flora & fauna assessment, proposed development

at 124 – 128 Killeaton Street, St Ives

13th October 2014

prepared by

Mark Couston CPESC. - Ass. Dip. Env. Ctrl. (CSU), Grad. Dip. Env. Mgmt. (CSU),
Cert. Soil & Water Mgmt. (UWS), MECA.
OEH - Scientific Licence No. S L100777, DPI - Animal Research Authority 04-4786

Footprint Green Pty Ltd
Arboricultural, Environmental & Horticultural Consultants
5 Watkins Road, Avalon Beach, NSW 2107
Email: mail@footprintgreen.com.au
Ph: (02) 99188877
Fax: (02) 99188876
ABN 34 097 138 817

contents

list of figures

Footprint Green Pty Ltd
Arboricultural, Environmental & Horticultural Consultants
5 Watkins Road, Avalon Beach, NSW 2107
Email: mail@footprintgreen.com.au
Ph: (02) 99188877
Fax: (02) 99188876
ABN 34 097 138 817

executive summary

This report has been prepared in conjunction with a proposed development at 124-128 Killeaton Street, St. Ives. The report identifies the flora species on the site and fauna species residing on or using the site as part of their foraging range. Specific assessment of the properties has been undertaken to identify habitats of threatened species, populations and ecological communities listed in the schedules of the *Threatened Species Conservation Act (NSW) 1995* & *Environmental Protection Biodiversity Conservation Act (Cwlth) 1999*.

The report has been commissioned by Develotek Property Group Pty Ltd who have also provided site instructions. Site inspections and field work were conducted between the 17th August 2014 and 3rd September 2014.

For the purposes of this report the properties known as 124, 126 &128 Killeaton Street, St. Ives will be referred to as the subject site. The tree reference numbers used in this report correspond to those used in the arboricultural impact assessment (Footprint Green, 2014a).

The subject site has an area of approximately 4,500 m^2 and is currently developed containing 3 dwellings, 3 swimming pools, 1 detached garage and formal landscaped areas of private open space.

The proposed development involves demolition of the existing built structures, the removal of trees and construction of new residential apartments with basement level car parking (Marchese, 2014).

A number of threatened species have been recorded as occurring within a 5km radius of the site and field surveys and habitat assessments have been carried out primarily targeting threatened species. Those threatened species that have been recorded on the site or have some habitat relationships with the habitats on the site include;

- Species & Population of Gang-gang Cockatoo (*Callocephalon fimbratum*)
- Species - Eastern False Pipistrelle (*Falsistrellus tasmaniensis)*:
- Species - Eastern Freetail Bat (*Mormopterus norfolkensis*);
- Species - Grey-headed Flying-fox (*Pteropus poliocephalus*);
- Species - Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*), and
- Ecological Community – Sydney Turpentine Ironbark Forest.

Whilst there are 60 trees considered in the arboricultural impact assessment (Footprint Green, 2014a), the Sydney Turpentine Ironbark Forest community on the site consists of 1 Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), Tree No. 713, which is proposed to be retained and a semi-mature Narrow-leaved Wattle (*Acacia longissima)* which appears to have been planted adjacent the front boundary masonry wall and is likely to be removed.

From an ecological perspective the direct long-term negative impacts involve:

- removal of 5 non-indigenous native trees, and
- removal of 23 exotic tree and gardens and open cleared / lawn areas.

From an ecological perspective the direct long-term positive impacts involve:

- retention of the 1 indigenous tree on site, a Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) which is possibly a planted specimen;
- retention of 2 non-indigenous native trees being 1 Flooded Gum (*Eucalyptus grandis*) and 1 River Peppermint (*Eucalyptus elata*);
- planting of an additional 14 indigenous canopy trees consisting of 1 Smooth-barked Apple (*Angophora costata*), 3 Grey Ironbarks (*Eucalyptus paniculata*), 1 Sydney Blue Gum (*Eucalyptus saligna*), and 9 Turpentines (*Syncarpia glomulifera*)

In relation to threatened species, based upon assessments carried out in accordance with section 5A of the *Environmental Planning and Assessment Act 1979 (NSW)* (refer Appendix A), the proposed development is unlikely to have a significant impact on threatened species, populations and ecological communities listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*. Therefore a Species Impact Statement is not required.

The site is within the Ku-ring-gai LEP 2012 (Local Centres) which shows part of the site containing an: Area of Biodiversity Significance. The Local Centres Development Control Plan (2012), Part 6 further categorises part of the site as containing trees that are Category 3- Landscape Remnants.

Within this area mapped as Category 3 - Landscape Remnant there is 1 locally indigenous Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), Tree No.713 which potentially is a planted specimen and there is 1 planted non-indigenous Flooded Gum (*Eucalyptus grandis*) which is not considered to be a remnant tree..

Both these canopy trees within the area mapped as Category 3 -Landscape Remnant are proposed to be retained, therefore satisfying the objectives in the Local Centres Development Control Plan (2012).

1. introduction

1.1 Background

This report has been prepared in conjunction with a proposed development at 124-128 Killeaton Street, St. Ives.

The report identifies the flora species on the site and fauna species residing on or using the site as part of their foraging range. Specific assessment of the properties has been undertaken to identify habitats of threatened species, populations and ecological communities listed in the schedules of the *Threatened Species Conservation Act (NSW) 1995* & *Environmental Protection Biodiversity Conservation Act (Cwlth) 1999*.

The report has been commissioned by Ausprospect Pty Ltd who have also provided site instructions. Site inspections and field work were conducted between the 17th August 2014 and 3rd September 2014. For the purposes of this report the properties known as 124, 126 &128 Killeaton Street, St. Ives will be referred to as the subject site. The tree reference numbers used in this report correspond to those used in the arboricultural impact assessment (Footprint Green, 2014a).

1.2 Existing site & proposed development

The subject site has an area of approximately 4,500 m^2 and is currently developed containing 3 dwellings, 3 swimming pools, 1 detached garage and formal landscaped areas of private open space.

The proposed development involves demolition of the existing built structures, the removal of trees and construction of new residential apartments with basement level car parking (Marchese, 2014).

Figure 1.1 Site frontage looking south west along Killeaton Street St. Ives

1.3 Local planning context

The site is within the Ku-ring-gai LEP 2012 (Local Centres) and is zoned R4 High Density Residential. The LEP 2012 also shows part of the site containing an:

- Area of Biodiversity Significance.

Local Centres Development Control Plan (2012), Part 6 further categorises the part of the site containing Area of Biodiversity Significance into:

- Category 3- Landscape Remnant.

1.4 NSW environmental planning & assessment

Whilst there several State Acts and planning instruments that relate to flora and fauna issues those covered in this report include:

- species, populations and ecological communities listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW);*
- S. 5A(2) (7-part test or Assessment of Significance) *Environmental Planning and Assessment Act 1979 (NSW)*;

Should this report conclude that the proposed development will have a significant impact on species, communities or populations listed in the schedules of *Threatened Species Conservation Act 1995 (NSW)* a more detailed Species Impact Statement will need to be prepared in accordance with the requirements of the *Threatened Species Conservation Act 1995 (NSW).*

1.5 Commonwealth context

This report also identifies flora and fauna species or communities, relevant to the site that are listed under Part 13 Division 1 of the *Environment Protection & Biodiversity Act 1999 (Cwlth)* (EPBC). Species or communities listed in the Act are considered to be "matters of national environmental significance" and consideration needs to be given as to whether the proposed development will or is likely to have a "significant impact" on "matters of national environmental significance". In determining whether a "significant impact" will occur, consideration is given to;

- EPBC Act Administrative guidelines on significance (DEH 2006)

To minimise duplication in the environmental assessment procedures, a bilateral agreement was made in January 2007 between the Commonwealth & NSW Governments giving accreditation of New South Wales assessment processes in relation to threatened species, populations and ecological communities. The agreement provides for "Controlled actions" as defined in the *Environment Protection & Biodiversity Act 1999 (Cwlth)* relating to threatened species, to no longer require assessment under Part 8 of the *Environment Protection & Biodiversity Act 1999 (Cwlth)* where they are assessed under Part 3A, 4 or 5 of the *Environmental Planning and Assessment Act 1979 (NSW)*.

Should the assessment in this report determine that a "significant impact" will occur, or is likely to occur; on "matters of national environmental significance" the proposed development will need to be referred to the Minister (Cwlth) to determine as to whether or not the proposed development is a "controlled action".

2. the site

2.1 General information

The site is situated on the south eastern corner of Mona Vale Road and Killeaton Street and is currently developed containing 3 dwellings, 3 swimming pools, 1 detached garage and formal landscaped areas of private open space.

The surrounding landscape comprises primarily of residential developments with private open space areas.

The general site characteristics are:

Site Area	4,500 m^2 aprox.
Landform Morphology	Crest
Aspect	-
Geology	Mittagong Formation
Soil Landscape	Lucas Heights Soil Landscape
Watercourse	No defined channel
Catchment	Branch of Cowan Creek
Receiving Waters	Cowan Creek / Hawkesbury River
Vegetation	Developed landscape exotic gardens.

Figure 2.1 Aerial view of the subject site.

3. flora & fauna survey

3.1 Flora species survey methods

3.1.1 Flora literature search

Flora records post 1950 were obtained from the NSW Office of Environment & Heritage's (OEH, 2014) Wildlife Atlas searching a 10km grid square centred on the site (AMG co-ordinates E 330110 and N 6266530).

3.1.2 Flora field surveys

The flora survey covered an area of approximately 2,200m^2 using the Random Meander Method described by Cropper (1993) involving 4 person hours and was conducted on the 03/09/14.

Specific effort was undertaken to identify optimal and sub-optimal natural habitats of threatened species and communities and in these areas detailed searches were undertaken.

Species identifications are consistent with the nomenclature in Harden (1992, 1993, 2000 & 2002) with recent name changes as amended in the Royal Botanic Gardens Sydney publication *Cunninghamia*. Where some taxonomic uncertainty exists, samples were taken for verification using recognised floristic keys.

3.2 Fauna species survey methods

3.2.1 Fauna Literature search

Fauna records post 1950 were obtained from the NSW Office of Environment & Heritage's (OEH, 2014) Wildlife Atlas searching a 10km grid square centred on the site (AMG co-ordinates E 330110 and N 6266530).

3.2.2 Fauna field surveys

The fauna surveys carried out have departed from those outlined in Threatened Biodiversity Survey & Assessment Guidelines for Developments & Activities Working Draft (OEH, 2004) because of the extent of site modifications, the simplified habitats on the site and the site's context, being surrounded by developed urban areas. Fauna investigations have been taken into account in:

- habitat assessments, and
- opportunistic sightings, calls, scats etc.

3.2.2.1 Habitat Assessment

To overcome the limitations associated with short term surveys and seasonal variations, habitat assessments are carried out to identify key habitat features, such as trees with hollows, rock overhangs and watercourses, and to identify potential habitats where threatened fauna species could reside, find refuge, breed or forage. This habitat assessment was carried out in conjunction with the flora survey on the 03/09/14.

3.2.2.2 Opportunistic sighting, calls, scats and scratchings

During the course of individual surveys opportunistic observations, calls, scats, tracks and scratchings were also recorded both within the study area and locally off site.

Figure 3.1 The rear of 126 Killeaton Street, typical of the rear parts of the subject site dominated by exotic species as specimen trees, garden shrubs and open lawns.

Figure 3.2 The front portion of 124 Killeaton Street, with canopy trees of non-indigenous Flooded Gum (*Eucalyptus grandis*) (right foreground) and Narrow-leaved Scribbly Gum, (*Eucalyptus racemosa)* (right rear).

3.3 Survey findings

3.3.1 Flora site data

The following table identifies flora species:

- listed in the schedules of the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)* and recorded within a 10km grid square centered on the site in the Wildlife Atlas (OEH, 2014) post 1950;
- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded within a 10km grid square centered on the site in the Wildlife Atlas (OEH, 2014) post 1950, and
- recorded on the site as part of field surveys.

OEH Wildlife Atlas (2014)	Recorded on subject site	Family	Genus species	Common Name	Autochthony	Conservation Status
✔- Recorded, - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).						
	✔	Aceraceae	*Acer palmatum*	Japanese Maple	Exotic	Unprotected
	✔	Agapanthacea	*Agapanthus africanus*	Agapanthus	Exotic	Unprotected
	✔	Anthericaceae	*Chlorophytum comosum*	Ribbon / Spider Plant	Exotic	Unprotected
	✔	Araceae	*Monstera deliciosa*	Fruit-salad Plant	Exotic	Unprotected
	✔	Araliaceae	*Hedera helix*	English Ivy	Exotic	Unprotected
	✔	Arecaceae	*Archontophoenix cunninghamii*	Bangalow Palm	Native	Protected
	✔	Arecaceae	*Chrysalidocarpus lutescens*	Golden Cane Palm	Exotic	Unprotected
	✔	Arecaceae	*Howea forsteriana*	Kentia Palm	Native	Unprotected
	✔	Arecaceae	*Phoenix sp. Robelenii*	Little Phoenix Palm	Exotic	Unprotected
	✔	Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	Exotic	Unprotected
	✔	Arecaceae	*Syagrus romanzoffianum*	Cocos Palm	Exotic	Unprotected
	✔	Asparagaceae	*Dracaena sp.*	Dracaena	Exotic	Unprotected
	✔	Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern	Native	Unprotected
	✔	Asteraceae	*Conyza sp.*	Fleabane	Exotic	Unprotected
	✔	Asteraceae	*Hypochaeris radicata*	Catsear	Exotic	Unprotected
	✔	Asteraceae	*Senecio madagascariensis*	Fireweed	Exotic	Unprotected
	✔	Asteraceae	*Soliva sessilis*	Bindi	Exotic	Unprotected

OEH Wildlife Atlas (2014)	Recorded on subject site	Family	Genus species	Common Name	Autochthony	Conservation Status
✔- Recorded, 🌲 - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).						
	✔	Berberidaceae	*Nandina domestica*	Sacred Bamboo	Exotic	Unprotected
	✔	Buxaceae	*Buxus microphylla*	Box	Exotic	Unprotected
	✔	Commelinaceae	*Tradescantia fluminensis*	Wandering Jew	Exotic	Noxious
	✔	Cornaceae	*Nyssa sylvatica*	Tupelo	Exotic	Unprotected
	✔	Cupressaceae	*Cupressus sempervirens*	Italian Cypress	Exotic	Unprotected
✔		Elaeocarpaceae	*Tetratheca glandulosa*	Glandular Pink-bell	Indigenous	Vulnerable NSW, Cwth
	✔	Ericaceae	*Azalea sp.*	Azalea (horticultural)	Exotic	Unprotected
✔		Ericaceae	*Epacris purpurascens var. purpurascens*	-	Indigenous	Vulnerable NSW
✔		Fabaceae	*Acacia bynoeana*	Bynoe's Wattle	Indigenous	Endangered NSW, Vulnerable Cwth
	✔🌲	Fabaceae	*Acacia longissima*	Narrow-leaved Wattle	Indigenous	Unprotected
✔		Haloragaceae	*Haloragodendron lucasii*	Hal	Indigenous	Endangered NSW, Cwlth
	✔	Hamamelidaceae	*Liquidambar formosana*	-	Exotic	Unprotected
	✔	Hamamelidaceae	*Liquidambar styraciflua*	Sweet Gum	Exotic	Unprotected
	✔	Lamiaceae	*Lavandula spp.*	Lavender	Exotic	Unprotected
	✔	Magnoliaceae	*Magnolia grandiflora*	Magnolia	Exotic	Unprotected
	✔	Moraceae	*Ficus benjamina*	Weeping Fig	Native	Unprotected
	✔	Moraceae	*Ficus microcarpa var.hillii*	Hills Fig	Native	Unprotected
	✔	Moraceae	*Ficus pumila*	Creeping Fig	Exotic	Unprotected
✔		Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	Indigenous	Vulnerable NSW
	✔🌲	Myrtaceae	*Callistemon salignus*	Willow Bottlebrush	Indigenous	Unprotected
✔		Myrtaceae	*Darwinia biflora*	-	Indigenous	Vulnerable NSW, Cwth
✔		Myrtaceae	*Eucalyptus camfieldii*	Heart-Leaved Stringybark	Indigenous	Vulnerable NSW, Cwth
	✔🌲	Myrtaceae	*Eucalyptus elata*	River Peppermint	Native	Unprotected
	✔🌲	Myrtaceae	*Eucalyptus globulus*	Tasmanian Blue Gum	Native	Unprotected
	✔🌲	Myrtaceae	*Eucalyptus grandis*	Flooded Gum	Native	Unprotected
✔🌲		Myrtaceae	*Eucalyptus nicholii*	Narrow-Leaf Peppermint	Native	Vulnerable NSW
	✔	Myrtaceae	*Eucalyptus racemosa*	Narrow-Leaved Scribbly Gum	Indigenous	Unprotected
✔		Myrtaceae	*Leptospermum deanei*	-	Indigenous	Vulnerable NSW, Cwth

OEH Wildlife Atlas (2014)	Recorded on subject site	Family	Genus species	Common Name	Autochthony	Conservation Status
✔- Recorded, - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).						
	✔	Myrtaceae	*Melaleuca bracteata*	Revolution Gold	Native	Unprotected
✔		Myrtaceae	*Melaleuca deanei*	Deane's Melaleuca	Indigenous	Vulnerable NSW, Cwth
	✔	Myrtaceae	*Melaleuca quinquenervia*	Paperpark	Native	Unprotected
✔		Myrtaceae	*Syzygium paniculatum*	Magenta Lillypilly	Indigenous	Vulnerable NSW, Cwth
	✔	Nyctaginaceae	*Bougainvillea sp.*	Bougainvillea	Exotic	Unprotected
	✔	Oleaceae	*Fraxinus oxycarpa*	Claret Ash	Exotic	Unprotected
	✔	Oleaceae	*Jasminum jasminoides*	Yellow Flowering Jasminum	Exotic	Unprotected
	✔	Oleaceae	*Ligustrum lucidum*	Large Leaf Privet	Exotic	Noxious
✔		Orchidaceae	*Cryptostylis hunteriana*	Leafless Tongue-orchid	Indigenous	Vulnerable NSW, Cwth
✔		Orchidaceae	*Genoplesium baueri*	Midge Orchids	Indigenous	Vulnerable NSW
	✔	Pittosporaceae	*Pittosporum eugenoides*	Variegated Tarata	Native	Unprotected
	✔	Pittosporaceae	*Pittosporum undulatum*	Native Daphne	Indigenous	Unprotected
	✔	Poaceae	*Cynodon dactylon*	Couch Grass	Exotic	Unprotected
	✔	Poaceae	*Ehrharta erecta*	Panic Veldtgrass	Exotic	Unprotected
	✔	Poaceae	*Oplismenus imbecillis*	Basket Grass	Indigenous	Unprotected
	✔	Poaceae	*Pennisetum clandestinum*	Kikuyu Grass	Exotic	Unprotected
	✔	Poaceae	*Stenotaphrum secundatum*	Buffalo Grass	Exotic	Unprotected
	✔	Polygalaceae	*Polygala myrtifolia*	Myrtle-leaf Milkwort	Exotic	Unprotected
✔		Proteaceae	*Grevillea caleyi*	Caley's Grevillea	Indigenous	Endangered NSW, Cwlth
✔		Proteaceae	*Persoonia hirsuta*	Hairy Geebung	Indigenous	Endangered NSW, Cwlth
✔		Proteaceae	*Persoonia mollis subsp. maxima*	-	Indigenous	Endangered NSW, Cwlth
	✔	Rosaceae	*Cotoneaster sp.*	Cotoneaster	Exotic	Unprotected
	✔	Rosaceae	*Rosa sp.*	Rose	Exotic	Unprotected
	✔	Sapindaceae	*Alectryon tomentosus*	Hairy Bird's Eye	Native	Unprotected
	✔	Solanaceae	*Brunfelsia sp.*	-	Exotic	Unprotected
✔		Sterculiaceae	*Lasiopetalum joyceae*	-	Indigenous	Vulnerable NSW, Cwth
	✔	Strelitziaceae	*Strelitzia sp.*	-	Exotic	Unprotected
	✔	Theaceae	*Camellia japonica*	Camellia	Exotic	Unprotected

OEH Wildlife Atlas (2014)	Recorded on subject site	Family	Genus species	Common Name	Autochthony	Conservation Status
✔- Recorded, - Planted Native Specimen. **Unprotected** / **Protected** - Schedule 13 National Parks & Wildlife Act 1974 (NSW), Vulnerable **NSW** / **Endangered NSW / Critically Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Noxious** - Noxious Weeds Act 1993 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth).						
	✔	Theaceae	*Camellia sasanqua*	Camellia	Exotic	Unprotected
✔		Thymelaeaceae	*Pimelea curviflora var. curviflora*	Curved Rice-flower	Indigenous	Vulnerable NSW, Cwth
	✔	Ulmaceae	*Ulmus parvifolia*	Chinese Weeping Elm	Exotic	Unprotected
	✔	Ulmaceae	*Ulmus procera "vanhouttie"*	Golden Elm	Exotic	Unprotected

3.3.2 Fauna site data

The following table identifies fauna species:

- listed in the schedules of the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)* and recorded within a 10km grid square centered on the site in the Wildlife Atlas (OEH 2014) post 1950;
- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded within a 10km grid square centered on the site in the Wildlife Atlas (OEH 2014), post 1950;
- recorded on the site as part of field surveys.

OEH Wildlife Atlas (2014)	Recorded on Site	Class	Genus species	Common Name	Autochthony	Conservation Status
✔- Recorded / Identified, ✔θ Record Highly Probable, ✔ Record Probable, ✔ Record Likely / Possible. **Unprotected** / **Protected** - National Parks & Wildlife Act 1974 (NSW), **Vulnerable NSW** / **Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)						
✔		Amphibia	*Heleioporus australiacus*	Giant Burrowing Frog	Native	Vulnerable NSW, Cwth
✔		Amphibia	*Litoria aurea*	Green and Golden Bell Frog	Native	Endangered NSW, Vulnerable Cwth
✔		Amphibia	*Pseudophryne australis*	Red-crowned Toadlet	Native	Vulnerable NSW
✔		Aves	*Anthochaera phrygia*	Regent Honeyeater	Native	Critically Endangered NSW, Endangered Cwlth
✔		Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	Native	Vulnerable NSW
✔		Aves	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Native	Vulnerable NSW
✔		Aves	*Daphoenositta chrysoptera*	Varied Sittella	Native	Vulnerable NSW
✔		Aves	*Glossopsitta pusilla*	Little Lorikeet	Native	Vulnerable NSW
✔		Aves	*Haematopus fuliginosus*	Sooty Oystercatcher	Native	Vulnerable NSW
✔		Aves	*Haematopus longirostris*	Pied Oystercatcher	Native	Endangered NSW

OEH Wildlife Atlas (2014)	Recorded on Site	Class	Genus species	Common Name	Autochthony	Conservation Status
✔- Recorded / Identified, ✔θ Record Highly Probable, ✔ Record Probable, ✔ Record Likely / Possible. **Unprotected** / **Protected** - National Parks & Wildlife Act 1974 (NSW), **Vulnerable NSW** / **Endangered NSW** - NSW Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwlth** / **Endangered Cwlth** / **Vulnerable Cwlth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)						
✔		Aves	*Hieraaetus morphnoides*	Little Eagle	Native	Vulnerable NSW
✔		Aves	*Ixobrychus flavicollis*	Black Bittern	Native	Vulnerable NSW
✔		Aves	*Lathamus discolor*	Swift Parrot	Native	Endangered NSW, Cwlth
	✔	Aves	*Manorina melanocephala*	Noisy Miner	Native	Protected
✔		Aves	*Ninox connivens*	Barking Owl	Native	Vulnerable NSW
✔		Aves	*Ninox strenua*	Powerful Owl	Native	Vulnerable NSW
✔		Aves	*Petroica boodang*	Scarlet Robin	Native	Vulnerable NSW
✔		Aves	*Polytelis swainsonii*	Superb Parrot	Native	Vulnerable NSW, Cwth
✔		Aves	*Ptilinopus superbus*	Superb Fruit-Dove	Native	Vulnerable NSW
	✔	Aves	*Strepera graculina*	Pied Currawong	Native	Protected
	✔	Aves	*Trichoglossus haematodus*	Rainbow Lorikeet	Native	Protected
✔		Aves	*Tyto novaehollandiae*	Masked Owl	Native	Vulnerable NSW
	✔	Insecta	*Apis mellifera*	European Honey Bee	Introduced	Unprotected
✔		Mammalia	*Cercartetus nanus*	Eastern Pigmy-possum	Native	Vulnerable NSW
✔		Mammalia	*Chalinolobus dwyeri*	Large-eared Pied Bat	Native	Vulnerable NSW, Cwth
✔		Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	Native	Vulnerable NSW, Endangered Cwth
✔		Mammalia	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle Bat	Native	Vulnerable NSW
	✔	Mammalia	*Felis catus*	Cat	Introduced	Unprotected
✔		Mammalia	*Isoodon obesulus obesulus*	Southern Brown Bandicoot	Native	Endangered NSW, Cwlth
✔		Mammalia	*Miniopterus australis*	Little Bentwing-bat	Native	Vulnerable NSW
✔		Mammalia	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	Native	Vulnerable NSW
✔		Mammalia	*Mormopterus norfolkensis*	Eastern Freetail Bat	Native	Vulnerable NSW
	✔	Mammalia	*Oryctolagus cuniculus*	Rabbit	Introduced	Unprotected
✔		Mammalia	*Phascolarctos cinereus*	Koala	Native	Vulnerable NSW
✔		Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	Native	Vulnerable NSW, Cwth
✔		Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail Bat	Native	Vulnerable NSW
✔		Reptilia	*Varanus rosenbergi*	Rosenberg's Goanna /Heath Monitor	Native	Vulnerable NSW

3.3.3 Ecological communities site data

The following table identifies ecological communities based upon community descriptions in determinations by NSW Scientific Committee and those described in the draft The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area (OEH 2009) and the NSW Scientific Committee and include communities:

- listed in the schedules of the *Environment Protection & Biodiversity Conservation Act 1999 (Cwlth)* and recorded in the vicinity of the site (OEH, 2014);
- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded in the vicinity of the site (OEH, 2014);
- considered as possibly occurring within the local area, and
- recorded on the site from field surveys.

OEH (2009)	Recorded On Site	Community name	Conservation Status
Vulnerable NSW / Endangered NSW - Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwth** / **Endangered Cwth** / **Vulnerable Cwth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwth)			
✔		Blue Gum High Forest	Critically Endangered NSW, Cwlth
✔	✔ Potential component species	Sydney Turpentine Ironbark Forest	Endangered NSW, Critically Endangered Cwlth
✔		Duffy's Forest	Endangered NSW

3.3.4 Population site data

The following table identifies threatened populations:

- listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and recorded within 5km of the site in the Wildlife Atlas (OEH, 2014) post 1950,
- recorded on the site as part of field surveys.

OEH Wildlife Atlas (2014)	Recorded on Site	Type	Population Name	Conservation Status
Vulnerable NSW / Endangered NSW - Threatened Species Conservation Act 1995 (NSW), **Critically Endangered Cwth** / **Endangered Cwth** / **Vulnerable Cwth** - Environment Protection & Biodiversity Conservation Act 1999 (Cwth)				
✔		Fauna	Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas	Endangered NSW

4. habitat assessment

4.1 Local & regional habitat context

The site is located within a developed residential area within St Ives and is isolated from the larger bushland areas of Lane Cove National Park, to the west, and Garigal National Park, to the east.

The smaller local bushland reserves in close proximity to the site are Ivor Wyatt Reserve (270m south west), Bead Forest (460m south east), Huntleys Forest (940m south) and Acron Oval reserve (1,000m east).

Within the local area there are scattered pockets of indigenous trees in the parks, local streets and peripheral areas adjacent sports fields. Within the immediate residential areas surrounding the site there is a low to moderate tree canopy provided by individual trees and stands of trees that are primarily non-indigenous native species and exotic species.

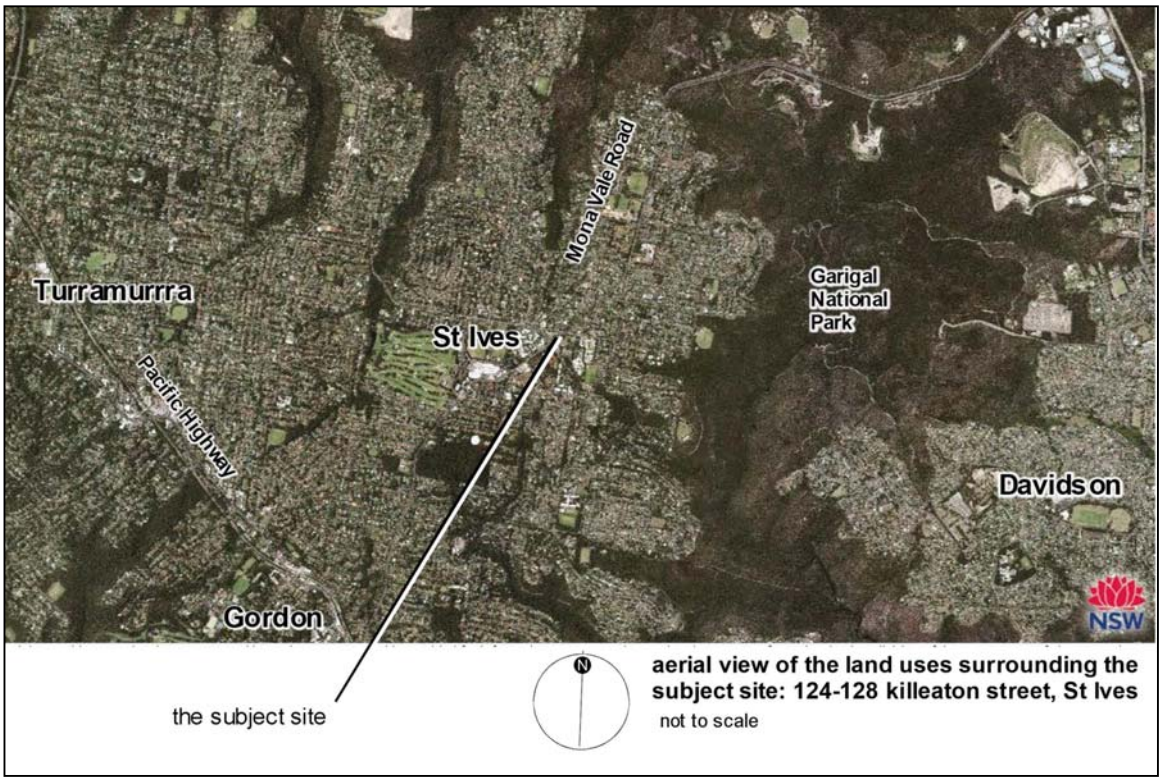

Figure 4.1 Aerial view of the subject site in context with the surrounding landuses

With limited tree cover and some scattered smaller bushland reserves, the local environment provides foraging and core habitat for species typically found in developed urban areas. The faunal composition on the site is also influenced by more typical urban native fauna including aggressive species such as Pied Currawong (*Strepera graculina*) and Noisy Miner (*Manorina melanocephala*) or resilient, adaptable species such as Grass/Delicate Skink (*Lampropholis delicata*) and Common Brushtail Possum (*Trichosurus vulpecula*). Trees and pockets of vegetation in urban areas can also typically provide core refuge habitat for some small mammals such Ringtail Possum (*Pseudocheirus*

peregrinus). Whilst these may be considered common species they are often the prey of threatened species such as Powerful Owl (*Ninox strenua*).

Fauna that do not reside locally and have broader foraging ranges are expected to be able to frequent the site. Some of these species such as the Grey-headed Flying-fox (*Pteropus poliocephalus*) and Powerful Owl (*Ninox strenua*) are listed in the schedules of the *Threatened Species Conservation Act (NSW) 1995.*

The urban habitats are not considered to be breeding or foraging habitat for sensitive species such as Regent Bowerbird *(Sericulus chrysocephalus*), Red-capped Robin (*Petroica goodenovii*), and Scarlet Honeyeater (*Myzomela sanguinolenta*) whose range does not usually extend outside larger bushland reserves.

4.2 Local habitat connectivity

Being in a developed urban area with modified habitats, the vegetation occurs as scattered trees amongst residential properties, private and public schools, roads reserves, parklands and sports fields. There are no contiguous links of natural habitats between the site and the larger natural bushland habitats in Garigal National Park. Fauna frequenting the site or moving through the site are typically those species capable of adapting or habituating to urban areas with fragmented habitats.

4.3 Site habitats

4.3.1.1 Previous land uses

Based upon historical aerial photos, the site has been developed prior to 1943 and at this point in time the native vegetation appears to have been cleared over the entire the site.

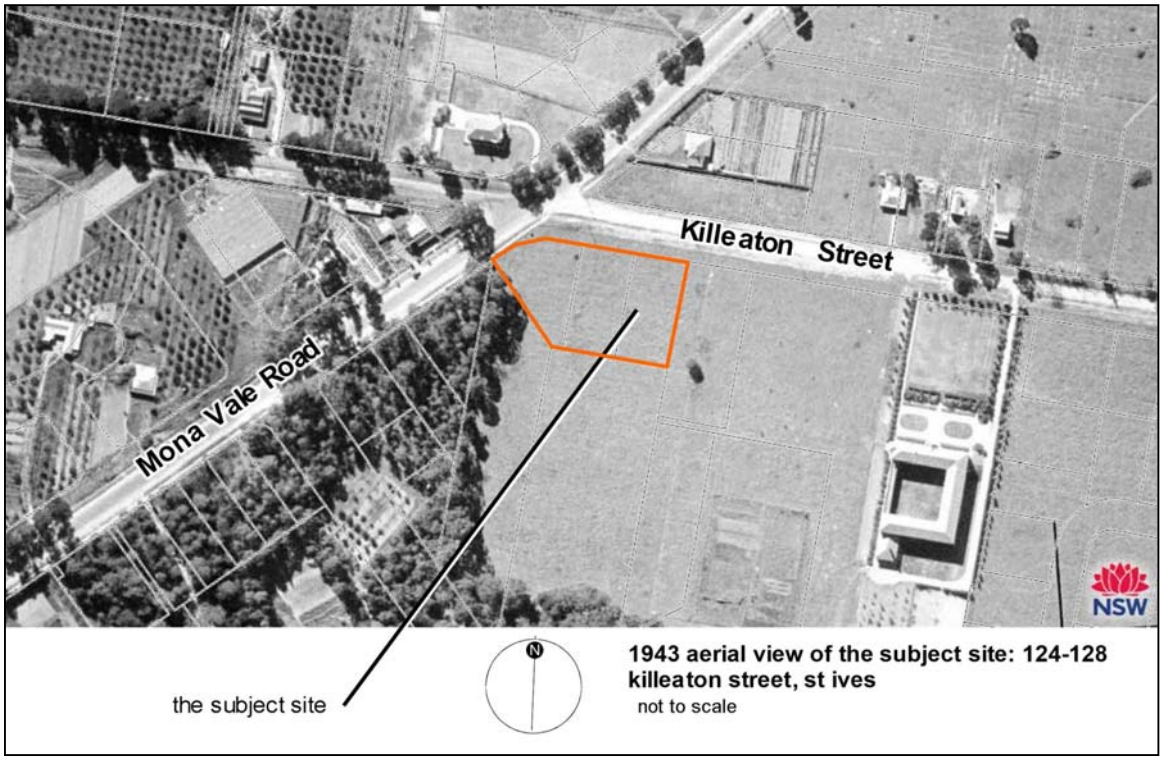

Figure 4.2 Aerial view of the subject site taken in 1943

4.3.2 Vegetation on the site

The vegetation structure consists of cleared open lawn areas, shrub plantings in garden beds and tree plantings in the front portion of the site, at the rear of 126 Killeaton Street and within the Killeaton Street road reserve.

The trees on the site are dominated by exotic species and non-indigenous native species with 1 indigenous Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) occurring within the front yard of 124 Killeaton Street which itself may be a planted specimen.

The non-indigenous native trees on the site include a tall mature Flooded Gum (*Eucalyptus grandis*), a Tasmanian Blue Gum (*Eucalyptus globulus*) and a River Peppermint (*Eucalyptus elata*) and Paperbark (*Melaleuca quinquenervia*).

Other exotic trees on the site include *Liquidambar formosana*, Elm (*Ulmus sp.*), Tupelo (*Nyssa sylvatica*) and Cocos Palms (*Syagrus romanzoffianum*).

The sub-canopy and garden shrubs on the site are exotic and non-indigenous plantings with the exception of a Narrow-leaved Wattle (*Acacia longissima*) which appears to have been planted adjacent the masonry wall near the Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*).

At the base of the Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) an immature Flooded Gum (*Eucalyptus grandis*) sapling has established from seed from the adjacent mature tree.

Figure 4.3 View of the front portion of the site looking west with the Tasmanian Blue Gum (*Eucalyptus globulus*) (centre left) and the River Peppermint (*Eucalyptus elata*) (rear right).

Figure 4.4 View of the rear of 128 Killeaton Street showing the developed landscape features that typically occur on the site.

Apart from exotic shrub plantings, the indigenous understorey vegetation across the site is absent and the ground covers comprise of a number of exotic species and environmental weeds.

In relation to the 35 trees on the site:

- 26 trees are exotic species;
- 8 tree are planted non-indigenous native species, and
- 1 tree is an indigenous species, a Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) which potentially is a planted specimen.

4.4 Fauna habitats

The topography over the subject site is gently sloping. In terms of natural habitat there are no caves or rock undercroft areas, no surface rock boulders are present and there is no defined watercourse and no dead trees with habitat hollows.

There are a number of microchiropteran bat species that are known to occur within the vicinity of the site. These typically include Gould's Wattled Bat (*Chalinolobus gouldii*) and Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*).

During the field surveys there was evidence of Rabbit (*Oryctolagus cuniculus*) droppings and diggings in the rear of 128 Killeaton Street which are likely to be part of a population that occurs on the adjacent Corpus Christy College.

Apart from the Long-nosed Bandicoot (*Perameles nasuta*), which can occur in many developed urban areas, the site is not considered to be suitable habitat for native ground dwelling mammals. Although none were recorded during the surveys the Common Ringtail Possum (*Pseudocheirus peregrinus*) and Common Brushtail Possum (*Trichosurus vulpecular*) could occur on the site however the site is not considered to be suitable habitat for Gliders (*Petaurus sp.).*

Noisy Miners (*Manorina melanocephala*) and Rainbow Lorikeets (*Trichoglossus haematodus*) were observed on and adjacent the site and were the dominant bird species. Other bird species such as Sulphur-crested Cockatoo (*Cacatua galerita*) Laughing Kookaburra (*Dacelo novaeguineae*) and Australian Raven (*Corvus coronoides*) were also heard calling in the local area. These species are considered to be typical of the resilient and aggressive avifauna found in urban areas where some tree cover remains and these species are known to adapt and survive well in urban landscapes.

The range and populations of several native hollow using bird species has increased significantly since European settlement (Gibbons & Lindenmayer, 2002) and these species typically include Rainbow Lorikeet (*Trichoglossus haematodus*) and Sulphur-crested Cockatoo (*Cacatua galerita*). Being more resilient to habitat modification and/or aggressive to other species, these species tend to dominate where there is competition for nest sites.

Noisy Miners (*Manorina melanocephala*) are also known to defend territories and aggressively drive other bird species away. It is thought that aggressive species particularly Noisy Minors (*Manorina melanocephala*) may be displacing the threatened species Regent Honeyeater (*Xanthomyza phrygia*) (Franklin et al., 1989, Grey et al., 1998).

The *Eucalyptus sp*. on and adjacent the site, may provide regional foraging opportunities when in flower for more mobile species such as Grey-headed Flying-fox (*Pteropus poliocephalus*). Exotic flora such as Cocos Palms (*Syagrus romanzoffiana*) also provide foraging opportunities for Grey-headed Flying-fox (*Pteropus poliocephalus*) when in fruit.

In considering the modified & open structure of the vegetation, avifauna studies in urban areas have identified that many bird species are selective in their habitat and foraging range, depending upon the extent of tree cover (Catterall, Green & Jones 1991). Certain species are restricted to forest areas, others prefer the forest edges, some have a preference for treed suburbs and others favour urban areas with little tree cover. Although the study was restricted to birds they can be considered surrogate indicators for the types of fauna species expected to be found.

The faunal composition in the subject site is considered to be consistent with that found in the local urban areas and the faunal compositions in these areas tend to be:

- aggressive or dominating species such as Rainbow Lorikeet (*Trichoglossus haematodus*) and Noisy Miner (*Manorina melanocephala*);
- resilient and adaptable species such as Common Brushtail Possum (*Trichosurus vulpecular);*
- species that reside off site in larger bushland reserves and have broad foraging ranges such as Powerful Owl (*Ninox strenua*) and Grey-headed Flying-fox (*Pteropus poliocephalus),* and
- occasional species that seasonally migrate from other areas and take advantage of breeding and foraging opportunities such as Channel-billed Cuckoo (*Scythrops novaehollandiae)*.

4.5 External influences affecting habitat potential

Being surrounded by urban developments the potential habitat on the site is influenced by the adjacent activities. These external influences include vehicular movements, noise, modified habitats and the presence of domestic pets all of which limit the site's potential as habitat for ground native dwelling fauna.

4.6 Ecological community prior to the original development

With very few indigenous flora species on the site it is difficult to positively classify the vegetation community that existed prior to the original development using published floristic models.

Published vegetation mapping (OEH 2009, Ku-ring-gai Council 2010) indicates that the site is within an area that was likely to be Sydney Turpentine Ironbark Forest

Based upon the remnant trees in the local area, the local topography and the published mapping; it is highly likely that the original vegetation prior to development of the site (pre 1943) was consistent with that currently described by the NSW Scientific Committee (1998) as the endangered Sydney Turpentine Ironbark Forest ecological community.

4.7 Critical habitat

Critical habitat is declared under the provisions of the Threatened Species Conservation Act 1995 (NSW) and this site is not listed as being part of any gazetted critical habitat. Currently the critical habitats listed in the schedules of the Act are:

- Gould's Petrel;
- Little Penguin habitat in Sydney's North Harbour;
- Mitchell's Rainforest Snail in Stott's Island Nature Reserve;
- Wollemia nobilis (The Wollemi Pine);
- Bomaderry zieria within the Bomaderry bushland - critical habitat recommendation, and
- Eastern Suburbs Banksia Scrub Endangered Ecological Community - critical habitat recommendation.

The site is not considered to be critical habitat for the purposes of the *Threatened Species Conservation Act 1995 (NSW)*.

5. sydney turpentine ironbark forest

5.1 Extent & nature of the Sydney Turpentine Ironbark Forest on the subject site in relation to the *Threatened Species Conservation Act 1995 (NSW)*

The Sydney Turpentine Ironbark Forest was listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* as an endangered ecological community in 1998.

Because of the site modifications and disturbance very few components of the endangered Sydney Turpentine Ironbark Forest ecological community remain however the NSW Scientific Committee (1998) recognises that the Sydney Turpentine Ironbark Forest was originally forest, but may now exist as woodland or as remnant trees.

On the site the Sydney Turpentine Ironbark Forest exists in a simplified and modified form with respect to both the structure of the vegetation and the floristic diversity. The faunal composition of the community is also limited being in a developed urban landscape The components of the Sydney Turpentine Ironbark Forest that remain are the indigenous trees that occur within the developed parts of the site. Although the Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) is potentially a planted specimen, the species is known to occur within the Sydney Turpentine Ironbark Forest community.

The components of the Sydney Turpentine Ironbark Forest on the site consist of:

- 1 mature Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), referred to as Tree No. 713 in the arboricultural report (Footprint Green, 2014a), that has potentially has been planted, and
- 1 semi-mature Narrow-leaved Wattle (*Acacia longissima*) which appears to have been planted adjacent the masonry wall near the Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*).

5.2 Extent & nature of the Turpentine Ironbark Forest on the site in relation to the *Environment Protection & Biodiversity Act 1999 (Cwlth)*

The Turpentine Ironbark Forest of the Sydney basin Bioregion is listed as a critically endangered ecological community in the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).* There are however significant differences between the Commonwealth and State descriptions of the community.

For the purposes of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth*), the Act only applies to high quality remnant patches of Turpentine Ironbark Forest with:

- characteristic native plant species present in all structural layers, where;
- Patch areas are > 1 hectare with a tree canopy cover of > 10%, or
- Patch areas are > 1 hectare with a tree canopy of < 10% within areas of native vegetation area of > 5 hectares

Stands of trees that are characteristic of the canopy of the Turpentine Ironbark Forest where the native forest understorey is absent are not considered to be Turpentine Ironbark Forest for the purposes of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*. The indigenous tree canopy cover on the site is <10% and the site does not contain indigenous plant species in all structural layers. Therefore the vegetation on the site is not considered to be the Turpentine Ironbark Forest ecological community for the purposes of the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).*

Figure 5.1 The Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), (centre front), Tree No. 713, being a component Sydney Turpentine Ironbark Forest and the planted non-indigenous native Flooded Gum (*Eucalyptus grandis*) (right rear) Tree No. 714 which is not part of the Sydney Turpentine Ironbark Forest vegetation.

6. proposed development

6.1 Nature of development impacts

In terms of the ecology, biophysical changes to the site can have impacts that are:

- direct, affecting the site, or
- indirect, affecting the down stream or adjacent environment.

These impacts can also be considered as being:

- short term, during construction / demolition activities, or
- long term, extending over the life of the development and are influenced by the development design.

Impacts on the natural environment, whether direct or indirect, short term or long term are also considered generally in the context of having either a negative or positive effect.

6.2 Existing site & proposed developments

The subject site has an area of approximately 4,500 m2 and is currently developed containing 3 dwellings, 3 swimming pools, 1 detached garage and formal landscaped areas of private open space.

The proposed development involves demolition of the existing built structures, the removal of trees and construction of new residential apartments with basement level car parking (Marchese, 2014) and associated landscaping (Britt, 2014).

6.3 Scope of development impact

The scope of the development impact is based upon the survey (Strata Serv, 2014), architectural plans (Marchese, 2014) and the arboricultural impact assessment (Footprint Green, 2014a) and field surveys carried out as part of this report.

6.3.1 Direct long term negative impacts

From an ecological perspective the direct long-term impacts involve:

- removal of 5 non-indigenous native trees, and
- removal of 23 exotic tree and gardens and open cleared / lawn areas.

6.3.2 Indirect long term negative impacts

6.3.2.1 Hydrological impacts

The proposed development will involve an increase in the built upon area. With the increase of impervious surface area there is the potential for an increase in the peak flows in downstream areas off site. Taking into account the developed nature of the catchment and current land uses, the ecological impact in the down

stream environments and in the receiving waters is considered to be negligible with adequate onsite detention controls.

6.3.2.2 Ecological impacts

The habitats on the site are currently modified and the vegetation structure is simplified and consists of indigenous, non-indigenous native and exotic trees. Although modified, these habitats provide a contribution to the local ecology by providing seasonal foraging opportunities and refuge for primarily bird species and potentially bat species. With suitable landscaping plantings, it is likely that some urban fauna will be displaced in the short term however the proposed development is unlikely to have a significant impact on common urban fauna populations. Detailed assessments on the impact on threatened species are considered in the following sections of this report.

6.3.3 Indirect short term negative impacts

Redevelopment of the site will have some short-term impacts associated with building activities including noise and soil disturbance.

6.3.3.1 Noise during construction

Taking into account the typical urban fauna found on site and within the surrounding areas, there may be some displacement of native fauna whilst works are in progress. The ecological impact is considered to be minimal after considering the existing modified habitats on the site and the background noise levels. Whilst there may be some temporary displacement of more common native fauna as a result of construction noise a detailed assessment on the impact on threatened species is considered in the following sections.

6.3.3.2 Soil disturbance during construction

During construction soil disturbance will occur. To minimise the impact on the natural environment and the receiving waters down stream standard industry erosion & sediment controls will need to be in place and maintained.

6.3.4 Direct long term positive impacts

The arboricultural impact assessment (Footprint Green, 2014a) shows:

- retention of the 1 indigenous tree on site Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) which is possibly a planted specimen;
- retention of 2 non-indigenous native trees being 1 Flooded Gum (*Eucalyptus grandis*) and 1 River Peppermint (*Eucalyptus elata*).

The landscape plan (Britt, 2014) shows replanting of a number of indigenous canopy trees consisting of:

- 1 Smooth-barked Apple (*Angophora costata*);
- 3 Grey Ironbarks (*Eucalyptus paniculata*)
- 1 Sydney Blue Gum (*Eucalyptus saligna*), and
- 9 Turpentines (*Syncarpia glomulifera*)

7. relationship between threatened species and site habitats

7.1 Threatened species habitat assessment

The following assessment is made in relation to threatened species, communities or populations identified in the previous data tables despite whether they were recorded as part of the field surveys associated with this report or have been recorded previously in the vicinity of the site. The following habitat assessment takes into account the habitats on the site and the relationship between these habitats and those of threatened species, communities and populations.

In accordance with the Threatened Species Assessment Guidelines (OEH, 2007) if adequate surveys/studies have been carried out that clearly show that a species: does not occur within the study area; will not use the habitats on the site on occasion, or will not be influenced by off-site impacts, the species does not need further consideration.

Figure 7.1 Habitats in the site frontage at 124 Killeaton Street St. Ives showing the emergent non-indigenous Flooded Gum (*Eucalyptus grandis*) behind the row of exotic tree plantings.

7.2 Threatened flora habitat assessment

Conservation Status	Genus species	Common Name	Habitat Requirements	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✖ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*						
Endangered NSW, Vulnerable Cwth	*Acacia bynoeana*	Bynoe's Wattle	Found mainly in dry heath and dry sclerophyll forest on sandy soils (Morrison and Davies ex. Harden 1991). It is found on soils that are typically sand and sandy clay, often with ironstone gravel and is usually very infertile and well drained. The species seems to prefer open sometimes slightly disturbed sites such as trail margins edges of roadside spoil mounds. Associated vegetation includes C*orymbia gummifera, Eucalyptus haemastoma, E. parramattensis, E. sclerophylla B. serrata* and *Angophora bakeri*. (OEH 2000)	3	Habitat not present, unlikely to occur	✖
Vulnerable NSW	*Callistemon linearifolius*	Netted Bottle Brush	The species has been recorded growing in dry sclerophyll forest on the coast and adjacent ranges. Its known distribution occurs from the Georges River to Hawkesbury River in the Sydney area and north to Nelson Bay. Other records in 2000 have been from Coal Cliffs in the Southern Rivers CMA. Within the Sydney area, recent records are predominately limited to the Hornsby Plateau area near the Hawkesbury River and 4 records of the species also occur within Pittwater. Currently only 5-6 populations of the previous 22 populations remain. Three of these populations occur within Ku-ring-gai Chase National Park, Lion Island Nature Reserve, and Spectacle Island Nature Reserve.	3	Habitat not present, unlikely to occur	✖
Vulnerable NSW, Cwth	*Cryptostylis hunteriana*	Leafless Tongue-orchid	The species flowers from December through to February, often in association with *Cryptostylis erecta* and *Cryptostylis subulata*. Flowers are green, red, black, and are carried on an auxiliary (lateral) raceme. It is chiefly a coastal species but can be found in a range of habitats including areas bordering swamps to open forest. This species, favours dry sclerophyll forests, heaths, dunes (including stabilised sands), riparian areas, swampy forests, swampy areas and wetlands.	1	Habitat not present, unlikely to occur	✖
Vulnerable NSW, Cwth	*Darwinia biflora*	-	Occurs on the edges of weathered shale capped ridges particularly at the interface with Hawkesbury sandstone. Most sites are on Lucas Heights Soil Landscape. The vegetation association often includes *Eucalyptus haemastoma, Corymbia gummifera* and or *E. squamosa* and the structure is usually woodland, open forest or scrub-heath (OEH, 2003).	75	Habitat not present, unlikely to occur	✖
Vulnerable NSW	*Epacris purpurascens var. purpurascens*	-	*Epacris purpurascens var. purpurascens* is found at 30 locations in and around Sydney extending from Gosford in the north, Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the south. Its habitat consists of ridgetop drainage depressions supporting wet heath within or adjoining shale cap communities such as Stringybark and Ironbark woodlands and various shale/sandstone transition forest (OEH, 2002).	48	Habitat not present, unlikely to occur	✖
Vulnerable NSW, Cwth	*Eucalyptus camfieldii*	Heart-Leaved Stringybark	This species is found on lateritic soils of the Mittagong formation and in Hawkesbury sandstone. Usually located on upper slopes and ridge tops its habitat is characterized by well drained soils and associated with dry sclerophyll woodlands and scrub.	31	Habitat not present, unlikely to occur	✖
Vulnerable NSW	*Eucalyptus nicholii*	Narrow-Leaf Peppermint	The species is endemic on the northern tablelands of NSW however it is widely planted as an urban street tree and in gardens It is quite rare in the wild and is confined to the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield, largely on private property. The species grows in dry grassy woodland, on shallow and infertile soils, mainly on growing on porphyry or granite soils (Brooker & Kleinig, 1999).	3	Habitat not present, outside the natural range of the species	✖

Conservation Status	Genus species	Common Name	Habitat Requirements	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✕ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*						
Vulnerable NSW	*Genoplesium baueri*	Midge Orchids	Is a terrestrial herb that grows in sparse sclerophyll forests and moss gardens over sandstone from the Hunter Valley to the Nowra district (Harden 1993). The species has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park (NSW Scientific Committee 2004).	37	Habitat not present, unlikely to occur	✕
Endangered NSW, Cwlth	*Grevillea caleyi*	Caley's Grevillea	This species typically grows on Mittagong soil landscapes characterized by lateritic soils rich in iron and can be associated with the Duffys Forest vegetation association.	13	Habitat not present, unlikely to occur.	✕
Endangered NSW, Cwlth	*Haloragodendron lucasii*	Hal	Found in the upper reaches of Middle Harbour and Cowan Creek it is usually found growing in moist damp sandstone habitats with shallow soils adjacent creeks or adjacent soaks associated with sandstone benches.	26	Habitat not present, unlikely to occur	✕
Vulnerable NSW, Cwth	*Lasiopetalum joyceae*	-	The species is typically occurs on ridgetops of the Hornsby Plateau and is known to occur from at 34 sites between Berrilee and Duffys Forest. It is an erect open shrub and is found growing on shale/sandstone transitional soils often associated with laterites. It can be found growing within a variety of communities ranging from open forests, woodlands & heathland.	1	Habitat not present, unlikely to occur	✕
Vulnerable NSW, Cwth	*Leptospermum deanei*	-	Found in Devlin's Creek in Pennant Hills Park, Cheltenham, amongst sandstone rocks in sandy soil adjacent creek/watercourse.	5	Habitat not present, unlikely to occur	✕
Vulnerable NSW, Cwth	*Melaleuca deanei*	Deane's Melaleuca	Found in similar habitats to *Darwinia biflora*, it occurs on the edges of weathered shale capped ridges particularly at the intergrade with Hawkesbury sandstone. Most sites are on Lucas Heights Soil Landscape and prefers an open habitat.	18	Habitat not present, unlikely to occur	✕
Endangered NSW, Cwlth	*Persoonia hirsuta*	Hairy Geebung	The species typically grows on sandstone amongst heath and low woodland. It has been recorded growing in the Duffy's Forest association on lateritic soils. It occurs in small numbers in woodlands and dry sclerophyll forest on sandstone and is known from a number of locations from Gosford and Hill Top to Glen Davis, at Putty and in the Royal National Park.	5	Habitat not present, unlikely to occur	✕
Endangered NSW, Cwlth	*Persoonia mollis subsp. maxima*	-	Has only been recorded in the area from Hornsby Heights to Mt Colah and its habitat is typically characterised by steep slopes with sandstone benches, scarps and rock outcrops. In these areas it is found in sheltered sites that are relatively moist receiving waters from drainage depressions and small intermittent creeks.	69	Habitat not present, unlikely to occur	✕
Vulnerable NSW, Cwth	*Pimelea curviflora var. curviflora*	Curved Rice-flower	This species is confined to the coastal areas around Sydney found growing on Hawkesbury sandstone (Harden 2000) or on lateritic soils in similar habit to that occupied by the Duffys Forest association (Smith & Smith 2000).	20	Habitat not present, unlikely to occur.	✕
Vulnerable NSW, Cwth	*Syzygium paniculatum*	Magenta Lillypilly	The species has been known to be associated with coastal dunes and Littoral Rainforest and is also found in riparian habitats (Payne 1997). The species has been commercially propagated and sold and is known to have been planted in a variety of urban habitats. The species been recorded growing on moist slopes on Narrabeen Group geology (Smith & Smith 2000).	5	Habitat not present, unlikely to occur.	✕

Conservation Status	Genus species	Common Name	Habitat Requirements	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*						
Vulnerable NSW, Cwth	*Tetratheca glandulosa*	Glandular Pink-bell	This species typically grows on dryer open sites of Hawkesbury sandstone and can be found in open forests, woodlands and scrub. Grows in sandy or rocky heath or scrub (Gardner & Murray ex. Harden 1992).	156	Habitat not present, unlikely to occur.	✘

7.3 Threatened fauna habitat assessment

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW, Cwth	Amphibia	*Heleioporus australiacus*	Giant Burrowing Frog	Sandy soil on sandstone ridges where sandy creek banks provide opportunities for burrowing. Tadpoles are typically found in rocky pools in the upper reaches of permanent and ephemeral creeks (Mahoney 1993)	7	Habitat not present, unlikely to occur.	✘
Endangered NSW, Vulnerable Cwth	Amphibia	*Litoria aurea*	Green and Golden Bell Frog	The species has a range extending at lower altitudes along eastern NSW and eastern Victoria. Its habitat includes in and at the edges of permanent slow moving or still, streams ponds, swamps and dams (Cogger 2000) and requires well-vegetated creeks, dams and swamps.	1	Habitat not present, unlikely to occur.	✘
Vulnerable NSW	Amphibia	*Pseudophryne australis*	Red-crowned Toadlet	Red-crowned Toadlets do not usually live along permanent flowing water courses such as occur in gullies, instead preferring permanently moist soaks, areas of dense ground vegetation or litter along or near head-water stream beds. It is known to inhabit upper forested slopes and ridges on Hawkesbury sandstone or Narrabeen group preferring is moist sandstone habits with grass and debris near ephemeral watercourses. Red-crowned Toadlets have not been recorded breeding in permanently flowing streams or waters that are even mildly polluted (OEH, 2002).	136	Habitat not present, unlikely to occur.	✘

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Endangered NSW, Cwth	Aves	*Xanthomyza phrygia*	Regent Honeyeater	Once considered abundant across south-eastern Australia its population is in decline (Garnett 1992), In New South Wales, the species are mostly recorded in forest associations of box/ironbark and they prefer the wetter sites within these associations. Riparian forests of *Casuarina cunninghamiana* (River Oak) with *Amyema ambagei*, (Needle-leaf Mistletoe) are also important for feeding and breeding. Nectar is the principal food, but sugary exudates from insects are also used, and insects are essential for breeding (Oliver, 1998, 2000). Important feed trees are *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus leucoxylon* (Yellow Gum) however the species also use other woodland types and wet lowland coastal forest dominated by *Eucalyptus robusta* (Swamp Mahogany) or *Corymbia maculata* (Spotted Gum) when shortages of preferred food trees occur (Franklin et al., 1989, Ley and Williams, 1992, Webster and Menkhorst, 1992, Geering and French, 1998, Oliver, 1999). It is thought that aggressive species particularly *Manorina melanocephala* (Noisy Miner) may be displacing the Regent Honeyeater (Franklin et al., 1989, Grey et al., 1998).	4	Habitat not present, unlikely to occur. Likely to be displaced by urban avifauna.	✘
Vulnerable NSW	Aves	*Callocephalon fimbriatum*	Gang-gang Cockatoo	With a range restricted to south eastern NSW and south eastern Victoria the species feeds on terminal leaves of eucalypts or in hawthorn hedges and nests in deep hollows in eucalypts (Slater 1993). The species occurs in a variety of forests and woodlands and the last known breeding population in metropolitan Sydney area is in the Hornsby/ Ku-ring-gai area. The species shows a strong nest site fidelity (NSW Scientific Committee 2001).	25	Core breeding habitat not present, some foraging potential Unlikely to occur.	✔
Vulnerable NSW	Aves	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Considered rare in a national context, but moderately common in N.S.W. Because of its dependence on one type of food it is considered to be vulnerable. It nests in large hollows of dead trees and roosts in both wet and dry eucalypts, feeding in open Casuarina woodland, primarily where the Black She-oak (*Allocasuarina littoralis*) and Forest Oak (*Allocasuarina torulosa*) occurs.	39	Habitat not present, unlikely to occur.	✘

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✖ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Aves	*Daphoenositta chrysoptera*	Varied Sittella	The Varied Sittella inhabits forests and woodlands in over most of the Australian mainland except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west (OEH, 2005). The species is considered to be sedentary and often re-uses the same upright fork or tree in successive years for nesting. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. The sedentary nature of the Varied Sittella makes cleared agricultural land a potential barrier to movement. Survival and population viability are sensitive to habitat isolation, reduced patch size and habitat simplification, including reductions in tree species diversity, tree canopy cover, shrub cover, ground cover, logs, fallen branches and litter (NSW Scientific Committee 2010). The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches (NSW Scientific Committee 2010).	3	Disturbed open landscape is not considered to be habitat and it is likely to be displaced by urban avifauna, Unlikely to occur.	✖
Vulnerable NSW	Aves	*Glossopsitta pusilla*	Little Lorikeet	Little Lorikeet occur along the east coast of Australia from Cairns to Adelaide. In New South Wales their distribution extends from the coast to the western slopes of the Great Dividing Range to Albury, Parkes, Dubbo and Narrabri (Barrett et al. 2003).They are generally considered to be nomadic and individuals can at any time of year when nectar and pollen, particularly on profusely-flowering eucalypts, is available. The species also feed on flowering Melaleucas and Mistletoes. (NSW Scientific Committee, 2009). Little Lorikeets nest in small hollows usually in live trees and nest-hollows are used "traditionally", with the same hollow known to be occupied for at least 29 years (not necessarily by the same individuals) (Courtney & Debus 2006). The breeding season extends from May to September (Higgins 1999).	4	Not considered to be core breeding habitat, competition with resident urban fauna, low foraging potential. Unlikely to occur	✖
Vulnerable NSW	Aves	*Haematopus fuliginosus*	Sooty Oystercatcher	Sooty Oystercatchers are found around the entire Australian coast, and the offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The species breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories (OEH, 2005) and is not known to breed in northern Sydney (Smith & Smith 2000). The species foraged on inter-tidal rock platforms along the coast favouring rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries where it feeds limpets and mussels.	4	Habitat not present, unlikely to occur.	✖
Endangered NSW	Aves	*Haematopus longirostris*	Pied Oystercatcher	Favouring ocean beaches and estuarine sand and mudflats, the bird typically nests near the high tide mark and feeds in the inter-tidal zone. Its prey molluscs, marine worms and occasionally small fish.	1	Habitat not present, unlikely to occur.	✖

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✖ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Aves	*Hieraaetus morphnoides*	Little Eagle	The Little Eagle occurs throughout Australia and occupies habitats that are rich in prey within open eucalypt forest, woodland or open woodland habitats. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. The species nests in tall living trees within a remnant patch of vegetation, where pairs build a large stick nest in winter and lay in early spring. The species preys on birds, reptiles and mammals and occasionally large insects (NSW Scientific Committee, 2010).	7	Core breeding habitat limited by competition with resident urban fauna, low foraging potential. Unlikely to occur	✖
Vulnerable NSW	Aves	*Ixobrychus flavicollis*	Black Bittern	The species Is known to inhabit mangroves and streamside vegetation including small creeks. Feeding is mostly undertaken at night where they stand and wait for small insects, crustaceans and small fish.	3	Habitat not present, unlikely to occur.	✖
Endangered NSW, Cwlth	Aves	*Lathamus discolor*	Swift Parrot	The Swift Parrot inhabits eucalypt forests and breeds in hollows of mature and senescing trees in Tasmania. On the mainland it feeds off winter flowering Eucalypts although it will also feed on lerps, honeydew, Banksia nectar, fruits, seeds and other plant material as well as insects and their larvae (Forshaw & Cooper 1981, Garnett 1992). In New South Wales important foraging tree species include, *Eucalyptus macrocarpa* (Grey Box), *Eucalyptus sideroxylon* (Mugga Ironbark) on the western slopes and *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus fibrosa* (Red Iron Bark), *Corymbia maculata* (Spotted Gum), *Eucalyptus robusta* (Swamp Mahogany) and *Corymbia gummifera* (Red Bloodwood) (Swift Parrot Recovery Team, 2000). Since 1980 there have been some 60 sightings recorded in the Wildlife Atlas database (NSW National Parks & Wildlife Service 2014) within the Sydney Metropolitan Areas and locally small flocks were reported at Ingleside in 1986 (Cooper 1990). In 1938 hundreds of Swift Parrots were reported feeding in *Eucalyptus robusta* (Swamp Mahogany) in Warriewood (Hindwood 1939).	2	Not considered to be core breeding habitat, no winter foraging opportunities available. Unlikely to occur	✖
Vulnerable NSW	Aves	*Ninox connivens*	Barking Owl	The species can be found inhabiting eucalypt forests, paperbark and other woodlands, dense scrubs, foothills; river red gums and other large trees near watercourses. The species is dependant on large hollows of mature eucalypts for nests. The bird feeds on prey such as rabbits, rats, gliders and birds such as Rosella and starlings (Smith & Smith 2000).	3	Core breeding habitat not present, low foraging potential. Unlikely to occur	✖
Vulnerable NSW	Aves	*Ninox strenua*	Powerful Owl	The species has a range of 400 -1500ha (Davey 1993) and is known to nest in hollows in Eucalypts between 9-37m above ground usually in secluded well-vegetated gullies and usually occupying the largest emergent trees. Powerful Owls live alone or in pairs which occupy a permanent territory containing a number of roost sites and one or more nesting sites. The species feeds over a large range on small to medium sized mammals, including gliders, ringtail possum and immature brushtail possums.	103	Core breeding habitat not present, very limited foraging potential.	✖

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✖ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Aves	*Petroica boodang*	Scarlet Robin	The Scarlet Robin is found from SE Queensland to SE South Australia and also in Tasmania and SW Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. Scarlet Robin pairs defend a breeding territory and they may raise two or three broods in each season. Birds usually occur singly or in pairs, occasionally in small family parties; pairs stay together year-round. In autumn and winter, the Scarlet Robin joins mixed flocks of other small insectivorous birds which forage through dry forests and woodlands (OEH, 2005).	1	Core breeding habitat limited by competition with resident urban fauna, low foraging potential. Unlikely to occur	✖
Vulnerable NSW, Cwth	Aves	*Polytelis swainsonii*	Superb Parrot	The species previously had a distribution range from Melbourne (VIC) to northern NSW on the western slopes of the Great Dividing Range (Higgins 1999). Currently it occupies areas within the ACT, surrounding Parks & Wagga Wagga and the Riverina districts in NSW (Webster 1998). In NSW the species is known to nest in riparian woodlands of *Eucalyptus camaldulensis* (River Red Gum) and forage in woodlands particularly in *Eucalyptus melliodora* (Yellow Box). While they use riparian woodlands, they are rarely seen crossing expansive areas of open ground. (Webster 1988, Davidson & Chandler 1992). They feed on seeds of herbaceous plants, grass seed, eucalypt blossoms, and agricultural grain spills from transport trucks.	1	Core breeding habitat limited by competition with resident urban fauna, low foraging potential. Unlikely to occur	✖
Vulnerable NSW	Aves	*Ptilinopus superbus*	Superb Fruit-Dove	It is a nomadic species known to occur from Indonesia, New Guinea, and north-eastern Queensland. It is considered to be a regular Autumn Winter migrant to the Hunter, Sydney and Illawarra regions. It is a common species in much of its usual range in northern Australia and is considered a vagrant but scarce species in N.S.W. (Slatter 1993).	4	Not considered to be core breeding habitat, low foraging potential. Unlikely to occur.	✖
Vulnerable NSW	Aves	*Tyto novaehollandiae*	Masked Owl	It is generally considered as a bird of forest margins recorded in wet and dry open forests and woodlands and urban areas (Debus & Rose 1994). The southern subspecies occupies a home range of 5 -10 km2 within a diverse range of habitats that provide large hollow-bearing trees for roosting and nesting (Kavanagh & Murray 1996) often in riparian forests. It has also been known to roost and nest in caves and preys on mammals typically less than 600g such as rats, mice, rabbits, sugar gliders and ringtail possums (Slater 1993, Debus & Rose 1996).	1	Core breeding habitat not present, limited foraging potential.	✖

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✗ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Mammalia	*Cercartetus nanus*	Eastern Pigmy-possum	Is found in a range of habitats from rainforest, sclerophyll forests to sclerophyll tree heath and the species range extends from south eastern Qld to south eastern SA and Tasmania (Turner & Ward, 2000). It feeds primarily on nectar and pollen from banksias, eucalypts and callistemon. It is generally nocturnal and whilst preferring to nest in small tree hollows it has been found in small constructed nests of shredded bark. It appears to be solitary with males having a range of about 0.68 ha and females having a range of 0.35 ha (Turner & Ward, 2000).	37	Suitable habitat not present, unlikely to occur.	✗
Vulnerable NSW, Cwth	Mammalia	*Chalinolobus dwyeri*	Large-eared Pied Bat	Their known range extends along the east coast and ranges of southern Qld the central and northern coast and ranges of NSW. This species is rarely sighted and therefore is poorly known, due to its confusion prior to 1966 with *Chalinolobus picatus* (Little Pied Bat) which found in northern Australia and Queensland. The species roosts in the day in small groups in shallow caves and mines and it is presumed that individuals hibernate deep in caves during the cooler months (Hoye & Dwyer 2000). They also have been recorded roosting in abandoned bottle shaped mud nests of *Hirundo ariel* (Fairy Martins) and feed on small flying insects (Hoye & Dwyer 2000).	1	Core breeding habitat not present, low foraging potential.	✗
Vulnerable NSW, Endangered Cwth	Mammalia	*Dasyurus maculatus*	Spotted-tailed Quoll	Found in a range of habitats and generally preying on medium size mammals and birds such as possums, small wallabies, rats, birds, domestic fowl, bandicoots, rabbits and also feed on insects and carrion. It is estimated that the range of the species is in the order of 500 – 3000ha using hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	7	Habitat not present, unlikely to occur.	✗
Vulnerable NSW	Mammalia	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. The species prefers moist habitats, with trees taller than 20 m and generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. The species forages on beetles, moths, weevils and other flying insects above or just below the tree canopy. The species hibernates in winter and females are pregnant in late spring to early summer.	1	Limited core breeding habitat present, low foraging potential.	✔

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✗ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Endangered NSW, Cwlth	Mammalia	*Isoodon obesulus obesulus*	Southern Brown Bandicoot (eastern)	The species has a patchy distribution along the southeast coast in NSW and reaches its most northern limit at the Hawkesbury River and has been recorded in the larger tracts of bushland in Ku-ring-gai Chase, Garigal National Parks and in Nadgee Nature Reserve. This species prefers sandy soil with scrubby vegetation and /or areas of low ground cover that is periodically burnt (Braithwait 1995). The species displays a preference for regenerating sites following disturbance (OEH, 2006) The species is known to feed on ants, beetle larvae and plant material and some fungal species and whilst recorded in Ku-ring-gai Chase and Garigal National Parks. The species is not known to occur in small patches of bushland <40ha in size (Atkin, 1983) and adjacent the urban / bushland interface. The Long-nosed Bandicoot is common in smaller reserves and urban areas of Ku-ring-gai.	296	Not considered to be core breeding or foraging habitat, Unlikely to occur.	✗
Vulnerable NSW	Mammalia	*Miniopterus australis*	Little Bentwing-bat	The distribution of the species is primarily along the eastern coast of Australia extending from Cape York to Taree in NSW. Incidental records have been recently in the Sydney and Hunter Region. There is some evidence that pregnant females from the Central Coast and Lower Hunter district migrate north every winter (Williams R. pers com.) The nearest known breeding colony is Willi Willi Caves near Kempsey. It appears that the southern most breeding population seem to depend upon the larger nursery colony of *Miniopterus schreibersii* (Eastern Bentwing-bat) to produce higher ambient temperatures to rear its young (Australian Museum 2000). The species roosts in caves or tunnels and feeds on insects flying beneath the tree canopy.	4	Core breeding habitat not present, low foraging potential. Unlikely to occur.	✗
Vulnerable NSW	Mammalia	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	The species has been recorded along the north coast of Australia from Qld to Vic and parts of northern WA and NT. Having been recorded in a variety of habitats it is typically found in well-timbered valleys. It roosts during the daylight hours in caves and has been recorded roosting in large storm water pipes. They fly quickly above tree tops in valleys, making fast dives to catch prey which are insects, mostly moths.	24	Core breeding habitat not present, low foraging potential. Unlikely to occur.	✗
Vulnerable NSW	Mammalia	*Mormopterus norfolkensis*	Eastern Freetail Bat	Has a range along the eastern coastal strip Australia extending from southern Queensland to southern NSW. Has been recorded roosting in tree hollows and feeds on flying insects. They forage above the tree canopy in forests or along the edges of forests (Allison & Hoye 2000). The habitat preference of this species is unclear. It has been predominantly recorded in dry eucalypt forest and woodland, but has been recorded in moist and edge environments. The wing morphology indicates that this species is adapted to the more open habitats.	13	Limited core breeding habitat present, low foraging potential.	✔

Conservation Status	Class	Genus species	Common Name	Habitat	No. of records within 10km grid search (OEH, 2014)	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the species, ✔ Potentially affected species requiring assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW*							
Vulnerable NSW	Mammalia	*Phascolarctos cinereus*	Koala	Koalas are generally solitary except during the mating season and have a home range of about 3 hectares. They can roam considerable distances in search of a mate or new food (Phillips 1990) and adolescent males can travel up to 10km in search for a mate. The breeding season begins around September when males commence calling and searching for reproductive females. Feeding on foliage, Koalas have been recorded feeding on tree species from Eucalyptus, Corymbia and Angophora genera. The preferred species of tree varies from region to region (Callaghan & Phillips 1995) and even within a region alternate species of trees may be favoured when growing on different soil landscapes (Jurskis 1996). Typical Koala feed trees in the Berowra Valley include *Angophora costata* (Sydney Red Gum), *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus racemosa* (Narrow-Leaved Scribbly Gum).	5	Core breeding habitat not present, unlikely to forage within densely developed urban areas.	✘
Vulnerable NSW, Cwth	Mammalia	*Pteropus poliocephalus*	Grey-headed Flying-fox	The species has 2 permanent maternal colonies in Sydney at Gordon and at Cabramatta. Other colonies exist at the Botanical Gardens and at Avalon Beach. The species predominately feeds on nectar and when blossoms are unavailable it feeds on fruit.	1042	Core breeding habitat not present, moderate foraging potential.	✔
Vulnerable NSW	Mammalia	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail Bat	The species is widely distributed across Australia in NSW, Qld, NT Vic and the northern parts of WA eastern SA. The species is known to occur in open grasslands and in open forests and usually are found in small colonies of up to 30. The species roost in hollows in old trees and sometimes in the abandoned nests of sugar gliders and they forage on flying insects, including beetles. They fly quickly and are not good at twisting and turning when chasing their prey. And they usually eat their prey as they are flying (Australian Museum 1999).	3	Limited core breeding habitat present, low foraging potential.	✔
Vulnerable NSW	Reptilia	*Varanus rosenbergi*	Rosenberg's Goanna /Heath Monitor	The species is typically found in woodland and heathland on sandy soils associated with ridge top plateaus (Smith & Smith 2000). It is diurnal scavenger and shelters in burrows logs and rock crevices (Cogger 2000). It breeds in spring and summer and lays eggs in termite mounds that are important habitat features. It feeds on a range of species, including invertebrates, small lizards, snakes and bird eggs. The species can be confused with the more common *Varanus varius* (Lace Monitor) which is more commonly occurs in gully forests.	27	Habitat not present, unlikely to occur.	✘

7.4 Threatened ecological community habitat assessment

Conservation Status	Ecological Community	Habitat	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat for the community, ✔ Potentially affected community requiring consideration in the site planning process and potentially requires assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*				
Critically Endangered, NSW, Cwlth	Blue Gum High Forest	The forest is confined to soils derived from the Wianamatta Shale group and is distinct from the open forests occurring in sandstone gullies or on alluvial soils (NSW Scientific Committee 1997). Characteristic tree species include *Eucalyptus saligna, Eucalyptus pilularis, Eucalyptus paniculata, Angophora floribunda and Allocasuarina torulosa*. (NSW Scientific Committee 2007),	Habitat not present.	✘
Endangered NSW, Critically Endangered Cwlth	Sydney Turpentine Forest	The forest typically occurs on plateaus and hillsides and on the margins of shale capping over sandstone. Characteristic tree species include *Syncarpia glomulifera*, *Eucalyptus globoidea, Eucalyptus resinifera, Eucalyptus paniculata, Angophora costata and Angophora floribunda.* Sydney Turpentine Ironbark Forest was originally forest, but may now exist as woodland or as remnant trees (NSW Scientific Committee 1998),	Habitats extremely modified, very few component species, the 1 indigenous canopy tree.	✔
Endangered	Duffy's Forest	The forest occurs on lateritic soils and deeply weathered shale soils typically found on lower ridges in Ku-ring-gai. Characteristic tree species include *Eucalyptus capitellata, Eucalyptus sieberi, Eucalyptus oblonga, and Angophora costata.*	Habitat not present.	✘

7.5 Threatened population habitat assessment

Conservation Status	Type	Population Name	Habitat	Likelihood of Occurrence on site	Relationship to the site
✘ Site not considered significant habitat of the population, ✔ Potentially affected population requiring consideration in the site planning process and potentially requires assessment under s.5a of *Environmental Planning and Assessment Act 1979 (NSW)*					
Endangered NSW	Fauna	Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas	With a range restricted to south eastern NSW and south eastern Victoria the species feeds on terminal leaves of eucalypts or in hawthorn hedges and nests in deep hollows in eucalypts (Slater 1993). The species occurs in a variety of forests and woodlands and the last known breeding population in metropolitan Sydney area is in the Hornsby/ Ku-ring-gai area. The species shows a strong nest site fidelity (NSW Scientific Committee 2001). This population is bounded by Beecroft – Cheltenham in the west, Epping – North Epping in the south, Turramurra – South Turramurra in the east, and Thornleigh – Wahroonga to the north. The population encompasses, but is not restricted to, Pennant Hills Park and parts of Lane Cove National Park. Individual birds are likely on occasion to move across the population boundary.	Core breeding habitat not present, some foraging potential Unlikely to occur.	✔

8. DCP biodiversity controls

8.1 Ku-ring-gai Local Centres Development Control Plan 2013

8.1.1 Biodiversity Controls

Biodiversity controls contained in Part 6 of the Ku-ring-gai Local Centres Development Control Plan 2013, shows the site is within the Pymble Greenweb Map which indicated areas of:

- Category 3 – Landscape Remnant.

In relation to Category 3 – Landscape Remnant, the DCP Part 6, Biodiversity Controls have the following objectives;

"To maintain smaller key vegetation communities as stepping stones, providing habitat, seed bank and pollination resources (facilitating gene flow) and supporting flora & fauna resilience.

To maintain and restore smaller remnants of key vegetation communities across a range of topographies.

To protect trees within key vegetation communities that provide food shelter or nesting resources for native fauna, or that are of exceptional aesthetic value."

8.1.2 Accuracy of LEP & DCP Mapping

Whilst part of the site is mapped as Category 3 Landscape Remnant, the mapping appears to apply to the area occupied by Tree No's 713 & 714, refer arboricultural report (Footprint Green, 2014a) These trees are a Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) and a Flooded Gum (*Eucalyptus grandis*).

The Flooded Gum (*Eucalyptus grandis*), referred to as Tree 714, is a planted specimen, is not an indigenous species and is not considered to be a remnant tree, nor indigenous to the Sydney Turpentine Ironbark Forest.

The Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), referred to as Tree 713, is likely to be a planted specimen however the species could occur as part of the Sydney Turpentine Ironbark Forest and taking a precautionary approach, it is considered to be a remnant tree.

8.1.3 Compliance with Biodiversity Control Objectives

Within the area of the site that is mapped as Category 3 - Landscape Remnant there is 1 locally indigenous Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), Tree No.713 which potentially is a planted specimen and there is 1 planted non-indigenous Flooded Gum (*Eucalyptus grandis*) which is not considered to be a remnant tree.

Both these canopy trees within the area mapped as Category 3 -Landscape Remnant are proposed to be retained, therefore satisfying the objectives in the Local Centres Development Control Plan (2012).

9. threatened species assessment

9.1 Section 5a EP&A Act, 1979 (NSW) assessment

Assessment of Significance have been carried out (refer Appendix B) of this report addressing the threatened species, communities and populations identified as having some relationship to the site. Each assessment addresses the 7 points of consideration identified in section 5A of the *Environmental Planning and Assessment Act 1979 (NSW)* and is referred to as an Assessment of Significance.

The Assessment of Significance is not a "pass or fail" test and the purpose of the assessment is to allow proponents to undertake a qualitative assessment analysis of the likely impacts and whether further detailed assessment is necessary in the form of a Species Impact Statement (OEH 2007).

The Threatened Species Assessment Guidelines - The Assessment of Significance (OEH, 2007) outline that mitigating, ameliorative or compensatory measures proposed as part of the development should not normally be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been proven successful for that species in a similar situation. Where complex mitigating, ameliorative or compensatory measures are required, such as translocation, bush restoration, purchase of land, further assessment through the Species Impact Statement process is likely to be required.

9.2 EPBC Act, 1999 (Commonwealth) assessment

Part 13 Division 1 of the *Environment Protection & Biodiversity Act 1999 (Cwlth)* (EPBC) lists flora, fauna and ecological communities that are considered to be "matters of national environmental significance". Under the Act consideration must be given as to whether the proposed actions will, or is likely to have a "significant impact" on "matters of national environmental significance".

To minimise duplication in the environmental assessment procedures, a bilateral agreement was made in January 2007 between the Commonwealth & NSW Governments giving accreditation of New South Wales assessment processes in relation to threatened species, populations and ecological communities.

The agreement provides for "Controlled actions" as defined in the *Environment Protection & Biodiversity Act 1999 (Cwlth)* relating to threatened species, to no longer require assessment under Part 8 of the *Environment Protection & Biodiversity Act 1999 (Cwlth)* where they are assessed under Part 3A, 4 or 5 of the *Environmental Planning and Assessment Act 1979 (NSW)*.

9.3 Findings of Section 5a EP&A Act, 1979 (NSW) assessments

Through field surveys, habitat assessments and literature/database searches a number of the threatened species, populations and communities have been identified as having some habitat relationships with the habitats on site. These being;

- Species & population of Gang-gang Cockatoo (*Callocephalon fimbratum*)
- Species - Eastern False Pipistrelle (*Falsistrellus tasmaniensis)*:
- Species - Eastern Freetail Bat (*Mormopterus norfolkensis*);
- Species - Grey-headed Flying-fox (*Pteropus poliocephalus*), and
- Species - Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*)
- Ecological Community – Sydney Turpentine Ironbark Forest.

These species, populations and ecological community have been considered in context with the Assessment of Significance outlined in section 5A of the *Environmental Planning and Assessment Act 1979 (NSW)* (refer Appendix A)

Based upon these assessments, the proposed development is unlikely to have a significant impact on threatened species, populations and communities and therefore a Species Impact Statement is not required.

10. conclusion

The subject site has an area of approximately 4,500 m2 and is currently developed containing 3 dwellings, 3 swimming pools, 1 detached garage and formal landscaped areas of private open space. The structure of the vegetation outside the built structures consists of open lawns, garden beds with a band of planted exotic and native trees along the Killeaton Street frontage. One of these trees along the street frontage, although potentially planted, is a locally indigenous species. The proposed development involves demolition of the existing built structures, the removal of trees and construction of new residential apartments with basement level car parking (Marchese, 2014).

A number of threatened species have been recorded as occurring within a 5km radius of the site and field surveys and habitat assessments have been carried out primarily targeting threatened species, populations and ecological communities and their habitats.

Part of the site is identified in the Ku-ring-gai LEP 2012 (Local Centres) as containing an area of biodiversity significance. This area is identified in the Ku-ring-gai Local Centres Development Control Plan 2013 as Category 3 – Landscape Remnant trees. Whilst one of these trees, Tree No. 713, is a planted non-indigenous native species it has been included in the CDP mapping as a landscape remnant tree.

Of the 60 trees considered in the arboricultural impact assessment (Footprint Green, 2014a) on and adjacent the site 1 tree on the site, Tree No. 713, a Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) is a locally indigenous tree.

From an ecological perspective the direct long-term negative impacts involve:

- removal of 5 non-indigenous native trees, and
- removal of 23 exotic tree and gardens and open cleared / lawn areas.

From an ecological perspective the direct long-term positive impacts involve:

- retention of the 1 indigenous tree on site, a Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*) which is possibly a planted specimen;
- retention of 2 non-indigenous native trees being 1 Flooded Gum (*Eucalyptus grandis*) and 1 River Peppermint (*Eucalyptus elata*);
- planting of an additional 14 indigenous canopy trees consisting of 1 Smooth-barked Apple (*Angophora costata*), 3 Grey Ironbarks (*Eucalyptus paniculata*), 1 Sydney Blue Gum (*Eucalyptus saligna*), and 9 Turpentines (*Syncarpia glomulifera*)

In relation to threatened species, based upon assessments carried out in accordance with section 5A of the *Environmental Planning and Assessment Act 1979 (NSW)* (refer Appendix A), the proposed development is unlikely to have a significant impact on threatened species, populations and ecological communities listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW)* and the *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*.

In relation to the Local Centres Development Control Plan (2012), the canopy trees within the area mapped as Category 3 -Landscape Remnant are proposed to be retained, therefore satisfying the objectives in the Local Centres Development Control Plan (2012).

references

Allison, F.R. and Hoye, G.A. (2000) Eastern Freetail-bat *Mormopterus norfolkensis* pp 484 in Strahan, R. (ed.). The Mammals of Australia. Reed Books, Sydney.

Braithwaite R, W. (1995), Southern Brown Bandicoot, pp176-177in *Mammals of Australia*. Ed. R Strahan, Australian Museum & Reed Books.

Britt (2014) *Landscape Plan*, Dwg No. L01, Dated September 2014, Jane Britt Design, Annandale, NSW

Brooker M.I & Kleinig D.A. (1999) *Field Guide to Eucalypts, Volume 1 South-eastern Australia*, Bloomings Books, Victoria.

Callaghan, J. & Philips, S (1995) Progress on the Koala Habitat Atlas: implications for the conservation and management of Koalas in Eastern Australia. Pp 264-275 in *Proceedings on a Conference on the Status of the Koala in 1995, incorporating the Fourth National Carers Conference, 21-23 August 1995, Greenmount Beach Resort.* Australian Koala Foundation, Brisbane.

Catterall, C.P., Green, R.L., & Jones, N. (1991) Habitat use by birds across a forest-suburb interface in Brisbane: Implications for Corridors. *In Nature Conservation 2: The Role of Corridors*, ed. D.A. Saunders & R.J. Hobs, Surrey Beatty & Sons

Cogger H.G. (2000), *Reptiles & Amphibians of Australia 6th ed*. Reed Holland, Sydney.

Cooper, R.M. (1990), New South Wales Bird Report. *Australian Birds* 23: 68-101.

Courtney J, Debus SJS (2006) Breeding habits and conservation status of the Musk Lorikeet *Glossopsitta concinna* and Little Lorikeet *G. pusilla* in Northern New South Wales. *Australian Field Ornithology* 23**,** 109-124.

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

Davey S M (1993). Notes on the habitat of four Australian owl species. Pp. 126-142 in Olsen, P (ed.), *Australian Raptor Studies*. Australasian Raptor Association, RAOU, Melbourne.

Davidson, I. and Chambers, L. (1991) *Vegetation Management for Superb Parrot foraging habitat in Victoria*. Department of Conservation and Environment, Benalla Region (*unpublished. report*).

Debus S.J.S. & Rose, A.B. (1994) The Masked Owl - Tyto novaehollandiae in New South Wales. *Australian Birds 28 (supplement),* pp40-64)

Eby, P. (1991) Seasonal movements of Grey-headed Flying-foxes, *Pteropus poliocephalus* (Chiroptera: Pteropodidae), from two maternal camps in northern New South Wales, *Wildlife Research* 18: 547-559.

Eby, P. (1995) Biology and Management of Flying foxes in New South Wales, *Species Management Report No. 18* NSW National Parks and Wildlife Service, Hurstville.

Eby, P. (1996) Interactions between the Grey-headed Flying-foxes, Pteropus poliocephalus (Chiroptera: Pteropodidae), and its diet plants- seasonal movements and seed dispersal, Phd Thesis, University of New England, Armidale NSW.

Footprint Green (2014a) *Arboricultural Impact Assessment, 124-128 Killeaton Street, St Ives,* Dated 80/10/14, Footprint Green Pty Ltd, Avalon Beach, NSW

Forshaw, J.M. & Cooper, W.T. (1981) *Australian Parrots*. 2nd edition, Lansdown Editions, Melbourne.

Franklin, D.C., Menkhorst, P.W. & Robinson, J.L. (1989). Ecology of the Regent Honeyeater *Xanthomyza phrygia. Emu* 89:140-154.

Garnett, S. (1992) Threatened and Extinct Birds of Australia. *RAOU Report No.82*, Royal Ornithologists Union of Australia & Australian National Parks & Wildlife Service.

Geering, D. & French, K. (1998). Breeding biology of the Regent Honeyeater *Xanthomyza phrygia* in the Capertee Valley, New South Wales*. Emu* 98:104-116.

Gibbons P. & Lindenmayer D. (2002) *Tree Hollows and Wildlife Conservation in Australia*, CSIRO Publishing, Collingwood, Vic.

Harden, G. (2000) *Flora of NSW: Volume 1,* New South Wales University Press, Kensington.

Harden, G. (2002) *Flora of NSW: Volume 2,* New South Wales University Press, Kensington.

Harden, G. (1992) *Flora of NSW Volume 3,* New South Wales University Press, Kensington.

Harden, G. (1993) *Flora of NSW Volume 4,* New South Wales University Press, Kensington.

Herr A. (1998). *Aspects of the ecology of insectivorous forest-dwelling bats (Microchiroptera) in the western slopes of the Australian alps*. PhD thesis, Charles Sturt University

Higgins, P.J. (ed.) 1999. Handbook of Australian, New Zealand and Antarctic Birds. Vol. 4. Parrots to Dollarbird. Oxford University Press, Melbourne.

Hindwood, K.A. (1939). Nectar-feeding birds near Sydney. *Emu* 34; 40-44.

Hoye & Dwyer (2000) Large-eared Pied Bat *Chalinolobus dwyeri*, p 510-1 in Strahan, R. (ed.). The Mammals of Australia. Reed Books, Sydney.

Jurskis, V. (1996) Habitat assessment, tree preferences, environment and history - where's the connection? Pp. 31-40 in *Proceedings from a Conference on the Status of the Koala in 1996, incorporating the Fifth National Carers Conference, 19-21 August 1996 at Greenmount, Coolangatta QLD*. Australian Koala Foundation, Brisbane.

Kavanagh, R.P. & Murray, M. (1996) Home range, habitat and behaviour of the Masked Owl *Tyto novaehollandiae* near Newcastle, New South Wales. *Emu* 96: pp 250 – 257 Birds Austraila.

Ku-ring-gai Council (2010) *Vegetation Mapping – Mapping to Complex Level,* Dated 15 June 2010, Ku-ring-gai Council, Gordon NSW

Ley, A.J & Williams, MB (1994). Breeding behaviour and morphology of the Regent Honeyeater *Xanthomyza phrygia* near Armidale, New South Wales. *Aust. Bird Watcher* 15:366-376.

Lumsden, L.& Bennett, A. (2006) Flexibility and Specificity in the Roosting Ecology of the Lesser Long-eared Bat, *Nyctophilus geoffroy:* A Common and Widespread Australian Species , in Akbar Zubaid, Gary F. McCracken, and Thomas H. Kunz (eds), *Functional and Evolutionary Ecology of Bats*, pp. 290-307, Oxford University Press, USA

McConville, A. (2010) Mangroves a Hotspot for Threatened Microbats in the Hunter, *Consulting Ecology*, Ecological Consultants Association of NSW, .p7, Vol 24, Feb 2010.

Mahoney, M.J. (1993), The Status of Frogs in the Watagan Mountains area, the Central Coast of N.S.W. pp 257 –264, *Herpetology in Australia – A Diverse Discipline*, ed D. Lunney & D. Ayres, Trans. Of the Royal Zool. Soc. NSW, Mosman

Marchese (2014) *124-128 Killeaton Street - Ground Level Plan, Dwg No. DA-1.03, Dated June 2014, Marchese & Partners International, Nth Sydney, NSW*

Martin P., Rhodes M.P., Hall L.S. (1997) Obeservations on Yellow-bellied Sheathtail-bat Saccolaimus flaviventris *Australian Zoologist* 30(3) March 1997.

Menkhorst, P. W & Lumsden, L. F. (1995). Eastern False Pipistrelle. *Falsistrellus tasmaniensis* (Gould, 1858). In P. W. Menkhorst (ed). *Mammals of Victoria*: 178-179.

NSW Scientific Committee (1998) *Final Determinations 1998, Sydney Turpentine Ironbark Forest* pp 68-70, Office of Environment & Heritage

NSW Scientific Committee (2001) Gang-gang Cockatoo, Callocephalon fimbriatum in the Hornsby and Ku-ring-gai Local Government Areas – endangered population listing, 23/02/01 NSW Office of Environment & Heritage

NSW Scientific Committee (2004) *Genoplesium baueri (an orchid) – vulnerable species listing*, 23/07/04 NSW National Parks & Wildlife Service

NSW Scientific Committee (2007) Blue Gum High Forest in the Sydney Basin Bioregion - critically endangered ecological community listing. NSW Office of Environment & Heritage

NSW Scientific Committee (2009) Little Lorikeet- vulnerable listing Office of Environment and Heritage, NSW Department of Premier and Cabinet

NSW Scientific Committee (2010) Little Eagle Hieraaetus morphnoides (Gould 1841) - vulnerable species listing, 12/02/10 NSW Office of Environment & Heritage

NSW Scientific Committee (2010) *Varied Sittella Daphoenositta chrysoptera vulnerable species listing*, 23/07/04 NSW Office of Environment & Heritage

OEH, (2000) *Threatened Species Information Acacia bynoeana,* September 2000, Office of Environment and Heritage, NSW Department of Premier and Cabinet.

OEH (2002) *Threatened Species Information Epacris purpurascens var. purpurascens*, May 2002, Office of Environment and Heritage, NSW Department of Premier and Cabinet

OEH, (2002) *Threatened Species Information Red-crowned Toadlet Pseudophryne australis (Gray 1835),* May 2002, NSW Office of Environment and Heritage, NSW Department of Premier and Cabinet.

OEH, (2003) *Threatened Species Information Darwinia biflora,* May 2003, NSW Office of Environment and Heritage, NSW Department of Premier and Cabinet.

OEH (2004), *Threatened Species Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft*, Office of Environment and Heritage, NSW Department of Premier and Cabinet, November 2004.

OEH (2005) *Sooty Oystercatcher – profile*, Office of Environment and Heritage, NSW Department of Premier and Cabinet

OHE, (2005) *Threatened Species Information Pink Robin,* Office of Environment and Heritage, NSW Department of Premier and Cabinet

OEH (2005) Eastern False Pipistrelle – profile *Falsistrellus tasmaniensis ,* NSW Department of Environment & Climate Change & Water, NSW National Parks & Wildlife Service, Hurstville.

OEH (2005) Varied Sittella - *species profile Daphoenositta chrysoptera,,* Office of Environment and Heritage, NSW Department of Premier and Cabinet.

OEH (2006), *Southern Brown Bandicoot Isoodon obesulus*, *Recovery Plan*, November 2006, Office of Environment and Heritage, NSW Department of Premier and Cabinet

OEH (2007) *Threatened Species Assessment Guidelines*, NSW Office of Environment and Heritage, NSW Department of Premier and Cabinet, August 2007

OEH (2009) *Draft Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area* NSW Office of Environment and Heritage, NSW Department of Premier and Cabinet

OEH (2014), *Bionet Atlas*, (search 10km grid square centred on AMG co-ordinates E 330110 and N 6266530, Office of Environment and Heritage, NSW Department of Premier and Cabinet .

Oliver, D.L. (1999). Breeding behaviour of the endangered Regent Honeyeater *Xanthomyza phrygia* near Armidale, NSW. *Aust. J. Zool*. 98:97-103.

Oliver, D.L. (2000). Foraging behaviour and resource selection of the Regent Honeyeater *Xanthomyza phrygia* in northern New South Wales. *Emu* 100:12-30.

Payne, R. (1997) *The Distribution and Reproductive Ecology of Syzygium paniculatum and Syzygium australe (Myrtaceae) in the Gosford-Wyong Region*. Unpublished Thesis prepared for the award of Masters of Natural Resources, University of New England. Armidale NSW.

Phillips, W.R. (1990) Koalas – the little Australians we would hate to loose. Australian National Parks & Wildlife Service, Canberra.

Richards, G. (2000) Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) pp 467 in Strahan, R. (ed.). The Mammals of Australia. Reed Books, Sydney.

Richards, G. & Pennay, M. (2008) Mormopterus norfolkensis. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org>. Downloaded on 23 March 2010.

Richards, G. (1995) Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) pp 467-8 in Strahan, R. (ed.). The Mammals of Australia. Reed Books, Sydney.

Robinson, N.H (1985) Bats of the Illawarra Region, *Australian Zoologist Vol. 22. No. 2 1985*

Smith, J. & Smith, P. (2000) *Management Plan for Threatened Fauna & Flora in Pittwater*, prepared for Pittwater Council.

Smith, J. & Smith, P. (2000) *Survey of the Duffys Forest Vegetation Community*, prepared for NSW National Parks & Wildlife Service and Warringah Council.

Spencer, H.J., Palmer,C., & Parry Jones,K. (1991) Movements of fruit-bats in eastern Australia, determined by using radio-tracking, *Wildlife Research* 18; 463-468.

Swift Parrot Recovery Team (2000) Swift Parrot Recovery Plan 2000-2005, Department of Primary Industries, Water and Environment, Hobart.

Tozer, M. (2003) The Native Vegetation of the Cumberland Plain, Western Sydney: Systematic Classification and Field Identification of Communities, *Cunninghamia* **8(1)**: 1-75pp, Royal Botanical Gardens Sydney.

Turner, V. & Ward, S.J. (2000), Eastern Pygmy Possum, pp217-218in *Mammals of Australia*. Ed. R Strahan, Australian Museum & Reed New Holland.

Vestijens W.M., Leslie, A. & Hall A.B. (1977) Stomach Contents of Forty-two Species of Bats from the Australasian Region**,** *Aust. Wildl. Res.,* 1977, *4,* 25-35, Division of Wildlife Research, CSIRO, P.O. Box 84, Lyneham, A.C.T. 2602.

Webster, R. (1998). New South Wales Superb Parrot Polytelis swainsonii *Draft Recovery Plan*. NSW National Parks & Wildlife Service, Sydney.

Webster, R. & Menkhorst, P. (1992). The Regent Honeyeater (Xanthomyza phrygia): population status and ecology in Victoria and New South Wales. *Arthur Rylah Inst. Tech. Rep. Ser.* 126, Department of Conservation and Environment, Melbourne.

appendix A - assessment of significance, (section 5A of the *EP&A Act 1979)*

Background & definitions

The habitat assessments and the following impact assessments made in this report have focused on identifying the relationship of threatened species, populations and communities to the habitats on the site as well as determining the suitability of these to support resident populations of threatened species.

Definitions for the terms “Composition”, “Extent”, “Habitat”, “Life cycle”, ”Local occurrence”, “Local population”, “Risk of extinction”, “Study area”, “Subject site”, “Viable”, used in this assessment are consistent with the Threatened Species Assessment Guidelines (OEH 2007) being:

- “Composition” refers to both the assemblage of flora and fauna species, and the physical structure of the ecological community;
- “Extent” refers to the physical area removed and/or to the compositional components of the habitat and the degree to which each is affected;
- “Habitat” is the area occupied or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by the different stages of their life cycles;
- “Life cycle” is the series or stages of reproduction, growth, development, aging and death of an organism;
- “Local occurrence” – Ecological Community. The ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community in the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated.
- “Local population”: - Species. The population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area.
- “Risk of extinction” – Ecological Community, Is the likelihood that the local occurrence of the ecological community will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the ecological community, and includes changes to ecological function.
- Risk of extinction” – Species Is the likelihood that the local population will become extinct either in the short- term or in the long term as a result of direct or indirect impacts on the viability of that population.
- “Study area” means the subject site and any other areas which are likely to be affected by the proposal, either directly or indirectly.
- “Subject site” means the area directly affected by the proposal.
- “Viable”, is the capacity to successfully complete each stage of the life cycle under normal conditions.

Species - Gang-gang Cockatoo (*Callocephalon fimbriatum*) & Population - Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas

(a) " in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that viable local population of the species is likely to be placed at risk of extinction. "

Gang Gang Cockatoos have a relatively restricted distribution in South-eastern Australia and are mainly found in the higher altitude old growth eucalypt forests. In winter the species is known to move down into lower altitude woodlands and are regularly seen in the Australian Capital Territory.

A population of Gang-gang Cockatoos persists in the Hornsby and Ku-ring-gai Local Government Areas. This population is bounded by Beecroft – Cheltenham in the west, Epping – North Epping in the south, Turramurra – South Turramurra in the east, and Thornleigh – Wahroonga to the north. The population encompasses, but is not restricted to, Pennant Hills Park and parts of Lane Cove National Park. Individual birds are likely on occasion to move across the population boundary. This population is estimated to be between 18 and 40 pairs. Birds have been observed nesting in hollows in large, old trees, and breeding has been documented at least since 1994. The species shows strong nest site fidelity.

The population used to extend across Baulkham Hills, Castle Hill, Cherrybrook and Dural, but due to initial clearing for farmland and more recently to urban releases and road construction, the habitat of the population has been greatly reduced. Loss of habitat, particularly core food and breeding trees, continues to be a major threat to the population. Other threats include competition for nest hollows with other species.

The species breed in large tree hollows in late spring to early summer and are commonly seen in flocks of up to 20 individuals. Their diet consists of seeds of eucalyptus and acacias, supplemented by other plant material and insects and they are known to feed on Cotoneaster and Hawthorn berries in winter.

None of the trees on the site have suitable breeding hollows and there is limited foraging opportunities.

The species was not recorded on the site during field surveys. Taking into account the nature and scope of the proposed development (refer section 6), and the foraging range of the species, the proposed development is unlikely to have an adverse effect on a viable local population of the species placing it at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that viable local population of the species is likely to be placed at risk of extinction. "

The endangered Population - Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas is also listed in the Schedule 1 Part 2 of the Threatened Species Conservation Act 1995 (refer comments above).

(c) " in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(d) " in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed and,

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality".

The site is not considered to be core breeding habitat but may provide some seasonal foraging potential. The extent of habitats to be removed or modified as a result of the development are summarised in section 6 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species in this locality.

(e) " whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)."

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(g) " whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process."

Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- *Psittacine circoviral* (beak and feather) Disease
- Loss of Hollow-bearing Trees

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 6), the proposed development will not significantly increase threats in relation to this species.

Psittacine circoviral (beak and feather) disease is a virus that infects and kills the cells of the feather and beak, as well as cells of the immune system, leaving birds vulnerable to bacterial and other infections. It is considered that the impacts of the proposed development will not increase the spread or infection of *Psittacine circoviral* disease.

The species was not recorded on the site and none of the trees to be removed contain suitable breeding hollows.

Summary: Species & Population - Gang-gang Cockatoo (Callocephalon fimbriatum)

Based upon the nature and scope of the proposed development (refer section 6) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the Species or local Population of Gang-gang Cockatoo (*Callocephalon fimbriatum*).

Species – Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

(a) " in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that viable local population of the species is likely to be placed at risk of extinction. "

The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) occurs on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania (OEH, 2005) and has been recorded from sea level up into the alpine area, but has clear preferences for wet forested habitats (Menkhorst & Lumsden 1995).

The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) has a body of approximately 60mm long with a forearm length of approximately 50mm (Phillips, 1995) and is thought to hibernate over winter.

The species is known to occur in sexually segregated colonies of up to 80 individuals (Phillips, 2000, Herr, 1998) for at least part of the year (Phillips, 2000). It is believed that females form maternity colonies away from the roosts used by the rest of the population (Menkhorst & Lumsden 1995).

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) generally roost in eucalypt hollows, but have also been found under loose bark on trees or in buildings (OEH, 2005). It has a preference for roosting in smooth bark trees with hollow openings of approximately 80mm in diameter (Lumsden & Bennett 2006). Larger hollows are likely to be used by mammals (Herr, 1989). Male colonies are known to select older living trees with an average trunk DBH of 1100mm for roosting.

Radio tracking (Herr, 1989) has shown that the Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) typically uses a number of roost sites within 300-400m of each other and the areas the bats covered for foraging and commuting between roost sites ranged from less than 10 ha to over 300 ha. The distance between two roosts used on consecutive nights was occasionally over 3.5 km.

The site is not considered to be core breeding habitat or core roosting habitat for a colony of the species. The loose bark sheaths on the non-indigenous Eucalypts

could provide some seasonal roosting shelter however these bark sheaths are temporarily available.

Taking into account the nature and scope of the proposed development (refer section 6) and the foraging range of the species it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(d) " in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed and,

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality".

The site is not considered to be core breeding habitat but may provide some seasonal or temporary roosting habitat. The extent of habitats to be removed or modified as a result of the development are summarised in section 6 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate or fragment foraging habitat of the species and is unlikely to affect the long term survival of the species.

(e) " whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly."
The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".
Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(g) " whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process."
Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5) the proposed development will not significantly increase threatening processes in relation to this species.

The Loss of Hollow-bearing Trees is a key threatening process for this species, however and none of the trees to be removed contain obvious roosting hollows.

Summary Species – Eastern False Pipistrelle (Falsistrellus tasmaniensis)

Based upon the nature and scope of the proposed development (refer section 5) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Eastern False Pipistrelle (*Falsistrellus tasmaniensis*).

Species – Eastern Freetail-bat (*Mormopterus norfolkensis*)

(a) " in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that viable local population of the species is likely to be placed at risk of extinction. "
The East Coast Freetail-bat (*Mormopterus norfolkensis*) occurs east of the Great Dividing Range from south of Sydney to south eastern Queensland (Churchill, 1989).

East Coast Freetail-bat (*Mormopterus norfolkensis*) have generally been recorded as solitary animals (Allison & Hoye, 1995). There are 15 records of the species occurring in the northern Sydney area with: 2 record of the species occurring in Warringah, 1 record in Pittwater, 6 record in Ku-ring-gai and 6 in Hornsby (OEH 2014) with 1 record of the species occurring within 5km of the site (2014) since 1950. East Coast Freetail-bats (*Mormopterus norfolkensis*) are also known to occur in maternal colonies in mangroves in the Hunter Estuary where they have been recorded in their hundreds (McConville, 2010).

East Coast Freetail-bat (*Mormopterus norfolkensis*) is known to occur in a variety of habitats including sclerophyll forest, woodland and mangroves. The species has a life span of approximately 5-7 years (Richards & Pennay, 2008).

The species has a greater forearm length than other Australian species of *Mormopterus* (Allison & Hoye 1995) and its morphology indicates that the species is a fast flyer adapted to foraging for insects in open areas. They are

known to forage above the tops of forest trees, along the edges of forests, along tracks and trails and along more open riparian areas and have been recorded as regularly travelling up to 8km to forage (McConville, 2010).

The species roosts in tree hollows and or under the loose bark of trees and has been recorded roosting in the roof of a hut with several Gould's Wattle Bats (*Chalinolobus gouldii*) (Allison, & Hoye 1995) and the species was also found roosting in the roof of Picton Primary School again with a colony of Gould's Wattle Bats (*Chalinolobus gouldii*) (Robinson 1985). The species is also known to utilise artificial nest boxes.

The loose bark sheaths on the non-indigenous Eucalypts could provide some seasonal roosting shelter however these bark sheaths are temporarily available.

Taking into account the nature and scope of the proposed development (refer section 6) and the foraging range of the species it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(d) " in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed and,

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality".

The site is not considered to be core breeding habitat but may provide some seasonal or temporary roosting habitat. The extent of habitats to be removed or modified as a result of the development are summarised in section 6 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate or fragment foraging habitat of the species and is unlikely to affect the long term survival of the species.

(e) " whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly."
The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".
Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(g) " whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process."
Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5) the proposed development will not significantly increase threatening processes in relation to this species.

The Loss of Hollow-bearing Trees is a key threatening process for this species, however and none of the trees to be removed contain obvious roosting hollows.

Summary Species – Eastern Freetail-bat (Mormopterus norfolkensis)

Based upon the nature and scope of the proposed development (refer section 6) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Eastern Freetail-bat (*Mormopterus norfolkensis*).

Species - *Pteropus poliocephalus* (Grey-headed Flying-fox)

(a) " in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that viable local population of the species is likely to be placed at risk of extinction. "

The species has 2 permanent maternal colonies in Sydney at Gordon and at Cabramatta. Other colonies exist at the Sydney Botanical Gardens and at Avalon. The species predominately feeds on nectar and when blossoms are unavailable it feeds on fruit. Grey-headed Flying-fox (*Pteropus poliocephalus*) individuals have been recorded travelling 100's of kilometres within weeks (Eby 1991, Spencer et al 1991) and nightly foraging distances from roosting camps are commonly 20km and can be up to 50km (Eby 1996).

The site is not considered to be core breeding or roosting habitat and taking into account the nature and scope of the proposed development (refer section 6), and the foraging range of the species, it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "

Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(d) " in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed and,

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality".

The extent of habitats to be removed or modified as a result of the development are summarised in section 6 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate foraging habitat of the species and the habitats to be removed are not considered to be significant to the long term survival of the species.

(e) " whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly."

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no final or draft Threat Abatement Plans relevant to this species.

(g) " whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process."

Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 6) the proposed development will not significantly increase threatening processes in relation to this species.

Summary Species – Grey-headed Flying-fox (Pteropus poliocephalus)

Based upon the nature and scope of the proposed development (refer section 6) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Grey-headed Flying-fox (P*teropus poliocephalus)*.

Species – Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)

(a) " in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that viable local population of the species is likely to be placed at risk of extinction. "
The Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) occurs widely across Australia in Victoria, New South Wales, Queensland, Northern Territory, in eastern parts of South Australia and the northern half of Western Australia (Richards 1995).

The Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) has a body of approximately 80mm long with a forearm length of approximately 80mm. The species has generally been recorded as solitary animals (Richards 1995) but has been recorded congregating in a colony of 29 individuals in South Eastern Queensland (Martin et al, 1997). It is believed that in southern parts of Australia the species migrates north in winter to warmer areas.

In NSW the species is a rare visitor in late summer and autumn and there are scattered records of this species across the New England Tablelands and North West Slopes (OEH, 2005).

The Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) has been recorded flying over a variety of habitats including low mangroves, over isolated stock dams in low open forests, cleared land, along a roads, along the banks of large rivers, above sclerophyll forest, and tall remnant forests surrounded by urban development (Martin et al, 1997).

The species typically flies and forages above the tree canopy at a height of 20-25m in forested areas and slightly lower in more open habitats where they tend to fly in very direct flight paths. The species is also known to engage in aerial pursuits flying at to 2m above the ground (Martin et al, 1997) and the species appears to defend an aerial territory (OEH, 2005).

Yellow-bellied Sheathtail-bats (*Saccolaimus flaviventris*) forage in canopy gaps and open spaces and are considered to fly at medium-high speed with low-medium manoeuvrability, primarily selecting prey averaging 9-24 mm long such as beetles (Taylor et al, 1987). The species feeds on flying insects including, beetles, grasshoppers and shield bugs and other insects (Vestjens & Hall 1977) and eat their prey in flight.

Yellow-bellied Sheathtail-bats (*Saccolaimus flaviventris*) are known to roost in hollows in mature trees and give birth from December to mid-March, when a single young is born (OEH, 2005).

The loose bark sheaths on the non-indigenous Eucalypts could provide some seasonal roosting shelter however these bark sheaths are temporarily available.

Taking into account the nature and scope of the proposed development (refer section 6) and the foraging range of the species it is unlikely that a viable local population of the species is to be placed at risk of extinction.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Endangered ecological communities are listed in Schedule 1 Part 3 of the Threatened Species Conservation Act 1995 and critically endangered ecological communities are listed in Schedule 1a Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(d) " in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed and,

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality".

The site is not considered to be core breeding habitat but may provide some seasonal or temporary roosting habitat. The extent of habitats to be removed or modified as a result of the development are summarised in section 6 of this report. Taking into account the mobility of the species and their foraging range, the proposed development will not isolate or fragment foraging habitat of the species and is unlikely to affect the long term survival of the species.

(e) " whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly."

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the species.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no threat abatement or draft threat abatement plan prepared for the species.

(g) " whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process."

Key Threatening Processes are listed in Schedule 3 of the Threatened Species Conservation Act and currently there are 37 Key Threatening Processes listed. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation
- Loss of Hollow-bearing Trees

Whilst the Clearing of Native Vegetation is listed as a key threatening process, based upon the nature and scope of the proposed development (refer section 5) the proposed development will not significantly increase threatening processes in relation to this species.

The Loss of Hollow-bearing Trees is a key threatening process for this species, however and none of the trees to be removed contain obvious roosting hollows.

Summary Species – Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris)

Based upon the nature and scope of the proposed development (refer section 6) and this assessment, it is considered that the proposed development is unlikely to have a significant impact on the species – Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).

Ecolgical Community - Sydney Turpentine Ironbark Forest

(a) " in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that viable local population of the species is likely to be placed at risk of extinction. "
Threatened species are listed in Schedule 1, Part 1 and Schedule 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(b) " in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction. "
Endangered populations are listed in Schedule 1 Part 2 of the Threatened Species Conservation Act 1995. - Not applicable.

(c) " in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to be substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Sydney Turpentine Ironbark Forest was heavily cleared for farming and timber, followed by suburban development as Sydney expanded and is currently estimated to cover an area of less than 1,183 ha (Tozer 2003). Its current extent amounts to less than 5% of this original distribution.

The remnants of the community are small and scattered and ongoing threats include clearing, physical damage from recreational activities, rubbish dumping, grazing, mowing and weed invasion.

Based upon the determination (NSW Scientific Committee, 1998) the community can exist as forest, woodland or as remnant trees.

Whilst there are 60 trees considered in the arboricultural impact assessment (Footprint Green, 2014a), the Sydney Turpentine Ironbark Forest community on the site consists of 1 Narrow-Leaved Scribbly Gum (*Eucalyptus racemosa*), Tree No. 713, which is proposed to be retained and semi-mature Narrow-leaved Wattle (*Acacia longissima*) which appears to have been planted adjacent the front boundary masonry wall and is likely to be removed.

The local occurrence of the Sydney Turpentine Ironbark Forest extends beyond boundaries of the site and includes indigenous trees within the adjacent property of 263 Mona Vale Road, St Ives, Ivor Wyatt Reserve on the corner of Mona Vale Road and Link Road and scatted trees within the St Ives precinct.

Taking into account the nature and scope of the proposed development and the modified habitats on the site, it is considered that the proposed development is unlikely to adversely affect the extent or modify the composition of the community placing the local occurrence of the community at risk of extinction.

(d) " in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed and,

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, population or ecological community in the locality".

Although an immature Flooded Gum (*Eucalyptus grandis*) sapling has established on the site there are no signs of the natural recruitment of indigenous canopy trees on the site.

The community exists in a fragmented landscape where individual trees persist in a developed landscape. The proposed development is unlikely to further fragment ecological interactions between habitats or the remnant components of the community given its urban context.

With very limited components of the community remaining on the site the habitats to be removed or modified are not considered to be important to the long term survival of the community.

(e) " whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly."

The area is not listed as critical habitat under Part 3 Division 1 of the Threatened Species Conservation Act 1995. There is no critical habitat within the site or in close proximity to the proposed development.

(f) " whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan".

Recovery plans are prepared under the provisions of Part 4, Division 1 of the Threatened Species Conservation Act 1995. There is no recovery or draft recovery plan prepared for the community.

Threat Abatement Plans are prepared under the provisions of Part 5, Division 1 of the Threatened Species Conservation Act 1995. There is no final or draft Threat Abatement Plans relevant to this community.

(g) " whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process."

Currently there are 37 Key Threatening Processes listed in the Threatened Species Conservation Act 1995. Key Threatening Processes relevant for the species include:

- Clearing of Native Vegetation

Although the Clearing of Native Vegetation is listed as a threatening process, it is considered that the proposed development will not be a significant threatening process in relation to this community.

Summary: Sydney Turpentine Ironbark Forest

Taking into account the modified nature of the habitats on the site and the very limited extent the community, it is considered that the proposed development will not have a significant impact on the Endangered Ecological Community – Turpentine Ironbark Forest.