

The identification of the most suitable PCT was based upon consideration of PCTs with *Angophora costata* as a co-dominant within the Sydney Basin Bioregion. Four potential PCTs were considered as being most representative of the vegetation within the subject land; PCTs 1250, 1845, 1181 and 1776. PCT 1250 was excluded based upon the absence of *E. resinifera* in the description of the community, as this species was present across the subject land in moderate-high cover and abundance. Similarly, PCT 1181 was excluded based upon the absence of *E. agglomerata* (Blue-leaved Stringybark), *E. punctata* (Grey Gum) and *Syncarpia glomulifera* (Turpentine) which, according to the description of the community, are canopy species that are often associated with community.

The profile source for PCT 1776 and 1845 is described by OEH (2016) and corresponds with Coastal Enriched Sandstone Dry Forest (S_DSF04) and Coastal Shale-Sandstone Forest (S_WSF06) respectively. OEH (2016) details that S_DSF04 (PCT 1776) is floristically related to other shale enriched sandstone communities, such as (S_WSF06), which occurs in similar situations. However, S_DSF04 has a higher proportion of sclerophyll shrub and a low cover

of grasses (OEH 2016a). A high proportion of sclerophyll shrubs was observed in the vegetation, which contributed in determining PCT 1776 as the 'best fit' for the dry sclerophyll forest in the subject land.

Figure 3.4: Smooth-barked Apple - Red Bloodwood open forest 'disturbed'.

Figure 3.5: Smooth-barked Apple - Red Bloodwood open forest 'intact'.

Table 3.2: VIS plant community type profile (OEH 2019b) – Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (PCT 1776; HN654).

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: HN654 and ME64
Vegetation formation	KF_CH5B 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 Moses), *Leptospermum trinervium* (Slender Tea-tree), *Persoonia levis* (Broad-leaved Geebung), ***Acacia suaveolens*** **(Sweet Wattle)**, *Acacia terminalis* (Sunshine Wattle), ***Lomatia silaifolia*** **(Crinkle Bush)**, ***Dodonaea triquetra*** **(Large-leafed Hop-bush)** and *Banksia spinulosa* (Hairpin Banksia).
Ground stratum	***Dianella caerulea*** **(Blue Flax-lily)**, ***Entolasia stricta*** **(Wiry Panic)**, ***Lomandra longifolia*** **(Spiny-headed Mat-rush)**, ***Pteridium esculentum*** **(Bracken)** and ***Xanthosia pilosa*** **(Woolly Xanthosia)**.
Landscape position	-
Profile source	S_DSF04 (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)	BC Act: Not listed EPBC Act: Not listed

3.1.4 Other vegetation

Exotic pasture

Large areas throughout the subject land that have been subject to previous vegetation clearing, soil dumping and modification now support grasslands dominated by exotic grasses and herbaceous weeds (**Figure 3.6**), including *Chloris gayana** (Rhodes Grass), *Lolium* sp.*, *Melilotus officinalis** (Common Melilot), *Paspalum dilatatum** (Paspalum) and *Trifolium repens** (White Clover).

Figure 3.6: Cleared land 'exotic grassland' in the subject land.

3.2 Vegetation zones

3.2.1 Condition classes, subcategories and areas

The PCT identified within the development site was classified into vegetation zones for credit calculation purposes. The vegetation zones are based on the condition descriptions above with the area of each vegetation zones shown in **Table 3.1**. **Figure 3.7** shows the spatial arrangement of the vegetation zones within the development site and associated vegetation integrity survey plots.

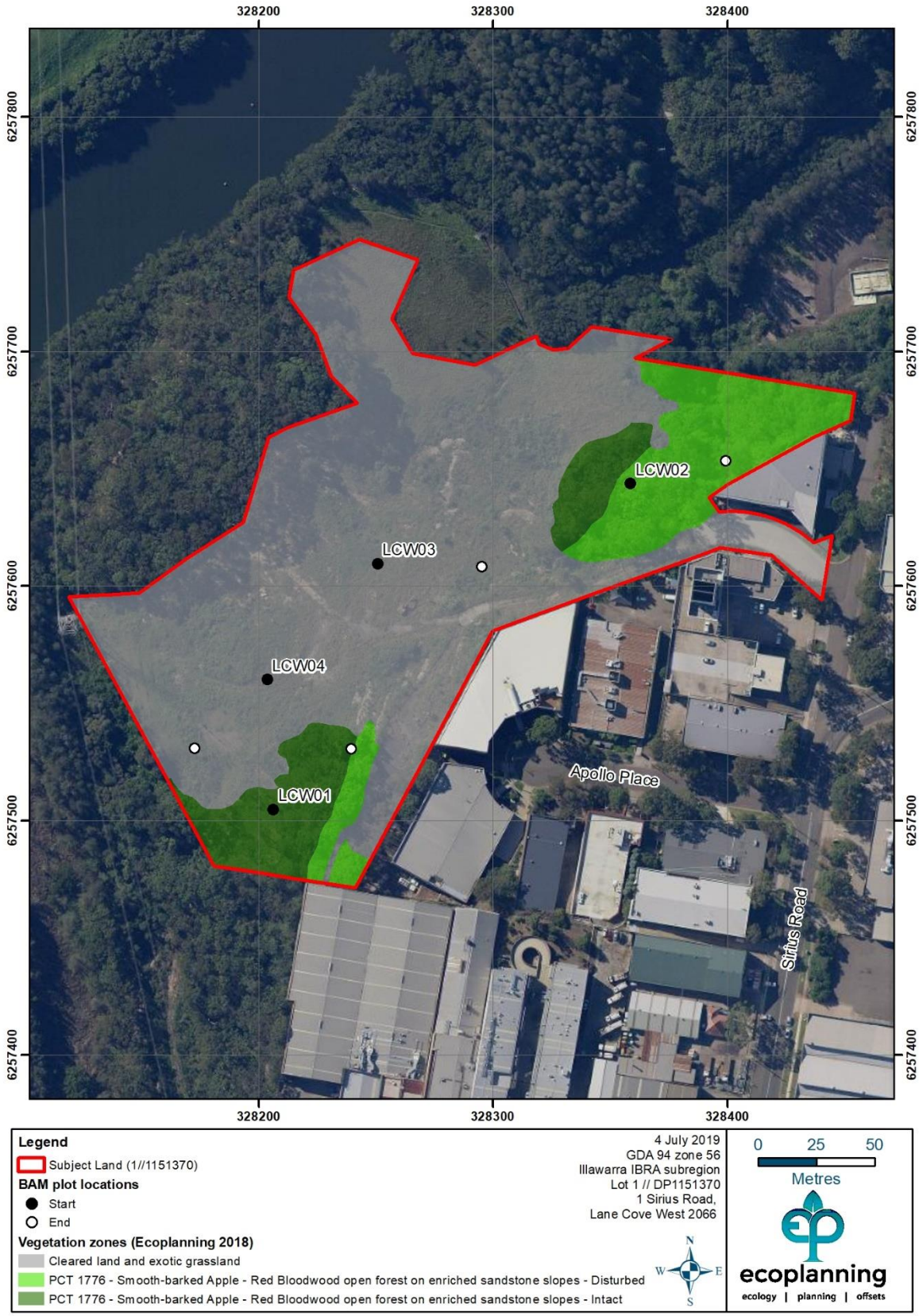

Figure 3.7: Vegetation zones and vegetation integrity survey plot locations.

3.2.2 Vegetation integrity survey plots

Four vegetation integrity survey plots were completed on the subject land, with all being used to meet the requirements of the BAM (see **Appendix A** for data captured) (**Figure 3.7**). The number of plots surveyed within each vegetation zone is consistent with the requirements as outlined within Table 4 of the BAM.

Table 3.3: Vegetation integrity scores.

Veg zone number	Plant community type	Condition class	Area impacted (ha)	Veg integrity plots required	Veg integrity plots undertaken
1	PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Disturbed	0.40	1	1
2		Intact	0.27	1	1
3	N/A	Cleared land	2.62	2	2
Total			**3.29**	**4**	**4**

3.3 Current and future vegetation integrity scores

Vegetation integrity scores were calculated based on the vegetation integrity survey plots collected for each vegetation zone assigned to a native PCT. The vegetation integrity scores for each vegetation zone are provided in **Table 3.4**. Current vegetation integrity scores for native vegetation ranged from 46.8/100 for PCT 1776 'disturbed' to 70.5/100 for PCT 1776 'intact' condition class. While the cleared land 'exotic grassland' vegetation zone was not assigned to a native PCT, the data collected from the two plots surveyed within this vegetation zone was entered into the BAM Calculator as a zone of PCT 1776 in order to calculate a vegetation integrity score for this vegetation zone. The vegetation integrity score for this zone is 0.8/100 and, therefore, does not require an offset for the impacts calculated.

The vegetation zones were divided into two management zones; one for complete clearing and one for APZ (**Figure 3.8**). For those areas to be completely cleared the default future vegetation integrity score of 0 was retained and was specific to the footprint of the proposed data centre and associated infrastructure. Approximately 0.40 ha of complete clearing of native vegetation is required, and 0.27 ha will be managed within the APZ. Future vegetation integrity scores for the APZ are discussed in Section 3.3.1.

3.3.1 Asset Protection Zone

Credits have been calculated to account for a reduction in vegetation quality in the APZ, as informed by the Bushfire Protection Assessment for the subject land (Travers Bushfire & Ecology 2019b). The APZ is situated within PCT 1776 in an 'disturbed' condition, which has a tree cover of 43.5% and a shrub cover of 1%. Native flora species have been allocated to 'tree' or 'shrub' based on the classification of species by growth form list, which classifies several species that often occurs as shrub like midstorey elements (i.e. *Acacia parramattensis* and *Glochidion ferdinandi*) as trees. Nevertheless, tree cover has been reduced within the APZ to achieve a cover of 15%, whereas shrub cover has been reduced to 10% cover. Given

that a shrub cover of 1% was recorded for PCT 1776 in a 'disturbed' condition, this value has not been modified.

It is likely that the APZ would require routine slashing in order to keep grass species at a height of 10 cm or less, which will prevent the establishment of midstorey and canopy species. However, the reduction in habitat quality would not constitute complete clearing, as native groundlayer species will be able to persist in the APZ and hence the impact within the APZ does not constitute a complete loss resulting in a future vegetation integrity score of 0. Areas to be managed as APZs were adjusted based on the likely level of management intervention required. The following broad ruleset was applied:

- *Zone composition data*
  - Half the recorded value for all components (trees, shrubs, grass and grass like, forbs, ferns and other counts)
- *Zone structure data*
  - Half the recorded value for all components (grass and grass like, forbs, ferns and other cover) except for tree cover, where a value of 15 was entered, and shrub cover, which was not modified
- *Zone function data*
  - Reduce litter cover and course woody debris to 0
  - Remove regenerating stems and stem classes 5-10 cm (change to absent)
  - Remove high threat weed cover based on the removal of exotic species in the APZ in accordance with the VMP.

Table 3.4: Vegetation integrity scores.

Veg zone no.	Plant community type	Condition class	Impact type		Veg integrity score – before development or APZ impacts	Veg integrity score – after development (complete clearing)	Veg integrity score – after development (APZ)
			Complete clearing (ha)	Partial Impact - APZ (ha)			
1	PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Disturbed	0.24	0.16	46.8	0	16.6
2		Intact	0.17	0.10	70.5	0	29.6
Total clearing (native vegetation)			**0.41**	**0.26**	**N/A**	**N/A**	**N/A**
3	N/A	Cleared	2.23	0.39	0.8	0	0

Figure 3.8: Management zones.

4. Threatened species

Section 6 of the BAM details the process for determining the habitat suitability for threatened species.

Under the BAM, threatened species are separated into two classes, 'ecosystem' and 'species' credit species. Those threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which a targeted survey has a low probability of detection, are identified as 'ecosystem' credit species. Targeted surveys are not required for ecosystem species and potential impacts to these species are assessed in conjunction with impacts to PCTs.

Threatened species where the likelihood of occurrence of a species or elements of suitable habitat for the species cannot be confidently predicted by vegetation surrogates and landscape features and can be reliably detected by survey are identified as 'species' credit species. A targeted survey or an expert report is required to confirm the presence or absence of these species on the subject land.

For some threatened species, they are identified as both ecosystem and species credit species, with different aspects of the habitat and life cycle representing different credit types. Commonly, threatened fauna species may have foraging habitat as an ecosystem credit, while their breeding habitat represents a species credit.

The following sections outline the process for determining the habitat suitability for threatened species within the subject lands, and the results of targeted surveys for candidate threatened species.

4.1 Identifying threatened species for assessment

Threatened species that require assessment are initially identified based upon the following criteria:

- the distribution of the species includes the IBRA subregion in which the subject land (Cumberland IBRA subregion).
- the subject land is within any geographic constraints of the distribution of the species within the IBRA subregion.
- the species is associated with any of the PCTs identified within the subject land
- the native vegetation cover within an assessment area including a 1500 m buffer around the subject land is equal to or greater than the minimum required for the species.
- the patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species.
- the species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

The process for identifying threatened species which meet the above criteria is completed through the BAM Calculator. The PCTs identified within the subject land, patch sizes and native vegetation cover, as outlined in **Section 3**, were entered into the BAM Calculator and a preliminary list of threatened species were identified.

4.1.1 Geographic and habitat features

Selected 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 buffer. Some species require further assessment of habitat constraints and/or geographic limitations before being confirmed as a candidate species for assessment. **Table 4.1** and outlines the questions asked for these species, and whether the species has been maintained as a candidate species.

Table 4.1: Assessment of habitat constraints and geographic limitations.

Scientific Name / Common Name	Habitat constraints	Geographic limitations	Maintained as candidate species
Chalinolobus dwyeri Large-eared Pied Bat	1. Cliffs 2. Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	-	Yes
Mixophyes iteratus Giant Barred Frog	1. Other 2. Land within 50 m of semi permanent and permanent drainages	-	Yes
Myotis macropus Southern Myotis	1. Hollow bearing trees 2. Within 200 m of riparian zone 3. Bridges, caves or artificial structures within 200 m of riparian zone	-	Yes
Petaurus norfolcensis - endangered population Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill	-	1. Barrenjoey Peninsula	No
Phascolarctos cinereus - endangered population Koala in the Pittwater Local Government Area	-	1. Pittwater LGA	No

4.1.2 Ecosystem credit species

The ecosystem credit species predicted on site are provided in **Table 4.2**. The habitat and geographic constraints were initially assessed for the ecosystem credit species. Areas of exotic grassland were not considered as habitat for any ecosystem credit species.

Table 4.2: Ecosystem credit species predicted on site.

Scientific Name / Common Name	NSW listing status*	National listing status*
Anthochaera phrygia Regent Honeyeater (Foraging)	CE	CE
Artamus cyanopterus cyanopterus Dusky Woodswallow	V	-
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)	V	-
Calyptorhynchus lathami Glossy Black-Cockatoo (Foraging)	V	-
Daphoenositta chrysoptera Varied Sittella	V	-
Dasyurus maculatus Spotted-tailed Quoll	V	E
Glossopsitta pusilla Little Lorikeet	V	-
Haliaeetus leucogaster White-bellied Sea-Eagle (Foraging)	V	-
Hieraaetus morphnoides Little Eagle (Foraging)	V	-
Lathamus discolor Swift Parrot (Foraging)	E	CE
Lophoictinia isura Square-tailed Kite (Foraging)	V	-
Melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	V	-
Miniopterus australis Little Bentwing-bat (Foraging)	V	-
Miniopterus schreibersii oceanensis Eastern Bentwing-bat (Foraging)	V	-

Scientific Name / Common Name	NSW listing status*	National listing status*
Mormopterus norfolkensis Eastern Freetail-bat	V	-
Neophema pulchella Turquoise Parrot	V	-
Ninox connivens Barking Owl (Foraging)	V	-
Ninox strenua Powerful Owl (Foraging)	V	-
Pandion cristatus Eastern Osprey (Foraging)		
Petroica boodang Scarlet Robin	V	-
Phascolarctos cinereus Koala (Foraging)	V	V
Pteropus poliocephalus Grey-headed Flying-fox (Foraging)	V	V
Tyto novaehollandiae Masked Owl (Foraging)	V	-
Varanus rosenbergi Rosenberg's Goanna	V	-

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

4.2 Identify candidate species

In accordance with Section 6.4.1.17 of the BAM, a predicted candidate species can be considered unlikely to occur within the subject land (or specific vegetation zones) where habitat is substantially degraded such that the species is unlikely to use the area, or where an expert report identifies that the species is unlikely to be present within the subject land (or a vegetation zone within the subject land). A predicted candidate species credit species that is not considered to have suitable habitat on the subject land (or specific vegetation zones) in accordance with Section 6.4.1.17 of the BAM does not require further assessment on the subject land (or specific vegetation zones).

The reasons for determining that a predicted species credit species is unlikely to have suitable habitat on the subject land (or specific vegetation zones) is provided. As discussed in **Section 3**, much of the vegetation within the subject land has been previously cleared and fragmented and consists of cleared land 'exotic grassland'. **Table 4.3** outlines the predicted candidate

species which were deemed to not have suitable habitat within the subject land, including justification for this decision.

Table 4.3: Candidate species for which the subject land is not considered suitable habitat.

Species	Justification*
FLORA	
Ancistrachne maidenii	Unsuitable habitat within subject land. This species is restricted to northern Sydney, around St Albans - Mt White - Maroota - Berowra areas and to the Shannon Creek area south-west of Grafton. Habitat requirements appear to be specific, with populations occurring in distinct bands in areas associated with a transitional geology between Hawkesbury and Watagan soil landscapes. The site is not situated near this soil landscape transitional boundary, with the nearest being about 17 km to the north of the site.
Caladenia tessellata (Thick Lip Spider Orchid)	Unsuitable habitat within subject land, this species is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW becoming more common to the south in coastal parts of Victoria. Generally found in coastal heaths, heathy woodland and open-forest on well drained sand to clay loam soils (Backhouse 2018).
FAUNA	
Anthochaera phrygia (Regent Honeyeater)	The proposal does not impact on mapped important areas for the species.
Callocephalon fimbriatum (Gang-gang Cockatoo) (Breeding)	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. The habitat in the subject land is substantially degraded, such that it does not constitute breeding habitat for the species.
Calyptorhynchus lathami (Glossy Black-Cockatoo) (Breeding)	The Glossy Black-Cockatoo inhabits open forest and woodlands of the coast and the Great Dividing Range where sheaoks, such as *Allocasuarina littoralis* and *Allocasuarina torulosa* occur. The subject land does not constitute breeding habitat for the Glossy Black-Cockatoo, as it does not contain any hollow bearing trees for nesting. The Glossy Black-Cockatoo is dependent on large hollow-bearing eucalypts for nest site. The habitat in the subject land is substantially degraded, such that it does not constitute breeding habitat for the species.
Cercartetus nanus (Eastern Pygmy-possum)	This species is found in a broad range of habitats from rainforest through to sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Past disturbances, such as underscrubbing has substantially reduced the cover of native midstorey species across most of the subject land. Furthermore, the subject land contains a low abundance and cover of feed trees, such as banksias. As such, the subject land is substantially degraded and does not contain suitable habitat for the species.

Species	Justification*
Haliaeetus leucogaster (White-bellied Sea-Eagle) (Breeding)	Breeding habitat for this species consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat (characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea). 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. The habitat within the subject land is substantially degraded and was not found to contain any stick nests.
Hieraaetus morphnoides (Little Eagle) (Breeding)	Habitat within the subject land is unsuitable and degraded for breeding. Breeding habitat for this species is tall living trees within a remnant patch, where pairs build a large stick nest in winter. No stick nests were identified in the subject land that may belong to the Little Eagle.
Lathamus discolor (Swift Parrot)	The proposal doesn't impact on mapped important areas for the species. The dominant canopy trees (i.e. *E. piperita*, *A. costata* and *E. resinifera*) are not winter flowering species. Therefore, the subject land is unlikely to be utilised as winter foraging habitat for the species.
Lophoictinia isura (Square-tailed Kite) (Breeding)	Habitat within the subject land is unsuitable and degraded for breeding. This species nests on horizontal branches in mature living trees, especially eucalypts, often near water, and they need extensive areas of forest or woodland surrounding or nearby. No stick nests were identified in the subject land that may belong to the Square-tailed Kite.
Meridolum maryae Maroubra Woodland Snail	This species has a habitat constraint of within 6 km of the ocean shoreline. Habitat within the subject land is not considered suitable due to the habitat constraints on this species.
Miniopterus australis (Little Bentwing-bat) (Breeding)	No suitable breeding habitat within the subject land. Maternity colonies form in spring and birthing occurs in early summer with males and juveniles disbursing in summer. Females leave their babies in nursery caves at night to go and hunt, returning in the morning. Nursery caves have specific requirements and only five nursery sites / maternity colonies are known in Australia. 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.
Miniopterus schreibersii oceanensis (Eastern Bentwing-bat) (Breeding)	No suitable breeding habitat within the subject land. This species forms 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.
Mixophyes iteratus (Giant Barred Frog)	Giant Barred Frogs are found along freshwater streams with permanent or semi-permanent water. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. The subject land is substantially degraded and does not constitute habitat for the species.

Species	Justification*
Ninox connivens (Barking Owl) (Breeding)	This species nests in living or dead trees with hollows >20 cm diameter and >4 m above the ground. Habitat includes woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extent into close forest and more open areas. Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 ha, with 2000 ha being more typical in NSW habitats. No hollow bearing trees of suitable size as breeding habitat for the Barking Owl were identified in the subject land.
Ninox strenua (Powerful Owl) (Breeding)	This species nests 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. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him. No hollow bearing trees of suitable size as breeding habitat for the Powerful Owl were identified in the subject land.
Petaurus norfolcensis (Squirrel Glider)	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Require abundant tree hollows for refuge and nest sites. The subject land is substantially degraded and does not provide habitat for the species. The subject land is connected to Lane Cove National Park to the north by a vegetated corridor adjacent to the Lane Cove River. The Squirrel Glider has not been recorded in Lane Cove National Park (OEH 2019a), which contains intact bushland and more suitable habitat for the species.
Phascolarctos cinereus (Koala) (Breeding)	Habitat within the subject land is unsuitable and substantially degraded for Koala breeding habitat. The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. Inhabit eucalypt woodlands and forests. The subject land is connected to Lane Cove National Park to the north by a vegetated corridor adjacent to the Lane Cove River. The Koala has not been recorded in Lane Cove National Park (OEH 2019a), which contains intact bushland and more suitable habitat for the species.
Pseudophryne australis (Red-crowned Toadlet)	No suitable habitat within the subject land. The species occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones, where it inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Habitat features, such as rocks, dense vegetation or thick piles of leaf litter are required. Eggs are laid in moist leaf litter, from where they are washed by heavy rain into small pools and ephemeral drainage lines.
Tyto novaehollandiae (Masked Owl) (Breeding)	No suitable breeding habitat within the subject land. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. The Masked Owl utilises hollows greater than 20 cm diameter in living or dead trees. No suitable hollow bearing trees of suitable size as breeding habitat for the Masked Owl were identified in the subject land.

* Unless otherwise stated, habitat information is sourced from OEH (2018c)

Based upon the assessment of available habitat for predicted candidate species within the subject land, the following predicted candidate species were confirmed for the subject land:

- *Callistemon linearifolius* (Netted Bottle Brush)
- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Darwinia peduncularis*
- *Pimelea curviflora* var. *curviflora*
- *Hibbertia puberula* (Hibbertia puberula)
- *Hibbertia spanantha* (Julian's Hibbertia)
- *Myotis macropus* (Southern Myotis)
- *Pteropus poliocephalus* (Grey-headed Flying-fox) (Breeding)

4.3 Determine presence or absence of a candidate species credit species

Confirmed candidate species were assessed consistent with Steps 4 – 6 of section 6.4 of the BAM. Targeted surveys for species credit species was undertaken in accordance within section 6.5 of the BAM, including undertaking surveys during the nominated survey period specified for each candidate species and in accordance with OEH threatened species survey guidelines. The survey effort, timing and locations for threatened flora and fauna are outlined in the following sections

4.3.1 Targeted field surveys - flora

Targeted surveys for candidate threatened flora were undertaken on 14 November 2018 by Tammy Paartalu (Senior Ecologist) and Thomas Hickman (Ecologist) in accordance with the NSW Guide to Surveying Threatened Plants (OEH 2016b). Targeted surveys initially involved identifying areas of potential habitat for candidate threatened flora species within the subject land. Areas of potential habitat were then surveyed along parallel field-traverses with approximately 10 m separation, consistent with the requirements of OEH (2016b) for the smallest lifeforms (herbs ferns, forbs and climbers) on the list of candidate threatened flora species. Survey effort for threatened flora is shown **Figure 4.1**. Areas of cleared land 'exotic grassland' were not assessed as areas of potential habitat for threatened flora, hence were not surveyed in accordance with OEH (2016b).

The nominated survey period for candidate threatened flora species is shown in **Table 4.3**. The timing of the flora surveys (14 November 2018) is in accordance with the survey requirements for all candidate threatened flora species. No threatened flora species were detected in the subject land. A total of 177 flora species were identified in the subject land during the field survey, of which 99 were native and 78 were exotic (**Appendix B**). Nomenclature follows the Flora of NSW (Harden 1990-2002) and updates provided in PlantNET (RBGDT 2018).

Table 4.4: Survey periods for confirmed candidate threatened flora species.

Candidate species	Survey period (BAM Calculator)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Callistemon linearifolius (Netted Bottle Brush)	Y									Y	Y	Y
Darwinia peduncularis	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pimelea curviflora var. *curviflora*	Y	Y	Y							Y	Y	Y
Hibbertia puberula (Hibbertia puberula)										Y	Y	Y
Hibbertia spanantha (Julian's Hibbertia)										Y	Y	

Blue column indicates the primary survey month.

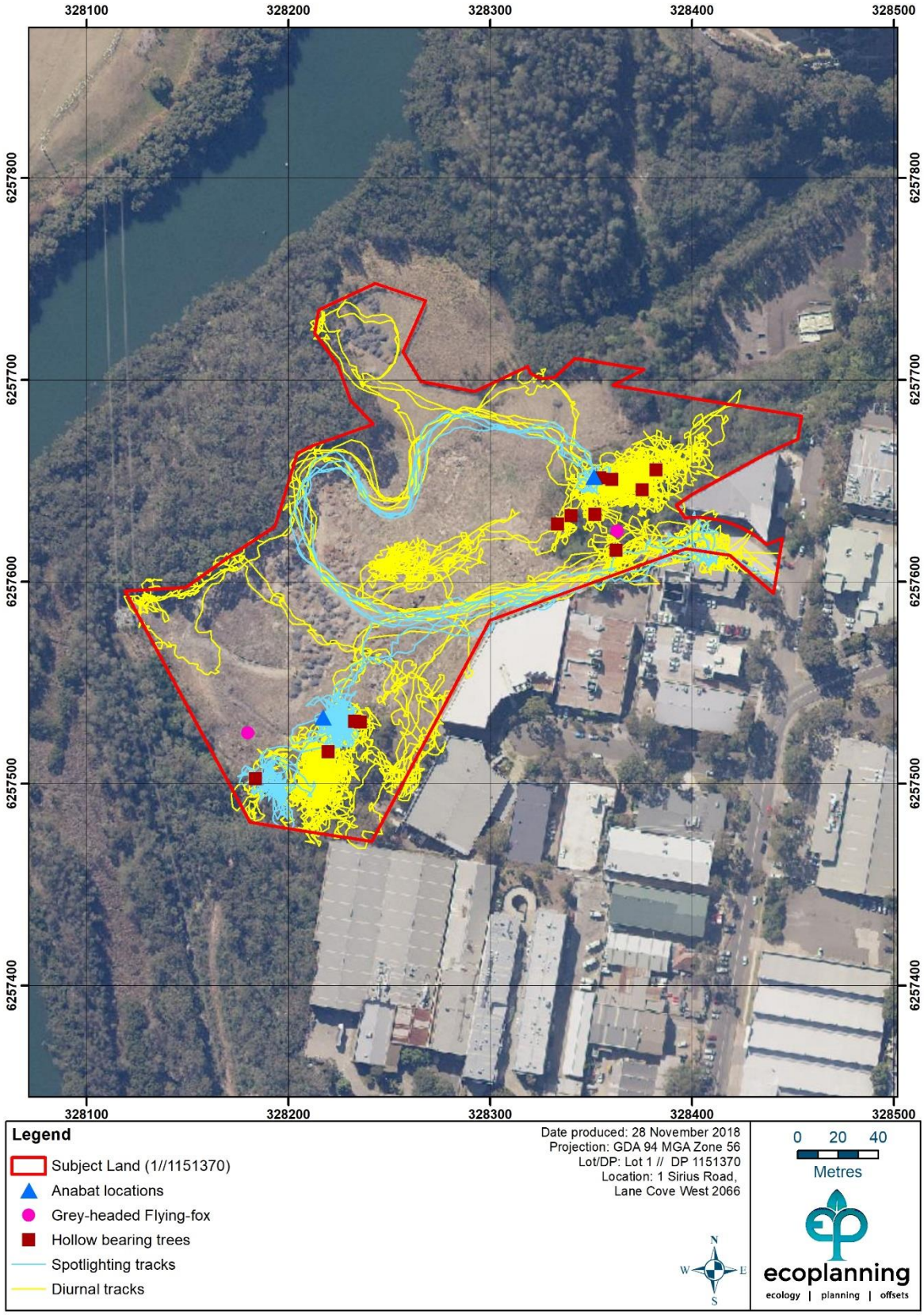

Figure 4.1: Survey effort.

4.3.2 Targeted field surveys – fauna

Targeted surveys for candidate threatened fauna species requiring further assessment and their associated survey periods are outlined for each of the candidate threatened fauna species below.

Table 4.5: Survey periods for candidate threatened fauna species.

Candidate species	Survey period (BAM Calculator)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chalinolobus dwyeri (Large-eared Pied Bat)	Y										Y	Y
Myotis macropus (Southern Myotis)	Y	Y	Y							Y	Y	Y
Pteropus poliocephalus (Grey-headed Flying-fox) (Breeding)										Y	Y	Y

Blue: indicates the survey months

Microbats - Southern Myotis *(Myotis macropus) and* Large-eared Pied Bat (*Chalinolobus dwyeri)*

Targeted surveys for the Large-eared Pied Bat and Southern Myotis included ultrasonic Anabat detection over 16 nights (20 November 2018 to 6 December 2018). Two devices were deployed on 20 November 2018, however, one of the devices stopped collecting data on 24 November 2018. As such, the survey effort equates to 19 survey nights, which meets the total survey effort specified in the "*'Species credit' threatened bats and their habitats*" (OEH 2018). The detectors were set to record before sunset and stop after dawn, placed >50 m apart and in a position that maximised the likelihood of recording bats in accordance with (OEH 2018) (**Figure 4.1**).

Neither the Large-eared Pied Bat or the Southern Myotis were recorded in the subject land. A total of five microchiropteran bat species were detected from calls within the subject land: *Chalinolobus gouldii* (Gould's Wattled Bat), *Chalinolobus morio* (Chocolate Wattled Bat), *Mormopterus ridei* (Eastern Free-tailed Bat), *Scotorepens orion* (Eastern broad-nosed Bat) and *Vespadelus vulturnus* (Little Forest Bat), none of which are listed under the EPBC Act or the BC Act.

Grey-headed Flying-fox *(Pteropus poliocephalus)* – Breeding habitat

Grey-headed Flying-fox was observed foraging in an *Angophora costata* on 20 November 2018 (**Figure 4.1**), however, this observation alone does not indicate the presence of breeding habitat for this species within the subject land. Grey-headed Flying-fox roosts within communal 'camps', which are large congregations of many individuals of this species, where individuals hang from branches with limited protection. Many of these camps act as maternity camps where annual breeding and rearing of young takes place (DEC 2004). Camps are typically located near water, such as lakes, rivers or the coast and commonly include rainforest patches, stands of Melaleuca, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas (van der Ree et al. 2005).

As part of the '*National Flying-fox Monitoring Program*' maps of known camps of this species have been prepared, with no known camp mapped within the subject land (DoEE 2019). The nearest known camp of this species is located approximately 3.5 km south southwest of the subject land at Gladesville with between 2,500-10,000 individuals of this species recorded

from this camp in February 2018 (DoEE 2018). The method for surveying for the presence of unrecorded day roosts included diurnal observations across the subject land.

Grey-headed Flying-fox camps are easily recognised from a distance due to the distinctive audible calls that are heard most frequently in the early morning or under sunny conditions. Other signs include their distinctive odour and droppings. No camps for this species were observed within the subject land during traverses undertaken during the allowable survey period for the Grey-headed Flying-fox under the BAM (14 November 2018, 20 November 2018 and 6 December 2018; **Table 4.5**).

4.3.3 Fauna and fauna habitat

Opportunistic fauna survey was undertaken for birds, amphibians, reptiles and mammals, which included opportunistic observations along with signs of direct and indirect occupancy (i.e. scats, owl pellets, fur, bones, tracks, bark scratches, foliage chew marks and chewed cones of *Allocasuarina* spp. or *Pinus* spp. as well as some of the other cultivars known to be used by native fauna).

Fauna habitat searches were conducted for potential foraging, roosting, breeding or nesting habitat of nocturnal and diurnal species. This includes inspection for the presence of tree hollows, stags, bird nests, possum dreys, decorticating bark, rock shelters, rock outcrops/crevices, mature / old growth trees, food trees (*Banksia* spp., *Allocasuarina* spp., and winter-flowering eucalypts), culverts, dens, dams, riparian areas and refuge habitats of man-made structures.

The majority of the subject land consists of cleared land 'exotic grassland', which provides minimal habitat value for native fauna. However, where present, the native woodland in the subject land contains a range of habitat values, including:

- Hollow bearing trees
- Stag trees
- Rocky overhangs and crevices
- Coarse woody debris

The subject land was found to contain 12 hollow bearing trees (HBTs) of differing sizes and qualities, of which four were stag trees. Habitat within the subject land provides potential foraging, roosting, breeding and nesting resources for native fauna. A total of 0.91 ha of native vegetation in an 'intact' (0.37 ha) and 'disturbed' (0.54ha) condition were identified in the subject land.

The native vegetation in the subject land provides potential foraging habitat for highly mobile species that rely on large areas for food resources, particularly microbats and the Grey-headed Flying-fox. Furthermore, the native vegetation provides foraging habitat and refugia for common small passerine birds, woodland birds and reptiles species. No terrestrial arboreal mammals were identified in the subject land, although it is possible that common such as the Brushtail-tailed Possum (*Trichosurus vulpecula*) and the Ringtail Possum (*Pseudocheirus peregrinus*) species occur within the subject land.

Habitat features relevant to each fauna group with potential to use the subject land are presented in **Table 4.6**.

Table 4.6: Key fauna habitat features present across the subject land.

Habitat features	Fauna species
Woodland	Birds, arboreal and terrestrial mammals, microchiropteran bats, reptiles and frogs
Hollow bearing and stag trees	Arboreal mammals, birds, microchiropteran bats, reptiles and frogs
Rocky overhangs and crevices	Reptiles, small mammals and gastropods

4.3.4 Fauna species

The field survey undertaken for this report recorded a total of 36 fauna species, of which two were introduced. Of the 36 species, there were 27 birds, one frog species, seven mammals (including five microbats and one megabat species) and one reptile (**Appendix B**). Grey-headed Flying-fox were seen flying over the subject land and feeding in an *Angophora costata* on 20 November 2018 in PCT 1776 in a 'disturbed' condition. No other threatened fauna species recorded in the subject land.

4.4 Identifying potential prescribed biodiversity impacts on threatened species

The presence of biodiversity values prescribed by the BC Reg have been considered in context of the subject land (**Table 5.1**). The subject land was found to contain areas of cliffs, crevices, rocks and other geological features, which have been identified in accordance with section 6.7.1.1 and section 6.7.1.2 of the BAM (**Figure 1.2**). Section 6.7.1.1 (b) and section 6.7.1.2 (c) of the BAM requires a list of candidate threatened species and TECs using or dependent on these features. As discussed in **Section 3.1**, the vegetation in the subject land does not correspond with any TECs listed under the BC Act or the EPBC Act. Threatened species with the potential to use or depend on these features consists exclusively of threatened microbat species, which can rely on these features for roosting and breeding, specifically Large-eared Pied Bat, *Miniopterus australis* (Little Bentwing-bat) and *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat). Ultrasonic Anabat detection has been conducted in the subject land (see **Section 4.3.2**) and did not record these species in the subject land. Therefore, impacts to the cliffs, crevices, rock and other geological features do not constitute a prescribed biodiversity impact, as the candidate threatened species are not dependent on these features (**Table 5.1**).

Impacts to water quality, water bodies and hydrological processes that sustain threatened species and TECs were considered as a potential prescribed biodiversity impact (**Table 5.1**). However, these features are not situated in the subject land, and potential impacts to adjoining areas that sustain threatened species and TECs would be mitigated through the Construction Environmental Management Plan (CEMP). The CEMP will address matters such as the control of runoff during construction and post construction to prevent impacts to the adjoining sensitive vegetation types. Furthermore, appropriate stormwater treatment design has been proposed, therefore reducing the potential impacts to adjoining areas that sustain threatened species and TECs. As such, a prescribed biodiversity impacts on water quality, water bodies and hydrological processes that sustain threatened species and TECs is considered unlikely.

5. Avoiding and minimising impacts on biodiversity values

5.1 Avoiding and minimising impacts on native vegetation and habitat during project planning

5.1.1 Locating a project to avoid and minimise impacts on native vegetation and habitat

Section 8.1.1.4 of the BAM states that in selecting a project location, the following should be addressed, as they apply to the project:

- an analysis of alternative modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology
- an analysis of alternative routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route
- an analysis of alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location
- an analysis of alternative sites within a property on which the project is proposed that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site.

The subject land is zoned under the LCLEP (2009) as IN2 - Light Industrial. Given the location of the subject land being positioned within the Lane Cove West Business Park, which is designated for industrial and industrial related uses, the proposed data centre is a logical use for the land and no alternative modes or technologies have been considered.

The subject land has been selected for the proposed data centre, as the proposal would provide employment opportunities close to where people live and is in a suitable position to nearby transport infrastructure routes. The subject land is in close proximity to the M2 Motorway and Epping Road, which makes the subject land a desirable location for the proposed data centre. The data centre will provide positive social and economic values to the area and facilitate an increasingly important cloud and data centre service to the broader community.

The site is largely cleared, and the proposal would mostly impact on cleared land 'exotic grassland' The design of the proposed data centre within the subject land has been designed to avoid and minimise impacts to biodiversity values where possible (see **Section 5.1.2**). Further avoidance and minimisation of impacts has not been possible, as the project requires a large amount of services infrastructure, which only becomes economical with the 80-90 MW capacity currently proposed for the data centre. Further, the steep gradients in the subject land require a large amount of excavation to achieve the level floor planes required, resulting in substantial financial input. Given these factors, including the scale of the proposed data centre, alternative proposal configurations within the property are not feasible and the design in its current form is necessary to achieve the required economies.

The Environmental Impact Statement (EIS) for the subject land (Willow Tree Planning 2019) documents the site constraints in accordance with Section 8.1.1.5 of the BAM. For example, the location of the project is suitable from a bushfire constraints perspective, as the subject land is adjacent to forest, remnant forested wetland and grassland to the southwest, west,

north and northeast, which does not expose the development to potential flame, ember and radiant heat attack (Willow Tree Planning 2019). Further the bushfire risk to the site is reduced by the adjoining saline wetlands and the Lane Cove River, which is not considered to be bushfire prone land. As a result, the fire potential has been substantially reduced, and has been further mitigated through the provision of a suitable Asset Protection Zone. This is considered substantial justification for the project location based on the bushfire protection requirements.

As documented in the EIS (Willow Tree Planning 2019), the flood report prepared for the subject land concluded that the proposed development in its intended design is unaffected by flooding, as the lowest proposed building level is 11 m Australian Height Datum (AHD) and to be flood free buildings would have to be set at no lower than 5.4 AHD. Therefore, flooding was not considered an issue for the proposed location and design of the data centre. As previously stated, necessary constraints relevant to the location and design of the project are documented in the EIS (Willow Tree Planning 2019) and provided sufficient justification for the proposal in its current form and location.

The above information provides sufficient justification for the actions taken to avoid and minimise impacts through locating the project in accordance with section 8.1.1.6 of the BAM.

5.1.2 Designing a project to avoid and minimise impacts on native vegetation and habitat

The avoidance of impacts to native vegetation and habitat has largely been achieved through the selection of Lot // DP 1151370; a degraded area of land as the site for the proposed data centre. Whilst the principal components of the proposal have been defined based upon the ideal design of the proposed data centre, both the development footprint of the data centre and the associated APZ have been designed to optimise the design of the centre, whilst minimising impacts to native vegetation and riparian buffer areas, where possible. As previously mentioned, the complete avoidance of impacts has not been achievable given the large amount of excavation and infrastructure services required to support the proposal, which only becomes economical with the 80-90 MW capacity and extent of the footprint currently proposed.

The proposal would involve clearing of approximately 0.67 ha of native vegetation within the subject land, of which 0.41 ha will be removed to accommodate the data centre and associated infrastructure, and an additional 0.26 ha would be managed within the APZ. A further 2.62 ha of land identified as cleared land ‘exotic grassland’ will be impacted as a result of the proposal. As such, a majority (approximately 80.08 %) of the impacts will occur to cleared land ‘exotic grassland’.

The avoidance measures have resulted in the retention of approximately 27.97 % of the native vegetation in the subject land. The proposal has been designed to avoid impacts to native vegetation with a higher vegetation integrity score, specifically Smooth-barked Apple - Red Bloodwood open forest in an ‘intact’ condition. These avoidance measures have resulted in the retention of 0.09 ha (approximately 25.34 %) of Smooth-barked Apple - Red Bloodwood open forest in an ‘intact’ condition, which would not be impacted by the building footprint or proposed APZ.

Retained vegetation in a ‘disturbed’ condition class in the north eastern portion of the subject land and in an ‘intact’ condition class in the south west of the subject land will managed in accordance with the VMP (Travers Bushfire & Ecology 2019a). Those areas of cleared land ‘exotic grassland’ avoided along the northern perimeter of the subject land will be revegetated

with native shrubs and groundcover species representative of PCT 1776 (Travers Bushfire & Ecology 2019a). The VMP for the subject land will improve the vegetated corridor adjacent to the Lane Cove River and assist in mitigating the impacts of the proposal.

5.2 Avoiding and minimising prescribed biodiversity impacts during project planning

Prescribed biodiversity impacts are defined under clause 6.1 of the BC Reg and include impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. Prescribed biodiversity impacts are outlined within **Table 5.1** including their relevance to the proposal.

Table 5.1: Prescribed Biodiversity Impacts

Prescribed Biodiversity Impacts	Presence within the Subject Land	Additional Comments
(a) the impacts of development on the following habitat of threatened species or ecological communities: (i) karst, caves, crevices, cliffs and other geological features of significance, (ii) rocks, (iii) human made structures, (iv) non-native vegetation,	The subject land contains areas of cliffs, crevices, rocks and other geological areas of significance.	The subject land contains exposed Hawkesbury Sandstone outcropping, boulders and minor cliff development (**Figure 5.1** and **Figure 5.2**) in the south east and north east of the subject land. These features do not support threatened species or ecological communities, hence do not constitute a prescribed biodiversity impact.
(b) the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,	The subject land has not been identified as providing connectivity between areas of habitat for threatened species that facilitates the movement of that threatened species across its range.	The native vegetation in the subject land provides some connectivity between Lane Cove National Park and land to the south. However, the areas of habitat in the subject land are confined to the south western and north eastern portions of the subject land, hence occur at the edge of a larger expense of bushland. The patches of vegetation in the subject land are poorly connected and are separated by a large expanse of cleared land.
(c) the impacts of development on movement of threatened species that maintains their lifecycle,	The subject land has not been identified as providing movement of threatened species that maintains their lifecycle.	
(d) the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),	Potential impacts.	Stringybark Creek is situated to the north of the subject land and flows in a north easterly direction, where it subsequently joins with the Lane Cove River. Stringybark Creek and the Lane Cove River sustain threatened species and threatened ecological communities. Consequently, impacts to water quality and hydrological process of Stringybark Creek and Lane Cove River could constitute a prescribed impact. However, these impacts would be mitigated through the implementation of a CEMP to avoid potential indirect offsite impacts during construction.
(e) the impacts of wind turbine strikes on protected animals,	Not applicable.	-
(f) the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.	Not applicable.	-

Figure 5.1: A minor cliff-line in the south east of the subject land.

Figure 5.2: A rocky overhang in the north east of the subject land.

6. Assessing and offsetting impacts

6.1 Assessment of impacts

6.1.1 Assessing impacts to native vegetation and habitat

Following the avoidance of Smooth-barked Apple - Red Bloodwood open forest in the north east of the subject land, impacts to native vegetation are anticipated through the direct impact of 0.67 ha of Smooth-barked Apple - Red Bloodwood open forest within the subject land. This comprises 0.41 ha of complete clearing to accommodate the proposed data centre and associated infrastructure, which would represent a permanent impact, or loss, of this native vegetation and habitat. A further 0.26 ha of the subject land will be partially impacted within the APZ.

6.1.2 Assessing indirect impacts on native vegetation and habitat

It is difficult to quantify indirect impacts associated with the project, but these may include impacts such as noise and/or erosion associated with the construction phase of the project. The assessment of direct impacts to native vegetation and habitat to include all land within the subject land provides an adequate assessment of indirect impacts within the subject land. The project is considered unlikely to reduce viability of any adjacent native vegetation or habitat due to edge effects, noise dust or light spill, or disturbance to breeding habitats. Further, within adjacent areas of native vegetation and habitat, the project is considered unlikely to cause any increase in trampling of flora, rubbish dumping, firewood or bush rock collection or introduce any pests, weeds or pathogens to the adjacent areas of native vegetation and habitat.

6.2 Assessing prescribed biodiversity impacts

As described in **Section 2.1.3**, no prescribed biodiversity impacts are anticipated from the proposed development.

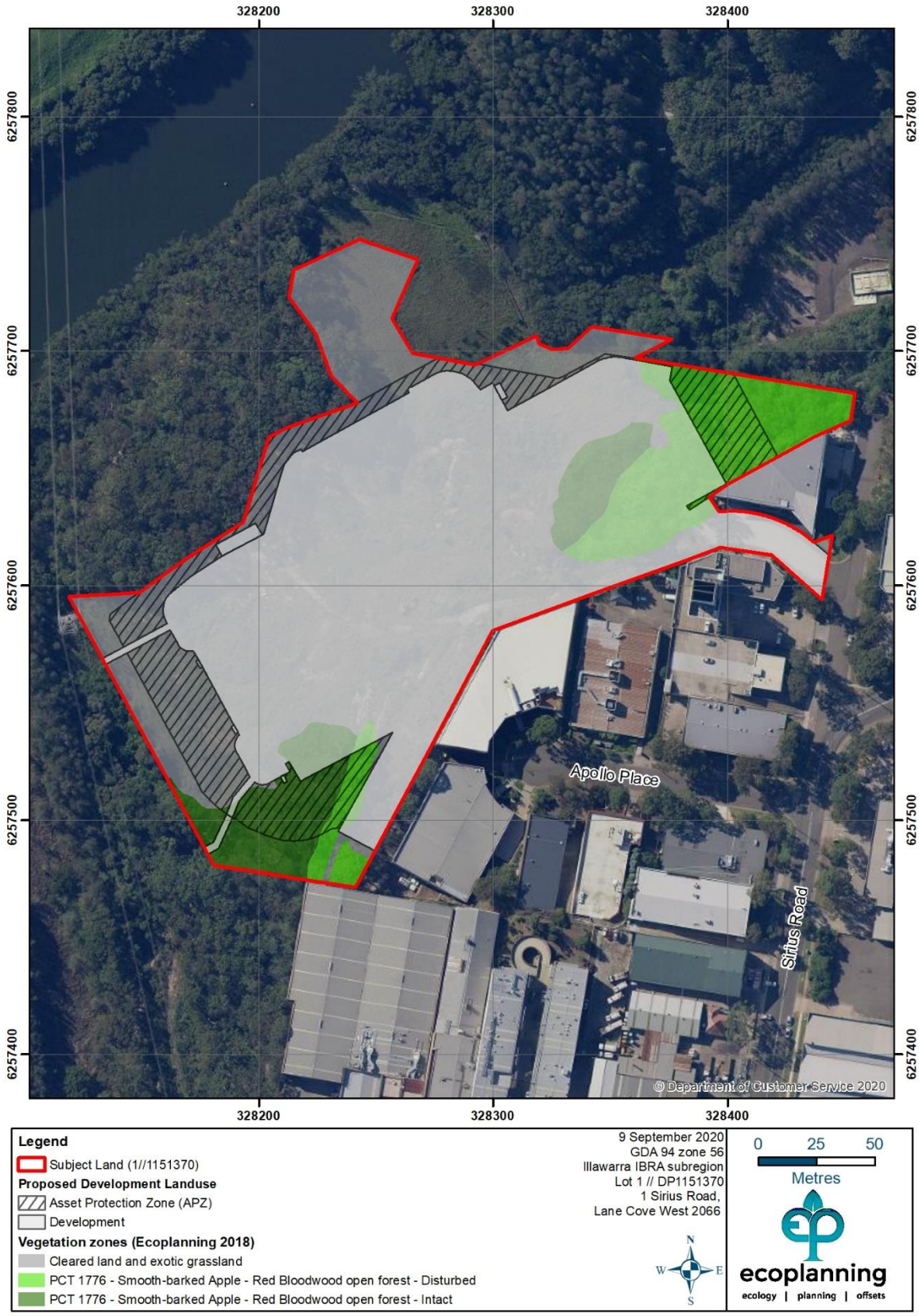

Figure 6.1: Field validated vegetation (Ecoplanning 2018) and proposed footprint.

6.3 Mitigating and managing impacts on biodiversity values

As described in **Section 4.4** of this report, the project has been situated to minimise impacts to native vegetation, habitat and biodiversity values. Several measures will be implemented to reduce impacts, where possible, such as appropriate pre-clearance protocols and a CEMP, as detailed below. Additional mitigation measures have been recommended by OEH, and should be implemented as part of the proposal, including the following:

- the revegetation areas and landscaped areas must use a diversity of local provenance species (trees, shrubs and groundcovers) from the native vegetation community (or communities) that occurs, or once occurred, on the site
- any native trees that are required to be cleared from the site shall be salvaged (for example tree hollows and tree trunks which are greater than approximately 25-30cm in diameter and 3 m in length) and placed in the revegetation and regeneration areas to enhance habitat
- remnant native vegetation that is required be removed from the site, especially juvenile plants shall be translocated to the revegetation and regeneration and landscape areas
- the topsoil from areas of native vegetation that are to be cleared for the development shall be collected and used in the revegetation and regeneration areas on the site
- seed from any native plants to be removed shall be collected and used in the revegetation and regeneration areas landscape areas
- any tree hollows to be removed are to be replaced at a ratio greater than 1:1

6.3.1 Pre-clearance protocols

A number of non-threatened fauna species such as birds, arboreal mammals and amphibians are likely to be present at the development site. Appropriate pre-clearance protocols will be put in place at the time of construction to avoid and mitigate any potential harm or injury to these individuals. These protocols are discussed below and should be included as a component of the CEMP.

On-site supervision of habitat tree felling and relocation of fauna

An ecologist will be required to be present onsite when felling habitat trees (hollow bearing and/or stag trees). Hollows should be inspected from an elevated work platform or cameras mounted to telescopic poles, prior to felling operations. Any fauna occupying a hollow during felling operations will be relocated (where feasible) to bushland immediately adjacent to the site.

The ecologist will need to work closely with the plant operators to identify each hollow and to stop work if an animal is observed and requires rescue. The ecologist will encourage any fauna species that may be present to move from site or if considered necessary capture, store and actively relocate them to another area. All habitat trees should be left over night to give species that are not possible to handle, further opportunity to relocate. Advice on appropriate actions for individuals that continue to utilise habitat of trees should be provided by the onsite ecologist. Any variation to this protocol must be approved by onsite ecologist.

The ecologist will ensure that any injured animals receive the appropriate levels of care. The nearest veterinary clinics should be contacted prior to the works beginning to ensure that they have the capabilities to care for injured native animals. Qualified wildlife carer organisations (e.g. WIRES) should also be identified and contacted if required.

Soft felling operations

Soft felling of hollow bearing trees is encouraged to avoid unnecessary injuries to undetected fauna. This process involves an excavator or bulldozer softly 'nudging' trees before felling, in order to encourage any fauna that may be occupying a hollow or crevice to vacate the tree prior to being felled. Once the tree has been felled, the ecologist will undertake further searches of the tree for any animal that has not fled or is unable to flee. As above, fauna will be relocated to bushland adjacent to the site, or if required, veterinary clinics and/or qualified wildlife carers contacted.

6.3.2 Vegetation Management Plan

A VMP has been prepared to guide the revegetation of the of retained native vegetation, the revegetation of disturbed land, cleared areas and contaminated land (Travers Bushfire & Ecology 2019a). Schedule 1 in the VMP highlights that areas proposed for management within the subject land. The primary objectives of the VMP include:

- To protect, restore and maintain retained native vegetation.
- To revegetate selected areas with appropriate native vegetation of local provenance.
- Maximise native vegetation cover and species diversity within the restoration areas.
- Minimise weed cover to ensure long term establishment of native vegetation
- Undertake monitoring, auditing and maintenance activities to ensure an effective and a resilient restoration outcome
- Ensure compliance with the development consent and this VMP.

6.3.3 Construction Environmental Management Plan

To avoid potential indirect offsite impact during construction, an appropriate erosion and sedimentation control plan should be in place following best practice protocols such as Landcom (2004). It is recommended that this is included in a site specific CEMP, prior to any construction works taking place.

The CEMP will be required to span the pre, during and post-construction period, and will include the above pre-clearance and fauna management protocols.

6.4 Adaptive management for uncertain impacts

Excluding the need for a CEMP, no additional adaptive management measures are proposed.

6.5 Thresholds for the assessment and offsetting of impacts of development

6.5.1 Serious and Irreversible impacts

The Guidance to assist a decision-maker to determine a serious and irreversible impact (OEH 2017b) and the BioNet database identify potential SAII entities. The Smooth-barked Apple - Red Bloodwood open forest identified in the subject land does not correspond with any TEC identified as a SAII entity in accordance with Appendix 3. Appendix 2 is a list of potential species that meet the SAII principles and criteria (OEH 2017b), of which none would be impacted by the proposal.

6.5.2 Impacts which require an offset

Section 10.3.1 of the BAM outlines that the following vegetation zones require offsets:

- vegetation zones that have a vegetation integrity score ≥15 where the PCT is representative of an endangered or critically endangered ecological community.
- a vegetation zone that has a vegetation integrity score of ≥17 where the PCT is associated with threatened species habitat or is a vulnerable ecological community.
- a vegetation zone that has a vegetation integrity score ≥20.

Impacts associated with vegetation zones PCT 1776 in an 'intact' and 'disturbed' condition for the project will require offset under the BAM.

6.5.3 Impacts that do not require further assessment

As described in section 3.1.1.3 of the BAM, impacts to non-native vegetation (cleared land 'exotic grassland') were not considered beyond section 5.4 or for section 6.2 (including section 6.2.1.4) of the BAM and did not require an offset. Hence, they have not been assessed here.

Table 6.1: Vegetation zones assessed that require an offset.

Veg zone no.	Plant community type	Condition class	Biodiversity Risk Weighting	Impact type		
				Complete clearing (ha)	Partial Impact - APZ (ha)	Total impact*(ha)
1	PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Disturbed	1.75	0.24	0.16	0.40
2		Intact	1.75	0.17	0.10	0.27
Total clearing (native vegetation)				**0.41**	**0.26**	**0.67**
3		Cleared	1.75	2.23	0.39	2.62

* subject to rounding errors.

7. Final Credit Calculations

7.1 Credit calculations and classes

7.1.1 Ecosystem credits

The ecosystem credits required to offset the proposal are provided in **Table 7.1** and **Appendix C**. A total of **14** ecosystem credits are required to offset the development

The following offset rules apply:

- Sydney Coastal Dry Sclerophyll Forests (including PCT's 1138, 1253, 1625, 1636, 1638, 1776, 1778, 1782, 1786) - Sydney Coastal Dry Sclerophyll Forests - ≥ 50% - < 70% cleared group (including Tier 6 or higher)
- In the following subregions – Pittwater ,Cumberland, Sydney Cataract, Wyong and Yengo. Or any IBRA subregion that is within 100 km of the outer edge of the impacted site.
- Containing hollow bearing trees – yes

The total cost of ecosystem credits, should the Biodiversity Conservation Trust (BCT) be used to offset the impacts, are currently (10 September 2020) estimated to be **$103,177.72** (excluding GST). Details are provided in **Table 7.2**. The proponent may also wish to purchase credits available on the market or may wish to pursue other offset sites as required. A final decision on how the credits will be secured will be made as the project progresses.

7.1.2 Species credits

No species credit species are required for the impacts proposed at the subject land.

Table 7.1: Ecosystem credits summary and credit profiles.

Veg zone no.	Plant community type	Condition class	Impact type			Credits required
			Complete clearing (ha)	Partial Impact - APZ (ha)	Total impact* (ha)	
1	PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	Disturbed	0.24	0.16	0.40	7
2		Intact	0.17	0.10	0.27	7
Total clearing (native vegetation)			**0.41**	**0.26**	**0.67**	**14**
3		Cleared	2.23	0.39	2.62	0

* subject to rounding errors.

Table 7.2: Ecosystem credits summary and credit profiles.

Plant community type	Price per credit	Methodology adjustment factor	No. of ecosystem credits	Final credits price (ex GST)
PCT 1776 - Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast	$7,369.84	2.4240	14	$103,177.72

References

Backhouse, G (2018). Spider Orchids: *The Genus Caladenia and its relatives in Australia.* Gary Backhouse, Melbourne.

Commonwealth Department of the Environment & Energy (2012). Interim Biogeographic Regionalisation for Australia, Version 7. Available online: http://www.environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps, accessed 14 December 2018.

Department of Environment and Conservation (DEC) (NSW) (2004b). Natural Resource Management Advisory Series: Note 8: Flying Fox Camps. Available online: http://www.environment.nsw.gov.au/resources/nature/landholderNotes08FlyingFoxCamps.pdf, accessed 14 December 2018.

Department of the Environment (2019). National Flying-fox Monitoring Program. Online database available at: http://www.environment.gov.au/biodiversity/threatened/species/flying-fox-monitoring, accessed 3 July 2019.

Department of Planning and Environment (NSW) (2019). NSW Planning Portal. Online database available at: https://www.planningportal.nsw.gov.au/find-a-property, accessed 3 July 2019.

Harden, G. J. (ed.) (1990-2002). Flora of New South Wales Volume 1-4, and including

Natural Resource Access Regulator (NRAR) (2018) Guidelines for controlled activities on Waterfront Land – Riparian Corridors. Published by NSW Department of Industry.

NSW Scientific Committee (2002). Final determination for 'Duffys Forest Ecological Community in the Sydney Basin Bioregion'. Available online: https://www.environment.nsw.gov.au/determinations/DuffysForestEcologicalCommunitySydneyEndComListing.htm, accessed 18 December 2018.

Office of the Environment (OEH) (2016a). The native vegetation of the Sydney Metropolitan Area (Version 3). NSW Office of Environment and Heritage, Sydney.

Office of Environment and Heritage (NSW OEH) (2016b). *NSW Guide to Surveying Threatened Plants*. Office of Environment and Heritage, Sydney.

Office of Environment and Heritage (NSW OEH) (2017a). Biodiversity Assessment Method. Office of Environment and Heritage for the NSW Government, Sydney.

Office of Environment and Heritage (NSW OEH) (2017b). Guidance to assist a decision-maker to determine a serious and irreversible impact. Office of Environment and Heritage for the NSW Government, Sydney.

Office of Environment and Heritage (NSW OEH) (2017c). Threatened Species Profile – Ancistrachne maidenii – Profile. Office of the Environment and Heritage for the NSW Government, Sydney.

Office of Environment and Heritage (OEH) (2018). 'Species credit' threatened bats and their habitats. Office of Environment and Heritage for the NSW Government, Sydney.

Office of Environment and Heritage (NSW OEH) (2019a). BioNet Atlas of NSW Wildlife. Accessed at: http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx.

Office of Environment and Heritage (NSW OEH) (2019b). NSW Vegetation Information Sydney (VIS) Classification Database VIS 2.1, logged in as public user at: http://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx?ReturnUrl=%2fNSWVCA20PRapp%2fdefault.aspx.

Office of Environment and Heritage (OEH) (2019c). *Threatened Species Profiles Database*. Online database available at: http://www.environment.nsw.gov.au/threatenedSpeciesApp/, accessed 28 March 2018.

Tozer, M. G., Turner, K., Simpson, C. C., Keith, D. A., Beukers, P., Mackenzie, B., Tindall, D. & Pennay, C. (2006) Native Vegetation of Southeast NSW: *A Revised Classification and Map for the Coast and Eastern Tablelands*. Version 1.0. Department of Environment & Conservation and Department of Natural Resources, Sydney.

Tozer, M.G., Turner, K., Keith, D.A., Tindall, D., Pennay, C., Simpson, C., MacKenzie, B., Beukers, M. and Cox, S. (2010) Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Cunninghamia 11(3): 359-406.

Travers Bushfire & Ecology (2019a). Vegetation Management Plan – Lot 1, DP1151370, 1 Sirius Road, Lane Cove West.

Travers Bushfire & Ecology (2019b). Bushfire Protection Assessment – Proposed Data Centre Warehouse/Distribution Centre, Lot 1, DP1151370, 1 Sirius Road, Lane Cove West.

Van der Ree, R., J. McDonnell, I. Temby, J. Nelson & E. Whittingham (2005). The establishment and dynamics of a recently established urban camp of flying foxes (Pteropus poliocephalus) outside their geographic range. *Journal of Zoology*. 268:177-185. The Zoological Society of London.

Willow Tree Planning (2019). Proposed Data Centre, 1 Sirius Road, Lane Cove West (Lot 1 in DP 1151370). Prepared by Willow Tree Planning on behalf of Greenbox Architecture.

Appendix A: Plot data collected

Plot No.	PCT	Area (ha)	Patch size	Condition class	Zone	Easting	Northing	Bearing
1	1776	0.28	101	Intact	56	328206	6257505	16
2	1776	0.40	101	Disturbed	56	328362	6257647	65
3	1776	2.78	101	Cleared	56	328251	6257609	76
4	1776		101	Cleared	56	328204	6257560	225

Plot No.	Composition					
	Tree	Shrub	Grass	Forb	Fern	Other
1	5	22	13	7	4	4
2	7	7	9	2	2	5
3	0	0	1	2	0	0
4	0	0	0	2	1	0

Plot No.	Structure					
	Tree	Shrub	Grass	Forb	Fern	Other
1	36.3	23.8	29.2	6.9	1.4	4.3
2	43.5	1.0	1.8	0.2	0.2	0.9
3	0.0	0.0	0.1	0.2	0.0	0.0
4	0.0	0.0	0.0	0.2	1.0	0.0

Plot No.	Function										
	Large trees	Hollow trees	Litter cover	Fallen logs	Tree stem 5-10	Tree stem 10-20	Tree stem 20-30	Tree stem 30-50	Tree stem 50-80	Tree regen	High threat exotic
1	1	2	74.0	29.2	0	1	1	1	1	0	0.9
2	1	1	74.0	128.0	1	1	1	1	0	1	62.9
3	0	0	13.2	0.0	0	0	0	0	0	0	17.7
4	0	0	3.0	0.0	0	0	0	0	0	0	31.0

Appendix B: Flora and fauna species inventories

Flora

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Alliaceae	*Nothoscordum gracile*	Onion Weed	Exotic	x								
Anthericaceae	*Chlorophytum comosum*	Spider Plant	Exotic	x			0.1	1				
Anthericaceae	*Laxmannia gracilis*	Slender Wire Lily	Native	Forb	0.1	2						
Apiaceae	*Actinotus minor*	Lesser Flannel Flower	Native	Forb	0.1	5						
Apiaceae	*Centella asiatica*	Indian Pennywort	Native	Forb								
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	Exotic	x			0.1	20	5	400	5	400
Apiaceae	*Foeniculum vulgare*	Fennel	Exotic	x								
Apiaceae	*Xanthosia pilosa*	Woolly Xanthosia	Native	Forb	1	100						
Apiaceae	*Xanthosia tridentata*	Rock Xanthosia	Native	Forb	0.1	10	0.1	1				
Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush	Exotic	x							0.5	100
Araliaceae	*Hydrocotyle sibthorpioides*		Native	Forb							0.1	5
Araliaceae	*Polyscias sambucifolia*	Elderberry Pana	Native	Shrub	0.1	5						
Asparagaceae	*Asparagus aethiopicus*	Ground Asparagus	Exotic	x	0.1	2	0.1	10				
Aspleniaceae	*Asplenium flabellifolium*	Necklace Fern	Native	Fern	0.3	20						
Asteraceae	*Ageratina adenophora*	Crofton Weed	Exotic	x			0.1	20				
Asteraceae	*Aster* sp.		Exotic	x							0.1	1
Asteraceae	*Bidens pilosa*	Cobblers Pegs	Exotic	x			0.1	5	0.3	10		
Asteraceae	*Cirsium vulgare*	Spear Thistle	Exotic	x					0.1	20	1	100
Asteraceae	*Conyza bonariensis*		Exotic	x			0.1	10				
Asteraceae	*Conyza* sp.		Exotic	x	0.1	10			0.3	50	0.3	100
Asteraceae	*Gamochaeta* sp.		Exotic	x					0.3	20	0.1	20

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Asteraceae	*Hypochaeris radicata*	Catsear	Exotic	x							0.1	10
Asteraceae	*Lactuca serriola*	Prickly Lettuce	Exotic	x					0.1	5	1	100
Asteraceae	*Ozothamnus diosmifolius*	Rice Flower	Native	Shrub	0.1	1						
Asteraceae	*Senecio hispidulus*	Hill Fireweed	Native	Forb								
Asteraceae	*Senecio madagascariensis*	Fireweed	Exotic	x			0.1	1	0.1	1	0.1	1
Asteraceae	*Sigesbeckia orientalis*		Native	Forb								
Asteraceae	*Sonchus oleraceus*		Exotic	x					0.5	20	0.1	10
Asteraceae	*Taraxacum officinale*	Dandelion	Exotic	x					0.1	1		
Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine	Native	Other								
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern	Native	Fern	0.5	2						
Brassicaceae	*Hirschfeldia incana*	Hairy Brassica	Exotic	x					0.3	10		
Campanulaceae	*Wahlenbergia gracilis*		Native	Forb							0.1	20
Caryophyllaceae	*Arenaria serpyllifolia*	Lesser Thyme-leaved Sandwort	Exotic	x								
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	Native	Tree	0.5	10	0.2	1				
Chenopodiaceae	*Chenopodium album*	Fat Hen	Exotic	x					0.3	50		
Casuarinaceae	*Casuarina glauca*	Swamp Oak	Native	Tree								
Cyatheaceae	*Cyathea australis*	Black Tree-fern	Native	Other								
Cyperaceae	*Ficinia nodosa*	Knobby Club-rush	Native	Grass & grasslike								
Cyperaceae	*Lepidosperma laterale*		Native	Grass & grasslike	6	250	0.1	10				
Cyperaceae	*Schoenus melanostachys*	Black Bog-rush	Native	Grass & grasslike	0.5	10						
Dennstaedtiaceae	*Pteridium esculentum*	Common Bracken	Native	Fern	0.5	50	0.1	10			1	20
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern	Native	Fern	2	50	0.1	30				
Dilleniaceae	*Hibbertia fasciculata*		Native	Shrub								
Dilleniaceae	*Hibbertia* sp.		Native	Shrub	0.5	30						
Elaeocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash	Native	Shrub	0.1	1						

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Ericaceae - Epacridoideae	*Leucopogon juniperinus*	Prickly Beard-heath	Native	Shrub	0.5	20						
Ericaceae - Epacridoideae	*Woollsia pungens*		Native	Shrub	0.3	25						
Euphorbiaceae	*Euphorbia peplus*	Petty Spurge	Exotic	x					0.3	100		
Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart	Native	Shrub			0.2	5				
Euphorbiaceae	*Ricinus communis*	Castor Oil Plant	Exotic	x								
Fabaceae - Caesalpinioideae	*Senna pendula* var. *glabrata*		Exotic	x			0.5	5				
Fabaceae - Faboideae	*Bossiaea obcordata*	Spiny Bossiaea	Native	Shrub	0.3	10						
Fabaceae - Faboideae	*Dillwynia elegans*		Native	Shrub	0.5	20						
Fabaceae - Faboideae	*Genista monspessulana*	Montpellier Broom	Exotic	x								
Fabaceae - Faboideae	*Hardenbergia violacea*	Purple Coral Pea	Native	Other								
Fabaceae - Faboideae	*Lotus* sp.		Exotic	x					1	50	2	200
Fabaceae - Faboideae	*Melilotus officinalis*	Common Melilot	Exotic	x					25	500	5	250
Fabaceae - Faboideae	*Pultenaea flexilis*	Graceful Bush-pea	Native	Shrub								
Fabaceae - Faboideae	*Trifolium campestre*	Hop Clover	Exotic	x								
Fabaceae - Faboideae	*Trifolium repens*	White Clover	Exotic	x					8	100	1	100
Fabaceae - Faboideae	*Vicia sativa*		Exotic	x					0.1	10		
Fabaceae - Faboideae	*Vicia* sp.		Exotic	x					0.1	25		
Fabaceae - Mimosoideae	*Acacia linifolia*	White Wattle	Native	Shrub	1	20						
Fabaceae - Mimosoideae	*Acacia longifolia*		Native	Shrub	1	20	0.1	1				
Fabaceae - Mimosoideae	*Acacia parramattensis*	Parramatta Wattle	Native	Tree			3	2				
Fabaceae - Mimosoideae	*Acacia saligna*	Golden Wreath Wattle	Exotic	x								
Fabaceae - Mimosoideae	*Acacia suaveolens*	Sweet Wattle	Native	Shrub	0.5	10						
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses	Native	Shrub	0.5	50						
Gentianaceae	*Centaurium erythraea*	Common Centaury	Exotic	x					0.1	10	0.5	150
Haloragaceae	*Gonocarpus teucrioides*	Raspwort	Native	Forb	5	200						

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Juncaceae	*Juncus* sp.		Native	Grass & grasslike					0.1	1		
Lauraceae	*Cassytha glabella*		Native	Other			0.1	1				
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	Exotic	x	0.5	10	15	50				
Lindsaeaceae	*Lindsaea linearis*	Screw Fern	Native	Fern								
Lomandraceae	*Lomandra cylindrica*	Needle Mat-rush	Native	Grass & grasslike	0.3	5						
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush	Native	Grass & grasslike	1	100						
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	Native	Grass & grasslike	1.5	30	1	10				
Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush	Native	Grass & grasslike	2	150	0.1	5				
Lomandraceae	*Lomandra obliqua*		Native	Grass & grasslike	0.3	50						
Lomariopsidaceae	*Nephrolepis cordifolia*	Fishbone Fern	Exotic	x								
Malvaceae	*Malva parviflora*	Small-flowered Mallow	Exotic	x								
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	Exotic	x							0.1	30
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	Exotic	x					0.3	1	0.2	50
Moraceae	*Ficus rubiginosa*	Port Jackson Fig	Native	Tree								
Moraceae	*Morus alba*	White Mulberry	Exotic	x					0.1	1		
Myrtaceae	*Angophora costata*	Sydney Red Gum	Native	Tree	15	6	20	4				
Myrtaceae	*Corymbia gummifera*	Red Bloodwood	Native	Tree			5	2				
Myrtaceae	*Eucalyptus pilularis*	Blackbutt	Native	Tree								
Myrtaceae	*Eucalyptus piperita*	Sydney Peppermint	Native	Tree	20	10	10	2				
Myrtaceae	*Kunzea ambigua*	Tick Bush	Native	Shrub	0.3	5						
Myrtaceae	*Leptospermum* sp.		Native	Shrub	0.1	20						
Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark	Native	Shrub								
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant	Exotic	x			0.2	10				
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet	Exotic	x			0.5	10				
Oleaceae	*Ligustrum sinense*	Small-leaved Privet	Exotic	x	0.1	1	35	100			0.3	20

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Oleaceae	*Notelaea longifolia*	Large Mock-olive	Native	Tree	0.5	5						
Oleaceae	*Olea europaea* subsp. *cuspidata*	African Olive	Exotic	x								
Onagraceae	*Oenothera* sp.		Exotic	x					0.1	5	3	200
Orchidaceae	*Cryptostylis erecta*	Bonnet Orchid	Native	Forb	0.1	20						
Orchidaceae	*Dipodium variegatum*		Native	Forb								
Orchidaceae	*Microtis* sp.		Native	Forb								
Oxalidaceae	*Oxalis perennans*		Native	x					0.1	1		
Passifloraceae	*Passiflora suberosa*	Cork Passionflower	Exotic	x			0.1	3				
Phormiaceae	*Dianella caerulea* var. *producta*		Native	Forb	0.5	20	0.1	10				
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush	Native	Shrub	0.1	1						
Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree	Native	Tree	0.3	10	5	20				
Phyllanthaceae	*Phyllanthus hirtellus*	Thyme Spurge	Native	Shrub								
Phyllanthaceae	*Poranthera microphylla*		Native	Forb								
Picrodendraceae	*Micrantheum ericoides*		Native	Shrub	0.5	20						
Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry	Native	Other	0.3	50	0.1	1				
Pittosporaceae	*Bursaria spinosa* subsp. *spinosa*	Blackthorn	Native	Shrub								
Pittosporaceae	*Pittosporum undulatum*	Native Daphne	Native	Shrub			0.2	2				
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongue	Exotic	x					0.5	50	0.3	50
Poaceae	*Aristida vagans*	Threeawn Speargrass	Native	Grass & grasslike	0.1	5						
Poaceae	*Arundo donax*	Spanish Reed	Exotic	x								
Poaceae	*Austrostipa pubescens*		Native	Grass & grasslike	0.5	25	0.1	1				
Poaceae	*Axonopus fissifolius*	Narrow-leafed Carpet Grass	Exotic	x								
Poaceae	*Briza maxima*	Quaking Grass	Exotic	x								
Poaceae	*Briza subaristata*		Exotic	x								
Poaceae	*Bromus catharticus*	Prairie Grass	Exotic	x					0.5	30		

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	Exotic	x					1	50		
Poaceae	*Chloris gayana*	Rhodes Grass	Exotic	x					15	200	20	300
Poaceae	*Cortaderia* sp.		Exotic	x			1	5			0.2	1
Poaceae	*Cynodon dactylon*	Couch	Exotic	x					10	100	10	100
Poaceae	*Digitaria parviflora*	Small-flowered Finger Grass	Native	Grass & grasslike			0.1	1				
Poaceae	*Digitaria sanguinalis*	Summer Grass	Exotic	x								
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	Exotic	x			0.1	5				
Poaceae	*Entolasia marginata*		Native	Grass & grasslike	1	50	0.1	50				
Poaceae	*Entolasia stricta*	Wiry Panic	Native	Grass & grasslike	10	250	0.1	50				
Poaceae	*Eragrostis brownii*	Brown's Lovegrass	Native	Grass & grasslike								
Poaceae	*Eragrostis curvula*	African Lovegrass	Exotic	x							0.5	20
Poaceae	*Festuca* sp.		Exotic	x								
Poaceae	*Hordeum* sp.			x							0.2	100
Poaceae	*Imperata cylindrica*	Blady Grass	Native	Grass & grasslike	5	300						
Poaceae	*Lolium* sp.		Exotic	x					10	100	5	200
Poaceae	*Melinus repens*	Red Natal Grass	Exotic	x			0.1	1				
Poaceae	*Microlaena stipoides*	Weeping Grass	Native	Grass & grasslike	1	200						
Poaceae	*Oplismenus aemulus*	Australian Basket Grass	Native	Grass & grasslike								
Poaceae	*Oplismenus imbecillis*	Creeping Beard Grass	Native	Grass & grasslike			0.1	5				
Poaceae	*Panicum simile*	Two-colour Panic	Native	Grass & grasslike								
Poaceae	*Paspalidium distans*		Native	Grass & grasslike			0.1	1				
Poaceae	*Paspalum dilatatum*	Paspalum	Exotic	x					1	50		
Poaceae	*Paspalum urvillei*	Vasey Grass	Exotic	x							5	150
Poaceae	*Setaria parviflora*		Exotic	x	0.1	1			0.1	5	0.5	100
Poaceae	*Sporobolus africanus*	Parramatta Grass	Exotic	x								

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Poaceae	*Sporobolus fertilis*	Giant Parramatta Grass	Exotic	x							0.1	1
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass	Exotic	x					0.3	10		
Poaceae	*Themeda triandra*	Kangaroo Grass	Native	Grass & grasslike								
Polygonaceae	*Acetosa sagittata*	Turkey Rhubarb	Exotic	x							10	100
Polygonaceae	*Rumex brownii*	Swamp Dock	Native	Forb					0.1	1		
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	Exotic	x					3	150	0.5	100
Primulaceae	*Myrsine variabilis*		Native	Shrub								
Proteaceae	*Banksia integrifolia*	Coast Banksia	Native	Tree								
Proteaceae	*Grevillea buxifolia*	Grey Spider Flower	Native	Shrub	1	20						
Proteaceae	*Grevillea robusta*	Silky Oak	Native	Tree			0.3	1				
Proteaceae	*Grevillea sericea*	Pink Spider Flower	Native	Shrub								
Proteaceae	*Lomatia silaifolia*	Crinkle Bush	Native	Shrub	0.1	1	0.1	2				
Proteaceae	*Persoonia lanceolata*	Lance Leaf Geebung	Native	Shrub	0.3	1						
Proteaceae	*Persoonia pinifolia*	Pine-leaved Geebung	Native	Shrub			0.1	1				
Proteaceae	*Xylomelum pyriforme*	Woody Pear	Native	Shrub								
Pteridaceae	*Adiantum* sp.		Native	Fern	0.1	1						
Pteridaceae	*Pellaea falcata*	Sickle Fern	Native	Fern			0.1	2				
Rhamnaceae	*Pomaderris lanigera*	Woolly Pomaderris	Native	Shrub	0.5	5	0.1	1				
Rosaceae	*Cotoneaster* sp.		Exotic	x								
Rosaceae	*Rubus fruticosus*	Blackberry	Exotic	x	0.1	1	0.1	5	2	15	15	150
Rutaceae	*Zieria pilosa*	Pilose-leafed Zieria	Native	Shrub	0.5	50						
Sapindaceae	*Dodonaea triquetra*	Large-leafed Hop-bush	Native	Shrub	15	300	0.2	20				
Scrophulariaceae	*Verbascum thapsus*	Great Mullein	Exotic	x					0.1	1	0.2	10
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	Native	Other	1	30	0.1	5				
Solanaceae	*Solanum mauritianum*	Wild Tobacco	Exotic	x			0.1	5			0.2	1

Family	Scientific Name	Common name	Native/Exotic	BAM Growth Form	LCW01		LCW02		LCW03		LCW04	
					C	A	C	A	C	A	C	A
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	Exotic	x							0.1	10
Verbenaceae	*Lantana camara*	Lantana	Exotic	x	0.1	5	10	50				
Verbenaceae	*Verbena bonariensis*	Purpletop	Exotic	x					0.5	25	0.1	30
Verbenaceae	*Verbena officinalis*	Common Verbena	Exotic	x			0.1	2	0.3	10		
Xanthorrhoeaceae	*Xanthorrhoea arborea*		Native	Other			0.5	1				
Xanthorrhoeaceae	*Xanthorrhoea media*	Grass Tree	Native	Other	1	10						

Fauna

Class	Family	Scientific name	Common name	Native/ Exotic	Ecoplanning
Amphibia	Myobatrachidae	Crinia signifera	Common Eastern Froglet	Native	W
Aves	Acanthizidae	*Gerygone mouki*	Brown Gerygone	Native	W
Aves	Artamidae	*Cracticus tibicen*	Australian Magpie	Native	W
Aves	Artamidae	*Cracticus torquatus*	Grey Butcherbird	Native	OW
Aves	Artamidae	*Strepera graculina*	Pied Currawong	Native	OW
Aves	Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	Native	W
Aves	Climacteridae	*Cormobates leucophaea*	White-throated Treecreeper	Native	W
Aves	Coraciidae	*Eurystomus orientalis*	Dollarbird	Native	W
Aves	Corvidae	*Corvus coronoides*	Australian Raven	Native	OW
Aves	Cuculidae	*Eudynamys orientalis*	Eastern Koel	Native	W
Aves	Cuculidae	*Scythrops novaehollandiae*	Channel-billed Cuckoo	Native	W
Aves	Estrildidae	*Neochmia temporalis*	Red-browed Finch	Native	OW
Aves	Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra	Native	OW
Aves	Halcyonidae	*Todiramphus sanctus*	Sacred Kingfisher	Native	W
Aves	Hirundinidae	*Hirundo neoxena*	Welcome Swallow	Native	OW
Aves	Maluridae	*Malurus cyaneus*	Superb Fairy-wren	Native	W
Aves	Meliphagidae	*Acanthorhynchus tenuirostris*	Eastern Spinebill	Native	W
Aves	Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	Native	W
Aves	Meliphagidae	*Manorina melanocephala*	Noisy Miner	Native	W
Aves	Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	Native	W
Aves	Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin	Native	OW
Aves	Podargidae	Podargus strigoides	Tawny Frogmouth	Native	O
Aves	Psittacidae	*Alisterus scapularis*	Australian King-Parrot	Native	W
Aves	Psittacidae	*Platycercus elegans*	Crimson Rosella	Native	OW
Aves	Psittacidae	*Trichoglossus haematodus*	Rainbow Lorikeet	Native	OW

Class	Family	Scientific name	Common name	Native/ Exotic	Ecoplanning
Aves	Pycnonotidae	*Pycnonotus jocosus**	Red-whiskered Bulbull*	Exotic	W
Aves	Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	Native	W
Aves	Threskiornithidae	*Threskiornis molucca*	Australian White Ibis	Native	O
Mammalia	Canidae	*Vulpes vulpes**	European Red Fox*	Exotic	P
Mammalia	Molossidae	*Mormopterus ridei*	Eastern Free-tailed Bat	Native	U
Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	Native	OW
Mammalia	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	Native	U
Mammalia	Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	Native	U
Mammalia	Vespertilionidae	*Scotorepens orion*	Eastern broad-nosed Bat	Native	U
Mammalia	Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	Native	U
Reptilia	Carphodactylidae	*Phyllurus platurus*	Broad-tailed Gecko	Native	O

Observation type = O (seen), W (heard call), OW (seen and heard), P (scat)

Appendix C: Biodiversity payment summary report and credit summary

BAM Credit Summary Report

Proposal Details

Assessment Id
00013369/BAAS17055/18/00013370

Proposal Name
1 Sirius Road Lane Cove West

BAM data last updated *
20/08/2020

Assessor Name
Tammy Paartalu

Report Created
10/09/2020

BAM Data version *
30

Assessor Number
BAAS17055

BAM Case Status
Finalised

Date Finalised
10/09/2020

Assessment Revision
1

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Coastal enriched sandstone dry forest								
1	1776_Intact	59.6	0.3	0.25	High Sensitivity to Potential Gain	1.75		7
2	1776_Disturbed	40.1	0.4	0.25	High Sensitivity to Potential Gain	1.75		7

NSW GOVERNMENT

BAM Credit Summary Report

3	1776_Cleared	0.8	2.6	0.25	High Sensitivity to Potential Gain	1.75		0
							Subtotal	**14**
							Total	**14**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits

Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00013369/BAAS17055/18/00013370	68	1	10/09/2020

Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Tammy Paartalu	BAAS17055	1 Sirius Road Lane Cove West	Finalised

Assessment Type	Date Finalised
Major Projects	10/09/2020

PCT list

Price calculated	PCT common name	Credits
Yes	**1776 -** Coastal enriched sandstone dry forest	14

Species list

Price calculated	Species	Credits

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

NSW GOVERNMENT

Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Pittwater	**1776** - Coastal enriched sandstone dry forest	No	Sydney Coastal Dry Sclerophyll Forests >=50% and <70%	20.69%	$236.42	2.4240	$7,369.84	14	$103,177.72

Subtotal (excl. GST)	**$103,177.72**
GST	**$10,317.77**
Total ecosystem credits (incl. GST)	**$113,495.49**

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price

No species available

Grand total	**$113,495.49**

Assessment Id: 00013369/BAAS17055/18/00013370
Proposal Name: 1 Sirius Road Lane Cove West
Page 3 of 4

Note: pages 2 and 4 of the payment report have been excluded as they are blank.