ATTACHMENT T

ACS Environmental Pty Ltd

REVISED ECOLOGICAL ASSESSMENT

FOR

PROPOSED AMENDED RE-DEVELOPMENT

AT

CASTLE RIDGE RETIREMENT RESORT

350 OLD NORTHERN ROAD,

CASTLE HILL

Prepared for:

STOCKLANDS

REVISED 30th AUGUST 2022

ACS Environmental P/L

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Consultants experience

The director principal ecologist at 'Actinotus Consultancy Services (ACS) – Environmental P/L' (formerly Actinotus Environmental Consultants) has collectively worked in the area of biodiversity impact assessment, bushland management planning and bushfire hazard assessment services for a period of greater than 20 years. He also has over 20 years of experience in scientific research (ecology) and teaching in biological science.

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EXECUTIVE SUMMARY

'ACS (Actinotus Consultancy Services) – Environmental' were commissioned by FPD Planning on behalf of Stockland to undertake an ecological assessment of vegetation and undertake a biodiversity impact assessment for proposed amended re-development of the residential complex on an area of developed, landscaped land at the Castle Ridge Retirement Resort, 350 Old Northern Road, Castle Hill.

The subject site has been extensively modified in relation to natural vegetation structure and floristics, the site currently containing existing independent living units and other retirement facilities in an area of managed curtilage with formal garden beds and landscaped areas of planted and established trees.

Established trees have been planted mainly along the surrounding boundaries of internal roadways and grassy garden areas and include locally-occurring and non-locally occurring indigenous species as well as exotic ornamental species, the tree assemblages and locations comprehensively documented in an original arboricultural report by Scales (2022) and further updated by a recent arboricultural report by Eco Logical (2022).

Ground-truthing of tracts of canopy vegetation within the residential sections of the resort (Scales 2022; Eco Logical 2022) indicate that most individuals of tree and shrub species have been planted in a landscape plan for the development, probably in the early 1980's, when the development was first constructed. As such, and in contrast to the Hills Shire Council Mapping, no areas of remnant Blue Gum High Forest are considered to occur within the residential areas of the subject land. Ground-truthing is consistent with recent mapping by DPE (2022) and the aerial imagery of the land in 1943.

Similarly, the tract of maintained parkland that occurs in the valley landform between the two linear residential sections of the resort ('Palisander Park') (Scales 2022), is landscaped mostly with exotic ornamental species and non-locally occurring indigenous species (Scales 2022; Eco Logical 2022), though a few individuals of planted Sydney Blue Gum occur within the canopy. The new revised masterplan proposal ensures that none of these individuals of Blue Gum will be impacted by the proposed re-development (Scales 2022; Eco Logical 2022).

Three individuals of Turpentine have established in association with the landscaped area of the complex at the edge of the managed grassland. Though, unlikely, these individuals may be remnant, in the form of seedling propagation and regeneration, of a former distribution of STIF or BGHF that may have occurred at the location before clearing in association with shale-based soils. As such, these individuals may represent such a former distribution of STIF or BGHF but will not be impacted by the proposed re-development (Eco Logical 2022). Tree No. 14 however, will require specific mitigation measures to ensure its retention (Eco Logical 2022).

All of the trees observed in this assessment occur within managed curtilage with no natural shrub or ground cover plants present. None of the trees were sufficiently mature or appear to have formed any hollows which may provide shelter and/or breeding resources for birds and arboreal mammals.

In relation to locally-occurring indigenous trees occurring within the garden beds or other landscaped areas within the subject site, this vegetation does not contain any threatened flora species or threatened ecological communities and it is considered that any proposed redevelopment of the site will have no impact on any species or ecological community in relation to the requirements of Section 5A (s.5A) of the *Environmental Planning & Assessment Act 1979.*

An assessment of species of fauna recorded within a 5km radius of the site and listed under the EPBC Act and the BC Act as threatened, found that habitat for these species does not occur at the highly modified and landscaped site. Though some threatened fauna species such as the Powerful Owl, Grey-headed Flying Fox and Eastern Bentwing Bat may occasionally forage in the vicinity of the subject site, it is considered that none would be impacted by any proposed redevelopment of the site.

As there are no threatened species, ecological communities or populations occurring at the subject site, it is not considered necessary to undertake any further assessment of significance or refer the proposal to the Director General of DPE or to the Commonwealth Department of Climate Change, Environment, Energy and Water (DCCEEW).

It is recommended that new trees are to be planted in a landscape plan for the proposed development would include many derived from species that are representative of BGHF and STIF at this location. Such a landscape plan would enhance the foraging prospects for native insectivorous feeding fauna to utilise the subject site.

It is considered that with appropriate safeguards implemented in relation to environmental issues of soil erosion, drainage, etc, engineered solutions and mitigation measures outlined in a Construction Environmental Management Plan for the proposed re-development would not lead to any significant direct or indirect impacts to surrounding vegetation or to any significant landscape modification.

ABBREVIATIONS

BC Act (2016) - Biodiversity Conservation Act

BGHF - Blue Gum High Forest

CEEC – Critically Endangered Ecological Community

CEMP - Construction Environment Management Plan

DCCEEW- Department of Climate Change, Environment, Energy and Water

DEC - Department of Environment and Conservation (now OEH)

DPE - Department of Planning and Environment

EEC – Endangered Ecological Community

EPA Act – Environment Protection Act

EPBC Act – Environment Protection and Biodiversity Conservation Act

NPWS – State National Parks and Wildlife Service

OEH – Office of the Environment and Heritage

RoTAP – Rare and Threatened Australian Plants

STIF - Sydney Turpentine Ironbark Forest

TSC Act – Threatened Species Conservation Act

INTRODUCTION

1.1 Proposed development

'ACS (Actinotus Consultancy Services) – Environmental' were commissioned by FPD Planning on behalf of Stockland to undertake an ecological impact assessment of vegetation and undertake a biodiversity survey within the grounds of the Castle Ridge Retirement Resort at 350 Old Northern Road, Castle Hill, and surrounding parks and reserves.

The proposed development is to undertake a staged demolition of the entire complex according to a new redesigned and amended Masterplan (Architectus May 2021) to redesign the village in order to address current structural, physical and social challenges and create new opportunities and more convenient access for residents. The most recent development master plan for the proposal has been amended to adopt significantly smaller floor plates with a maximum length of 40m. This break down of the built form envelopes allows for an increase in the number of buildings (from 9 to 14) that are significantly smaller in footprint and elevation. This will help to create a more 'village like' feel that is consistent with the character of existing development on the site (Architectus 2021)

The plans of the upgraded development is shown in detail in the arboricultural report by Eco Logical (2022). A list of 387 trees has been prepared by Eco Logical (2022) indicating the species of tree, the attributes of each individual and its status as to removal or retention.

Figure 1 indicates the area of study at the Castle Ridge Retirement Resort, 350 Old Northern Road, Castle Hill.

1.2 Study methodology

A comprehensive survey was undertaken on foot to identify the location of a total of 13 potentially 'locally - occurring' indigenous trees and 11 'locally-occurring' indigenous shrubs. A total of 5 individuals of 2 common 'locally occurring' species of shrubs are proposed for removal, whereas with mitigation measures where required, none of the 13 individuals of 6 species of 'locally-occurring' tree species are proposed for removal (Table 1; Eco Logical 2022).

These individuals may or may not be considered remnant individuals on the property and the survey included an ecological assessment of the landscaped and vegetated areas of the site and surrounds.

The ecological assessment will address the direct impacts to the potential ecological plant communities that occur on site and in the vicinity.

Figure 1 - Indicates the area of study at the Castle Ridge Retirement Resort (outlined in red) (from SIX maps). Note that the study area also includes the parkland area of Pioneer Place Reserve, located to the south-west of the village complex

Attributes of 23 individuals of potentially 'locally - occurring' indigenous trees and shrubs where potential impacts are listed in Table 1 (derived from Eco Logical 2022).

TREE NUMBER (Eco Logical 2022)	TREE or SHRUB SPECIES	TREE/SHRUB	HEIGHT (m)	CROWN (m)	DBH (mm)	COMMENT RETAIN/REMOVE	LOCATION - MAP SHEET NO. (Eco Logical 2022)
11	BANGALAY (*Eucalyptus botryoides*)	TREE	18	16	600	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN WITH MITIGATION	MAP 3
14	TURPENTINE (*Syncarpia glomulifera*)	TREE	13	11	690	RETAINED WITH MITIGATION	MAP 6
15	TURPENTINE (*Syncarpia glomulifera*)	TREE	14	10	620	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 6
131	TURPENTINE (*Syncarpia glomulifera*)	TREE	20	14	920	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 6
16	SYDNEY BLUE GUM (*Eucalyptus saligna*)	TREE	30	22	910	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 2
17	SYDNEY BLUE GUM (*Eucalyptus saligna*)	TREE	26	20	1050	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 2
94	SYDNEY BLUE GUM (*Eucalyptus saligna*)	TREE	28	8	420	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 2
97	SYDNEY BLUE GUM (*Eucalyptus saligna*)	TREE	25	18	940	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 2
132	SYDNEY BLUE GUM (*Eucalyptus saligna*)	TREE	20	34	1500	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 6
18	SYDNEY RED GUM (*Angophora costata*)	TREE	16	10	300	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 2
92	BLACKBUTT (*Eucalyptus pilularis*)	TREE	29	20	920	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 1
95	BLACKBUTT (*Eucalyptus pilularis*)	TREE	23	8	400	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 1
112	SPOTTED GUM (*Corymbia maculata*)	TREE	15	8	300	MATURE, HIGH PRIORITY INDIVIDUAL - RETAIN	MAP 2
21	PRICKLY PAPERBARK (*Melaleuca styphelioides*)	SHRUB	10	8	460	SHRUB - HABITAT UNLIKELY - REMOVE	MAP 2

TREE NUMBER (Eco Logical 2022)	TREE or SHRUB SPECIES	TREE/SHRUB	HEIGHT (m)	CROWN (m)	DBH (mm)	COMMENT RETAIN/REMOVE	LOCATION - MAP SHEET NO. (Eco Logical 2022)
23	PRICKLY PAPERBARK (*Melaleuca styphelioides*)	SHRUB	9	8	520	SHRUB - HABITAT UNLIKELY - REMOVE	MAP 2
31	PRICKLY PAPERBARK (*Melaleuca styphelioides*)	SHRUB	8	8	320	SHRUB - HABITAT UNLIKELY - REMOVE	MAP 2
33	PRICKLY PAPERBARK (*Melaleuca styphelioides*)	SHRUB	9	5	260	SHRUB - HABITAT UNLIKELY - REMOVE	MAP 2
90	BLUEBERRY ASH (*Elaeocarpus reticulatus*)	SHRUB	6	2	100	SHRUB - Species is exempt from protection under council DCP - REMOVE	MAP 2
129	WILLOW-LEAVED BOTTLEBRUSH (*Callistemon salignus*)	SHRUB	9	5	200	SHRUB - GOOD CONDITION - RETAIN	MAP 6
130	WILLOW-LEAVED BOTTLEBRUSH (*Callistemon salignus*)	SHRUB	10	5	220	SHRUB - GOOD CONDITION - RETAIN	MAP 6
61	SWEET PITTOSPORUM (*Pittosporum undulatum*)	SHRUB	5	5	100	SHRUB - Species is exempt from protection under council DCP - RETAIN	MAP 3
245	SWEET PITTOSPORUM (*Pittosporum undulatum*)	SHRUB	8	7	290	SHRUB - GOOD CONDITION - RETAIN	MAP 3
247	SWEET PITTOSPORUM (*Pittosporum undulatum*)	SHRUB	6	6	200	SHRUB - GOOD CONDITION - RETAIN	MAP 3
249	SWEET PITTOSPORUM (*Pittosporum undulatum*)	SHRUB	6	4	180	SHRUB - GOOD CONDITION - RETAIN	MAP 3

Table 1 - Attributes of 24 individuals of potentially 'locally-occurring' indigenous trees and shrubs that are proposed for retention (all trees) and removal (for the development (Eco Logical 2022)

Currently existing information on 'Threatened Flora of the Locality', defined as a 5km radius within and around the site, was accessed from the Bionet Atlas of NSW Wildlife (May 2022) and the Department of Climate Change, Environment, Energy and Water (DCCEEW) Protected Matters Environmental Reporting Tool (May 2022) databases.

The survey included an assessment of the presence, or likelihood of occurrence, of any threatened (endangered, vulnerable), rare (RoTAP) or regionally or locally significant species, or plant community, occurring on the site.

Specific details relating to floristic and fauna habitat survey and assessment are documented in following sections of this report.

1.3 Updated documents and information provided

- Castle Ridge Resort - Castle Hill (Urban Design Report) - Amended Master Plan prepared by Architectus (May 2021)
- Amended Arboricultural Impact Appraisal and Method Statement for Castle Ridge Retirement Resort, 350 Old Northern Road, Castle Hill - prepared by Andrew Scales (Naturally Trees) for Stocklands (April 2022)
- Arboricultural Impact Appraisal for Castle Ridge Retirement Resort, 350 Old Northern Road, Castle Hill - prepared by Eco Logical for FPD Planning on behalf of Stocklands (August 2022)

2 EXISTING ENVIRONMENT

2.1 Topography, geology and soils

The topography of the subject land is a fairly steeply sloping hillcrest sloping to the north-west on its eastern flanks, and similarly sloping hillcrest sloping to the south-east on its northern flanks (Figure 1). Both flanks of the existing development occur on either high side of a valley (Palisade Park) which drains to the west (Figure 1).

The local underlying geology of the subject area is the Ashfield Shale Series of the Wianamatta Group of Shales (Herbert 1983), the lithology of which is black to dark grey shale and laminite (Herbert 1983).

The Soil Landscape Grouping of the site is the colluvial 'West Pennant Hills' Soil Landscape Series, characterised by roling to steep sideslopes on Wianamatta Group shales and shale colluvium and where gradients are usually > 20% (Chapman & Murphy 1989).

Soils include deep red and brown podzolics on upper and mid-slopes with yellow and brown podzolics occurring on colluvial benches, and gleyed and yellow podzolics in poorly drained areas and drainage lines (Chapman & Murphy 1989).

2.2 Existing vegetation

The site currently contains existing independent living units in an area of managed curtilage with formal garden beds and landscaped areas of planted and established trees (Figure 1).

Established trees have been planted mainly along the surrounding boundaries of internal roadways and the managed grassy landscaped valley area central to the complex (Figures 2 & 3) and include up to 10 'locally-occurring' indigenous species, as well as many, mostly 'non-locally occurring' indigenous species or exotic ornamental species, the tree assemblages and locations documented in the updated arboricultural report by Eco Logical (2022).

The principal locally-occurring indigenous tree species observed at the site include Sydney Blue Gum, of which 5 individuals have been documented, and Turpentine, of which 3 individuals have been documented, with individuals of Spotted Gum, Blackbutt and Sydney Red Gum also occurring within the subject site (Scales 2022; Eco Logical 2022).

2.3 Fauna species recorded on site

Weather conditions at the time of survey included mild temperatures to 23^0 with clear skies and slight to no breeze.

Fauna species recorded during the site visit included common species of avifauna and one species of skink. Scats of Ring-tail Possum activity were evident in some areas of the subject site (Table 2).

No hollows suitable for nesting by birds or small arboreal mammals were evident in any of the trees. No Ringtail Possum dreys were evident in any of the trees or shrubs. No scratch marks were observed on any individual trees although Brush-tail Possum would be expected to occur at the site. Table 2 lists all common fauna species observed or considered to have potential to occur at the site.

Family	Scientific Name	Common Name	May 2017
BIRDS			
Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	e
Artamidae	*Cracticus torquatus*	Grey Butcherbird	3 OS
	Strepera graculina	Pied Currawong	3 OS
	Cracticus tibicen	Australian Magpie	4 OS
Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	5 OS
Charadriidae	*Vanellus miles*	Masked Lapwing	e
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	e
	*Streptopelia chinensis **	Spotted Turtle-Dove	e
Corvidae	*Corvus coronoides*	Australian Raven	h
Hirundinidae	*Hirundo neoxena*	Welcome swallow	2 OS
Passeridae	*Passer domesticus **	House Sparrow	e
Podargidae	*Podargus strigoides*	Tawny Frogmouth	e
Sturnidae	*Acridotheres tristis*	Common Myna	2 OS
	*Sturnus vulgaris**	Common Starling	e
Psittacidae	*Trichoglossus haematodus*	Rainbow Lorikeet	15 OS
	Glossopsitta concinna	Musk Lorikeet	15 OS
	Alisterus scapularis	King Parrot	2 OS
	Platycerus eximius	Eastern Rosella	e
	Platycerus elegans	Crimson Rosella	e
MAMMALS			
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	e
Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum	Scats observed below trees of Hickory Wattle and River Peppermint (Tree No. 79 from Scales 2022)
REPTILES			
Scincidae	*Lampropholis delicata*	Dark-flecked Garden Sunskink	1 OS
	Cryptoblepharus virgatus	Cream-striped Shining-skink	e
	Saproscincuc mustelinus	Weasel Shadeskink	e
	Lampropholis guichenoti	Pale-flecked Garden Sunskink	e
	Tiliqua scincoides	Common Bluetongue	e
AMPHIBIANS			
Myobatrachidae	*Crinea signifera*	Common Eastern Froglet	e

Code for Table 2

OS - on site
* introduced species
heard - characteristic call heard nearby
e – expected to visit occasionally

Table 2 - Fauna species observed and/or expected with potential to occur within or nearby the study area at 350 Old Northern Road, Castle Hill

Figure 2 - Upper section of grassy landscaped and managed area of Palisander Park indicating planted individual of Sydney Blue Gum within managed exotic grassland

Figure 3 - Middle section of grassy landscaped and managed area of Palisander Park (Figure 1) indicating planted individuals of exotic ornamental trees such as Liquidambar and Himalayan Deodara within managed exotic grassland

2.4 Historical vegetation distribution

Figure 4 is an image of aerial photography taken in 1943 that indicates that the subject site was almost totally cleared of trees at that time with only a few individuals associated with the creekline that occurs at the bottom of the land at its western end.

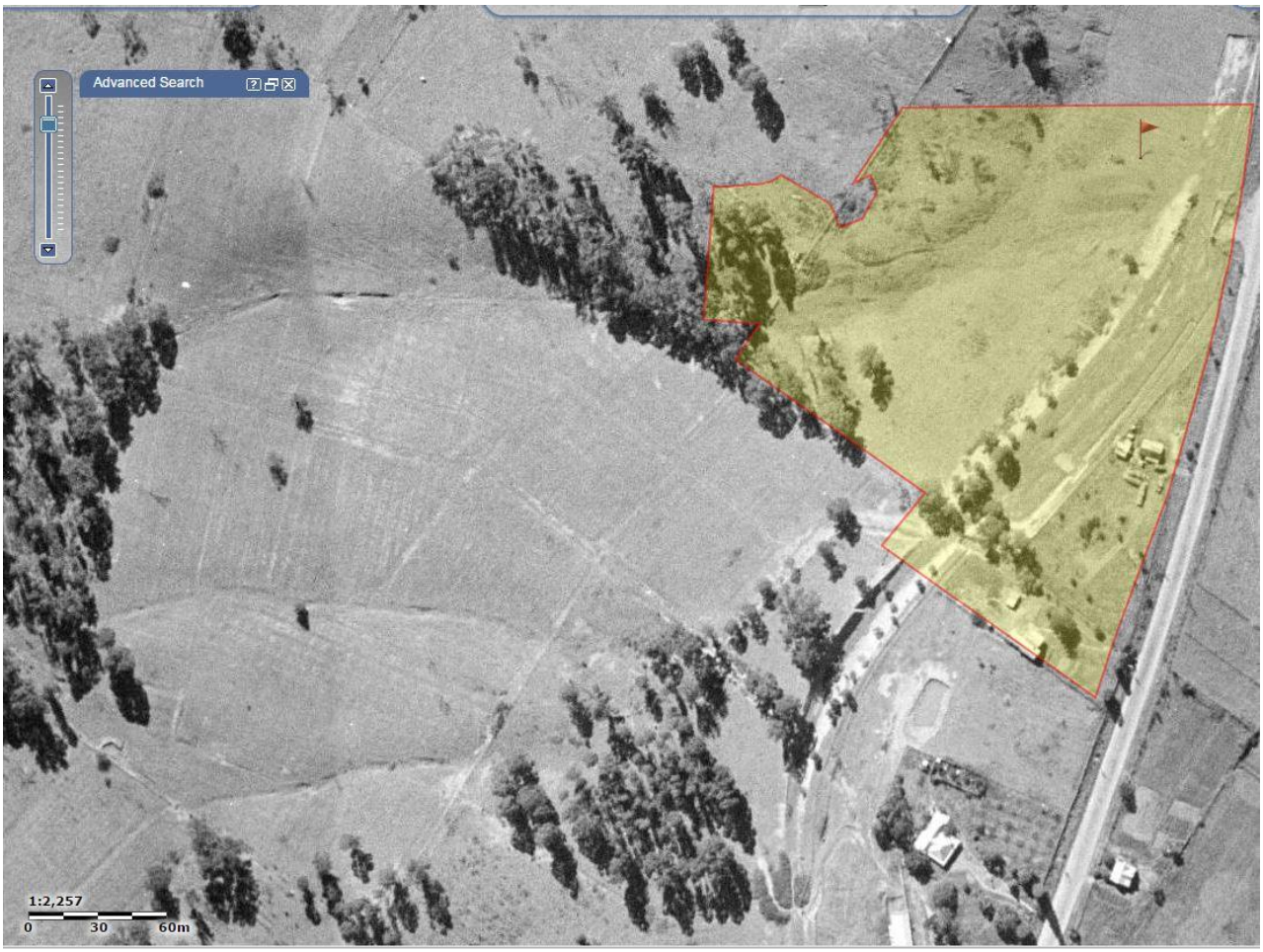

Figure 4 - Indicates an aerial image of the area of study at the current location of the Castle Ridge Retirement Resort taken in 1943 (outlined in red) (from SIX maps) showing extensive clearing of the landscape at that time.

3 ASSESSMENT OF STATUS OF INDIVIDUAL TREES AND ECOLOGICAL COMMUNITY ON SITE AND IN VICINITY

3.1 Ground-truthing and assessment

The likely origin of a total of only 10 potentially 'locally-occurring' indigenous tree and shrub species listed in Table 1, including some of the 5 that are proposed for removal was assessed by ground-truthing and examination of aerial photography and vegetation mapping by DPE (2022).

It appears that most of the individuals of these species have been planted in landscape plans, with the location of individuals of the Turpentine within the upper slopes of the south-eastern section of Palisander Park indicating that these individuals may either be remnant individuals or derived from former remnant trees (Figures 1 & 4).

3.2 Mapping of vegetation by DPE (2022)

Figure 5 indicates current mapping of the vegetation at the subject site by DPE (2022), well after the retirement resort was established more than 30 years ago.

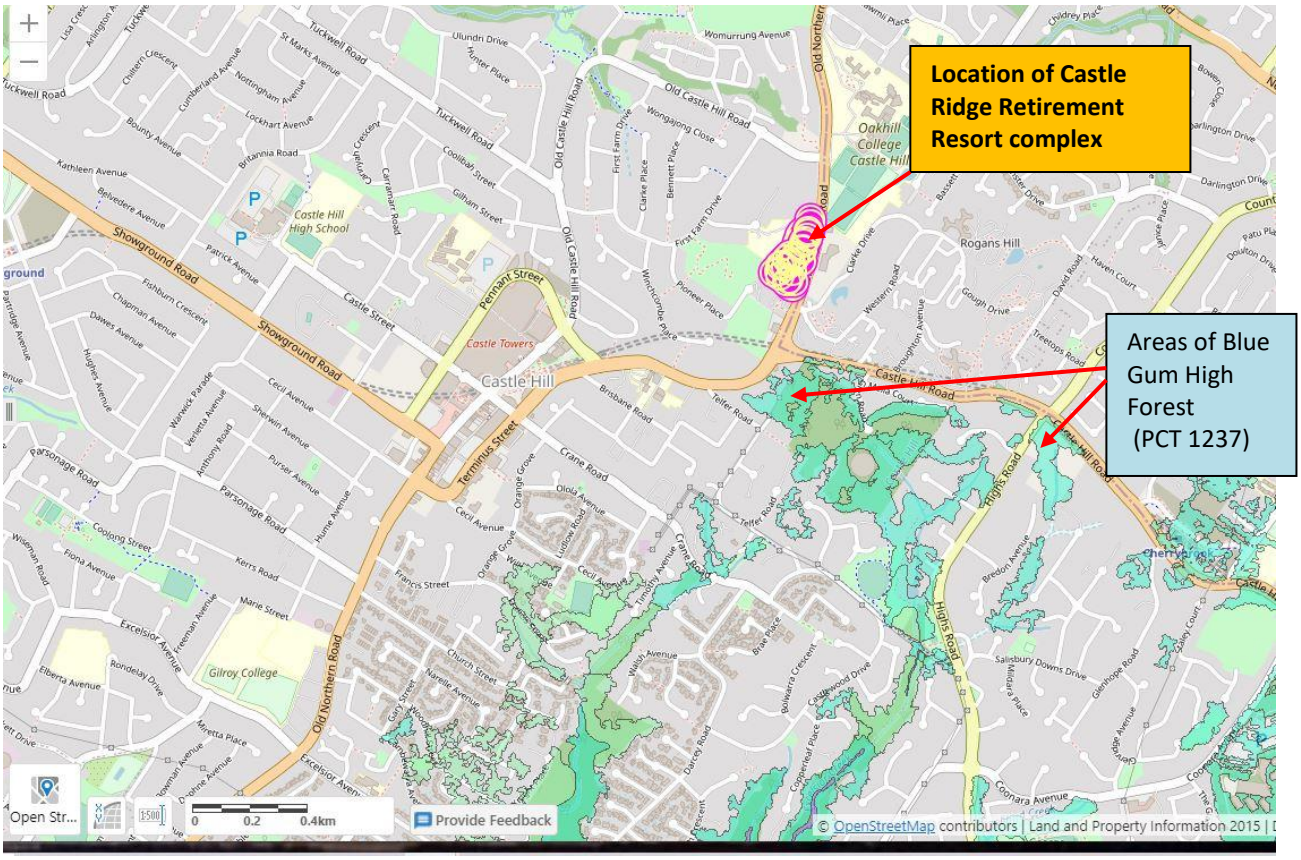

Figure 5 - Mapping of ecological communities at the locality around the Castle Ridge village complex (purple circles) (DPE 2022) indicating that there are no significant ecological communities occurring at the complex. Blue Gum High Forest (BGHF) is represented as PCT Code 1237 (green shaded polygons representing patches of BGHF in remnant wooded areas in the locality)

Ground-truthing of tracts of canopy vegetation within the residential sections of the resort indicate that most individuals of tree and shrub species have been planted in a landscape plan for the development, probably in the early 1980's, when the development was first constructed. As such, no areas of natural Blue Gum High Forest (BGHF) are considered to occur within the residential areas of the subject land. Ground-truthing is consistent with mapping by DPE (2022) and consistent with aerial imagery of the land in 1943 (Figure 4).

Similarly, the tract of maintained parkland that occurs in the valley landform between the two linear residential sections of the resort ('Palisander Park') (Figure 1) (Scales 2022), is landscaped mostly with exotic ornamental species and non locally-occurring indigenous species (Scales 2022; Eco Logical 2022), though a few individuals of planted Sydney Blue Gum occur within the canopy (Figures 2 & 3).

No individuals of planted Blue Gum would be impacted (Eco Logical 2022) in this latest amended proposal.

Though unlikely, remnant trees, or individuals derived from remnant vegetation, may occur in the south-western corner of the resort as indicated by their location on the 1943 imagery (Figure 4), consistent with their location at the edges of development at the subject site (Figure 6; Eco Logical 2022). Tree Numbers 14, 15 & 131 are all individuals of Sydney Turpentine. In this most recent master plan, all remnant individuals of Turpentine (Tree Nos. 14, 15 & 131 in Eco Logical 2022) would be retained as a result of the development, albeit specific mitigation measures would be undertaken for the retention of Tree No. 14 (Figure 6).

All other individuals of 'locally-occurring' indigenous trees would be retained including Tree No. 11, an individual of Coast Mahogany or Bangalay, which would also require specific mitigation measures to be undertaken for its retention (Eco Logical 2022).

All of the trees observed in this assessment occur within managed curtilage with no natural shrub or ground cover. None of the trees were sufficiently mature or appear to have formed any hollows which may provide shelter and/or breeding resources for birds and arboreal mammals.

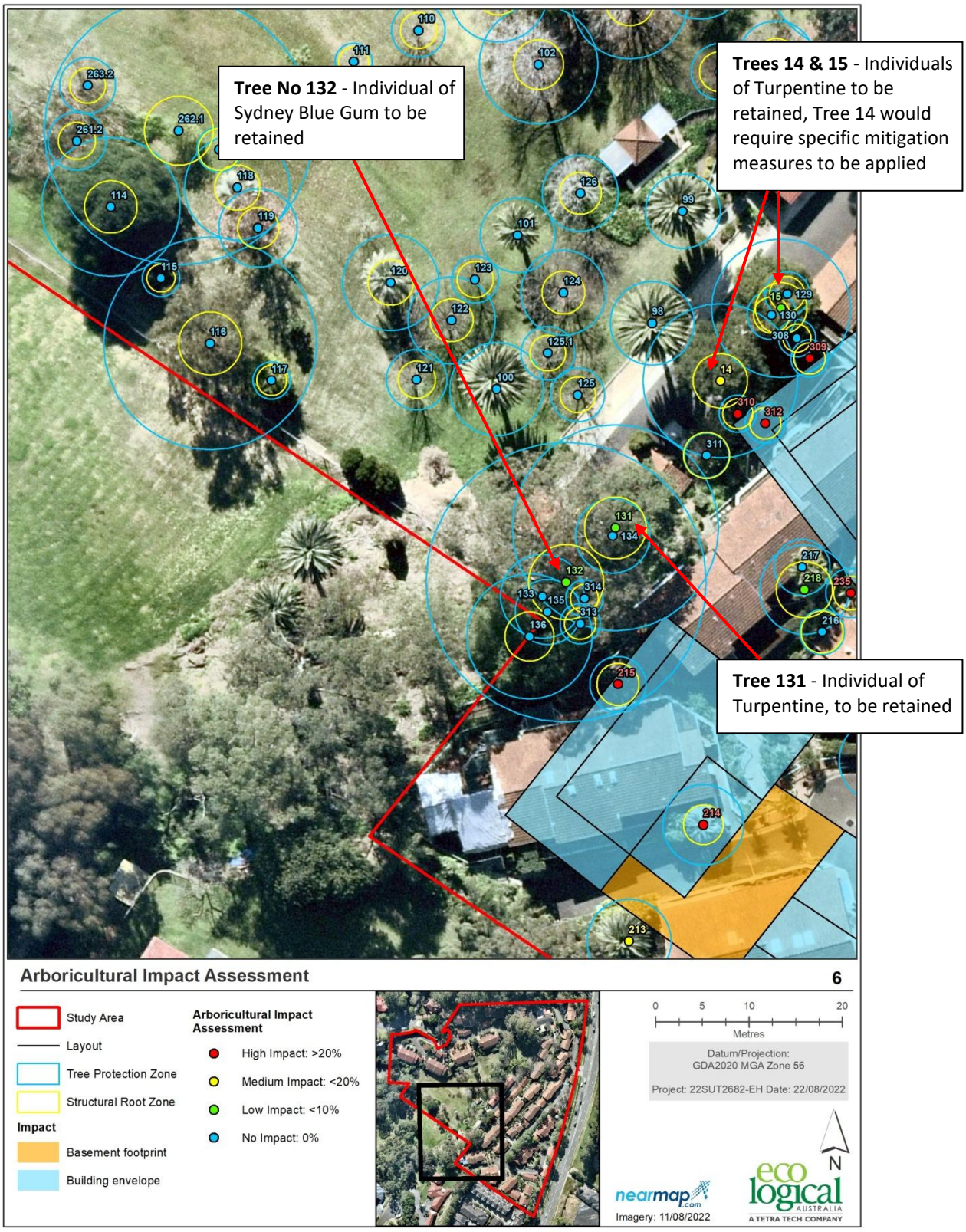

Figure 6 - Tree Numbers 14, 15 and 131 (Eco Logical 2022) may be remnant individuals of/or derived from a former distribution of forested vegetation of BGHF or STIF in the locality, with all individuals to be retained as described above (Eco Logical 2022).

The tract of low closed vegetation that occurs in association with the drainage line in Pioneer Park Reserve, located outside the boundaries of the resort complex at its western end (Figures 1 & 4), has been highly degraded and consists mostly of exotic invasive woody weed species such as Indian Coral Tree and Privet (Figure 7) and does not constitute a viable remnant of BGHF.

Figure 7 - Piped stormwater overflows are channeled into a natural drainage line that occurs outside the boundaries of the subject land at the western end of the resort, indicating the abundance of unmanaged woody weed species such Indian Coral Tree.

3.3 Assessments of potential impacts and Recommendations

In summary the following assessments and recommendations were made regarding the ecological value or significance of 24 'locally-occurring' native trees and shrubs occurring within the subject site as follows:

Impacts to the above individuals are summarised as follows:

1) Tree Number 11: Individual of Bangalay. This individual has been planted in a landscape plan for the facility some time previously. The usual location for this species is in dry sclerophyll forest or woodland on alluvial flats (PlantNet 2022). This individual would be moderately impacted by the revised masterplan design, and as such, will require mitigation measures to be undertaken to ensure its retention (Eco Logical 2022). It is considered that in regard to naturally occurring ecological communities that could potentially occur in this locality, the retention of this individual would be important.

2) Tree Numbers 16, 17, 94, 97 & 132: These 5 individuals of Sydney Blue Gum have been planted in a landscape plan in the managed parkland (Palisander Park) that occurs between the two areas of residential sections of the resort and represent former distributions of BGHF or STIF. None of the above numbered individuals will be impacted by the redesigned development (Eco Logical 2022).

3) Tree Numbers 92 & 95: These trees planted in a landscape plan include two individuals of 'locally occurring' Blackbutt which would naturally occur in this landform, in association with Sydney Blue Gum and Turpentine. These individuals will not be impacted by the proposed development (Eco Logical 2022).

4) Tree Numbers 14, 15 & 131: Individuals of Turpentine have established in association with the landscaped area of the complex at the edge of the managed grassland (Figure 6). Though, unlikely, these individuals may be remnant, in the form of seedling propagation and regeneration, of a former distribution of STIF or BGHF that may have occurred at the location before clearing in association with shale-based soils. As such, these individuals may represent such a former distribution of STIF or BGHF but will not be impacted by the proposed re-development (Eco Logical 2022). Tree No. 14 however, will require specific mitigation measures to ensure its retention (Eco Logical 2022).

5) Tree Number 112: An individual of Spotted Gum established in association with the landscaped area of the complex within the managed grassland. This tree planted in a landscape plan may naturally occur in this landform, in association with Sydney Blue Gum and Turpentine. This individual will not be impacted by the proposed development (Eco Logical 2022).

6) Tree Number 18: An individual of Sydney Red Gum established in association with the landscaped area of the complex within the managed grassland. This species planted in a landscape plan may naturally occur in this landform, in association with Sydney Blue Gum and Turpentine. This individual will not be impacted by the proposed development (Eco Logical 2022).

7) Shrub Numbers 21, 23, 31 & 33: Individuals of Prickly Paperbark that have been planted in a landscape plan on the upper slopes of the hillslope. This natural habitat of species occurs in moist situations, often along stream banks, and the location of these individuals on a dry hillslope is contrary to their natural habitat. These individuals are to be removed for the development, but as this is a common species and not associated with either STIF or BGHF, it is considered that the impact of their removal is insignificant.

8) Shrub Number 90: A semi-mature individual of Blueberry Ash to 6m tall is to be removed. This is a common species that occurs within the BGHF assemblage and occurs commonly throughout several other ecological communities, this individual having been planted in a landscape plan on the hillslope of the subject area. Its replacement in a landscape plan for the redevelopment is recommended.

9) Shrub numbers 61, 245, 247 & 249: Individuals of Sweet Pittosporum, a common shrub species occurring throughout various ecological communities including both STIF and BGHF. These individuals will not be impacted by the proposed redevelopment

10) On field investigation and from DPE vegetation community mapping (2022) and historical aerial imagery of the subject site, it is considered that no viable areas of Blue Gum High Forest currently occur at the subject land (Figure 5), and with appropriate mitigation actions undertake, none of these 'locally-occurring' native tree species representing this community would be impacted by the proposed redevelopment.

11) All of the trees observed in this assessment occur within managed curtilage either in exotic grassland or in formal garden beds, with no natural shrub or ground cover. None of the trees were sufficiently mature or appear to have formed any hollows which may provide shelter and/or breeding resources for birds and arboreal mammals.

3.4 Conclusions

- Ten individuals of trees of 5 different species are representative of STIF and/or BGHF ecological communities. These include Sydney Blue Gum, Blackbutt, Spotted Gum, Turpentine and Sydney Red Gum. None of these individuals would be remove as a consequence of the proposed redevelopment, though Tree No. 11, an individual of

Bangalay and Tree No. 14 an Individual of Turpentine, will require specific mitigation measures to ensure their retention (Eco Logical 2022).

- The three individuals of Turpentine (Tree Nos. 14, 14 & 131) may be derived from remnant distributions or genotypic seed sources of a former distribution of the EEC 'STIF' or 'BGHF' that may have occurred at the location in association with shale-based soils before clearing. None of these would be removed and as stated previously, Tree No. 14 would require specific mitigation measures to ensure its retention (Eco Logical 2022).

  It is recommended that, to ensure the potential genotypically integrity that may represent a former distribution of STIF or BGHF in the local area, landscaped plantings include the species Turpentine and Blue Gum, as well as Sydney Red Gum and Blackbutt, preferably derived from local provenance, to be included in a landscaping plan for the redesigned masterplan development (Architectus 2021). These species represent canopy trees that would have occurred in former forested communities in the locality and they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals and the Grey-headed Flying Fox.

- The shrub species Prickly Paperbark would not have occurred in its current hillslope habitat and the 4 individuals that are required to be removed, and this removal would not be considered to be ecologically significant. The semi-mature individual of Blueberry Ash that is to be removed should be replaced with the same species in landscaping plans for the facility.

- All of the other non-locally occurring indigenous trees, and exotic ornamental indigenous trees proposed for removal to facilitate the development are all landscaped plantings and occur commonly in surrounding local parks and reserves. As such, their removal would not incur a significant loss to the cohort of trees in the vicinity.

4 THREATENED SPECIES ASSESSMENT

4.1 Plant community

There are no extensive naturally occurring or reconstructed ecological communities occurring on site (Figures 4 & 5). However, small patches of open forest with <10% canopy cover representing potential areas of STIF and BGHF occur in the locality (Figure 5) and throughout the Hills Shire (DEC 2002, 2013 and Hills Shire Mapping 2008).

The current vegetation that occurs at the subject site is mostly confirmed by ground-truthing to be Derived/Garden/Modified Vegetation Communities (with few remnant trees and mainly landscaped individuals)

4.2 Flora and fauna species of conservation significance

Threatened flora assessment

Bionet Atlas of NSW Wildlife (2022) records for an area of 5km radius around the subject site indicate that eleven (11) plant species of conservation significance have been recorded within the last 20 years. Table 3 lists these 11 species as follows:

Family	Common name	Scientific name	NSW status	Comm. status	No. of records
Dilleniaceae		*Hibbertia superans*	E1		86
Elaeocarpaceae		*Tetratheca glandulosa*	V		12
Ericaceae		*Epacris purpurascens var. purpurascens*	V		160
		Leucopogon fletcheri subsp. fletcheri	E1		1
Fabaceae (Faboideae)		*Dillwynia tenuifolia*	V		1
Fabaceae (Mimosoideae)	Downy Wattle	*Acacia pubescens*	V	V	9
Myrtaceae		*Darwinia biflora*	V	V	96
		Eucalyptus sp. Cattai	E4A		81
	Magenta Lilly Pilly	*Syzygium paniculatum*	E1	V	10
Proteaceae	Hairy Geebung	*Persoonia hirsuta*	E1	E	7
Thymelaeaceae		*Pimelea curviflora var. curviflora*	V	V	27

Legend:
E4A - Considered extinct
E1, E - Endangered
V - Vulnerable

Table 3 - Details of 11 flora species of conservation significance recorded within 5km of subject site

Figure 8 indicates the locations of records of the 5 most common threatened flora species recorded within 5km of the study site in the last 25 years.

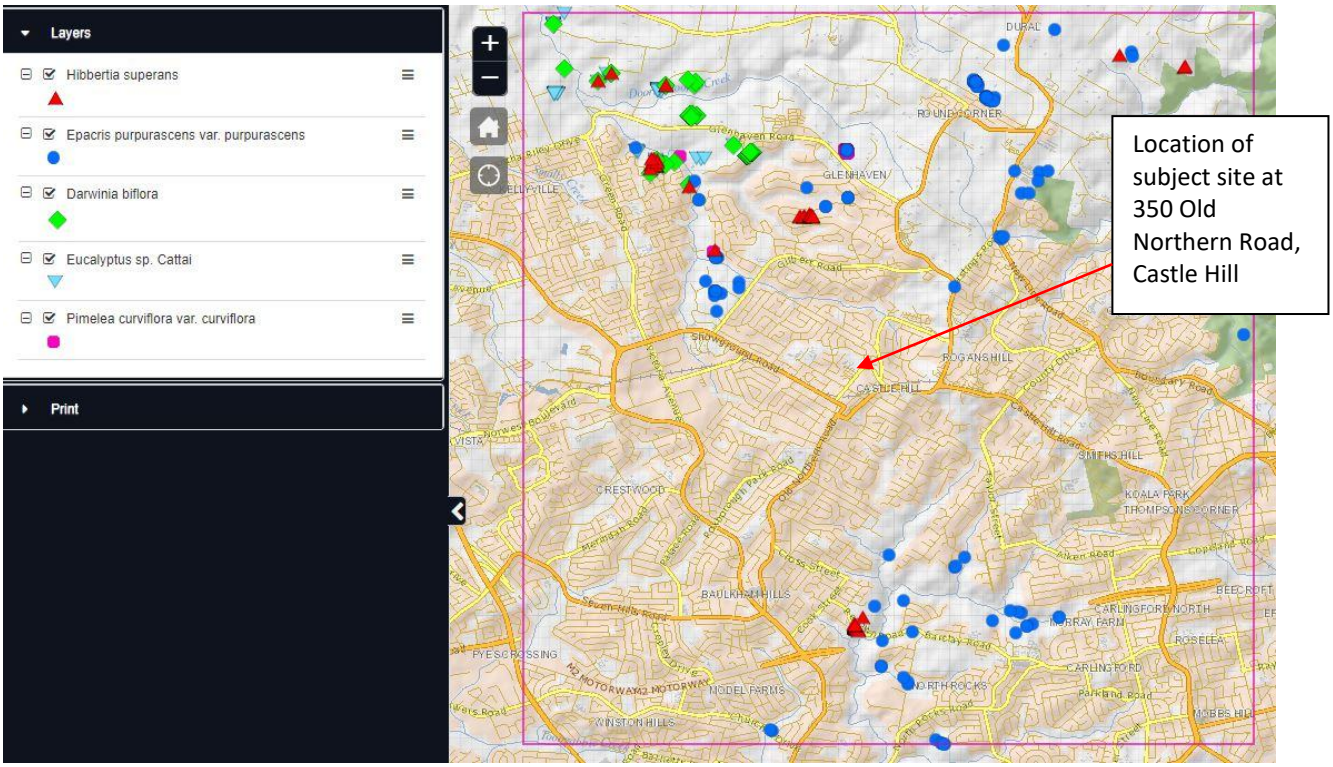

Figure 8 - Location of occurrences of five threatened flora species including *Pimelea curviflora*, *Epacris purpurascens*, *Darwinia biflora, Hibbertia superans* and *Eucalyptus sp* Cattai within a 5km radius of the study area (DPE 2022), none of which have been recorded for the subject site.

Figure 8 indicates that none of the threatened flora species occurred within the Castle Ridge Retirement Resort precinct, the closest record being of *Epacris purpurascens* occurring about 1 km to the north in bushland near Glenhaven (Figure 8).

Most of the threatened species records occur in association with nearby reserves and National Parks such as Berowra Valley Regional Park and bushland to the north-west at Glenhaven and Kenthurst (Figure 8) and would not be expected to occur in a landscaped setting such as occurs at the subject land.

Threatened Fauna Assessment

The subject area at the Castle Ridge Retirement Resort contains managed curtilage with no natural vegetation distribution occurring at the site. No threatened flora species are expected to occur at the site and none were located. No further assessment is considered necessary. Bionet Atlas of NSW Wildlife (2022) records for an area of 5km radius around the subject site indicate that 26 threatened fauna species have been recorded within the last 20 years.

Table 4 indicates the 26 species of threatened fauna recorded including threatened status and no. of records over the last 25 years.

Class/Family	Common name	Scientific name	NSW status	Comm. status	No. of records
Amphibia **Myobatrachidae**	Red-crowned Toadlet	*Pseudophryne australis*	V		11
Aves **Accipitridae**	Little Eagle	*Hieraaetus morphnoides*	V		1
	Square-tailed Kite	*Lophoictinia isura*	V		4
Cacatuidae	Gang-gang Cockatoo	*Callocephalon fimbriatum*	V		5
	Glossy Black-Cockatoo	*Calyptorhynchus lathami*	V		4
Psittacidae	Little Lorikeet	*Glossopsitta pusilla*	V		10
	Swift Parrot	*Lathamus discolor*	E1	CE	3
Strigidae	Barking Owl	*Ninox connivens*	V		2
	Powerful Owl	*Ninox strenua*	V		165
Tytonidae	Masked Owl	*Tyto novaehollandiae*	V		1
Neosittidae	Varied Sittella	*Daphoenositta chrysoptera*	V		2
Artamidae	Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V		1
Petroicidae	Flame Robin	*Petroica phoenicea*	V		1
Mammalia **Dasyuridae**	Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	1
Phascolarctidae	Koala	*Phascolarctos cinereus*	V	V	3
Pseudocheiridae	Greater Glider	*Petauroides volans*		V	1
Pteropodidae	Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	216
Emballonuridae	Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		20
Molossidae	Eastern Coastal Freetail-bat	*Mormopterus norfolkensis*	V		27
Vespertilionidae	Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V		19
	Little Bentwing-bat	*Miniopterus australis*	V		14
	Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V		71

Class/Family	Common name	Scientific name	NSW status	Comm. status	No. of records
	Southern Myotis	*Myotis macropus*	V		13
	Greater Broad-nosed Bat	*Scoteanax rueppellii*	V		20
Gastropoda Camaenidae	Cumberland Plain Land Snail	*Meridolum corneovirens*	E1		1
	Dural Woodland Snail	*Pommerhelix duralensis*	E1	E	74

Legend:
CE - Critically Endangered
E1, E - Endangered
E2 - Endangered population (considered Endangered at species level under BC Act 2016)
V - Vulnerable

Table 4 - Records of 26 threatened fauna species recorded over the previous 20 years within a 5km radius of the subject site at 350 Old Northern Road, Castle Hill

The site represents largely unsuitable habitat for most of these threatened fauna species, though locations of sightings were examined for the most likely 5 threatened fauna species where potential habitat may be considered to occur (Figure 9). The subject site containing managed curtilage is suboptimal at best for most of these species although some avian species and Grey-headed Flying Fox may feed on nectar from eucalypts and other flowering tree species and insect-foraging bats may occasionally forage above the canopies.

Figure 9 indicates the located sightings of the 5 most recorded threatened species of fauna recorded in the vicinity of 350 Old Northern Road, Castle Hill.

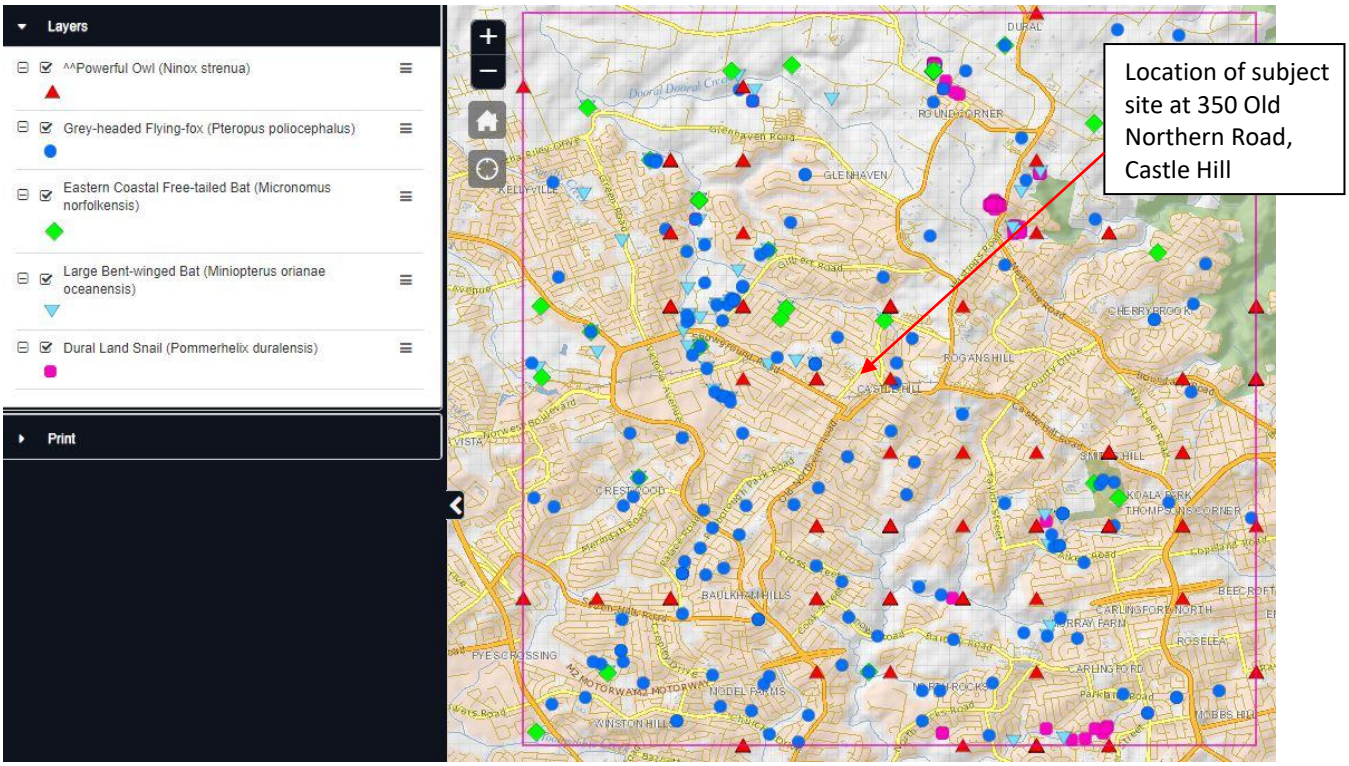

Figure 9 - Records for 5 fauna species, including the Grey-headed Flying Fox, Powerful Owl, Dural Land Snail, Eastern Coastal Freetail Bat and Large Bentwing Bat near Castle Ridge Retirement Resort.

Assessment

Many mobile fauna species that have been recorded in the highest numbers in the vicinity of the subject site such as the Little Bentwing Bat, Grey-headed Flying Fox and Powerful Owl occur in natural bushland associated with Berowra Valley Regional Park and bushland in the north at Glenhaven and Kenthurst (Figure 9) and do not occur or only occasionally forage in the vicinity of the subject land.

Three species, the Powerful Owl, Grey-headed Flying Fox and Large Bentwing Bat have been recorded in close proximity to the subject site at Castle Ridge Retirement Resort.

The Powerful Owl has a very large foraging range and preys on mammals such as the Brushtail Possum and Ringtail Possum. These prey mammals are common and occur in high numbers in natural bushland at Berowra Valley Regional Park and bushland in the north at Glenhaven and Kenthurst, and as such the loss of a small number of trees from the landscaped tree community at the Castle Ridge Retirement Village is not considered to contribute a significant habitat for prey for this species. As such, no further assessment is considered necessary.

The Grey-headed Flying Fox

Feeds on the nectar of blossoms of eucalypts and foraging is seasonal in relation to flowering times of particular eucalypt species. Extensive stands of eucalypts occur in nearby parks including Berowra Valley Regional Park and bushland in the north at Glenhaven and Kenthurst and the loss of a small number of indigenous tree species at the subject site is not considered to affect the foraging behaviour of the Grey-headed Flying Fox. As such, no further assessment is considered necessary.

Large Bentwing Bat

Previous recordings of bat sonographs over an extensive range of areas in the Greater Sydney Metropolitan Region by ACS Environmental P/L have indicated that this microbat species forages over a wide range of habitats for insects above a tree canopy. As such, records for this species appear to occur consistently across the 5km radius range of habitat as shown in Figure 9 and it is considered that the loss of a small number of indigenous locally-occurring and non-locally occurring native trees and exotic tree species will not impact on the viability of the populations of this bat species in the locality nor on potential numbers of the species. Mitigation of this small loss of trees would occur in the appropriate replacement of the numbers of locally-occurring indigenous tree species (Tree Nos. 62 & 63 in Scales 2022) with species such as Blue Gum, Forest Red Gum, Blackbutt and Turpentine in a landscape plan for the proposed development. As such, no further assessment is considered necessary.

Conclusions

None of the documented threatened flora or fauna species are likely to occur in the highly modified managed curtilage habitat of the subject site and it is considered that any avifauna or microchiropteran bat species overflying or foraging in the area will not be significantly impacted by the development as there are extensive parks including Berowra Valley Regional Park and bushland in the north at Glenhaven and Kenthurst, with copses of mature trees also occurring in close proximity in the local area (Figures 1 & 5).

4.3 Mapping of Biodiversity Values at the subject site

Biodiversity values in relation to threatened species of flora, fauna, ecological communities or significant waterways have been prepared by DPE (2022) on a 'Biodiversity Values Map.' Figure 10 indicates the areas of biodiversity value at and in proximity to the subject site at 350 Old Northern Road, Castle Hill.

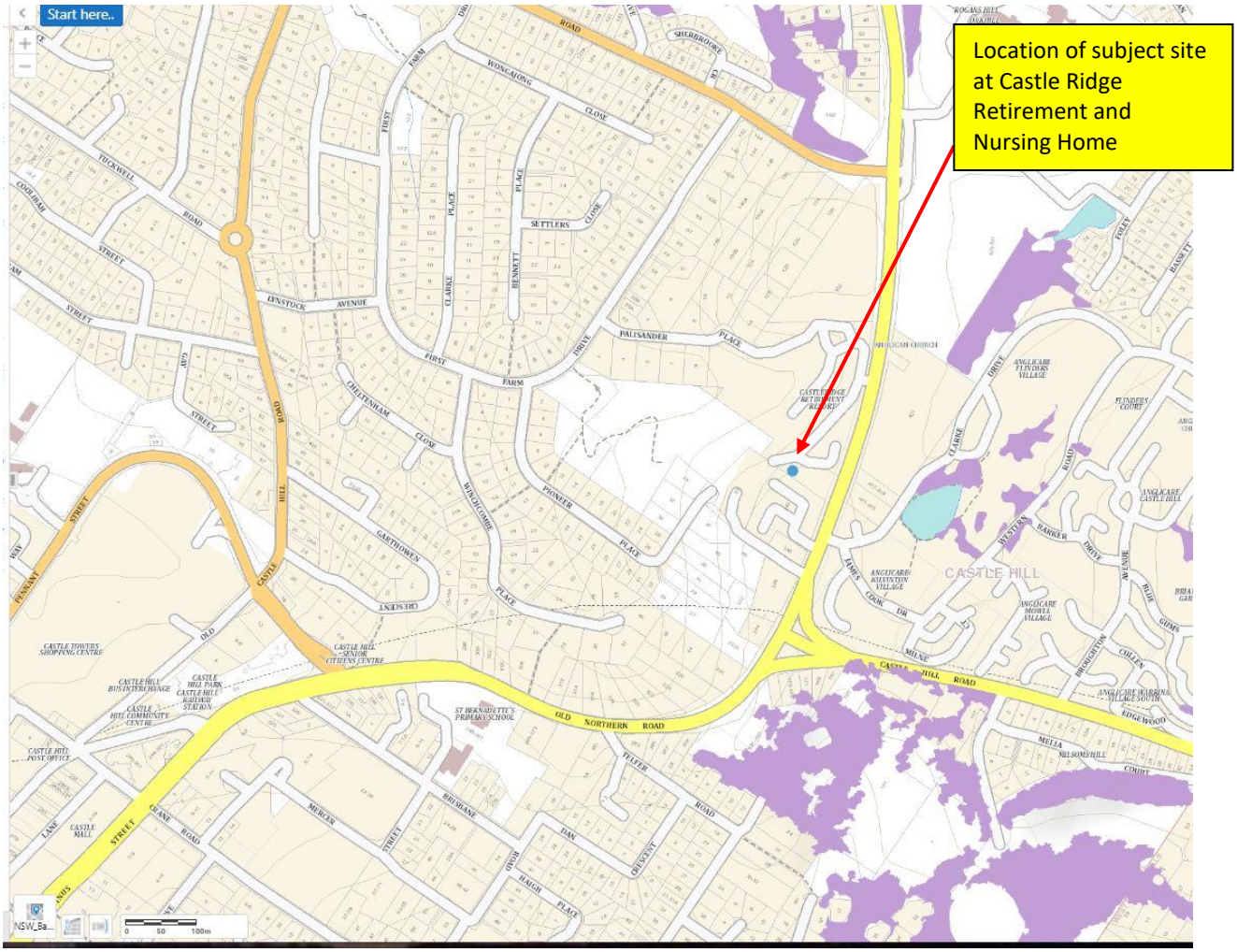

Figure 10 - Biodiversity Values Map indicating areas of Biodiversity Value in the locality of the subject site (marked by a blue dot). The areas of Biodiversity Value occur as shaded purple polygons on the map (from DPE 2022).

5 ASSESSMENT OF INDIRECT IMPACTS OF DEVELOPMENT ON SUBJECT AREA AND NEARBY PIONEER PARK RESERVE

5.1 Location of construction areas, site sheds, parking, stockpiles etc

The proposed development would occur as a staged construction process. Initial areas for the location of site sheds, construction vehicle parking, stockpiles etc will be determined as to the most appropriate location for these temporary facilities. Some initial demolition and cut-and-fill construction may be required, but appropriate safeguards must be put in place to prevent indirect impacts such as soil erosion and soil movement downslope, as well as dust minimisation etc.

Environmental safeguards such as silt-fencing, regular watering of exposed ground surfaces, covering exposed stockpiles of debris and other waste until removal etc will be implemented as well as other environmental protection measures which will be outlined in a Construction Environmental Management Plan for the development.

Engineering solutions will be determined for the staged development to ensure the most effective areas for the location of temporary construction areas to accommodate site sheds, stockpiles, parking etc

5.2 Potential alteration to drainage regimes

A potential increase in stormwater runoff may result from an increase in hard surface areas due to a greater roof area of the proposed development. Currently the accumulated stormwater derived from roof and other hard surface runoff is piped and channelled into large pipes which drain beneath 'Palisander Park' to the free draining creek exposed immediately outside the boundaries of the resort in Pioneer Place Reserve (Figure 7). Drainage retention pits spaced along the piped drainage network accumulate additional above-surface drainage runoff at several locations (Figures 11A & 11B) channelling water into the piped system and regulating flow rates into the open creek at the base of the resort (Figure 7).

Engineering solutions will ensure that retention pit volumes will be increased and flow rates regulated to accommodate any calculated increase in the amount of accumulated stormwater collected in any typical heavy downpour events.

Figure 11A- Indicating open drains with grates and piped runoff to the downslope grassed areas to be captured by larger open grated drains at the sink points in the landscape (Figure 11B) to be piped to the drainage creek line below (Figure 7).

Figure 11B - Indicating larger grated drains to retention pits in the subsurface drainage network, piped to the open creek shown in Figure 7. Retention pits may have to be enlarged to accommodate increased flow resulting from the development

5.3 Potential impacts of trenching/excavation within proximity of tree protection zones, increase in overshadowing to vegetation within the site identified as indicative of the BGHF community

None of the site has been identified by ground-truthing as being representative of Blue Gum High Forest or Sydney Turpentine Ironbark Forest (STIF). Safeguard measures to be implemented as discussed in Section 5.1 would be sufficient in regard to downslope soil wash and erosion, but for any trees to be retained that occur in proximity to construction areas, appropriate tree guards as described in Scales (2022) would be required.

It is proposed that 150 new trees are to be planted in a landscape plan for the proposed development and it is recommended that most would be derived from species that are representative of BGHF and STIF at this location. Typical species include Sydney Blue Gum, Forest Red Gum, Turpentine, Grey Ironbark and Blackbutt and a large range of small tree, shrub and ground cover species can be sourced from local nurseries for diagnostically positive species listed for these communities in OEH (2016).

5.4 Direct and indirect impacts to vegetation outside of the site, including Pioneer Place (Palisander Place) Reserve

Appropriate environmental safeguards for direct and indirect impacts to any vegetation outside the resort will be detailed in a Construction Environmental Management Plan for the development.

Though some individuals of Blue Gum and other associated tree species characteristic of BGHF have been planted in the landscape, ground-truthing has identified three potentially locally-occurring individuals of Turpentine, derived either directly from remnant populations or from provenance derived from previous populations, that will be impacted by the redesigned development (Architectus 2021; Scales 2022; Eco Logical 2022). These three individuals will all be retained (Eco Logical 2022).

At Pioneer Place (Palisander) Reserve, most retained trees occur along the upper elevated eastern perimeter of the reserve below a newly established residential complex. Runoff from this complex accumulates in a drainage swale to the south-west of the reserve and no substantial drainage runoff is expected to occur from the subject land at Castle Ridge (Figure 1).

The open drainage creek that occurs at the western junction of the boundaries of Castle Ridge Retirement Resort and Pioneer Place Reserve may have to be structurally modified, maybe partially piped, to accommodate potential increased stormwater flow rates.

6 GENERAL CONCLUSIONS

Ground-truthing of tracts of canopy vegetation within the residential sections of the resort (Scales 2022; Eco Logical 2022) indicate that most all of the individuals of tree and shrub species have been planted in a landscape plan for the development, probably in the early 1980's, when the development was first constructed. As such, and in contrast to the Hills Shire Council Mapping, no areas of remnant Blue Gum High Forest are considered to occur within the residential areas of the subject land. Ground-truthing is consistent with mapping by DPE (2022) and the historical aerial imagery of the land in 1943.

Similarly, the tract of maintained parkland that occurs in the valley landform between the two linear residential sections of the resort ('Palisander Park') (Figure 1) (Scales 2022), is landscaped mostly with exotic ornamental species and non-locally indigenous species (Scales 2022; Eco Logical 2022).

A few individuals of planted Sydney Blue Gum occur within the open fragmented canopy (Figure 6). In this current revised proposal of the masterplan (Architectus 2021), none of these individuals would be removed for the construction.

Though unlikely, remnant trees, or individuals derived from remnant vegetation, may occur in the south-western corner of the resort as indicated by their location on the 1943 imagery (Figure 4), and consistent with their location at the edges of development at the subject site (Figure 6; Scales 2022; Eco Logical 2022). Tree Numbers 14, 15 & 131 are all individuals of Sydney Turpentine (Figure 6; Eco Logical 2022). None of these trees (Tree Nos. 14, 15 & 131 in Eco Logical 2022; Figure 6) will be impacted by the proposed re-development, although Tree No. 14 will require specific mitigation strategies to ensure its retention (Eco Logical 2022).

All of the trees observed in this assessment occur within managed curtilage either within managed exotic grassland or in formal garden beds, with no natural shrub or ground cover. None of the trees were sufficiently mature or appear to have formed any hollows that may potentially provide shelter and/or breeding resources for birds and arboreal mammals.

In relation to locally-occurring indigenous trees occurring within the garden beds or other landscaped areas within the subject site, this vegetation does not contain any threatened flora species or threatened ecological communities and it is considered that any proposed redevelopment of the site will have no impact on any species or ecological community in relation to the requirements of Section 5A (s.5A) of the *Environmental Planning & Assessment Act 1979.*

An assessment of species of fauna recorded within a 5km radius of the site and listed under the EPBC Act and the BC Act as threatened, found that habitat for these species does not occur at the highly modified and landscaped site. Though some threatened fauna species such as the Powerful

Owl, Grey-headed Flying Fox and Eastern Bentwing Bat may occasionally forage in the vicinity of the subject site, it is considered that none would be impacted by any proposed redevelopment of the site.

As there are no threatened species, ecological communities or populations occurring at the subject site, it is not considered necessary to undertake any further assessment of significance, Species Impact Statements or to refer the proposal to the Director General of DPE or to the Commonwealth Department of Agriculture, Water and Environment.

No areas of Biodiversity Value have been mapped for the subject site at 350 Old Northern Road, Castle Hill (Figure 10).

It is recommended that of any new trees to be planted in a landscape plan for the proposed development, many would be derived from species that are representative of BGHF and STIF at this location. Such a landscape plan would enhance the foraging prospects for insectivorous feeding fauna to utilise the subject site

It is considered that with appropriate safeguards implemented in relation to environmental issues of soil erosion, drainage, etc, engineered solutions and mitigation measures outlined in a Construction Environmental Management Plan for the proposed re-development would not lead to any significant direct or indirect impacts to surrounding vegetation or landscape modification.

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