FLORA, FAUNA & FUNGI IMPACT ASSESSMENT

for a proposed development site at

266 Longueville Road, Lane Cove

Prepared for Lane Cove Council

By Applied Ecology Pty Ltd

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PROJECT BACKGROUND & SITE CONTEXT

The site of the former Ladies Bowling Greens at 266 Longueville Road, Lane Cove are being considered for redevelopment by Lane Cove City Council. The proposed development site covers an area of approximately 1.5 hectares and is bounded by Longueville Road, to the north by adjacent private properties fronting Richardson Street West, to the east by McMahons Road easement which is part of the Lane Cove Country Club, and to the south by a strata property as well as bushland owned by Lane Cove Council.

The old bowling greens are located on the east of the site with easy access from Longueville Road. The site is forested on the lower slopes to the east, leading down to golf greens and fairways associated with the Lane Cove Country Club that are part. To the immediate east and southeast of the development site is land owned by Council and is part of the Lane Cove Country Club. These sites also contain remnant Coastal Enriched Sandstone Moist Forest vegetation.

Figure 1. The development site location overview (red outline).

Figure 2. The development site

An apartment development is being considered for the western part of 266 Longueville Road (Figure 2). No apartment development will extend down the wooded slopes and the golf course on the eastern part of the site. As part of any development, Council is investigating a new walking track through existing bushland (Figure 2) to link this site with the Lane Cove Country Club. Prior to development of the proposl, Council needs to understand the ecological attributes of the immediate area.

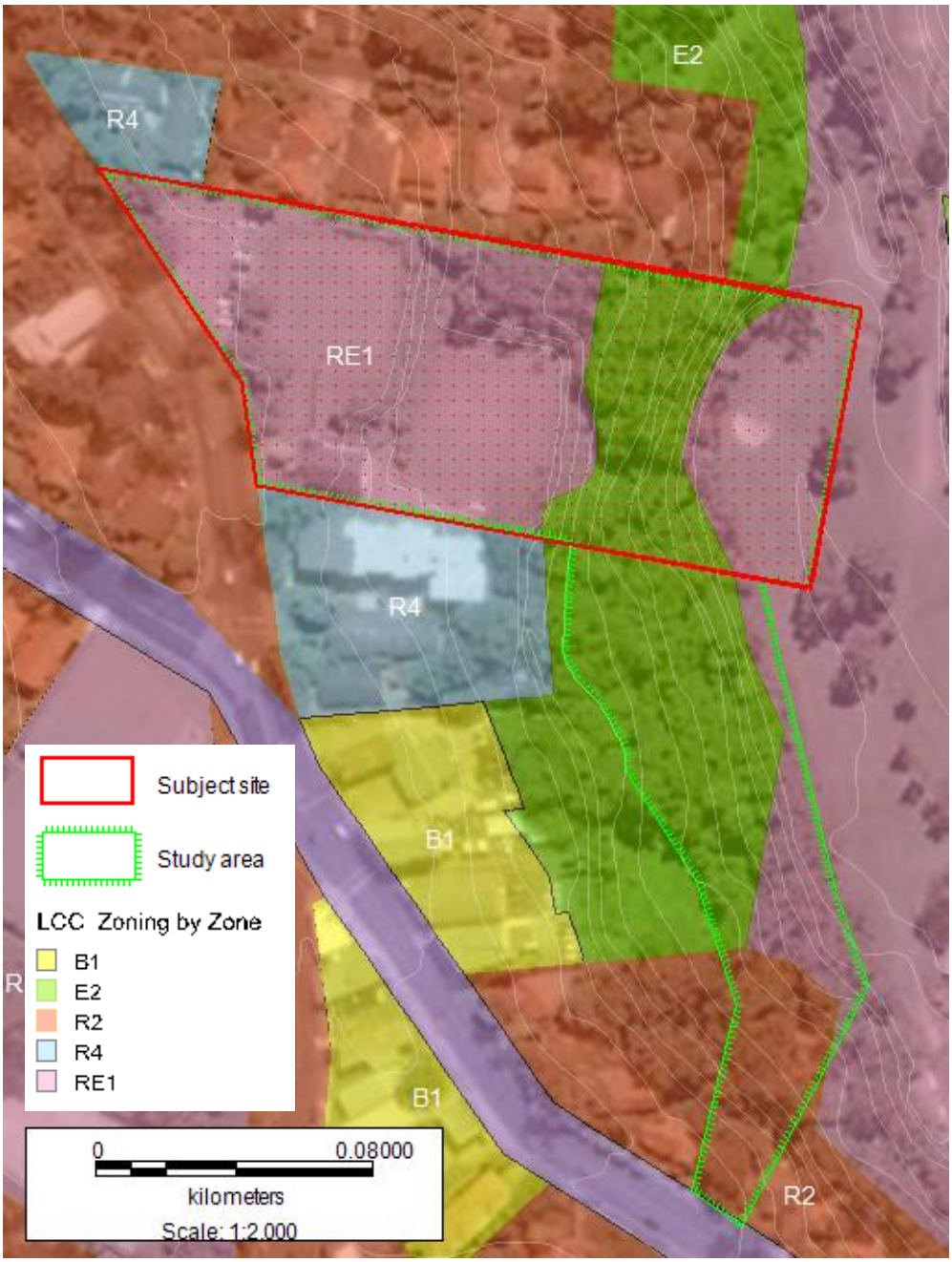
The subject site is currently zoned RE1- Public Recreation and E2 - Environmental Conservation under the Lane Cove Local Environment Plan 2009 (LCC LEP). R4 - High Density Residential abuts the subject site on the southern and north east boundary with R2 Low Density Residential along the northern boundary. The eastern portion of the subject site and adjacent areas are also zoned RE1 and form part of the Golf course.

The proposed development would occur in the portion of the lot zoned RE1. From the LCC LEP the objectives of this zoning are:

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.
- To make provision for rights of public access to more foreshore land and to link existing open space areas.

Environmental protection works are permitted without consent and Child care centres; Community facilities; Environmental facilities; Kiosks; Marinas; Mooring pens; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Respite day care centres; Restaurants or cafes; Roads; Signage; Take away food and drink premises are permiteed with consent. Any other development is prohibited.

Figure 3 Zoning



The subject site would require rezoning for the proposal to proceed.

The remnant forest is mapped as Coastal Enriched Sandstone Moist Forest (SMCMA/DECCW 2009) and forms part of a larger 4 hectare patch of this community on adjoining lots (see Figure 20). This community forms a patchy yet contiguous canopy with Coastal Shale Sandstone forest along the southern boundary of the golf course to provide linkages to Land Cove Bushland Park to the east. The Coastal Enriched Sandstone Moist Forest presents a low fire risk according to Council's Bush Fire Prone Land mapping (2010).

Figure 4 Recreation of Council's Bush Fire Prone Land - Rural Fires and Environmental Assessment Legislation Amendment Act 2002 map.

PROJECT OBJECTIVES

The key outputs of the flora, fauna and fungi assessment include:

- A review of any existing literature and information available for the development site and the general locality to determine issues for consideration
- A flora survey to identify species and vegetation communities present on the development site and, as a minimum extent, any present on the adjacent sites.
- A fauna survey to identify species present on the subject site and, as a minimum extent, any present on the adjacent sites.
- A fungi survey to identify species present on the subject site and, as a minimum extent, any present on the adjacent sites.
- An assessment of the conservation value of the species and communities recorded or identified with potential to occur on the subject site. This includes assessment of the condition of vegetation communities and the value of the subject site as fauna habitat.
- An analysis of the likely significance of the impacts of a future residential development in accordance with Commonwealth and State legislation requirements and local guidelines.
- The identification of specific measures that may be incorporated into the design of any future development to ameliorate any likely impacts upon the native flora and fauna on in the immediate area.

- The identification of any threat to flora, fauna, fungi or vegetation communities, due to future development on this site and also due to the cumulative effects of other development sites in the area, and undertake a seven part test if necessary.

FLORA SURVEYS

METHODS

Areas of different vegetation communities were delineated prior to field work from aerial photos, and these were traversed and inspected using the random meander method described by Cropper (1993). Community boundaries were recorded with a hand held GPS unit at appropriate intervals determined on site and downloaded into Applied Ecology's GIS system. Flora and fungi species present, vegetation type and quality, and special features and values were identified and recorded. Additional patch characteristics recorded during the survey included clearing, encroachment, observable fire history, weed invasion, proximity to housing or other developments, and connectivity.

From this, Applied Ecology staff have built an inventory of plant species recorded on site by ground truthing the extent of each vegetation community. Threatened, rare and regionally significant species were targeted.

The following information was recorded for each vegetation community type identified:

- dominant vascular plant species in each stratum (layer);
- typical range in the height of the tree or upper canopy layer and stem count;
- typical range in the projective foliage cover of the tree or upper canopy layer;
- typical % cover for dominant species in each stratum;
- topography;
- soil type;
- general condition of the community including evidence of fire, disturbance, presence and abundance of weeds; and
- any other factor relevant to the vegetation community.

A description of vegetation communities was prepared according to the structure of the plant community, as is outlined in Specht et al (1995). Structural classes were then further divided into plant communities on the basis of data collected during general traverses of the study area.

ATLAS SEARCH RESULTS

Searches of NSW Wildlife Atlas (www.bionet.nsw.gov.au/), PlantNet (www.rbgsyd.nsw.gov.au), and EPBC Act database (www.environment.gov.au/erin/ert/epbc/index.html) revealed the following plants recorded in the Lane Cove area or within 5km of the study site. A total of 10 species of threatened flora were reported for this area (Table 1). The year listed indicates the most recent record for this species in the area.

Table 1. Threatened flora species recorded within 5km of 266 Longueville Rd, Lane Cove.

FAMILY	SCIENTIFIC NAME	COMMON NAME	LEGAL STATUS	YEAR
Fabaceae (Mimosoideae)	*Acacia terminalis subsp. terminalis*	Sunshine Wattle	E1	2008
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V	1899
Myrtaceae	*Darwinia biflora*		V	2008
Myrtaceae	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	2008
Myrtaceae	*Leptospermum deanei*	Deane's Teatree	V	1893
Myrtaceae	*Melaleuca deanei*	Deane's Paperbark	V	1886
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	2002
Orchidaceae	*Genoplesium baueri*	Bauer's Midge Orchid	V	1918
Proteaceae	*Persoonia hirsuta*	Hairy Geebung	E1	1903
Thymelaeaceae	*Pimelea curviflora var. curviflora*		V	1887

A similar search was conducted for Endangered Ecological Communities revealed that there are three vegetation communities listed for the area (Table 2).

Table 2. Endangered Ecological Communities recorded within 5km of 266 Longueville Rd, Lane Cove

SCIENTIFIC NAME	COMMON NAME	LEVEL OF THREAT
Blue Gum High Forest in the Sydney Basin Bioregion	Blue Gum High Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community
Coastal Saltmarsh in the New South Wales North Coast; Sydney Basin and South East Corner Bioregions	Coastal Saltmarsh in the New South Wales North Coast; Sydney Basin and South East Corner Bioregions	Endangered Ecological Community
Hygrocybeae Community of Lane Cove Bushland Park	Hygrocybeae Community of Lane Cove Bushland Park	Endangered Ecological Community

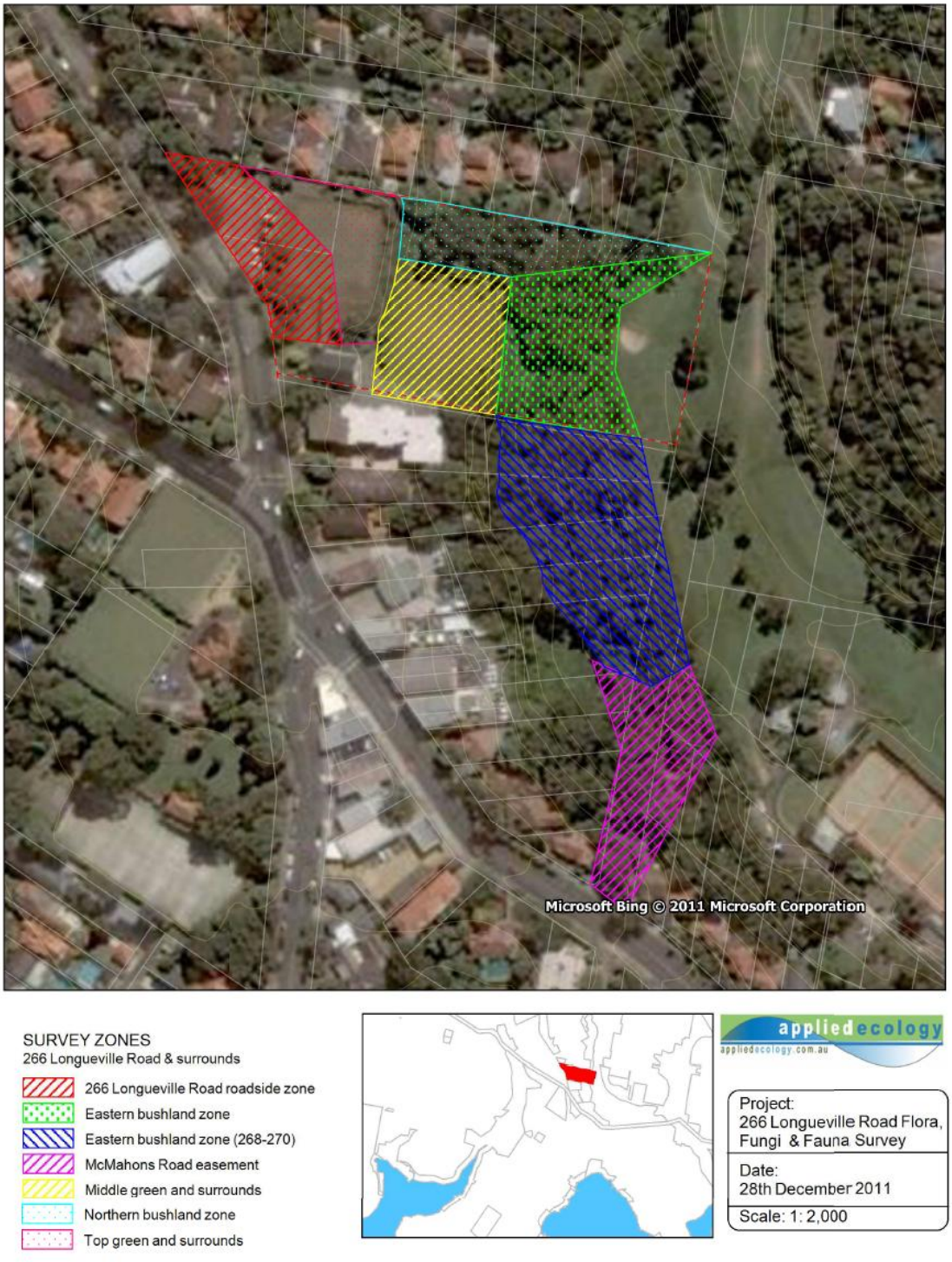
FIELD SURVEY RESULTS

A number of zones were identified on the ground and were used for the purposes of recording characteristics of vegetation communities such as composition and condition. These included the following zones:

1) 266 Longueville Rd roadside
2) Top green and surrounds
3) Middle green and surrounds
4) Northern Bushland (Beside middle green)
5) Below 266 Longueville Rd
6) Below other properties
7) McMahons Rd easement

Location of these zones are shown in Figure 5.

Figure 5. Location of vegetation zones for survey site at 266 Longueville Rd, Lane Cove and adjoining properties.



ZONES 1-3: SPECIES LISTS

Few native plant species were recorded around the bowling green sub sections. Species names and location(s) are provided in Table 3.

Table 3. Native flora species recorded during surveys in December, 2011 in zones 1-3, 266 Longueville Rd, Lane Cove.

SPECIES NAME	COMMON NAME	ROADSIDE ZONE	TOP GREEN	MID GREEN
TOTAL SPECIES		14	2	0
Acacia parramattensis	Parramatta Green Wattle	y		
Breynia oblongifolia	Breynia	y		
Callistemon citrinus	Lemon Bottlebrush	y		
Callistemon viminalis	Dwarf Bottlebrush	y		
Commelina cyanea	Scurvy Weed		y	
Dichelanthe micrantha	Shorthair Plume Grass	y		
Eucalyptus resinifera	Red Mahogany	y		
Eucalyptus saligna	Sydney Blue Gum	y		
Hakea salicifolia	Willow-leaved Hakea	y		
Hardenbergia violacea	False Sarsparilla	y		
Leptospermum polygalifolium	Tantoon	y		
Lomandra longifolia	Spiny Matrush	y		
Microlaena stipoides	Weeping Meadow Grass	y	y	
Pittosporum undulatum	Sweet Pittosporum	y		
Wahlenbergia gracilis	Bluebell	y		

Numerous exotic plant species were recorded around the bowling green sub sections. Species names and location(s) are provided in Table 4.

Table 4. Exotic flora species recorded during surveys in December, 2011 in zones 1-3, 266 Longueville Rd, Lane Cove.

SPECIES NAME	COMMON NAME	FRONT AREA	TOP GREEN	MID GREEN
TOTAL SPECIES		63	39	39
Abelia grandiflora	Abelia	y		
Acetosa sagittata	Turkey Rhubarb			y
Agapanthus praecox ssp *orientalis*	Agapanthus	y	y	
Ageratina adenophora	Crofton Weed			y

SPECIES NAME	COMMON NAME	FRONT AREA	TOP GREEN	MID GREEN
Alstroemeria psittacina	Parrot Lily			y
Anagalis arvensis	Scarlet pimpernel	y		
Anredera cordifolia	Madeira Vine		y	y
Araujia sericifera	Moth Vine	y		
Arrhenatherum elatius var *bulbosum*	Bulbous Oat Grass	y		
Asparagus aethiopicus	Asparagus Fern	y		
Bidens pilosa	Cobblers Pegs	y	y	y
Bromus catharticus	Prairie Grass	y	y	y
Bryophyllum delagoense	Spider Plant	y	y	
Camellia sp	Camellia	y		
Canna indica	Indian Shot		y	y
Cardiospermum grandiflorum	Balloon Vine		y	
Chrysanthemum sp	Chrysanthemum	y		
Cinnamomum camphora	Camphor Laurel		y	
Cirsium vulgare	Spear Thistle	y		
Conyza sp	Fleabane	y		y
Cotoneaster glaucophyllus var *serotinus*	Cotoneaster	y		
Crassula multicava ssp *multicava*	Shade Crassula	y		
Crocosmia x crocosmiiflora	Montbretia	y	y	
Cyclospermum leptophyllum	Slender Celery	y		
Cynadon dactylon	Common Couch	y	y	y
Digitaria ciliaris	Summer Grass	y		y
Digitaria sanguinalis	Purple Summer Grass		y	
Ehrharta erecta	Panic Veldt Grass	y		
Euchiton sphaericus	Cudweed		y	
Euphorbia marginata	Snow-on-the-Mountain	y		
Euphorbia peplus	Petty Spurge	y	y	y
Euphorbia tirucalli	Pencil Tree/Malabar Tree	y		

SPECIES NAME	COMMON NAME	FRONT AREA	TOP GREEN	MID GREEN
Gleditsia triacanthos	Honey Locust	y		
Hedera helix	English Ivy	y		y
Hibiscus sp	Hibiscus	y		
Hypochaeris radicata	Catsear	y	y	y
Ipheion uniflorum	Spring Star Flower	y	y	
Ipomea hederifolia	Small-flower Morning Glory	y		
Ipomea indica	Morning Glory	y	y	y
Ixia maculata	Yellow Ixia	y		
Jacaranda mimosifolia	Jacaranda	y		
Jasminum officinale	Jasmine	y		
Lagerstroemia indica	Crepe Myrtle	y		
Lantana camara	Lantana		y	y
Lantana montevidensis	Trailing Lantana	y		
Ligustrum lucidum	Large-leaved Privet	y	y	y
Ligustrum sinense	Small-leaved Privet		y	
Malva neglecta	Dwarf Mallow			y
Medicago polymorpha	Burr Medic			y
Modiola caroliana	Red-flowered Mallow		y	y
Nerium oleander	Oleander	y		
Nothoscordum borbonicum	Onion Weed		y	
Ochna serrulata	Ochna/Mickey Mouse Plant	y	y	
Olea europaea ssp. *cuspidata*	African Olive	y		
Ophiopogon japonicus	Mondo Grass		y	
Oxalis latifolia	Large-leaf Wood Sorrel		y	
Oxalis pes-caprae	Soursob	y	y	y
Parietaria judaica	Asthma Weed/Pellitory	y	y	y
Paspalum dilatatum	Caterpillar Grass	y	y	y
Paspalum urvillei	Vasey Grass			y

SPECIES NAME	COMMON NAME	FRONT AREA	TOP GREEN	MID GREEN
Passiflora caerulea	Blue Passionflower		y	
Pelargonium sp	Geranium	y		
Pennisetum clandestinum	Kikuyu		y	y
Photinia serratifolia	Photinia			y
Plantago lanceolata	Plantain	y	y	y
Poa annua	Winter Grass		y	
Polycarpon tetraphyllum	Four-leaf Allseed			y
Polygala myrtifolia	Myrtle-leaf Milkwort	y		
Portulaca oleracea	Pigweed		y	y
Protea sp	Protea	y		
Prunus cerasifera	Cherry Plum	y		
Prunus persica	Peach Tree	y		
Quercus robur	English Oak	y		
Rhododendron sp	Rhododendron	y		
Richardia stellaris	Field Madder	y		
Rosa sp	Rose	y		
Rubus fruticosus species aggregate	Blackberry			y
Rumex conglomeratus	Clustered Dock	y		
Rumex obtusifolia	Large-leaved Dock		y	
Senna pendula var glabrata	Winter Senna	y		y
Setaria parviflora	Slender Pigeon Grass			y
Sida rhombifolia	Paddy's Lucerne	y		y
Solanum mauritianum	Wild Tobacco	y	y	
Solanum nigrum	Blackberry Nightshade	y		
Sonchus oleraceus	Milk Thistle	y	y	y
Stachys arvensis	Staggers			y
Stellaria media	Chickweed	y		y
Stenotaphrum secundatum	Buffalo Grass		y	
Taraxicum officinale	Dandelion	y	y	y

SPECIES NAME	COMMON NAME	FRONT AREA	TOP GREEN	MID GREEN
Trachelospermum jasminoides	Star Jasmine		y	
Tradescantia albiflora	Trad/Wandering Creeper			y
Tradescantia pallida	Purple Heart/Wandering Jew	y		
Trifolium repens	White Clover	y	y	y
Tropaeolum majus	Nasturtium			y
Ulmus aff. *procera*	English Elm	y		

Overall condition of the vegetation communities recorded in these zones is presented in a later section, along with an assessment of their conservation value. Threats to these conservation values are identified and measures to mitigate these threats are proposed.

ZONES 4-5: SPECIES LISTS

A number of native plant species were recorded in bushland adjoining the bowling green sites. Species names and location(s) are provided in Table 5.

Table 5. Native flora species recorded during surveys in December, 2011 in zones 4-5, 266 Longueville Rd, Lane Cove.

SPECIES NAME	COMMON NAME	BESIDE 266	BELOW 266
TOTAL SPECIES		12	37
Acacia longifolia ssp *longifolia*	Sydney Golden Wattle		y
Acmena smithii	Lilly Pilly		y
Angophora costata	Smooth-barked Apple	y	y
Blechnum cartilagineum	Gristle Fern		y
Brachychiton acerifolius	Illawarra Flame Tree		y
Breynia oblongifolia	Breynia		y
Calochlaena dubia	Soft Bracken		y
Casuarina torulosa	Forest Oak	y	y
Ceratopetalum gummiferum	Christmas Bush		y
Christella dentata	Binung/Downy Wood Fern		y
Commelina cyanea	Scurvy Weed	y	y
Correa reflexa var *reflexa*	Native Fuschia		y
Cyathea australis	Tree Fern		y

SPECIES NAME	COMMON NAME	BESIDE 266	BELOW 266
Dianella caerulea var *producta*	Blue Flax Lily		y
Dodonea triquetra	Common Hop Bush		y
Elaeocarpus reticulatus	Blueberry Ash	y	y
Entolasia marginata	Panic Grass		y
Entolasia stricta	Panic Grass		y
Eucalyptus pilularis	Blackbutt	y	y
Eucalyptus resinifera	Red Mahogany	y	y
Eucalyptus saligna	Sydney Blue Gum	y	
Ficus macrophylla	Moreton Bay Fig	y	
Glochidion ferdinandi	Cheese Tree		y
Grevillea linearifolia	White Spider Flower		y
Hibbertia dentata	Twining Guinea Flower		y
Lepidosperma laterale	Sword Sedge		y
Lomandra longifolia	Spiny Matrush		y
Microlaena stipoides	Weeping Meadow Grass	y	y
Monotoca scoparia	Monotoca		y
Omalanthus populifolius	Bleeding Heart Tree		y
Oplismenus aemulus	Basket Grass	y	y
Pandorea pandorana	Wonga Wonga Vine		y
Panicum simile	Two Colour Panic		y
Pittosporum undulatum	Sweet Pittosporum	y	y
Pseuderanthum variabile	Pastel Flower		y
Smilax glyciphylla	Sarsparilla		y
Syncarpia glomulifera	Turpentine		y
Viola hederacea	Native Violet	y	
Wahlenbergia gracilis	Bluebell		y
Xanthorrhoea media	Forest Grass Tree		y

Numerous exotic plant species were recorded in bushland adjoining the bowling green sites. Species names and location(s) are provided in Table 6.

Table 6. Exotic flora species recorded during surveys in December, 2011 in zones 4-5, 266 Longueville Rd, Lane Cove.

SPECIES NAME	COMMON NAME	BESIDE 266	BELOW 266
TOTAL SPECIES		55	28
Acetosa sagittata	Turkey Rhubarb	y	y
Agapanthus praecox ssp *orientalis*	Agapanthus	y	
Ageratina adenophora	Crofton Weed	y	y
Alstroemeria psittacina	Parrot Lily	y	
Amaryllis belladonna	Naked Lady		y
Anredera cordifolia	Madeira Vine	y	y
Araucaria heterophylla	Norfolk Pine	y	
Araujia sericifera	Moth Vine	y	y
Asparagus aethiopicus	Asparagus Fern		y
Bidens pilosa	Cobblers Pegs	y	y
Briza major	Blowfly Grass/Quaking Grass	y	
Bromus catharticus	Prairie Grass	y	
Canna indica	Indian Shot	y	
Cinnamomum camphora	Camphor Laurel		y
Conyza sp	Fleabane	y	y
Coprosma repens	Mirror Bush		y
Cotoneaster glaucophyllus var *serotinus*	Cotoneaster	y	
Crocosmia x crocosmiiflora	Montbretia	y	y
Cyclospermum leptophyllum	Slender Celery	y	
Ehrharta erecta	Panic Veldt Grass		y
Eriobotrya japonica	Loquat	y	
Euchiton sphaericus	Cudweed	y	
Grevillea robusta	Silky Oak	y	
Hypochaeris radicata	Catsear	y	
Ipomea indica	Morning Glory	y	y
Ixia maculata	Yellow Ixia	y	
Jacaranda mimosifolia	Jacaranda	y	y

SPECIES NAME	COMMON NAME	BESIDE 266	BELOW 266
Jasminum officinale	Jasmine		y
Lantana camara	Lantana	y	y
Ligustrum lucidum	Large-leaved Privet	y	y
Ligustrum sinense	Small-leaved Privet	y	y
Lonicera japonica	Japanese Honeysuckle	y	y
Lophostemon confertus	Brush Box	y	
Monstera deliciosa	Monstera	y	y
Morus alba	White Mulberry	y	
Nephrolepis cordifolia	Fishbone Fern	y	y
Nothoscordum borbonicum	Onion Weed	y	
Ochna serrulata	Ochna/Mickey Mouse Plant	y	y
Olea europaea ssp. *cuspidata*	African Olive	y	y
Oxalis articulata	Shamrock oxalis	y	
Passiflora edulis	Passionfruit		y
Pennisetum clandestinum	Kikuyu	y	
Phyllostachys aurea	Fishpole Bamboo	y	
Phytolucca octandra	Ink Weed		y
Plantago lanceolata	Plantain	y	
Polycarpon tetraphyllum	Four-leaf Allseed	y	
Prunus persica	Peach Tree	y	
Ranunculus repens	Creeping Buttercup	y	
Rubus fruticosus species aggregate	Blackberry	y	
Rumex conglomeratus	Clustered Dock	y	
Rumex obtusifolia	Large-leaved Dock	y	
Senna pendula var glabrata	Winter Senna	y	y
Setaria parviflora	Slender Pigeon Grass	y	
Sida rhombifolia	Paddy's Lucerne	y	
Solanum mauritianum	Wild Tobacco	y	
Sonchus oleraceus	Milk Thistle	y	

SPECIES NAME	COMMON NAME	BESIDE 266	BELOW 266
Taraxicum officinale	Dandelion	y	
Thunbergia alata	Black-eyed Susan	y	y
Tradescantia albiflora	Trad/Wandering Creeper	y	y
Trifolium repens	White Clover	y	
Tropaeolum majus	Nasturtium	y	
Verbena bonariensis	Purple Top	y	
Wisteria floribunda	Wisteria	y	

Overall condition of the vegetation communities recorded in these zones is presented in a later section, along with an assessment of their conservation value. Threats to these conservation values are identified and measures to mitigate these threats are proposed.

ZONES 6-7: SPECIES LISTS

Numerous native plant species were recorded in bushland on properties adjoining the bowling green sites. Species names and location(s) are provided in Table 7.

Table 7. Native flora species recorded during surveys in December, 2011 in zones 6-7, 266 Longueville Rd, Lane Cove.

SPECIES NAME	COMMON NAME	BETTER BUSH	ROAD EASEMENT
TOTAL SPECIES		61	11
Acacia longifolia ssp *longifolia*	Sydney Golden Wattle	y	
Acacia obtusifolia	Stiff-leaved Wattle	y	
Acacia ulicifolia	Prickly Moses	y	
Adiantum aethiopicum	Maidenhair Fern	y	
Angophora costata	Smooth-barked Apple	y	y
Austrostipa pubescens	Spear Grass	y	
Backhousia myrtifolia	Grey Myrtle	y	
Banksia oblongifolia	Forest Banksia	y	
Billardieri scandens	Dwarf Apple	y	
Brachychiton acerifolius	Illawarra Flame Tree	y	
Breynia oblongifolia	Breynia	y	
Cassytha pubescens	Devil's Twine	y	
Commelina cyanea	Scurvy Weed		y

SPECIES NAME	COMMON NAME	BETTER BUSH	ROAD EASEMENT
Correa reflexa var *reflexa*	Native Fuschia	y	
Cymbopogon refracta	Barbed Wire Grass	y	
Dianella caerulea var *producta*	Blue Flax Lily	y	
Dipodium punctatum	Hyacinth Orchid	y	
Dodonea triquetra	Common Hop Bush	y	
Elaeocarpus reticulatus	Blueberry Ash	y	
Entolasia marginata	Panic Grass		y
Entolasia stricta	Panic Grass	y	
Eucalyptus pilularis	Blackbutt		y
Eucalyptus resinifera	Red Mahogany	y	
Eustrephus latifolius	Wombat Berry	y	
Glochidion ferdinandi	Cheese Tree	y	
Grevillea linearifolia	White Spider Flower	y	
Hakea bakeriana	Needlebush	y	
Hakea salicifolia	Willow-leaved Hakea	y	
Hardenbergia violacea	False Sarsparilla		y
Hibbertia dentata	Twining Guinea Flower	y	y
Hydrocotyle peduncularis	Pennywort	y	
Imperata cylindrica	Blady Grass	y	
Juncus usitatus	Common Rush	y	
Lepidosperma laterale	Sword Sedge	y	
Leptospermum polygalifolium	Tantoon	y	
Leucopogon juniperinus	Prickly Beard Heath	y	
Lomandra filiformis	Wattle Mat-rush	y	
Lomandra longifolia	Spiny Matrush	y	
Lomandra obliqua	Fish Bones/Twisted Mat-rush	y	
Microlaena stipoides	Weeping Meadow Grass	y	y
Monotoca scoparia	Monotoca	y	
Myrsine variabilis	Mutton Wood	y	

SPECIES NAME	COMMON NAME	BETTER BUSH	ROAD EASEMENT
Notolea longifolia	Large Mock Olive	y	
Omalanthus populifolius	Bleeding Heart Tree	y	y
Opercularia aspera	Thin Stink Weed	y	
Oplismenus aemulus	Basket Grass	y	y
Oplismenus imbecillis	Basket Grass	y	
Pandorea pandorana	Wonga Wonga Vine	y	
Panicum simile	Two Colour Panic	y	
Persoonia linearis	Narrow-leaved Geebung	y	
Pittosporum revolutum	Yellow Pittosporum	y	
Pittosporum undulatum	Sweet Pittosporum	y	y
Platylobium formosum ssp *formosum*	Handsome Flat-pea	y	
Polymeria calycina	Swamp Bindweed	y	
Polyscias sambuccifolia	Elderberry Panax	y	
Pomaderris elliptica	Yellow Dogwood	y	
Poranthera microphylla	Small Poranthera	y	
Pseuderanthum variabile	Pastel Flower	y	
Pultenaea daphnoides	Bush Pea	y	
Pultenaea retusa	Bush Pea	y	
Smilax glyciphylla	Sarsparilla	y	
Syncarpia glomulifera	Turpentine	y	
Viola hederacea	Native Violet	y	
Wahlenbergia gracilis	Bluebell		y
Xanthorrhoea media	Forest Grass Tree	y	
Zieria smithii	Sandfly Zieria	y	

Numerous exotic plant species were recorded in bushland on properties adjoining the bowling green sites. Species names and location(s) are provided in Table 8.

Table 8. Exotic flora species recorded during surveys in December, 2011 in zones 6-7, 266 Longueville Rd, Lane Cove.

SPECIES NAME	COMMON NAME	BETTER BUSH	ROAD EASEMENT
TOTAL SPECIES		18	51
Acetosa sagittata	Turkey Rhubarb		y
Agapanthus praecox ssp *orientalis*	Agapanthus		y
Anredera cordifolia	Madeira Vine		y
Araujia sericifera	Moth Vine	y	y
Arrhenatherum elatius var *bulbosum*	Bulbous Oat Grass		y
Asparagus aethiopicus	Asparagus Fern	y	
Bidens pilosa	Cobblers Pegs		y
Briza major	Blowfly Grass/Quaking Grass		y
Bromus catharticus	Prairie Grass		y
Bryophyllum delagoense	Spider Plant		y
Canna indica	Indian Shot	y	y
Cardiospermum grandiflorum	Balloon Vine		y
Cinnamomum camphora	Camphor Laurel		y
Cirsium vulgare	Spear Thistle	y	
Conyza sp	Fleabane		y
Cotoneaster glaucophyllus var *serotinus*	Cotoneaster		y
Digitaria ciliaris	Summer Grass		y
Ehrharta erecta	Panic Veldt Grass	y	
Euphorbia peplus	Petty Spurge	y	y
Hedera helix	English Ivy		y
Hypochaeris radicata	Catsear		y
Ipomea indica	Morning Glory	y	y
Jacaranda mimosifolia	Jacaranda		y
Lantana camara	Lantana	y	y
Ligustrum lucidum	Large-leaved Privet	y	y
Ligustrum sinense	Small-leaved Privet	y	y

SPECIES NAME	COMMON NAME	BETTER BUSH	ROAD EASEMENT
Lilium formosum	Formosan Lily	y	
Lonicera japonica	Japanese Honeysuckle		y
Modiola caroliana	Red-flowered Mallow		y
Monstera deliciosa	Monstera		y
Nephrolepis cordifolia	Fishbone Fern		y
Nothoscordum borbonicum	Onion Weed		y
Ochna serrulata	Ochna/Mickey Mouse Plant	y	y
Olea europaea ssp. *cuspidata*	African Olive	y	y
Oxalis pes-caprae	Soursob	y	y
Parietaria judaica	Asthma Weed/Pellitory		y
Paspalum dilatatum	Caterpillar Grass		y
Passiflora edulis	Passionfruit	y	
Pennisetum clandestinum	Kikuyu		y
Plantago lanceolata	Plantain		y
Rhamnus alaternus	Italian Buckthorn	y	
Rubus fruticosus species aggregate	Blackberry		y
Rumex conglomeratus	Clustered Dock		y
Rumex obtusifolia	Large-leaved Dock		y
Senna pendula var *glabrata*	Winter Senna	y	y
Setaria parviflora	Slender Pigeon Grass		y
Sida rhombifolia	Paddy's Lucerne		y
Solanum mauritianum	Wild Tobacco		y
Solanum nigrum	Blackberry Nightshade		y
Sonchus oleraceus	Milk Thistle		y
Stenotaphrum secundatum	Buffalo Grass		y
Strelitzia reginae	Bird of Paradise Plant	y	
Taraxicum officinale	Dandelion		y
Thunbergia alata	Black-eyed Susan		y
Tradescantia albiflora	Trad/Wandering Creeper		y

SPECIES NAME	COMMON NAME	BETTER BUSH	ROAD EASEMENT
Trifolium repens	White Clover		y
Tropaeolum majus	Nasturtium		y
Verbena bonariensis	Purple Top		y

Overall condition of the vegetation communities recorded in these zones is presented in a later section, along with an assessment of their conservation value. Threats to these conservation values are identified and measures to mitigate these threats are proposed.

FAUNA SURVEYS

METHODS

Applied Ecology has opted for passive techniques that involve no handling of animals or using traps (such as Elliot and harp traps) that can be prone to tampering and theft in urbanised areas therefore endangering any animals in the traps and damage or loss of equipment.

SPOTLIGHTING SURVEY

Spotlighting was undertaken over two nights for all terrestrial and arboreal mammals, amphibians and nocturnal birds within the study area. Spotlighting random meanders were traversed by two observers on foot using 100 Watt hand-held spotlights. All fauna heard or observed during spotlighting transects was recorded. Spotlighting was undertaken in all vegetation communities in the study area. Stags located within the study area were watched at dusk for two nights.

Optimal conditions for spotlighting are calm weather and the new moon phase. Windy nights and bright moonlight were avoided during the survey. Optimal conditions for detecting frog species can be warm nights following rain events. The field surveys were be scheduled in response to the availability of optimal conditions.

CALL PLAYBACK

Threatened owl species calls were played after spotlighting. Listening was undertaken throughout the spotlighting surveys, and calls were played for a total of five minutes for the targeted species (Powerful Owl) followed by a fifteen minute listening period. Poor weather conditions, particularly strong wind and rain will be avoided during the survey.

BAT ULTRASONIC (ANABAT) CALL RECORDING

The method requires the recording and identification of high frequency, echolocation calls made by bats, which, except for one or two species, are ultrasonic, and thus inaudible to humans. The recording equipment consists of an Anabat SDII® detector housed within a Tupperware box for weather protection. Two Anabats were set to commence detection at dusk. Anabat detection was conducted in different locations within the study site to maximise the areas sampled. Anabat recordings were transferred onto computer and sent to an expert in this field for analysis. Identification was designated as either: definite, probable or possible, following the methodology of Parnaby (1992).

DIURNAL BIRD CENSUS

Bird surveys were both targeted and opportunistic. Systematic surveys designed to capture peak activity (dawn chorus and prior to 10 am) were undertaken on two mornings. Any birds sighted or heard calling during other survey activities were recorded.

HERPETOFAUNA SEARCH

Reptiles and amphibians were surveyed within the study area by diurnal searches in suitable areas. Rocks, logs, debris and other material which provides suitable cover for herpetofauna were investigated and any species observed recorded.

ATLAS SEARCHES

Searches of NSW Wildlife Atlas (www.bionet.nsw.gov.au/), and EPBC Act database (www.environment.gov.au/erin/ert/epbc/index.html) revealed the following threatened animal species recorded in the Lane Cove area or within 5km of the study site. A total of 8 species of threatened fauna were reported for this area (Table 9). The year listed indicates the most recent record for this species in the area.

Table 9. Threatened fauna species recorded within 5km of 266 Longueville Rd, Lane Cove.

CLASS	FAMILY	SCIENTIFIC NAME	COMMON NAME	LEGAL STATUS	YEAR
Amphibia	Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E1	1977
Aves	Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V	1973
Aves	Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V	1993
Aves	Strigidae	*Ninox strenua*	Powerful Owl	V	1989 (call)
Aves	Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E4A	1946
Mammalia	Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V	1972
Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	2008
Mammalia	Vespertilionidae	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V	2008

Field surveys targeted these species, including call playback and timing of surveys to optimise the chance of their observation.

FIELD SURVEY RESULTS

A total of six bird species were recorded in fauna surveys around 266 Longueville Rd, Lane Cove (Table 10). Anecdotal evidence indicates that the threatened Powerful Owl *(Ninox strenua)* is nesting in nearby bushland at Lane Cove Bushland Park (pers.comm. R&E Kearney) and would potentially use the subject site for foraging. As well, six species of lizard were recorded and three species of frogs (Table 10).

Three species of mammals were sighted during surveys, with a further 2 species identified through identification of hairs from hair tubes and scats, and 1 species of microbat identified through ultrasonic calls recorded by the Anabat detector (Table 10).

Table 10. Fauna species recorded during surveys in December, 2011 around 266 Longueville Rd, Lane Cove.

COMMON NAME	SPECIES NAME	EVIDENCE
BIRDS		
Australian Magpie	*Gymnorhina tibicen*	sighting
Grey Butcherbird	*Cracticus torquatus*	sighting

COMMON NAME	SPECIES NAME	EVIDENCE
Laughing Kookaburra	*Dacelo novaeguineae*	sighting
Little Wattlebird	*Anthochaera chrysoptera*	sighting
Noisy Miner	*Manorina melanocephala*	sighting
Rainbow Lorikeet	*Trichoglossus haematodus*	sighting
REPTILES		
Delicate or Garden Skink	*Lampropholus delicata*	sighting
Pale-flecked Garden Sunskink or Common Garden Skink	*Lampropholus guichenoti*	sighting
Eastern Water Skink	*Eulamprus quoyii*	sighting
Eastern Striped Skink	*Ctenotus robustus*	sighting
Wall Skink	*Cryptoblepharus virgatus*	sighting
Eastern Blue-tongue Lizard	*Tiliqua scincoides*	sighting
FROGS		
Eastern Banjo Frog	*Limnodynastes dumerilii*	call
Common Froglet	*Crinia signifera*	call
Brown Toadlet	*Pseudophryne bibronii*	call
MAMMALS		
Black Rat*	*Rattus rattus*	Hair analysis
Common Brushtail Possum	*Trichosurus vulpecula*	Sighting/ hair analysis
Grey-headed Flying-fox[1]	*Pteropus poliocephalus*	sighting
Red fox*	*Vulpes vulpes*	scat
Ringtail Possum	*Pseudocheirus peregrinus*	sighting
Gould's Wattled Bat	*Chalinolobus gouldii*	call

[1] species listed as "Vulnerable" under Threatened Species Act 1995

Figure 6. Ringtail possums were plentiful during night surveys.

Figure 7. A Blue Tongue Lizard was seen soaking up the early summer sunshine.

Habitat condition based on the suites of species present in each faunal group is discussed in later sections, along with an assessment of their conservation value. Threats to these conservation values are identified and measures to mitigate these threats are proposed. In particular, management actions to preserve threatened species and their feeding and roosting habitats are discussed.

Figure 8. Grey Butcherbirds raise their young in nearby canopy.

FUNGI SURVEY

METHODS

Fungal survey methods need to accommodate their unique characteristics such as the patchy distribution of sporocarps. The random meander search field search for fungi included scrutinizing the full range of microhabitats available across the site. The record of fungi encountered includes identification based on Fuhrer (2009) and Young & Smith (2005), and for species from the Hygrophoraceae family, further reference was made to threatened species identification material and Young & Orchard (2005). For all fungi, and particularly those from the Hygrophoraceae family and other unfamiliar species, photographs were taken of the top view, the under-surface of the cap and the comparative size of the fungi. Data recorded included recent climatic conditions as well as a description of the substrate, such as soil, moss, root, decaying wood or leaf litter from which the specimen was growing.

Problematic identifications were referred to local mycologists Ray and Elma Kearney. Dr and Mrs Kearney assisted with the fungal survey and provided a brief report and list of species, which has been included with the results of field surveys for fungi.

ATLAS SEARCHES

Searches of NSW Wildlife Atlas (www.bionet.nsw.gov.au/), PlantNet (www.rbgsyd.nsw.gov.au), and EPBC Act database (www.environment.gov.au/erin/ert/epbc/index.html) revealed the following threatened fungi recorded in the Lane Cove area or within 5km of the study site. A total of 9 species of threatened fungi were reported for this area (Table 4). The year listed indicates the most recent record for this species in the area.

One endangered fungi community, the Hygrocybeae Community of Lane Cove Bushland Park, was also reported (see EEC listings in Flora Surveys section).

Table 11. Threatened fungi species recorded within 5km of 266 Longueville Rd, Lane Cove.

FAMILY	SCIENTIFIC NAME	COMMON NAME	LEGAL STATUS	YEAR
Hygrophoraceae	*Camarophyllopsis kearneyi*		E1	1998
Hygrophoraceae	*Hygrocybe anomala var. ianthinomarginata*		V	1998
Hygrophoraceae	*Hygrocybe aurantipes*		V	1990
Hygrophoraceae	*Hygrocybe austropratensis*		E1	1998
Hygrophoraceae	*Hygrocybe collucera*		E1	1999
Hygrophoraceae	*Hygrocybe griseoramosa*		E1	1999
Hygrophoraceae	*Hygrocybe lanecovensis*		E1	1998
Hygrophoraceae	*Hygrocybe reesiae*		V	1998
Hygrophoraceae	*Hygrocybe rubronivea*		V	1998

FIELD SURVEY RESULTS

The field survey was undertaken by Ray and Elma Kearney, Meredith Brainwood and Caroline Forest over a period of over 2 hours, totalling 10 hours of searching. Weather in the preceding days had been showery providing conditions that permitted fruiting of some fungal species. It should be noted that fungal fruiting is dependent on many factors including moisture, temperature and seasonal triggers. Drought conditions tend to affect underground mycelium which may take years to recover as noted in Lane Cove Bushland Park. Most fungal species produce fruiting bodies in the autumn and winter months. Species in the family Hygrophoraceae fruit mainly during June and July in Lane Cove Bushland Park. Thus the fungal sightings in this survey would be an under-estimate as fungal surveys are undertaken throughout the year to obtain a more accurate and meaningful record.

The area under survey could best be described as weed-infested, degraded, warm-temperate wet sclerophyll forest - with a general east-west aspect. It is evergreen, hygrophilous in character with weed overgrowth in some sections. The vegetation is a mixture of open forest species, but not luxuriant. In some sections as little as 20 percent of the sunlight shining on the crown of the trees reaches the ground in the understorey. At the bottom of the subject bushland is valley now a golf course (formerly a tributary of Gore Creek) and is partly surrounded by often steep-sided ridges which carry run-off rainwater. The major rock types, Wianamatta shale and Hawkesbury sandstone, give rise to two distinctly different types of soil in the subject site which was heavily weed infested in parts.

Figure 9. Elma and Ray Kearney assisted Applied Ecology's staff (Meredith Brainwood in photo) with collection and identification of fungi at 266 Longueville Rd, Lane Cove.

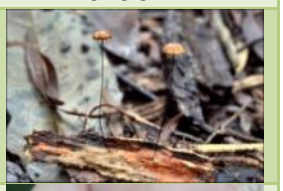
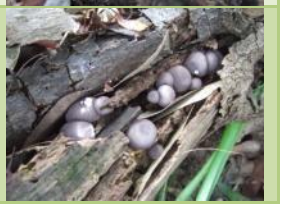
The following list was determined from macro features (see Table 12). Some specimens were too dry or degraded to obtain a spore print. Identification in a few cases is tentative (?) at the species level subject to detailed microscopic investigation.

Figure 10. Fungi collection ready for identification

Table 12 Species observed

CLASS & ORDER	GENUS/SPECIES	COMMENTS	PHOTOGRAPH
Division Myxomycota			
Class Myxomycetes	*Fuligo septica* (?)	Slime mould on leaf litter	
Division Ascomycota			
Class Sordariomycetes Order Xylariales	*Xylaria sp*	specimen growing on dead wood; Cylindrical 20-25mm tall, covered with white powdery conidia	
Division Eumycota Subdivision Basidiomycotina			
Class Homobasidiomycetes Order Aphyllophorales	*Fomitopsis sp F. hemitephrus?*	on living tree – may be causing 'heart-rot'. Specimen immature on damaged *Angophora costata*	
	Ganoderma applanatum	young specimen; on rotting stump	picture not available
	Hexagonia tenuis	on rotting stump	
	"Polypore" Sp. 1	Immature, resupinate, cream, with very small round pores; smallish patches, on dead wood	
	Polyporus arcularius	on rotting log	picture not available
	Pycnoporus cinnabarinus	on rotting log	
	Schizophyllum commune	on rotting log; toxic, inhaling spores can cause pneumonia	
	Stereum illudens	on rotting log	picture not available

CLASS & ORDER	GENUS/SPECIES	COMMENTS	PHOTOGRAPH
	Trametes versicolor	on rotting stump and logs	
Order Agaricales	*Agaricus sp.*	spores dark brown, on soil in grassland	
	Amanita umbrinella	on soil in grassland	
	Boletellus obscurecoccineus	damaged, aged specimen – bright red cap, bright yellow pores, and scales scattered on stem. The stem grades to deep red at the base. Pores stain blue when scratched	
	COLLYBIA BUTYRACEA (? **RHODOCOLLYBIA BUTYRACEA**)	too dry for spore print; growing on rotting log	picture not available
	Gymnopilus sp.	Cap to 15mm diam., bright ferruginous, surface a little matt; gills bright ferruginous, shallow, stem mostly slightly excentric, 2mm dia. x 10-15mm long.	 
	Omphalotus nidiformis	yellowish variety to be re-named; luminescent (green) species on rotting stump (luminescence was observed during night surveys)	

CLASS & ORDER	GENUS/SPECIES	COMMENTS	PHOTOGRAPH
	Marasmius sp. (? *M. crinisequi*)	dry, damaged specimen growing from rotting bark and leaf litter	
	Mycena sp.	White cap, smooth; stem long and slender, slightly brownish tinge, towards the base. Growing in soil amongst leaf litter	
	Xerula aff. radicata	Immature specimen. Previously listed as *Oudemansiella aff. Radicata.* Growing in soil amongst leaf litter	
Class Agaricomycetes Order Auriculariales Class Gastromycetes Order Lycoperdales	*Auricularia auricula-judae*	Brown-yellow jelly fungus on rotting log	
	Morganella purpurascens	Grey-purple Puff Balls on rotting log	

Note: There were no species in the family Hygrophoraceae recorded on this occasion.

ASSESSMENT OF CONDITION

ASSESSMENT OF VEGETATION CONDITION

ZONES 1-3: ROADSIDE AND BOWLING GREENS

Vegetation in Zones 1-3 is comprised almost entirely of exotic species (Table 13), many of which are considered environmental weeds because of their capacity to invade bushland and colonise disturbed areas.

Figure 11 Zones 1,2 &3

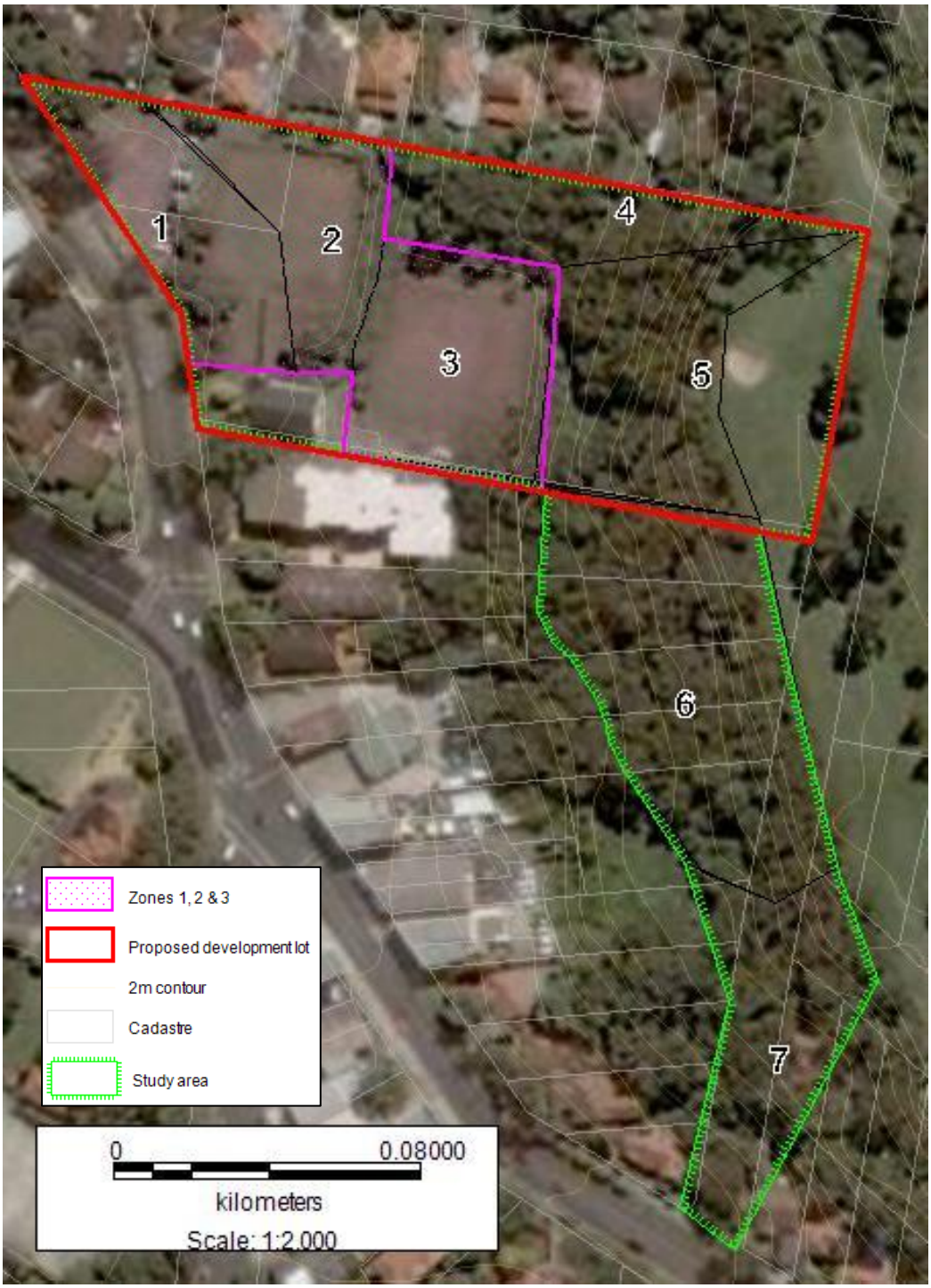


Table 13. Percentage cover of native and exotic flora in vegetation layers for each of Zones 1-3.

ZONE	LAYER	PERCENT COVER	PERCENT NATIVE	PERCENT EXOTIC
Roadside	Canopy	10	25	75
	Mid-storey	15	50	50
	Groundcover	100	1	99
Top Green	Canopy	0	n/a	n/a
	Mid-storey	5	20	80
	Groundcover	100	0.5	99.5
Middle Green	Canopy	0	n/a	n/a
	Mid-storey	10	0	100
	Groundcover	100	0	100

This part of the property has a long history of degrading processes. Constructed as bowling greens, most of the area was reshaped, compacted, replanted, regularly fertilised, species present were controlled, removed or managed by mowing or pruning. The few native species present in the canopy and mid-storey layers have been retained for shading and screening, or planted for aesthetic value during the period of active management. More recently, the bowling greens have fallen into disuse, and this has led to colonisation by invasive exotic species that have the potential to impact the adjoining bushland areas.

Figure 12 Vegetation along the roadside edge (Zone 1) at 266 Longueville Rd, Lane Cove.

Figure 14 Vegetation associated with the disused top green (Zone 2) at 266 Longueville Rd, Lane Cove.

Figure 13 Vegetation associated with the disused middle green (Zone 3) at 266 Longueville Rd, Lane Cove.

ZONES 4-5: BUSHLAND BELOW BOWLING GREENS

Below the bowling greens the land slopes away steeply to the east, towards the golf course. On the northern edge of the middle green the slope is less steep, and the site is bordered by fully detached residential properties. Several of these properties have rear access that leads to this bushland area.

Figure 15 Zones 4 & 5

Table 14. Percentage cover of native and exotic flora in vegetation layers for each of Zones 4-5.

ZONE	LAYER	PERCENT COVER	PERCENT NATIVE	PERCENT EXOTIC
Northern bushland	Canopy	35	90	10
	Mid-storey	30	0	100
	Groundcover	100	5	95
Bushland below 266	Canopy	20	98	2
	Mid-storey	35	50	50
	Groundcover	98	25	75

Vegetation on this part of the site includes mature eucalypts that provide extensive canopy. The mid-storey layer comprises a mixture of native and exotic species, with exotic flora tending to dominate. Diversity of flora in this layer is lowest in the northern bushland section (Zone 4), while bush regeneration weed control in the eastern section (Zone 5) has reduced the dominance of exotic species and retained more of the native flora species richness. Groundcover species are predominantly exotic throughout, although there is a greater diversity of native species in the eastern section.

Figure 17 Mature eucalypts provide canopy over weeds in the midstorey and groundlayers in Zone 4.

Figure 16 . Native canopy shelters a mixed understorey of native and exotic species in bushland in Zone 5.

ZONES 6-7: BUSHLAND BELOW ADJOINING PROPERTIES

Bushland below adjoining properties has been targeted for weed control activities associated with bush regeneration. As a result, native plant cover is higher in Zone 6, and native diversity is also greater in this zone than elsewhere on the survey site. In contrast, the road easement (Zone 7) is predominantly vegetated with environmental weeds.

Figure 18 Zones 6 & 7

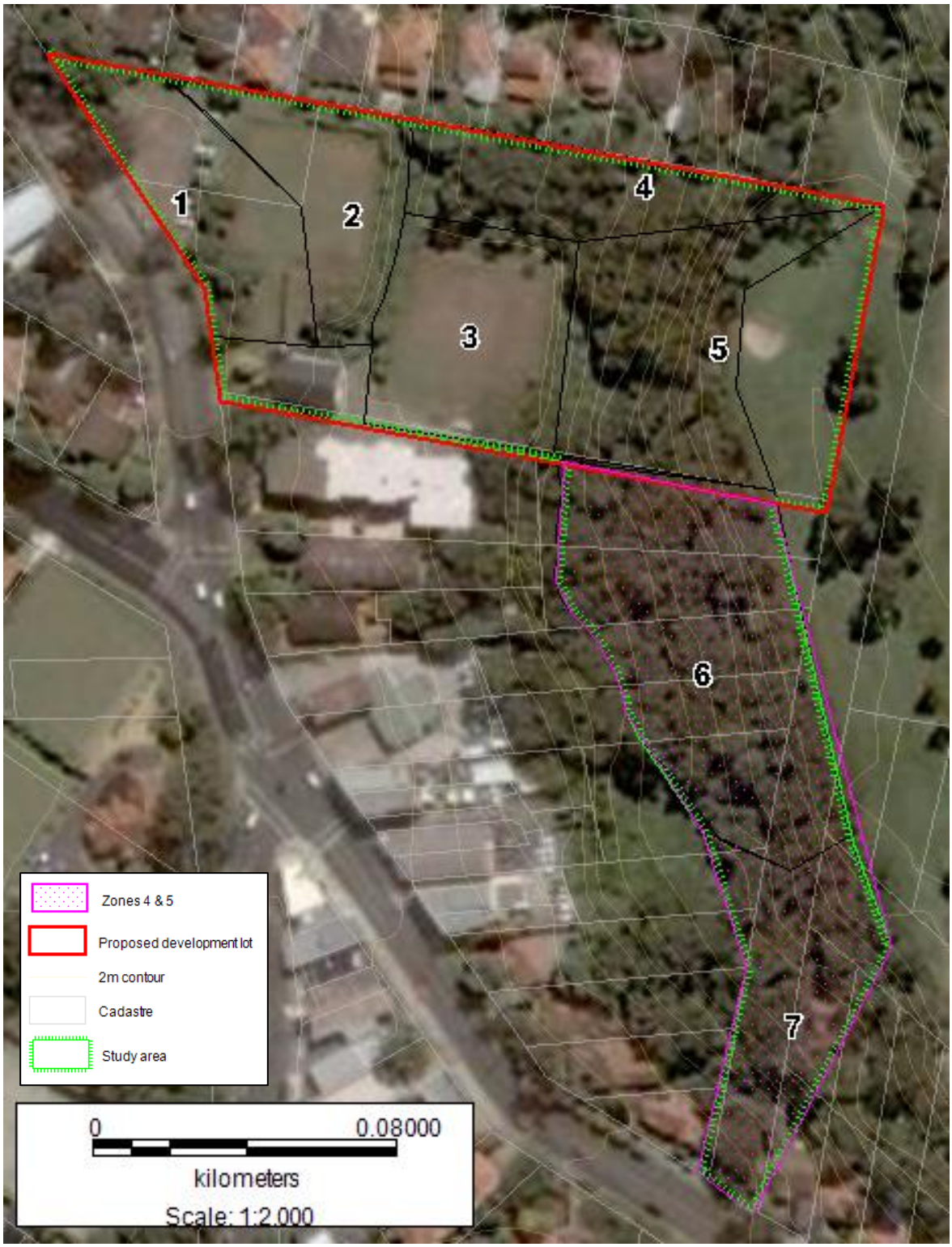


Table 15. Percentage cover of native and exotic flora in vegetation layers for each of Zones 6-7.

ZONE	LAYER	PERCENT COVER	PERCENT NATIVE	PERCENT EXOTIC
Adjoining bushland	Canopy	35	100	0
	Mid-storey	20	90	10
	Groundcover	85	90	10
Road easement	Canopy	30	80	20
	Mid-storey	50	5	95
	Groundcover	85	5	95

Native flora species richness is highest in Zone 6, with a total of 61 species of native plants recorded in this zone. In contrast, the vegetation in the McMahons Rd easement (Zone 7) is predominantly weeds, and has a low diversity of native plant species.

Figure 19 Diversity of native flora is greatest in the bushland below adjoining properties (Zone 6).

ASSESSMENT OF HABITAT AND CONSERVATION VALUE

FLORA/VEGETATION

The underlying geology of the survey site is Hawkesbury Sandstone. The sandstone produces sandy, stony soils, which dry out readily and tend to be associated with steeper slopes and rock outcrops. Additional influences are present include Wianamatta shales, which produce deeper and more fertile clay soils. The result is sandy loam soils, with varying fertility, some rock outcrops and a range of water holding capacities. This gives rise to a mosaic of microclimate conditions that supports a diverse array of plants, animals and fungi under normal, undisturbed conditions.

Vegetation in the bushland sections of the survey site has been mapped as Coastal Enriched Sandstone Moist Forest (CESMF; see Figure 15; SMCMA &DECCW, 2009). Some parts of this CESMF are in very good condition, while others are highly degraded. The better areas, such as those in Zone 6, are indicative of the overall resilience of the site, and provide a source of native plant propagules in close proximity for recolonisation of other bushland parts of the site.

The suite of plant species recorded on site also showed strong similarities with those listed for Blue Gum High Forest, an Endangered Ecological Community recorded in parts of the nearby Lane Cove Bushland Park. By maintaining healthy bushland with high floristic diversity, the survey site has the capacity to provide buffering for this EEC and a seed source for revegetation. High floristic diversity in close proximity ensures local provenance across a range of important species for the EEC.

Figure 20 Most of the vegetation on the survey site has been mapped as Coastal Enriched Sandstone Moist Forest (SMCMA draft vegetation mapping, DECCW 2009).

ZONES 1-3: ROADSIDE AND BOWLING GREENS

Several large eucalypts towards the front edge of the property have some ecological value, providing potential habitat for birds and arboreal marsupials, as well as their food sources. These trees, however, are disconnected from the main bushland areas at the lower end of the property where there is more suitable

feeding and roosting habitat present. Apart from this, there is no ecological value in this part of the site. Instead, it provides a constant source of invasive weed propagules in an area where the topography encourages dispersal from above to the bushland below. The current policy of minimalist management – mowing grassed open space, leave the rest - does little to reduce these impacts.

ZONES 4-5: BUSHLAND BELOW BOWLING GREENS

Mature eucalypt canopy trees provide good feeding and roosting habitat for several bird species. The contiguous shrub layer provides safe feeding habitat for a plentiful population of ringtail possums, which in turn provides a preferred food source for the threatened Powerful Owl. This part of the site is, therefore, important feeding habitat for owls that breed and roost in nearby Lane Cove Bushland Reserve.

ZONES 6-7: BUSHLAND BELOW ADJOINING PROPERTIES

The bushland in Zone 6 consists of a diverse suite of native canopy, shrub and groundcover species which provides important resources for food and habitat for a range of animals. A dense leaf litter layer, fallen logs and some rock outcrops increase the diversity of microhabitats available. Key aspects of its habitat and conservation value are the diversity of habitat and the source of native plant propagules for recolonisation or revegetation of adjoining bushland areas. Effective management of more degraded bushland areas nearby, including the McMahons Rd easement (Zone 7) are important for maintaining the quality of this bushland patch.

FAUNA

One threatened species was recorded at the survey site. Anecdotal evidence suggest a second, the Powerful Owl (*Ninox strenua*) also may use the forested areas of the site. Ringtail Possums provide an important component of the preferred diet of the Powerful Owl, and are present on site in plentiful supply. At least 5 individual animals were observed on site, including a mother with offspring. Anecdotal reports from nearby residents support observations about population densities for the Ringtail Possums in this area.

The Ringtail lives in rainforests, eucalypt forests, shrubby woodland, and have adapted to suburban gardens. Food consists mainly of eucalypt leaves, fresh new buds of native trees, flowers and fruit. The nest is usually in a hollow log lined with leaves, but as old trees are fast disappearing from our landscape, the ringtail will also build a spherical nest called a drey, made from leaves and shredded bark. The ringtail is not particularly aggressive and territories may overlap with dreys in close proximity to each other, although the male will defend his territory from other males specially if food is scarce.

Grey-headed Flying Foxes were observed feeding in the canopy of several trees on site. The favourite food of the Grey-headed Flying-fox is the nectar and pollen of eucalypts and other native trees, such as paperbarks and banksias, a number of which were recorded on the survey site. Flying-foxes also like eating rainforest fruits, such as figs and lilly pilly berries, which they chew to extract the juice and then spit out the fibre and the large seeds. Small seeds are often swallowed and may not pass through the gut until the flying-foxes is 35-50 km away from the source tree. By dispersing rainforest seeds over wide areas, flying-foxes give seeds a chance to grow away from the parent plant, and potentially expand remnant patches of valuable rainforest vegetation.

A comparatively low number of bird species was recorded on site, with small birds notably absent. This may be due to the lower density of the shrub layer under the dominant canopy. Another impacting factor may be the proximity of the golf course, immediately adjoining the bushland patch. Numerous golf balls were found on site, and may discourage smaller birds from using the area. Predation is not a major issue, evidenced by the

numbers and diversity of lizards recorded. Several species of frogs were also recorded (by chorus attendance) in response to the recent rain.

FUNGI

The nearby Lane Cove Bushland Park is the site of the only fungal community listed as an EEC in Australia. This community currently includes 9 Hygrocybeae species individually listed as threatened, and several more fungal species await proper description before they can be listed as threatened. The majority of species occur in the warm temperate gallery rainforest centred on the banks of the north-eastern arm of Gore Creek and its tributaries. Key aspects of the preferred habitat for the Hygrocybeae Community of Lane Cove Bushland Park are absent from the survey site at 266 Longueville Rd. While the timing of the fungal survey did not optimise chances for locating macrofungi fruiting bodies the absence of suitable substrate conditions suggest that it is unlikely for members of the Hygrocybeae community to be found on this site.

Fungal surveys were conducted following several days of rain in the area, increasing the likelihood of production of fungal fruiting bodies, and a total of 22 species were recorded from a range of fungal groups. Many of these produce fruiting bodies in the few days following rain, and would not have been recorded at other times.

MITIGATION OF IMPACTS

IDENTIFICATION OF THREATS

It is understood that the proposed development is to be limited to the area already occupied by the disused bowling greens and immediate surroundings. Direct impacts are primarily positive as the result will be removal of a significant source of weed propagules that are currently impacting the bushland on site. Key threats for threatened species and endangered or other ecological communities:

- Reduction in food resources for Powerful Owls by affecting numbers of ringtail possums, or reducing feeding, roosting and breeding habitat for ringtail possums and increasing predation by domestic cats in the area. This has been identified as a key threat for this species
- Reduction in food resources for Grey-headed Flying Foxes by reducing the quality and/or extent of bushland in the area. This has been identified as a key threatening process for this species
- Reduction in floristic diversity in Coastal Enriched Sandstone Moist Forest in the area by clearing or changing conditions in surrounding areas (Figure 21)
- Reduction in extent of good quality vegetation in CESMF through invasion of weed species
- Reduction in condition of CESMF through runoff from proposed development site
- Reduction in condition of CESMF through sediment deposition during building on proposed development site

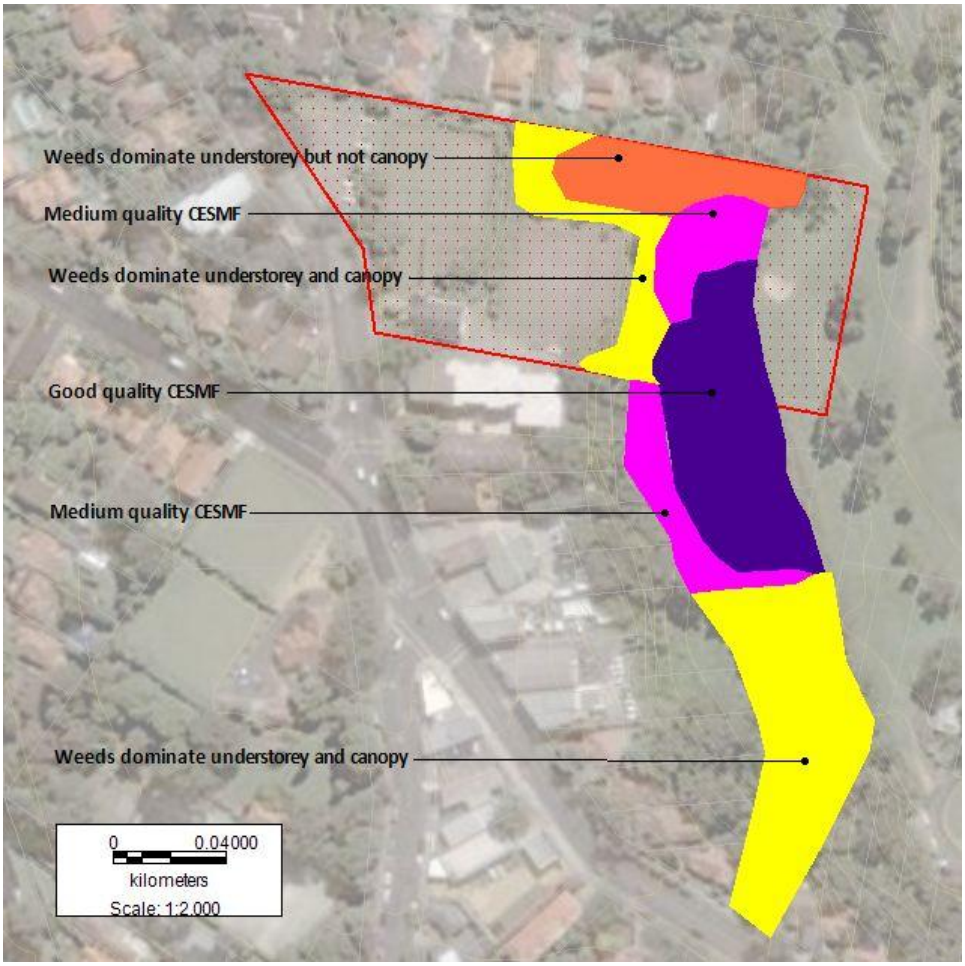


Figure 21. Location of good quality CESMF and poor quality CESMF based on current mapped extent of this community.

SPECIFIC MEASURES TO REDUCE AND OFFSET IMPACTS

- Choice of suitable plant species for landscaping clearly outlined as part of the development approval
- Ongoing weed management as part of a comprehensive bush regeneration plan for the E2 zone
- Management of soil stability on slopes below the bowling green area by staged weed removal, stabilisation and revegetation as required
- Staged removal of shrub layer weeds to retain habitat elements
- Offset weeds that provide possum food by planting suitable native species
- Provide supplementary nesting sites (eg nest boxes) for possums to ensure ongoing food supplies for Powerful Owls
- Plant native species that provide food resources for Grey-headed Flying Foxes
- Manage access by developing formal path(s)
- Management of runoff from development site to reduce impacts from changed water quality and quantity
- Supplementary fungi survey in autumn to confirm presence/absence of threatened fungal species
- Management of pedestrian access through the site and adjoining reserve area. Existing track alignments indicate current usage patterns (Figure 25), and provision of formal walking tracks should reflect these (Figures 22-24). Raised steps are recommended for steeper areas to reduce potential erosion impacts. Given the general lack of suitability of the habitat for *Hygrocybe* fungi, the remainder of the track route should be clearly delineated, but should remain a “natural” bush track.

Figure 22. “Natural" walking tracks should be clearly defined by logs or other edging.

Figure 24. Informal extension to road easement pathway.

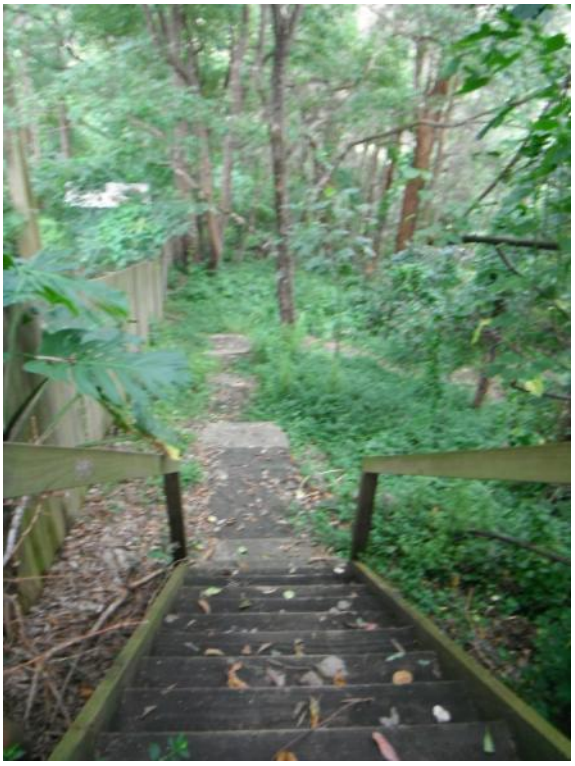


Figure 23. Formal footpath along McMahons Rd easement.

Figure 25. Location of existing paths through the subject site and adjoining reserve. Note that these routes may need to change following development of the bowling green site.

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