ACS Environmental Pty Ltd

ECOLOGICAL ASSESSMENT

FOR

PROPOSED DEVELOPMENT

AT

LOURDES RETIREMENT VILLAGE

AND

NURSING HOME,

95 STANHOPE STREET, KILLARA

Prepared for:

STOCKLANDS
c/o A SCALES
NATURALLY TREES

February 2017

ACS Environmental P/L

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Consultants experience

The directors of 'Actinotus Consultancy Services (ACS) – Environmental P/L' (formerly Actinotus Environmental Consultants) have collectively worked in the area of biodiversity impact and bushfire hazard assessment services for a period of greater than 20 years. They also have over 30 years of experience in scientific research (ecological, genetic) and teaching in biological science.

The principals of the former 'Actinotus Environmental Consultants' have completed the NSW Consulting Planners Bushfire Training Course organised by the Planning Institute of Australia NSW Division for planning consultants and allied professionals relating to the implementation of 'Planning for Bushfire Protection', in June 2003.

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EXECUTIVE SUMMARY

'ACS (Actinotus Consultancy Services) – Environmental' were commissioned by *Naturally Trees* on behalf of Stockland to undertake an ecological assessment of vegetation and undertake a biodiversity survey on an area of developed, landscaped land at the Lourdes Retirement Village and Nursing Home at 95 Stanhope Street, Killara.

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 and nursing home 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 the arboricultural report by Scales (2016).

Principal locally-occurring indigenous trees observed at the site include Turpentine, Red Bloodwood, Sydney Red Gum, Old Man Banksia, Sweet Pittosporum and Broad-leaved Scribbly Gum (Scales 2016).

This ecological assessment has concluded that a small copse of two Turpentine trees and one individual of Sweet Pittosporum (Tree Numbers 44, 45 & 46 in Scales 2016) may have been derived from genotypic sources of these tree species that occurring in a former distribution of Sydney Turpentine Ironbark Forest (STIF) (Figures 3 & 4). It is recommended that this small group of trees be retained as the development does not appear to impact on this area.

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.*

It is also recommended that Tree Number 349, a mature individual of Red Bloodwood that occurs along Stanhope Street (Scales 2016), does not appear to be potentially impacted by the proposed development, and should be retained. It appears that there may be an anomaly in the proposed removal status of this individual (Scales 2016) as there appears to be no reason to remove this tree.

All of the other locally-occurring indigenous trees proposed for removal to facilitate the development are mostly landscaped plantings and occur commonly in surrounding local parks

and reserves such as Soldiers Memorial Park and Garigal National Park. These species include Sydney Red Bum, Blackbutt, Red Bloodwood, Broad-leaved Scribbly Gum, Rough-barked Apple and Forest Oak (Tables 1 & 2). As such, their removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended however to utilise these species in any landscape plan that is prepared for the development as they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals and the Grey-headed Flying Fox.

All individuals of trees observed appeared insufficiently mature to have developed hollows in relation to nesting, sheltering and breeding habitat for avian species, arboreal mammals or microchiropterans. No hollows or spouts were evident on any of the individuals of trees observed.

An assessment of species of flora and fauna recorded within 5km of the site and listed under the EPBC Act and the TSC 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 significantly compromised or impacted by the proposed redevelopment of the site.

As there are no threatened species 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 OEH or to the Commonwealth Department of the Environment and Energy.

ABBREVIATIONS

CEEC – Critically Endangered Ecological Community

DoE – Commonwealth Department of 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 *Naturally Trees* on behalf of Stockland to undertake an ecological assessment of vegetation and undertake a biodiversity survey within the grounds of the Lourdes Retirement Village and Nursing Home at 95 Stanhope Street, Killara.

The proposed development is to demolish a number of single and double storey buildings at the site to be replaced by a number of multi-storey buildings and a single storey chapel. The plans of the upgraded development is shown in detail in the arboricultural report by Scales (2016). A list of 394 trees has been prepared by Scales (2016) 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 Lourdes Retirement Village and Nursing Home at 95 Stanhope Street, Killara.

Figure 1 - Indicates the area of study at the Lourdes Retirement Village and Nursing Home at 95 Stanhope Street, Killara (outlined in red font) (from SIX maps). Note that the study area also includes the patch of wooded vegetation occurring within the northern section of the Lourdes property along Stanhope Street as indicated by the bright red line

1.2 Study methodology

A comprehensive survey was undertaken on foot to identify the location of a total of 22 indigenous trees that may be required to be removed and that may or may not be considered remnant and to undertake an ecological assessment of the landscaped and vegetated areas of the site.

Attributes of these individuals of indigenous 22 trees that may require removal are listed in Table 1.

NUMBER	TREE SPECIES	HEIGHT (m)	CROWN (m)	DBH (mm)	COMMENT	LOCATION - MAP SHEET NO. (Scales 2016)
44	TURPENTINE	10	6	350	MATURE-LOPPED	GRASS - 1
46	TURPENTINE	12	10	400	MATURE	GRASS - 1
67	BLACKBUTT	20	20	600	MATURE	GARDEN BED - 1
78	BLACKBUTT	12	6	300	MATURE	ROAD CUTTING - 1
79	SYDNEY RED GUM	14	7	350	MATURE	ROAD CUTTING - 1, 4
80	SYDNEY RED GUM	14	7	350	MATURE	ROAD CUTTING - 1, 4
131	RED BLOODWOOD	16	9	350	MATURE	GARDEN BED - 4
138	SYDNEY RED GUM	10	10	450	MATURE	GARDEN BED - 4
139	FOREST OAK	10	6	300	MATURE	GARDEN BED - 5
144	SCRIBBLY GUM (*Eucalyptus haemastoma*)	8	6	300	MATURE	GARDEN BED - 5
218	RED BLOODWOOD	20	14	400	MATURE	GARDEN BED - 5
244	ROUGH-BARKED APPLE	22	16	600	MATURE	GRASS - 5
245	SYDNEY RED GUM	16	14	500	MATURE	GARDEN BED - 5
253	SCRIBBLY GUM (*Eucalyptus haemastoma*)	9	12	700	MAT URE - CAMBIUM DAMAGE	GARDEN BED - 5
256	RED BLOODWOOD	20	14	500	MATURE	GARDEN BED - 2
291	RED BLOODWOOD	18	12	400	MATURE	GARDEN BED - 2
326	BLACKBUTT	24	16	600	MATURE	GRASS - 2
327	RED BLOODWOOD	14	9	300	MATURE	GARDEN BED - 2
328	BLUE GUM	20	12	350	MATURE	GARDEN BED - 2
329	RED BLOODWOOD	18	12	400	OVER-MATURE BORERS	GARDEN BED - 2
349	RED BLOODWOOD	18	12	400	MATURE	GARDEN BED - 2
360	BLACKBUTT	28	26	1000	MATURE	GARDEN BED - 2

Table 1 - Attributes of 22 individuals of indigenous trees that may require removal for the development

Currently existing information on 'Threatened Flora of the Locality', defined as a 5km radius within and around the site, was accessed from the OEH Atlas of NSW Wildlife (February 2017) and the Department of the Environment and Energy (DoEE) Protected Matters Environmental Reporting Tool (February 2017) 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.

2 EXISTING ENVIRONMENT

2.1 Topography, geology and soils

The topography of the subject land slopes from a hillcrest gently to the south-east over gradients of from 2 - 4^0.

The local underlying geology of the subject area occurs across the boundaries of the Ashfield Shale Series of the Wianamatta Group of Shales (Herbert 1983) and Hawkesbury Sandstone (Herbert 1983).

The Soil Landscape type in the north-western section of the site is the 'residual 'Lucas Heights' Soil landscape Series that that is characterised by gently undulating crests and ridges on plateau surfaces of the Mittagong Formation where rock outcropping is usually absent. (Chapman & Murphy 1989). The remaining sections of the site occur on Hawkesbury Sandstone sediments where the colluvial 'Hawkesbury' Soil Landscape Series is characterised by rolling to steep hills on Hawkesbury Sandstone including rock outcropping and steep sideslopes with rocky benches, broken scarps and boulders (Chapman & Murphy 1989).

2.2 Existing vegetation

The site currently contains existing independent living units and other retirement and nursing home facilities 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 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 the arboricultural report by Scales (2017).

Principal locally-occurring indigenous trees observed at the site include Turpentine, Red Bloodwood, Sydney Red Gum, Old Man Banksia, Sweet Pittosporum and Broad-leaved Scribbly Gum (Scales 2017).

2.3 Fauna species recorded on site

Weather conditions at the time of survey included cool temperatures to 19^0 with overcast, cloudy skies with fairly constant drizzle punctuated by intermittent very heavy downpours.

The only species recorded during the site visit were the Noisy Minor, Magpie and Red Wattle Bird with small garden skinks observed under leaf litter in the some garden beds. Other common

avifauna likely to occur at the site however would include Currawong, Magpie Lark, Little Wattle Bird, Spotted Turtle Dove and Indian Myna (Table 1).

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. Scratch marks were observed on an individual of Scribbly Gum (Tree No. 253) apparently from Brush-tail Possum activity. Table 1 lists all common fauna species considered to have potential to occur at the site.

AVIFAUNA	SCIENTIFIC NAME	COMMON NAME
	Streptopelia chinensis	Spotted Turtle-Dove *
	Gymnorhina tibicen	Australian Magpie
	Strepera graculina	Pied Currawong
	Corvus coronoides	Australian Raven
	Cacatua galerita	Sulphur-crested Cockatoo
	Trichoglossus haematodus	Rainbow Lorikeet
	Platycercus elegans	Crimson Rosella
	Manorina melanocephala	Noisy Miner
	Acridotheres tritis	Common Myna
REPTILES	**SCIENTIFIC NAME**	**COMMON NAME**
	Lampropholis delicata	Grass Skink
	Lampropholis guichenoti	Garden skink
MAMMALS	**SCIENTIFIC NAME**	**COMMON NAME**
	Pteropus poliocephalus	Grey Headed Flying Fox
	Pseudocheirus peregrinus	Common Ringtail Possum
	Trichosurus vulpecula	Common Brushtail Possum

Table 1 - Common fauna expected or that may occur on or nearby the subject site

2.4 Historical vegetation distribution

Figure 2 is an image of aerial photography taken in 1943 that indicates that the hillcrest at the subject site had been extensively cleared at that time. The hillslopes facing to the south, south-east and east contained an open structured low woodland vegetation occurring on shallow skeletal and lithosol soils.

Unformed tracks are also evident around the hillslope, some of which have eventually been upgraded to form present day internal roads at the Lourdes Village including landscaped planting of trees affording visual amenity to the facility (Figures 1 & 2).

Some built structures were present at the north-west corner of the study area in 1943 where the current office and recreational facilities now occur (Figures 1 & 2).

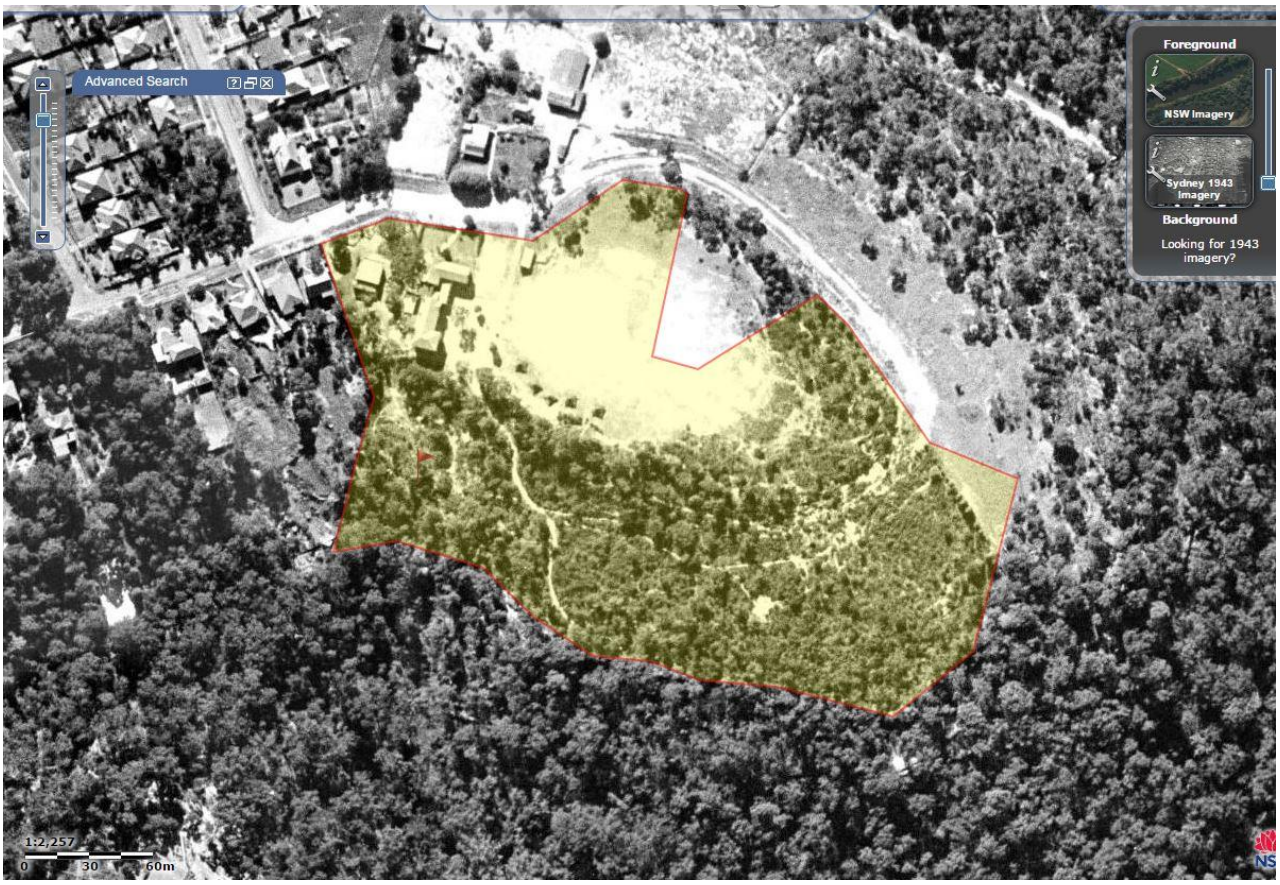

Figure 2 - Indicates an aerial image of the area of study at the Lourdes Retirement Village and Nursing Home at 95 Stanhope Street, Killara taken in 1943 (outlined in red font) (from SIX maps) showing extensive clearing at the crest section of the landform at that time.

3 ASSESSMENT OF STATUS OF INDIVIDUAL TREES ON SITE

The likely origin of a total of 22 locally-occurring indigenous trees described in Table 1 that may be required to be removed and that may or may not be considered remnant was assessed by ground-truthing and examination of aerial photography and vegetation mapping by OEH (2013).

3.1 Mapping of vegetation by OEH (2013)

Figure 3 indicates the current distribution of vegetation communities occurring at the Lourdes Retirement Village and near vicinity.

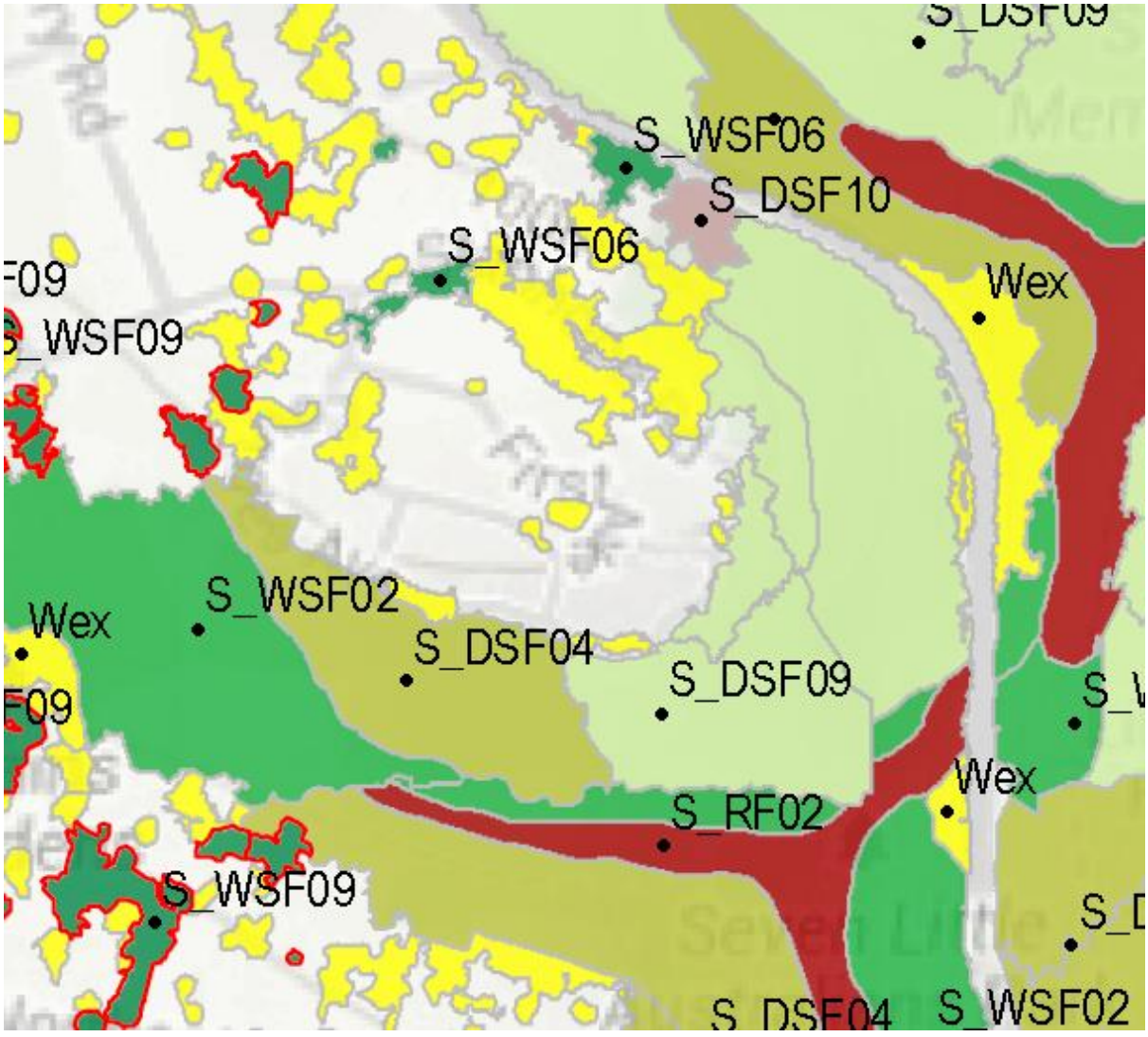

Figure 3 - Mapping by OEH (2013) of vegetation communities within and surrounding the area of the Lourdes Retirement Village and Nursing Home precinct. Relevant assemblages include those shaded in dark green with red borders: S_WSF09 (Sydney Turpentine Ironbark Forest) (STIF); olive green: S_DSF04 (Coastal Enriched Sandstone Dry Forest); light green: S_DSF09 (Coastal Sandstone Gully Forest); light violet: S_DSF10 (Hornsby Enriched Sandstone Exposed Woodland); and yellow: Natives and Exotics (either remnant trees or landscaped individuals)

Ground-truthing stands of natural vegetation in nearby Soldiers Memorial Park confirms that the vegetation that originally occurred at the subject site would have included intergrades of Coastal Enriched Dry Forest and Hornsby Enriched Sandstone Exposed Woodland nearer the crests and upper slopes of the landforms with Coastal Sandstone Gully Forest occurring on steeper sidelopes and gullies in the vicinity.

Towards the upper slope-western section of the site, aligned with the edges of the Wianamatta Shale/Hawkesbury Sandstone stratification boundaries, areas of Sydney Turpentine Ironbark Forest vegetation would likely have occurred.

3.2 Ground-truthing and assessment

All of the relevant 22 individuals of locally-occurring indigenous trees established on the subject site were located and observed in relation to their likely origin and condition and presence or otherwise of hollows or other habitat features in relation to fauna (Table 3). Figure 4 indicates the approximate location of these 22 individuals in relation to the network of internal roads and building facilities at the Lourdes Retirement Village.

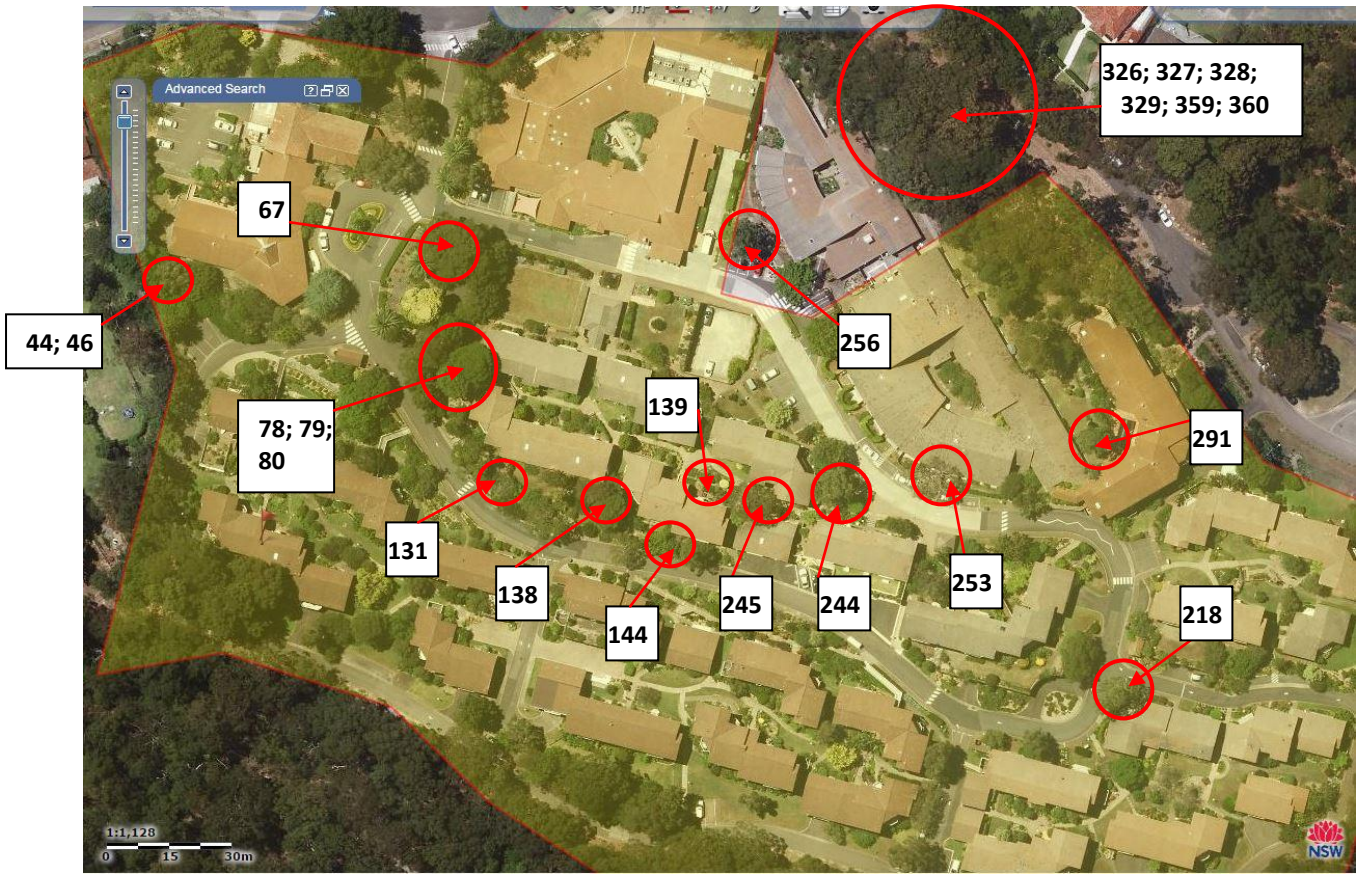

Figure 4 - Indicating approximate locations of 22 individuals of locally-occurring indigenous tree species within the subject site at the Lourdes Retirement Village, 95 Stanhope Street, Killara

TREE NUMBER	TREE SPECIES	LOCATION - MAP SHEET NO. (Scales 2016)	LOCATION AND ASSESSMENT
44	TURPENTINE	GRASS - 1	Mapped by OEH (2013) as component of STIF, may have derived from regeneration of original vegetation before clearing. Appears to contain borers.
46	TURPENTINE	GRASS - 1	Mapped by OEH (2013) as component of STIF, may have derived from regeneration of original vegetation before clearing.
67	BLACKBUTT	GARDEN BED - 1	Appears to have been planted in garden bed
78	BLACKBUTT	ROAD CUTTING - 1	Maybe occurs as natural establishment from seedling
79	SYDNEY RED GUM	ROAD CUTTING - 1, 4	Maybe occurs as natural establishment from seedling
80	SYDNEY RED GUM	ROAD CUTTING - 1, 4	Maybe occurs as natural establishment from seedling
131	RED BLOODWOOD	GARDEN BED - 4	Appears to have been planted in garden bed
138	SYDNEY RED GUM	GARDEN BED - 4	Appears to have been planted in garden bed
139	FOREST OAK	GARDEN BED - 5	Female individual. Appears to have been planted in garden bed
144	SCRIBBLY GUM (*Eucalyptus haemastoma*)	GARDEN BED - 5	Appears to have been planted in garden bed. Occurs naturally in Memorial Soldiers Park
218	RED BLOODWOOD	GARDEN BED - 5	Appears to have been planted in garden bed
244	ROUGH-BARKED APPLE	GRASS - 5	Appears to have been planted in garden bed
245	SYDNEY RED GUM	GARDEN BED - 5	Appears to have been planted in garden bed.
253	SCRIBBLY GUM (*Eucalyptus haemastoma*)	GARDEN BED - 5	Appears to have been planted in garden bed. Occurs naturally in Memorial Soldiers Park. Scratch marks from Brush-tail Possum
256	RED BLOODWOOD	GARDEN BED - 2	Planted. Flowering at present. Source of nectar for nectivorous bird species
291	RED BLOODWOOD	GARDEN BED - 2	Planted. Flowering at present. Source of nectar for nectivorous bird species
326	BLACKBUTT	GRASS - 2	Planted in a landscape plan outside Lourdes site forming open woodland
327	RED BLOODWOOD	GARDEN BED - 2	Planted in a landscape plan outside Lourdes site forming open woodland
328	BLUE GUM	GARDEN BED - 2	Planted in a landscape plan outside Lourdes site forming open woodland
329	RED BLOODWOOD	GARDEN BED - 2	Planted in a landscape plan outside Lourdes site forming open woodland
349	RED BLOODWOOD	GARDEN BED - 2	Planted in a landscape plan outside Lourdes site forming open woodland
360	BLACKBUTT	GARDEN BED - 2	Planted in a landscape plan outside Lourdes site forming open woodland

Table 3 - Details the likely origin and status of the 22 individuals of locally-occurring indigenous trees occurring within the subject site.

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 to have formed any hollows which may provide shelter and breeding resources for birds and arboreal mammals.

In summary the following conclusions were made regarding the ecological value or significance of the 22 locally-occurring native trees occurring within the subject site:

i) Tree Numbers 44 & 45: Two individuals of Turpentine established in association with an individual of Sweet Pittosporum. May be remnant in the form of seedling regeneration of a former distribution of STIF that occurred at the location before clearing in association with shale-based soils. It is recommended to maintain these individuals that may represent such a former distribution unless there are safety issues that may be of concern.

ii) Tree Number 67: Single individual of Blackbutt planted in a landscape plan in a managed garden. Removal would not be considered significant as this is a common species that occurs in thelocality.

iii) Tree Numbers 78; 79 & 80: These individuals comprising one Blackbutt and two Sydney Red Gums occur along an internal road cutting on shallow soils overlying sandstone bedrock. It is possible that seedlings of these species have established at this location, their growth limited by the shallow soils in which they have established. These species occur commonly in natural bushland in neighbouring parks and removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended however to utilise these species in any landscape plan that is prepared for the development as they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals.

iv) Tree Numbers 131 & 138: These trees planted in a landscape plan include an individual of Red Bloodwood and one of Sydney Red Gum. These species occur commonly in natural bushland in neighbouring parks and removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended to utilise these species in any landscape plan that is prepared for the development as they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals.

v) Tree Number 139: A mature individual of Forest Oak planted in a landscape plan. . This species may have occurred in previous distributions of STIF in the area. The individual is a female plant providing fruiting cones for many species of parrot. It is recommended to replace this individual with up to 3 replacement saplings to enhance the feeding opportunities for species of parrot, including Glossy Black, which may from time to time, occur in the area.

vi) Tree Numbers 144; 218; 244 & 245: Include individuals of Broad-leaved Scribbly Gum, Red Bloodwood, Rough-barked Apple and Sydney Red Gum respectively all planted in a landscape plan in various locations of the subject site (Scales 2016). These species occur commonly in natural bushland in neighbouring parks and removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended to utilise these species in any landscape plan that is prepared for the development as they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals.

vii) Tree Number 253: Mature individual of Broad-leaved Scribbly Gum, planted close to an existing apartment and showing signs of cambial damage (Scales 2016). Scratch marks from Brushtail Possum are evident on the trunk confirming the presence of these arboreal mammals at the site.

viii) Tree Numbers 256 & 291: Two individuals of Red Bloodwood planted in a landscape plan in proximity to established apartment residences. The individuals are in flower and provide important foraging resources for nectivorous birds, arboreal mammals as well as the Grey-headed Flying Fox. These species occur commonly in natural bushland in neighbouring parks and removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended to utilise these species in any landscape plan that is prepared for the development.

ix) Tree Numbers 326; 327; 328; 329 & 360: These individuals include 2 Blackbutt Trees, 2 Red Bloodwood trees and one individual of Blue Gum that is unusually elongated in height but with narrow trunk diameter and small crown (Scales 2016). All of these individuals have been planted in a landscape plan with mulched ground surface at the northern section of the study area that appears not to be included within the Lourdes Retirement Village precinct boundaries (Figure 1). Most of these individuals would incur damage due to proposed construction in the vicinity of their TPZ's (Tree Protection Zones) and would be significantly impacted by the development.

x) Tree Number 349: Individual of Red Bloodwood that appears to occur along Stanhope Street and potentially not impacted by the proposed development. It appears that there may be an anomaly in the proposed removal status of this individual (Scales 2016) and there appears to be no reason to remove this tree.

3.3 Recommendations

- Tree Numbers 44 & 45 are two individuals of Turpentine established in association with an individual of Sweet Pittosporum. These individuals may be derived from genotypic seed sources of a former distribution of the EEC 'STIF' that occurred at the location in association with shale-based soils before clearing. It is recommended to maintain these

genotypically-significant individuals that may represent such a former distribution of STIF in the local area unless there are safety issues related to these trees that may be of concern.

- Tree Number 349 is a mature individual of Red Bloodwood that appears to occur along Stanhope Street and does not appear to be potentially impacted by the proposed development. It appears that there may be an anomaly in the proposed removal status of this individual (Scales 2016) and there appears to be no reason to remove this tree.

- All of the other locally-occurring indigenous trees proposed for removal to facilitate the development are mostly landscaped plantings and occur commonly in surrounding local parks and reserves such as Soldiers Memorial Park and Garigal National Park. These species include Sydney Red Bum, Blackbutt, Red Bloodwood, Broad-leaved Scribbly Gum, Rough-barked Apple and Forest Oak (Tables 1 & 2). As such, their removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended however to utilise these species in any landscape plan that is prepared for the development as they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals and the Grey-headed Flying Fox.

4 THREATENED SPECIES ASSESSMENT

4.1 Plant community

There are no extensive naturally occurring or reconstructed ecological communities occurring on site (Figure 3). A small patch of woodland including two individuals of Turpentine and one of Sweet Pittosporum occurring at the western section of the subject land (Figure 4) may be derived from genotypic material from a former distribution of Sydney Turpentine Ironbark Forest that would have been aligned with the edges of the Wianamatta Shale/Hawkesbury Sandstone stratification boundaries (Figure 3.)

As such, this small copse of trees representing former distributions of STIF (Figure 4) should be conserved if possible.

Ground-truthing stands of natural vegetation in nearby Soldiers Memorial Park confirms that the vegetation that originally occurred at the subject site would have included intergrades of Coastal Enriched Dry Forest and Hornsby Enriched Sandstone Exposed Woodland nearer the crests and upper slopes of the landforms with Coastal Sandstone Gully Forest occurring on steeper sidelopes and gullies in the vicinity (OEH 2013).

The current vegetation that occurs at the subject site is mostly characterised by OEH (2013) and confirmed by ground-truthing to be 'Natives and Exotics' (either remnant trees or landscaped individuals)

4.2 Flora and fauna species of conservation significance

OEH Atlas of NSW Wildlife (2017) 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 25 years. Table 4 lists these 11 species as follows:

Family	Common name	Scientific name	NSW status	Comm status	No records
Dilleniaceae	Julian's Hibbertia	*Hibbertia spanantha*	E4A,P,2	CE	1
Elaeocarpaceae		*Tetratheca glandulosa*	V,P		21
Ericaceae		*Epacris purpurascens var. purpurascens*	V,P		10
Haloragaceae		*Haloragodendron lucasii*	E1,P	E	3
Myrtaceae	Netted Bottle Brush	*Callistemon linearifolius*	V,P,3		7
		Darwinia biflora	V,P	V	150
	Camfield's Stringybark	*Eucalyptus camfieldii*	V,P	V	9
	Deane's Paperbark	*Melaleuca deanei*	V,P	V	5
	Magenta Lilly Pilly	*Syzygium paniculatum*	E1,P	V	14
Proteaceae	Caley's Grevillea	*Grevillea caleyi*	E4A,P,3	E	2
	Small-flower Grevillea	*Grevillea parviflora subsp. parviflora*	V,P	V	1

Table 4 - Details of 11 flora species of conservation significance recorded within 5km of subject site

Figures 5A & 5B indicate the locations of records of the 10 threatened flora species within 5km of the study site.

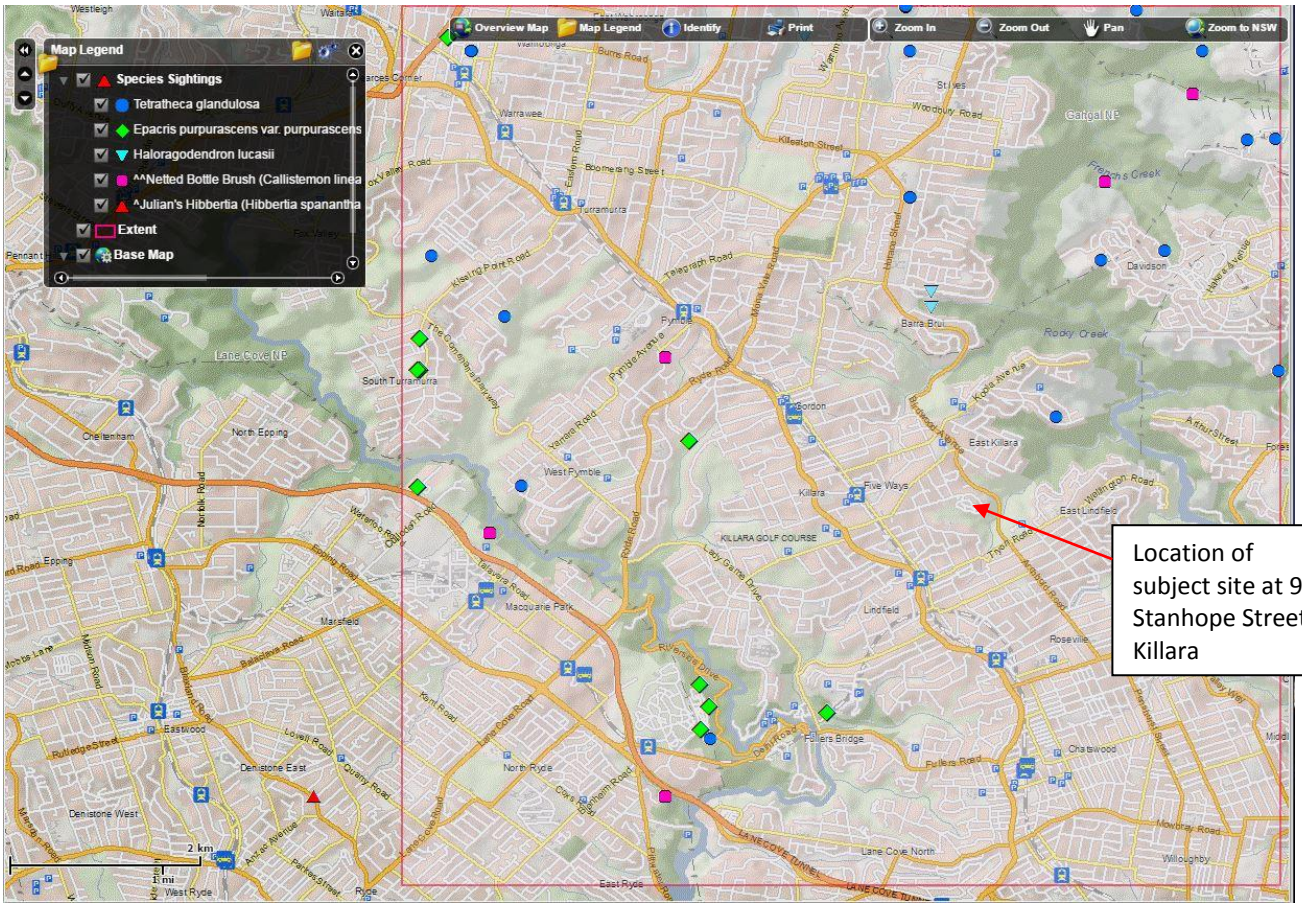

Figure 5A - Location of occurrences of five threatened flora species including Julian's Hibbertia, Glandular Pink-bell, *Epacris purpurascens, Haloragodendron lucasii* and Netted Bottlebrush within a 5km radius of the study area (OEH 2017), none of which have been recorded for the subject site.

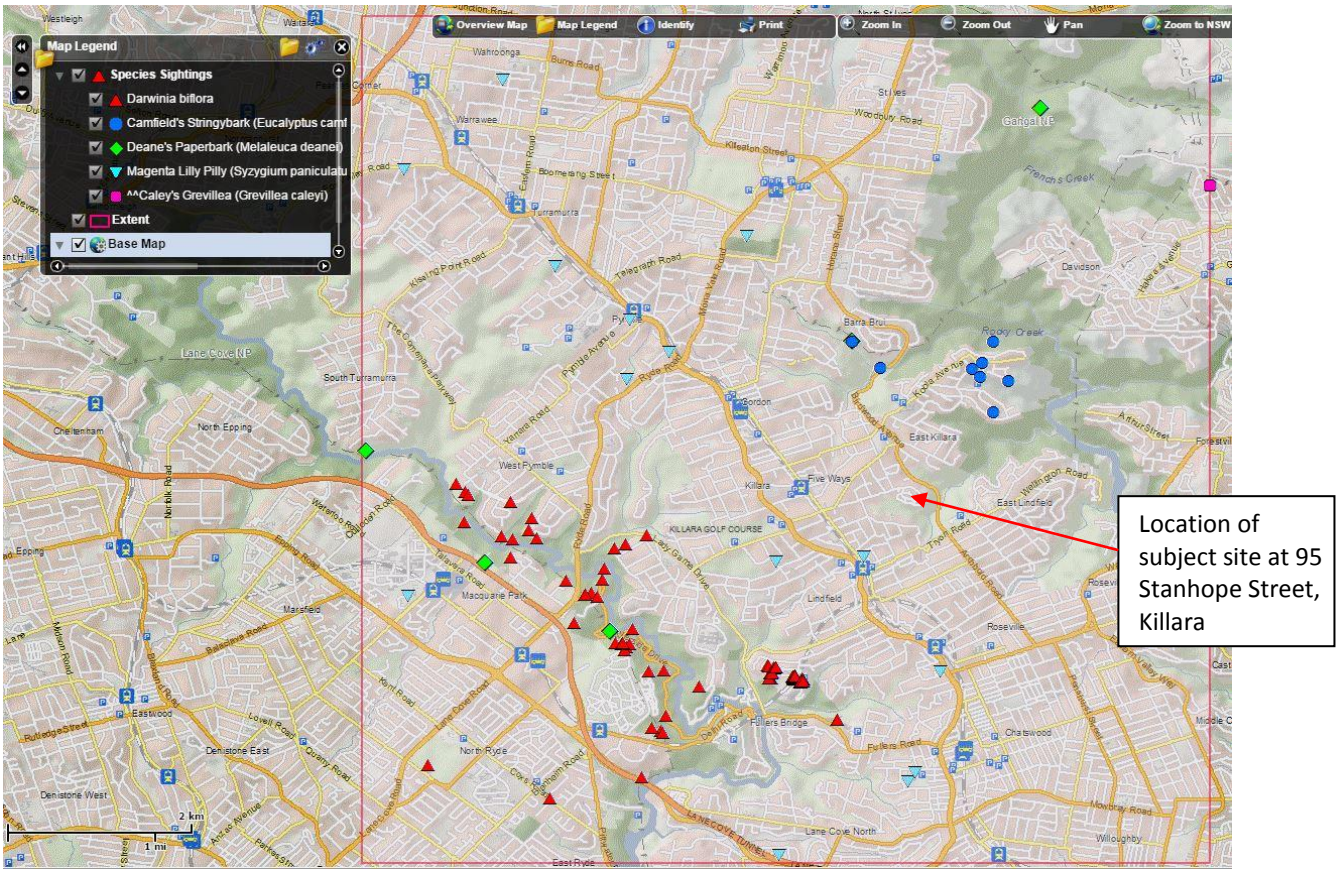

Figure 5B - Location of occurrences of five threatened flora species including Camfields Stringybark, Deanes Paperbark, *Darwinia biflora,* Magenta Lilly Pilly and Caleys Grevillea within a 5km radius of the study area (OEH 2017), none of which have been recorded for the subject site.

Figures 5A and 5B indicate that none of the threatened flora species occurred within the Lourdes Retirement Village precinct, the closest record being of Glandular Pink-bell being about 1.2km to the north-east near Soldiers Memorial Park (Figure 5A).

Most of the threatened species records occur in association with nearby reserves and National Parks such as Soldiers Memorial Park, Garigal National Park and Lane Cove National Park (Figures 5A & 5B).

One record for Small-flowered Grevillea occurs in Lane Cove National Park near Ryde Road.

Assessment

The subject area at the Lourdes Retirement Village at 95 Stanhope street, Killara, is 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.

OEH Atlas of NSW Wildlife (2017) records for an area of 5km radius around the subject site indicate that 35 threatened fauna have been recorded within the last 25 years.

Table 5 indicates the species of threatened fauna recorded including threatened status and no. of records over the last 25 years.

Order & Family	Common name	Scientific name	NSW status	Comm. status	No. of records
Myobatrachidae	Giant Burrowing Frog	*Heleioporus australiacus*	V,P	V	3
	Red-crowned Toadlet	*Pseudophryne australis*	V,P		83
Hylidae	Green and Golden Bell Frog	*Litoria aurea*	E1,P	V	2
Reptilia **Varanidae**	Rosenberg's Goanna	*Varanus rosenbergi*	V,P		21
Aves **Anatidae**	Cotton Pygmy-Goose	*Nettapus coromandelianus*	E1,P		3
Columbidae	Superb Fruit-Dove	*Ptilinopus superbus*	V,P		4
Ciconiidae	Black-necked Stork	*Ephippiorhynchus asiaticus*	E1,P		1
Ardeidae	Australasian Bittern	*Botaurus poiciloptilus*	E1,P	E	2
	Black Bittern	*Ixobrychus flavicollis*	V,P		6
Accipitridae	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V,P	C	28
	Little Eagle	*Hieraaetus morphnoides*	V,P		3
	Square-tailed Kite	*^^Lophoictinia isura*	V,P,3		4
	Eastern Osprey	*^^Pandion cristatus*	V,P,3		4
Cacatuidae	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	*^^Callocephalon fimbriatum*	E2,V,P,3		20
	Gang-gang Cockatoo	*^^Callocephalon fimbriatum*	V,P,3		20
	Glossy Black-Cockatoo	*^Calyptorhynchus lathami*	V,P,2		12
Psittacidae	Little Lorikeet	*Glossopsitta pusilla*	V,P		2
	Swift Parrot	*^^Lathamus discolor*	E1,P,3	CE	7
Strigidae	Barking Owl	*^^Ninox connivens*	V,P,3		7
	Powerful Owl	*^^Ninox strenua*	V,P,3		235
Neosittidae	Varied Sittella	*Daphoenositta chrysoptera*	V,P		2
Artamidae	Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V,P		1
Mammalia **Dasyuridae**	Spotted-tailed Quoll	*Dasyurus maculatus*	V,P	E	5
Peramelidae	Southern Brown Bandicoot (eastern)	*Isoodon obesulus obesulus*	E1,P	E	101
Burramyidae	Eastern Pygmy-possum	*Cercartetus nanus*	V,P		20
Petauridae	Yellow-bellied Glider	*Petaurus australis*	V,P		1
Pteropodidae	Grey-headed Flying-fox	*Pteropus poliocephalus*	V,P	V	743
Emballonuridae	Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V,P		3
Molossidae	Eastern Freetail-bat	*Mormopterus norfolkensis*	V,P		12

Order & Family	Common name	Scientific name	NSW status	Comm. status	No. of records
Vespertilionidae	Large-eared Pied Bat	*Chalinolobus dwyeri*	V,P	V	1
	Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V,P		2
	Little Bentwing-bat	*Miniopterus australis*	V,P		4
	Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V,P		37
	Southern Myotis	*Myotis macropus*	V,P		4
	Greater Broad-nosed Bat	*Scoteanax rueppellii*	V,P		3

Table 5 - Records of 35 threatened fauna species recorded over the previous 25 years within a 5km radius of the subject site at 95 Stanhope Street, Killara.

The site represents unsuitable habitat for many of these threatened fauna species, though locations of sightings were examined for a total of 26 threatened fauna species where potential habitat may be considered to occur (Figures 6A, 6B, 6C, 6D & 6E). The subject site containing managed curtilage is suboptimal at best for most of these species although some avian species may feed on nectar fro and insect-foraging bats may occur above the canopy.

Figures 6A, 6B, 6C, 6D & 6E indicate the locations of 25 threatened species of fauna recorded in the vicinity of 95 Stanhope Street, Killara.

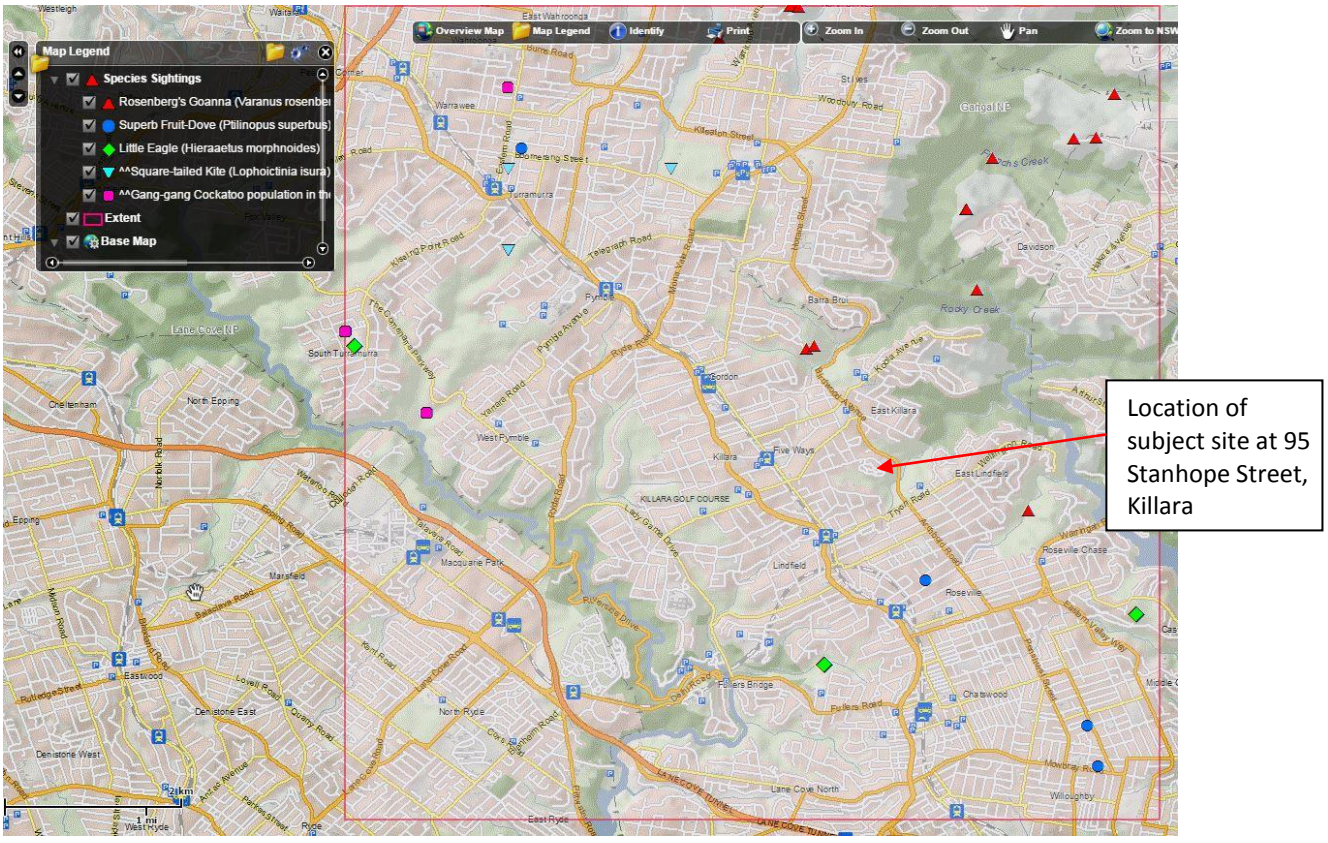

Figure 6A - Records for Rosenbergs Goanna and 4 avian species near Lourdes Retirement Village.

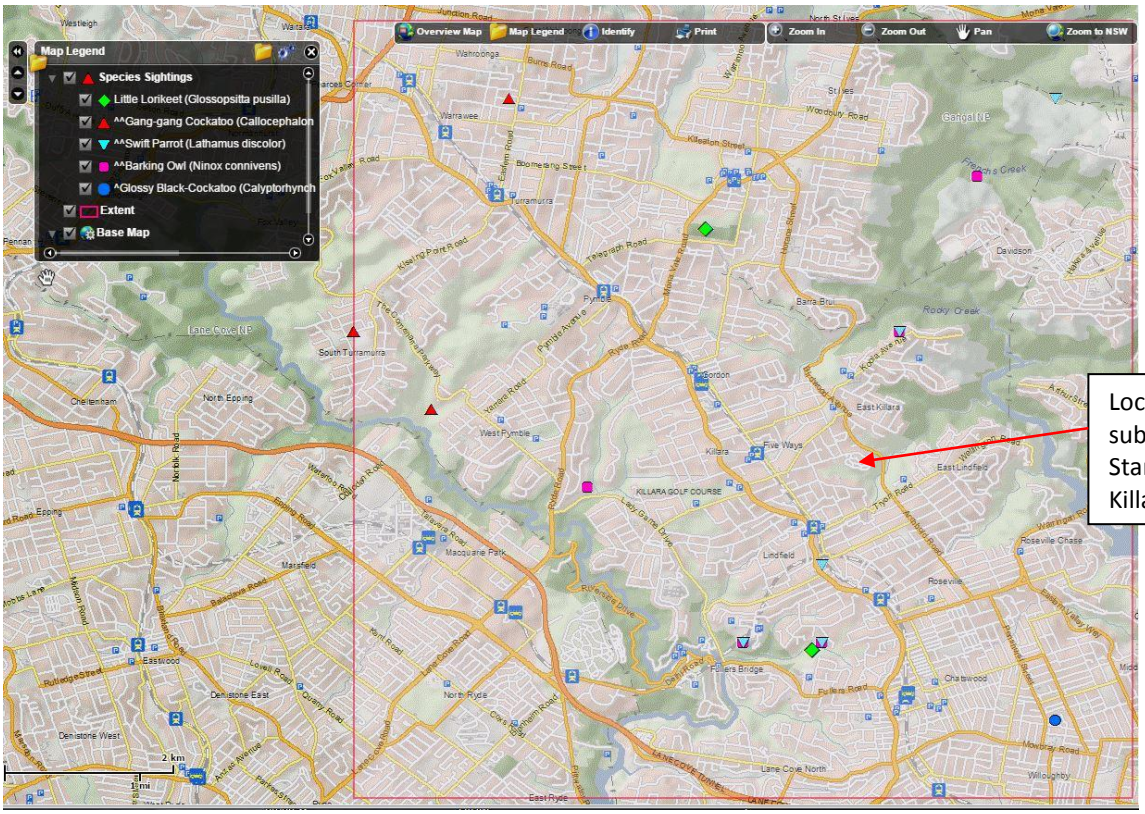

Figure 6B - Records for 5 avian species, including the Glossy Black Cockatoo near Lourdes Retirement Village.

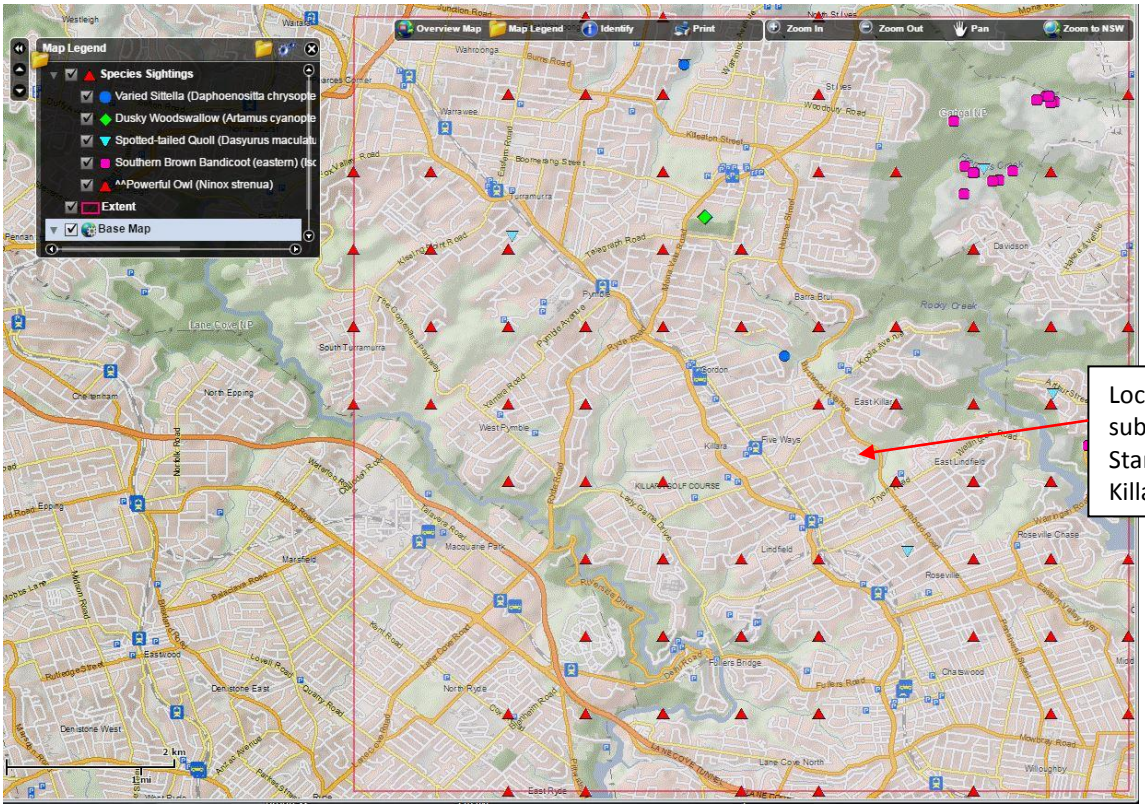

Figure 6C - Records for 3 avian species, including the Powerful Owl (red triangle) and 2 species of mammal near Lourdes Retirement Village.

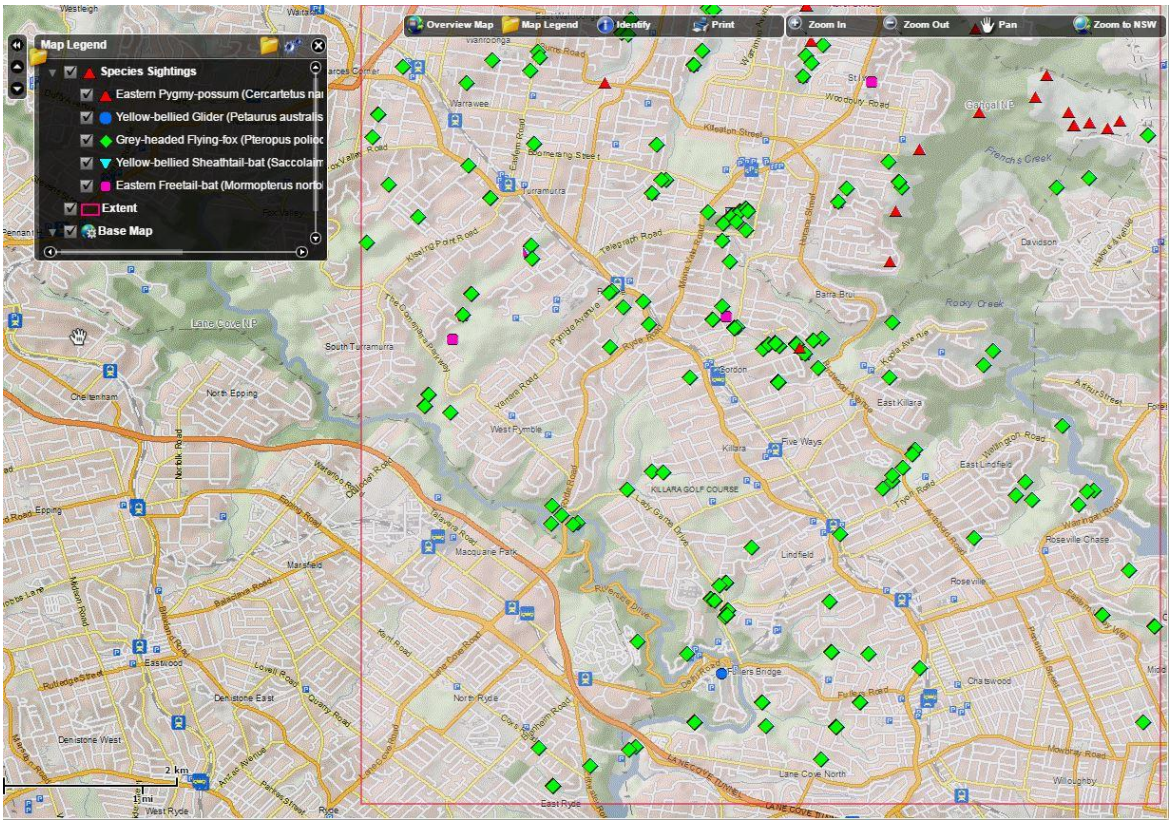

Figure 6D - Records for 3 species of mammal, including the Grey-headed Flying Fox (green diamond) and 2 species of microbat near Lourdes Retirement Village.

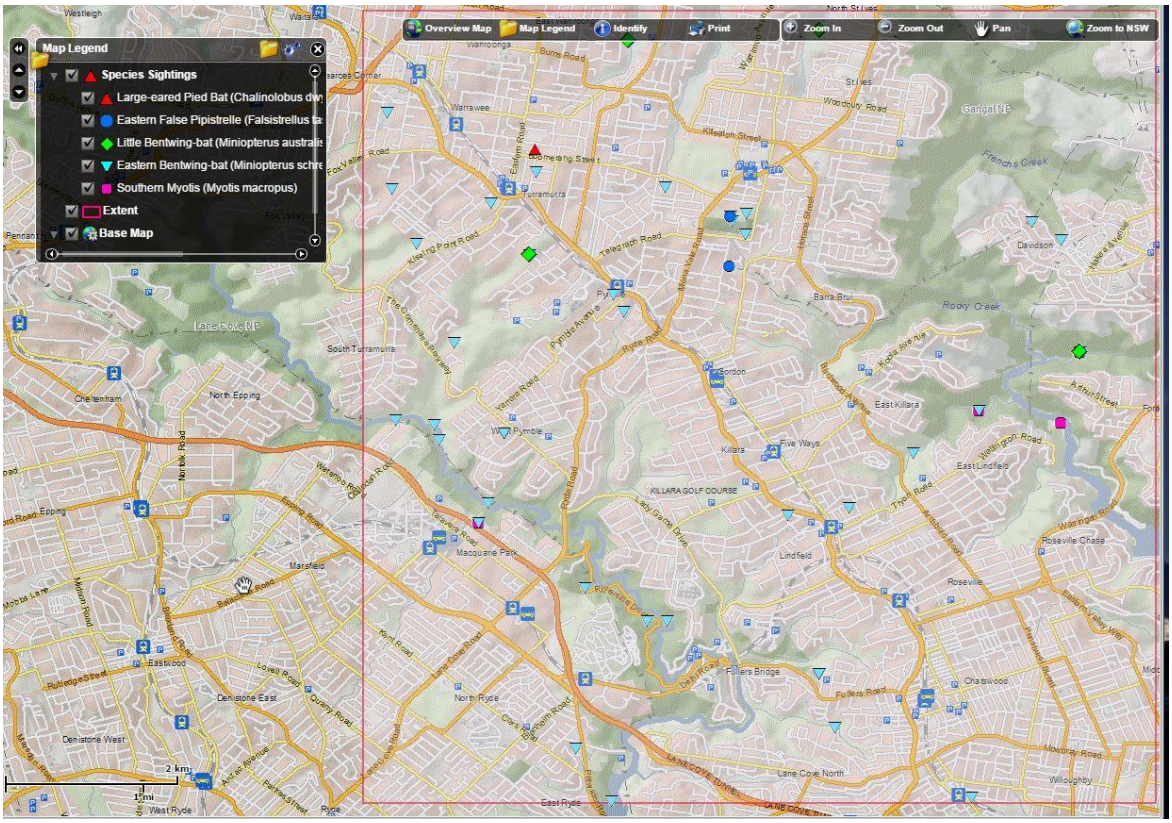

Figure 6E - Records for 5 species of microbat near Lourdes Retirement Village.

Figures 6A, 6B, 6C, 6D and 6E indicate that many mobile species of fauna, mostly avian and bat species, have been recorded in the vicinity of the subject area at the Lourdes Retirement Village.

Assessment

Many mobile fauna species that have been recorded in high numbers in the vicinity of the subject site such as the Little Bentwing Bat, Southern Myotis or Fishing Bat, Eastern Pygmy Possum, Rosenbergs Goanna, Spotted Tail Quoll and Southern Brown Bandicoot occur in natural bushland associated with Garigal National Park (Figures 6A, 6C and 6D) and do not occur or forage in the vicinity of the subject land.

One species, the Gang-gang Cockatoo population in the Hornsby Shire Council and Kuring-gai Council LGA, occurs in low frequency well to the west of the subject site (Figures 6A & 6B).

Three species, the Powerful Owl, Grey-headed Flying Fox and Eastern Bentwing Bat, have been recorded in close proximity to the subject site at 95 Stanhope Street, Killara (Figures 6C, 6D & 6E).

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 Soldiers Memorial Park and Garigal National Park, and as such the loss of a small number of trees from the tree community at the Lourdes 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 Soldiers Memorial Park and Garigal National Park 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, populations of which have an encampment in the nearby suburb of Gordon. As such, no further assessment is considered necessary.

Eastern Bentwing Bat

Previous recordings of bat sonographs over an extensive range of areas in the Sydney Metropolitan Region by ACS Environmental P/L have indicated that this microbat species is forages over a wide range of habitats for insects above a tree canopy. As such, records for this species occur consistently across the 5km range of habitat as shown in Figure 6E and it is considered that the loss of a small number of indigenous locally-occurring trees 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 and species of tree in a landscape plan for the proposed development. As such, no further assessment is considered necessary.

Conclusion

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 Garigal National Park with copses of mature trees occurring in close proximity in the local area.

5 CONCLUSIONS

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 and nursing home 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 the arboricultural report by Scales (2017).

No trees occurring at the subject site were observed to contain hollows or spouts that would provide sheltering or breeding habitat for any avian species, arboreal mammals or microbats.

Principal locally-occurring indigenous trees observed at the site include Turpentine, Red Bloodwood, Sydney Red Gum, Old Man Banksia, Sweet Pittosporum and Broad-leaved Scribbly Gum (Scales 2017).

This ecological assessment has concluded that a small copse of two Turpentine trees and one individual of Sweet Pittosporum (Tree Numbers 44, 45 & 46 in Scales 2016) may have been derived from genotypes of these tree species that occurring in a former distribution of Sydney Turpentine Ironbark Forest (STIF) (Figure 3). It is recommended that this small group of trees be retained as the development does not appear to impact on this patch of trees.

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.*

It is also recommended that Tree Number 349, a mature individual of Red Bloodwood that occurs along Stanhope Street (Scales 2016) and does not appear to be potentially impacted by the proposed development be retained. It appears that there may be an anomaly in the proposed removal status of this individual (Scales 2016) as there appears to be no reason to remove this tree.

All of the other locally-occurring indigenous trees proposed for removal to facilitate the development are mostly landscaped plantings and occur commonly in surrounding local parks and reserves such as Soldiers Memorial Park and Garigal National Park. These species include

Sydney Red Bum, Blackbutt, Red Bloodwood, Broad-leaved Scribbly Gum, Rough-barked Apple and Forest Oak (Tables 1 & 2). As such, their removal would not incur a significant loss to the cohort of trees in the vicinity. It is recommended however to utilise these species in any landscape plan that is prepared for the development as they provide valuable nectar and roosting resources for many bird species as well as arboreal mammals and the Grey-headed Flying Fox.

An assessment of species of flora and fauna recorded within 5km of the site and listed under the EPBC Act and the TSC 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 OEH or to the Commonwealth Department of the Environment and Energy.

6 REFERENCES & LITERATURE REVIEWED

Benson, D. and Howell, J. (1990) Taken for Granted: The Bushland of Sydney and its Suburbs. Kangaroo Press in association with the Royal Botanic Gardens of Sydney

Chapman, G.A. and Murphy, C.L. (1989) *Soil landscapes of the Sydney 1;100 000 sheet.* (Soil Conservation Service of N.S.W.: Sydney).

Fairley, A. (2004) '*Seldom Seen – Rare Plants of Greater Sydney'.* Pub. L. Egerton Toppan Printing Co. U.K.

Herbert, C. (1983) '*Geology of the 1:100 000 Sheet 9130'.* Geological Survey of NSW, Sydney.

OEH Atlas of NSW Wildlife (2017). NPWS Geographic Information Systems Division, Hurstville NSW, 2220.

OEH (2013) Report on 'The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area' Department of Environment and Climate Change NSW, Hurstville

Pizzey, G. and Knight, F. (2003). *The Field Guide to the Birds of Australia.* Angus and Robinson Publs.

Robinson, L. (1994) *Field Guide to the Native Plants of Sydney.* Kangaroo Press, Kenthurst, Sydney.

Scales, A. (2016) Arboricultural Impact Assessment at the Lourdes Retirement Village and Nursing Home, 95 Stanhope Street, Killara

Strahan, R. 2004 *The Mammals of Australia* Sixth Edition. Sydney: ReedBooks.