



Figure 2.1: Areas of BGHF Habitat to Which the Vegetation Management Plan Applies





2.7 DEFINITION OF TERMS USED

Proposal: the construction of a Private Hospital at 35 Water Street Wahroonga, consisting of two (2) new interconnecting buildings to be built across the south central part of the site, south of Rippon Grange. The Proposal also includes the refurbishment of historic Rippon Grange, reinstatement of significant landscape elements, and the rehabilitation and reconstruction of areas of BGHF Habitat.

Subject Property: comprises Lot 1 DP 726091 (only). The Property (formerly known as the John Williams Respite Care Centre) is 2.13 hectares in size, and occupies land bounded by Water Street (north) and Young Street (east).

Region: is an area approximately 10 kilometres in diameter, centred on the Subject Property

Locality: for the purposes of this VMP, describes an area within one (1) kilometre of the Subject Property and includes land in the grounds of The Bush School (~ 100 metres north), Clive Evatt Reserve (~425 metres north east), Turiban Reserve South (~245 metres east), and Turiban Reserve North (~260 metres north east).

Habitat - an area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, and including any biotic or abiotic components present.

Ecological Community – described as an assemblage of species occupying a particular area.

Endangered Ecological Community – a community that is likely to become extinct unless the circumstances and factors threatening its survival cease to operate.

Critically Endangered Ecological Community – a community that in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with criteria prescribed by the Threatened Species Conservation Regulation 2002

UBM: UBM Ecological Consultants Pty Ltd: formerly trading as Urban Bushland Management Consultants ('UBMC')

DECCW: NSW Department of Environment, Climate Change and Water

NPWS: National Parks & Wildlife Unit of DECCW

DWE: NSW Department of Water & Energy (formerly Department of Sustainable Natural Resources)



2.8 STATUTORY & PLANNING CONTEXT

A number of local planning policies, as well as State and Federal Acts and Policies apply to the management of remnant native vegetation in Ku-ring-gai Local Government Area. The most relevant of these, as they relate to the Proposal, are listed in Table 2.1, below.

Table 2.1: Summary of Policies, Planning & Legislative Requirements

GOVERNMENT LEVEL	RELEVANT POLICY /LEGISLATION	RELEVANCE TO SUBJECT PROPERTY
LOCAL	Ku-ring-gai Planning Scheme Ordinance	Lot 1 DP 375262 is zoned 5(a) Special Uses (Hospital) (Ku-ring-gai Municipal Council 2006).
	Plan of Management for KRG Council Bushland Reserves 2006	Council's Bushland PoM provides practical overarching guidance for the management of bushland reserves in the LGA The companion document to the Plan - 'Operation Information' - contains specific requirements & actions for individual reserves, with species lists and an overview of the relevant legislation and Recovery Plans. While not strictly applicable to bushland on private land, the PoM provides valuable information on local bushland species, habitats and ecological communities.
	Biodiversity Strategy May 2006	Among the Strategy Objectives are: - to prevent loss of local native biodiversity on public and private lands by eliminating/ameliorating threatening processes - to protect, enhance and where appropriate, increase local biodiversity on public and private lands - to protect and enhance aquatic and terrestrial ecosystems and habitats and connectivity between reserves. The VMP (as written) addresses each of the Strategy objectives listed above.
STATE	<i>Threatened Species Conservation Act 1995</i>	A single threatened flora species – Magenta Lilly Pilly (<i>Syzygium paniculatum</i>) – was recorded. This species has been planted widely throughout the Region, and is likely to be of horticultural origin rather than a natural occurrence. A single critically endangered ecological community – Blue Gum High Forest ('BGHF') – was recorded within part of the Subject Property. The community has been highly simplified, both structurally and floristically due to long-term severe disturbances. The Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>), is listed as 'vulnerable' under the Act. The Gang-gang Cockatoo (<i>Callocephalon fimbriatum</i>) is listed as a 'vulnerable' species throughout NSW.



GOVERNMENT LEVEL	RELEVANT POLICY /LEGISLATION	RELEVANCE TO SUBJECT PROPERTY
	<i>Noxious Weeds Act 1993(Amended 2005)</i>	There are 13 noxious weed species occurring within the Subject Property (see Section 4.3.4) As the landowner <i>Waterbrook</i> has a legal responsibility to control noxious weeds on the property and to prevent their spread to adjoining land.
	<i>Rural Fires Act 1997 / Amendment 2002</i>	The Subject Property is <u>not</u> classified as Bush Fire Prone Land (Ku-ring-gai Council 2002). Accordingly, no Asset Protection Zones are required to be established.
	State Environmental Planning Policy 19 – Bushland in Urban Areas	No areas within, or adjacent to the Subject Property are zoned as Community Land. Therefore the SEPP does <u>not</u> apply.
	State Environmental Planning Policy 44 – Koala Habitat	The Subject Property is not considered to constitute potential Koala habitat. Therefore, a Koala Plan of Management is <u>not</u> required.
	<i>Environmental Planning & Assessment Act 1979 – Part 3A amendment August 2005</i>	The project to develop a Hospital falls within the class of development included in Schedule 1 as “development that is declared to be a project in which Part 3A of the Act applies”.
	State Environmental Planning Policy (Major Projects) May 2005	Aims to identify project of economic, social or environmental significance to the State or regions of the State, so as to provide a consistent and comprehensive assessment and decision-making process for the development. Schedule 1 of the SEPP (Part 3A projects – classes of development) includes ‘Hospitals’ as development of the kind to which Part 3A applies.
	Sydney Regional Environmental Plan #20 – Hawkesbury Nepean River (#2, 1997)	The aim of the SREP is to “protect the environment of the Hawkesbury-Nepean River system by ensuring the impacts of future land uses are considered in a regional context”. Of relevance to this VMP, is the requirement that the ecological processes of the Catchment must be managed so that the diversity of flora and fauna communities, species and genetics is conserved and enhanced. In this regard, the impacts of the proposed development on the critically endangered BGHF Ecological Community will be minimal. The Proposal includes the rehabilitation and reconstruction of BGHF Habitat on the Subject Property. The Proposal has been supported by a Species Impact Statement (Cumberland Ecology March 2009) and a Vegetation Management Plan (UBM February 2009).



GOVERNMENT LEVEL	RELEVANT POLICY /LEGISLATION	RELEVANCE TO SUBJECT PROPERTY
COMMONWEALTH	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	A single threatened flora species – Magenta Lilly Pilly (<i>Syzygium paniculatum</i>) – was recorded. This species has been planted widely in the Region, and these plants are likely to be horticultural plantings, i.e. not naturally occurring. A single threatened ecological community – Blue Gum High Forest ('BGHF') – was recorded within part of the Subject Property. The community has been highly simplified, both structurally and floristically due to long-term and severe disturbances. As the BGHF on the Subject Property is < one (1) hectare in size, the Commonwealth Department of Environment, Water, Heritage & the Arts ('DEWHA') has declined to consider the proposal as significant. The Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>), is listed as 'vulnerable' under the Act. This species is known to occur in the Locality and may, on occasion, utilise the resources of the Subject Property.



3 PLAN PREPARATION - METHODOLOGY

3.1 LITERATURE REVIEW

During the preparation of this VMP, a number of previous studies and investigations for the Subject Property, Locality and Region were consulted.

As the VMP is intended to serve as a 'stand alone' Report, data and other background information has been sourced from these documents, and where appropriate incorporated into the Plan. All such information has been appropriately referenced.

The main documents referenced were:

- *Flora and Fauna Assessment / Opportunities and Constraints Report for Lot 1 DP 375262 (John Williams Respite Care Centre) and Lot 1 DP 726091 (64 Billyard Avenue, Wahroonga).* (UBMC February 2005);
- *Flora and Fauna Assessment for the former John Williams Respite Care Centre* (UBMC July 2006);
- *Review of Ecological Issues & Proposed Development at 35 Water Street, Wahroonga* (Footprint Green July 2006);
- *Identity and Condition of Native Vegetation at 35 Water Street, Wahroonga* (Smith & Smith, December 2006); and
- *Species Impact Statement for a residential development Waterbrook @ Wahroonga, 35 Water Street, Wahroonga* (Cumberland Ecology, November 2007).
- *Vegetation Management Plan for Blue Gum High Forest Habitat – a guide to the rehabilitation and reconstruction of a native vegetation community at Waterbrook @ Wahroonga* (UBM Ecological Consultants December 2007).
- *Species Impact Statement 35 Water Street, Wahroonga –* (Cumberland Ecology, March 2009).

Other reports, investigations and literary references are included in the References Section 9 of the VMP.

In preparing the VMP, consideration was given to concerns raised by Ku-ring-gai Council and the John Williams Neighbourhood Committee ('JWNC') with respect to the impact of the proposed development on the remnant BGHF Habitat occurring within the Subject Property. Accordingly, correspondence and related documentation prepared by Council, its consultants, and by consultants engaged by the JWNC were reviewed, and each of the main issues raised have been addressed (see Section 4 Management Issues and Recommendations).



3.2 FIELD INVESTIGATIONS

Field survey and weed mapping was undertaken by Judith Rawling (BA, DipEd, DipEnvStud, MEnvStud), Belinda Pellow (DipAppSc.Agr), Kylie Reed (B. Env.Sc [Hons]) and Gabriel Wardenburg (B.EnvMgt) on 1 and 9 October 2008. Site visits and supplementary investigations were undertaken on a number of occasions in September and October.

These investigations were undertaken to update information and data provided in the previous investigations (UBMC 2005, 2006), Species Impact Statement (Cumberland December 2007) and VMP (UBM December 2007); with the last two (2) documents having been prepared in support of a previous Development Application.

Potential impacts of the new Proposal – the construction of a Private Hospital - and management issues for individual locations/sites within the identified BGHF Habitat areas were identified, while a range of management strategies and remedial actions were considered.

Methods used to undertake the condition of vegetation (weed) mapping for the Subject Property are described below.

3.3 CONDITION OF VEGETATION MAPPING

Field survey and supplementary weed mapping was undertaken on 1 October 2008. New investigations were undertaken in order to update floristic data presented in the Flora & Fauna Assessment Report (UBM 2006) and subsequent VMP (UBM December 2007).

Vegetation boundaries were mapped in October 2007 to show the extent of the BGHF Habitat areas. This area was confirmed in October 2008. The vegetation map includes the extended area of BGHF Habitat in the south-western sector of the Subject Property identified by Smith & Smith (2006) as 'potential' BGHF Habitat (see Figure 2.1) - described in this VMP as 'Non-Core areas'.

A Thales MobileMapper GPS unit was used to log data in the field, with locations being recorded in three (3) second increments. The MobileMapper is a hand-held unit, accurate of up to three (3) metres under favourable conditions, and allowing for rapid translation of data into a Geographical Information System ('GIS'). This allowed for the identification and survey of a number of discrete 'weed polygons'.

A revised list of weed (or introduced) species was prepared; with abundance/density recorded for each polygon surveyed. Weed Polygons were established in 2007 to identify the keystone and secondary weeds present and to determine their relative abundance within the BGHF Habitat. The previous VMP (UBM 2007) recommended that all keystone weeds should be targeted as a matter of priority, and a table of proposed control methods for each species was compiled.

In October 2008, five (5) of the same Polygons (A-E) were re-visited and re-assessed to identify any changes in weed abundance and species composition. All "weeds" were identified within each polygon, and each was given an abundance rating of <25%, 25-50%, 50-75% or 75-100%.



Polygon F surveyed in October 2007 was not re-surveyed in 2008 because it is located in an area not currently being considered for development (i.e. residual Lot 1 Billyard Avenue). An additional polygon – also called Polygon F – was established in the former Croquet Lawn in 2008.

For each weed species the following information was noted:

1. Noxious Weed and Class
2. Listed as an Environmental Weed (Nuisance Plant) by Ku-ring gai Council; and
3. Listed as a Keystone or Secondary Weed by UBM (2007)

Areas/sites within the designated BGHF Habitat areas showing signs of native plant regeneration (i.e. indicating site resilience) were also noted.

Weed polygons mapped are shown in Figure 4.4 and results of the six (6) polygons surveyed are presented in Tables A to G in Appendix 4.

In addition to work carried out by UBM, in September 2008 Cumberland Ecology revised survey polygons first established in late-2007. Cumberland surveyed for both native and introduced species in each polygon, however they also estimated the % weed cover in each polygon. The results of these investigations are presented in Table 4.3.



4 SITE DESCRIPTION

4.1 LOCATION & SETTING

The Subject Property is located in the northern Sydney suburb of Wahroonga, about one (1) kilometre from the Wahroonga Shopping Centre and Railway Station. The character of the surrounding area is described as:

“...a well established leafy residential area. The Lots are larger than average found in Sydney, and the gardens are landscaped and well maintained. The exception to the surrounding residential dwellings is ‘The Bush School’, which is located opposite the site in Water Street” (R. Olssen for Ku-ring-gai Council, December 2006).

The former John Williams Respite Care Centre is 2.13 ha in size and occupies land bounded by Water Street (north) and Young Street (east). The property backs onto residential development in Billyard Avenue (south) and Plymouth Close (west)

The complex of buildings extant on the Subject Property comprise a one (1) and two (2) storey brick construction (former) hospital and two (2) and three (3) storey brick buildings known as 35 Water Street. These buildings are set in grounds which have been extensively landscaped over a number of years, although part of the site retains some native vegetation – most particularly a stand of mature Sydney Blue Gums *Eucalyptus saligna* in the western sector of the Property.

Some of the Sydney Blue Gums may be remnants of the original vegetation while others (particularly those occurring in a straight line on the Water/Young Street frontages) would appear to have been planted.

Table 4.1 provides a Site Definition for the Subject Property for which this VMP has been developed.

**Table 4.1: Summary of Site Definition**

TITLE INFORMATION	The former John Williams Hospital at 35 Water Street, Wahroonga, in Ku-ring-gai Local Government Area, Northern Sydney.
OWNERSHIP	<i>Waterbrook at Wahroonga Pty Ltd</i>
LOCATION	The land is bounded by Water Street (north) and Young Street (east); backing onto residential development in Billyard Avenue (south) and Plymouth Close (west).
CO-ORDINATES	<u>Latitude</u> : 33 degrees,43 minutes, 7 seconds <u>Longitude</u> : 151 degrees,7 minutes,.31 seconds
TOTAL AREA	21,320 sq metres (2.13 ha) comprising Lot 1 DP 375262
ZONING	Lot 1 DP 375262 is zoned 5(a) Special Uses (Hospital) (Ku-ring-gai Municipal Council 2006)



4.2 PHYSICAL ENVIRONMENT

The physical characteristics of the Subject Property and Locality are summarised in Table 4.2.

Table 4.2: Physical Features of the Subject Property & Environs

FEATURE	DESCRIPTION
Topography	The Subject Property is located on gently sloping land, with a moderately steep (10%) gradient from north-west to south-east - towards Young Street and Billyard Avenue. Site elevation ranges from 200m AHD at the top to 176m AHD at the lower southern site boundary, towards Billyard Avenue.
Geology	The geology has been mapped as Ashfield Shale (Rwa), which is a unit (or substrate) of the Wianamatta Group Shales. It typically comprises black to dark-grey shale and laminite (Herbert 1983).
Soil Landscape Unit	The Subject Property is located on the Glenorie (gn) Soil Landscape Unit. Glenorie soils are erosional landscapes, comprising shallow to moderately deep red podzolic soils on crests, moderately deep red and brown podzolic soils on upper slopes, deep yellow podzolic soils on lower slopes and humic gleys, yellow podzolic soils and gleyed podzolic soils along drainage lines (Chapman & Murphy 1989). Glenorie Soil Landscape comprises undulating to rolling low hills with a local relief of 50-80 m, and slopes of 5-20%. Ridges, hillcrests and valleys are narrow (Chapman & Murphy 1989). <u>Limitations:</u> As the gardens at Rippon Grange were developed in the late 19th Century, and have until recently been maintained as a managed landscape, it may be assumed that the native soil profile described above has been extensively modified. The former Croquet Lawn has been subject to cut and fill to create this facility, which is enclosed on all sides by sandstone walls of varying heights.
Local Hydrology	The Subject Property is located with the Lovers Jump Creek Catchment. There is no external catchment inflow to the site. There are no natural drainage lines within, or in close proximity to the Subject Property. Runoff drains generally overland, to the south-east. An ephemeral drainage line runs from north to south along the western side of the driveway in the south-eastern portion of the Subject Property. Existing stormwater drainage is limited to the developed areas, and consists of building roof drainage and sparsely located surface inlet pits on pavement, with discharge to Council's stormwater system at Billyard Avenue (LHO Group, <i>Drainage Concept Plan</i> November 2008).
Climatic Details	The mean daily maximum temperature is 22.3°C, with highest temperatures recorded in December, January and February. The mean daily minimum temperature 11.0°C, with lowest temperatures recorded in June, July and August. Mean annual rainfall is 1,068.0 mm; with February, March and April recording the highest mean levels (Bureau of Meteorology 2006, Pennant Hills #067047). Note: the suburb of Wahroonga (along with neighbouring Turramurra) receives the highest annual rainfall in the Sydney area.



4.3 BIOLOGICAL ENVIRONMENT – FLORA

Information in the following section of the VMP has been sourced from the Flora and Fauna Assessment for the Former John Williams Respite Care Centre (UBMC July 2006) and utilised in an earlier Vegetation Management Plan (UBMC December 2007). Supplementary information has also been sourced from the previous (December 2007) and current (March 2009) Species Impact Statements prepared by Cumberland Ecology.

4.3.1 Vegetation Mapping

The NSW National Parks and Wildlife Service⁸ has produced a series of vegetation maps at the smaller scale of 1:25 000 (NPWS 2002) which mapped all bushland remnants greater than 0.5 hectares in size.

NPWS (2002) mapped some vegetation within the Subject Property as **Blue Gum High Forest**. The condition of the community is mapped as “Txu” (canopy cover < 10% over urban development), and its conservation significance is classified as “Urban Remnant Trees (Critically Endangered Communities)”. There is a small stand of “Core” Blue Gum High Forest mapped directly north of Water Street (see Figure 4.1) – this presumably representing vegetation in The Bush School.

A description of the native vegetation community extant within the Subject Property and the dominant plants within each vegetation layer (or stratum) – as determined by site survey and quantitative analysis - is provided in Section 4.3.2.

⁸ Now the NPW Group within the NSW Department of Environment & Conservation (‘DECCW’)

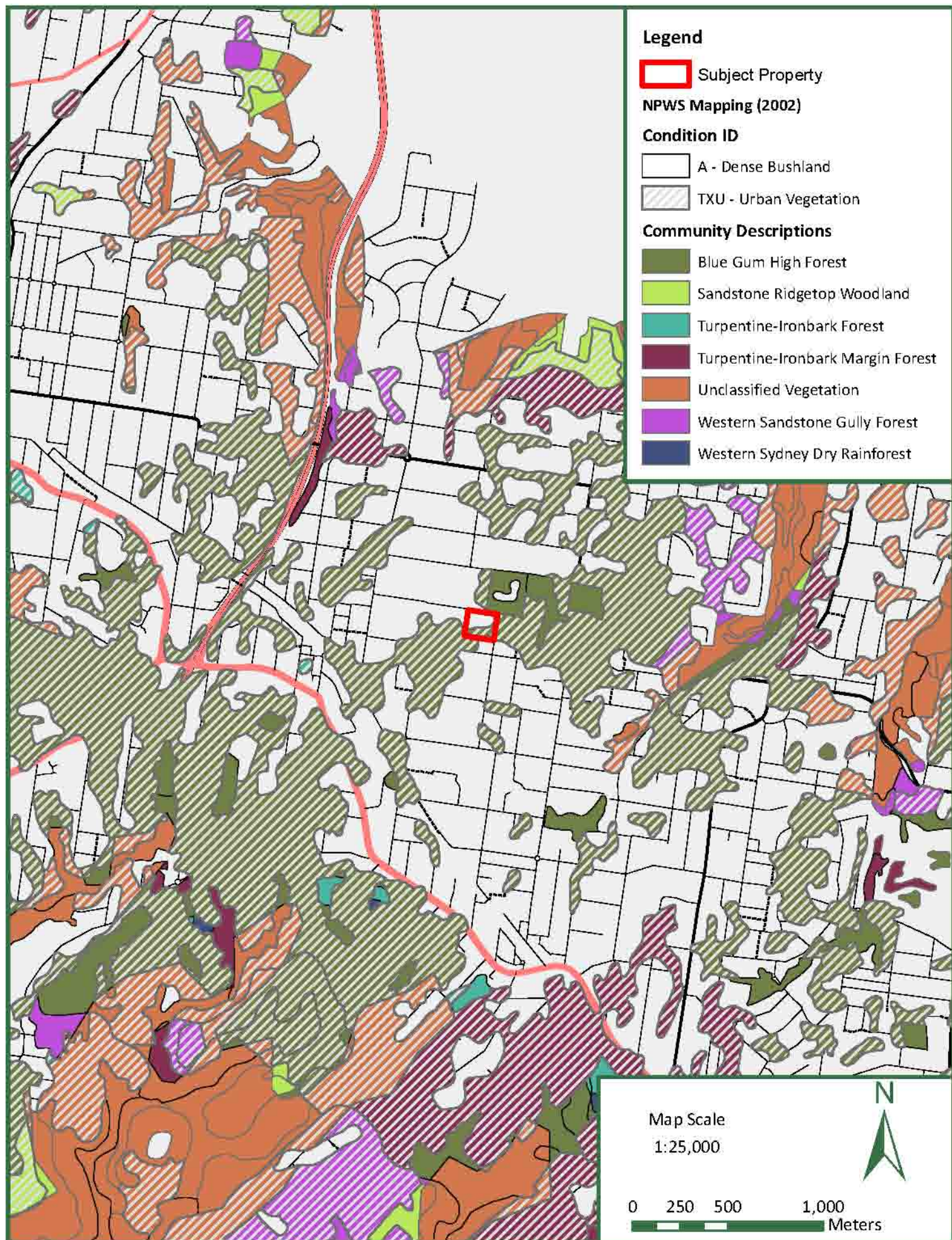


Figure 4.1: Vegetation Mapping (NPWS 2002)





4.3.2 Community Description

On 21 July 2006, the NSW Scientific Committee released a new Preliminary Determination which proposes to list the *Blue Gum High Forest in the Sydney Basin Bioregion* as 'critically endangered'. The Final Determination was gazetted on 20 April 2007 (see Appendix 1).

The description of the BGHF community in the Final Determination is far more prescriptive than that used in the previous Determination (gazetted 5 September 1997), and (from interpretation) would appear to include individuals and small stands of Sydney Blue Gum growing over an introduced or weedy understorey and lawns. Accordingly, the area of BGHF Habitat considered to be extant within the Subject Property has been substantially increased - from ~2,600 sq metres to 6,350 sq metres.

Part of the Subject Property is occupied by a floristically and structurally simplified form of BGHF (~6,350 sq metres – 0.64 ha), as shown in Figure 2.1⁹. Most of the vegetation has been severely modified, and is considered to be irreversibly altered to the point where the original native vegetation community (BGHF) would be unlikely to regenerate naturally to form a viable, fully functional native vegetation community. Due to the Property's long-term land uses, recurring disturbance events, and suspension of ecological processes, **site resilience** is estimated as 'low to absent' across most of the Property, and even in the larger remnants, estimated only as 'low to moderate' (see Section 6.3 for a discussion of **resilience**¹⁰).

A few components of the BGHF community remain in parts of the Subject Property, but these are mainly restricted to mature canopy trees growing over lawns, garden beds, and /or a weedy understorey. Other native plants occur in the herb layer (groundcover stratum), and comprise a small palette of disturbance-tolerant species commonly found in bushland, private gardens, parks and vacant land in the Locality and Region. The indigenous shrub stratum is sparse to absent (having been largely replaced by introduced horticultural species and woody weeds).

Accordingly these areas have been described as **BGHF Habitat**, rather than as a BGHF Ecological Community (as described in the Final Determination – see Appendix 1).

A description of the single native vegetation community in the Subject Property and the dominant plants within each vegetation or stratum are provided below.

Blue Gum High Forest

Structure

Moderate to sparse cover of large canopy trees, up to 25 metres in height. The shrub layer density is moderate to sparse, reaching up to approximately five (5) metres in height. The groundcover is moderate to dense, and reaches up to approximately one (1) metre in height.

Common Species (* denotes exotic species)

Trees

⁹ As mapped by Smith & Smith 2006, and used in the draft SIS (Cumberland Ecology October 2008)

¹⁰ Site resilience being described as the vegetation community's ability to recover naturally from disturbance.



Dominated by Sydney Blue Gum (*Eucalyptus saligna*), with rare occurrences of Rough-barked Apple *Angophora floribunda* and Turpentine *Syncarpia glomulifera*.

Shrubs

Commonly occurring shrubs include Large-leaved Privet *Ligustrum lucidum**, Montpellier Broom *Genista monspessulana**, Sweet Pittosporum *Pittosporum undulatum*, Willow Bottlebrush *Callistemon salignus*, Celery Wood *Polyscias elegans*, Sydney Golden Wattle *Acacia longifolia* var. *longifolia*, White Tick Bush *Kunzea ambigua*, Camphor laurel *Cinnamomum camphora**, Olive *Olea europaea* ssp *cuspidata**, and Small-leaved Privet *Ligustrum sinense**.

Groundcovers & Vines

Common groundcover and vine species include Asparagus 'Fern' *Asparagus aethiopicus**, Weeping Meadow Grass *Microlaena stipoides* var. *stipoides*, Kidney Weed *Dichondra repens*, Basket Grass *Opismenus imbecillis*, Japanese Honeysuckle *Lonicera japonica**, Agapanthus *Agapanthus africanus**, Forest Hedgehog Grass *Echinopogon ovatus*, Love Creeper *Glycine clandestine*, and Fishbone Fern *Nephrolepis cordifolia**.

4.3.3 Indigenous Flora Species

4.3.3.1 Threatened Species

A single threatened flora species comprising two (2) individuals – Magenta Lilly Pilly *Syzygium paniculatum* is present. This plant, which occurs naturally within littoral or gallery rainforest along the NSW Coastal District (Benson & McDougall 1998), is listed as 'vulnerable' under the *TSC* and *EPBC Acts*. However, the species has been planted widely in gardens and public parks in the Locality, and the plants in the Subject Property are thought to be horticultural specimens rather than natural occurrences (location shown in Figure 2.1).

No other flora species of National or State conservation significance listed as a ROTAP¹¹, or listed on the Schedules of the *EPBC* or the *TSC Acts* were located during previous (UBMC 2005/2006, Cumberland 2007) or current (UBM 2008, Cumberland 2008) surveys.

The likelihood of occurrence of other threatened species in the Subject Property is considered to be 'low' given its long history of cultivation as a garden and other severe disturbances to the original vegetation in the Locality. Local land uses, as noted in historical sources, including logging from the 1820s, followed by orcharding, and after the extension of the railway in 1890 (between 1895 and 1903), development as an exclusive residential area (www.villagevoice.com.au).

4.3.3.2 Floristic Biodiversity

Indigenous (floristic) biodiversity for the Subject Property is 'low' due to long-term disturbances such as (early) clearing of the understorey vegetation, extent of horticultural planting and cultivation, earthworks, construction, alterations to the 'natural' fire regime, altered hydrology and other disturbances. In recent years, in the absence of garden maintenance, weed invasion (including the unchecked spread of many former garden plants) has occurred. Indigenous plants are mainly restricted to individuals or small stands of remnant canopy trees, some few large shrubs or sub-canopy trees, and a limited number of herbaceous ground covers.

¹¹ Listed in *Rare or Threatened Australian Plants*, Briggs and Leigh 1996



It is also likely that a number of the 'native' species recorded are horticultural introductions. At least some 'native' species within the site have been planted; some still having planting stakes positioned beside them. As it was fashionable in the 1960s and 1970s to plant a range of generally 'Australian native species', it is considered likely that some of the species recorded as being indigenous occurrences are actually horticultural plantings.

The condition of the native vegetation and assessment of the Subject Property's existing conservation values has been confirmed by recent investigations carried out by UBM (September/October 2008) and by Cumberland Ecology during the preparation of a Species Impact Statement (Cumberland Ecology – March 2009).

4.3.4 Introduced / Weed Species

Of a total of 229 flora species recorded within the Subject Property, 190 species (83%) are introduced (horticultural) species or weeds (UBMC 2006/2007). Of these, 81 species (42.6%) are trees or shrubs (some classified as 'significant' plantings), 19 are vines or scramblers, and the remainder (163) are herbaceous species. Twelve (12) of the herbaceous species (26.4%) present are introduced grasses – several being popular domestic turf species (see Appendix 2)¹².

Using the results of updated surveys undertaken in support of the new SIS, Cumberland Ecology has prepared a table showing the % of exotic species in the projected foliage cover of each stratum of the BGHF Habitat areas. This is presented as Table 4.3. Polygon locations are shown in Figure 4.3.

Table 4.3: Percentage of Exotic Species in Projective Foliage Cover of Each Stratum

(Source Cumberland Ecology March 2009)

Quadrat	Canopy	Small Tree	Shrub	Groundcover
1	40	40	100	95+
2	0	100	70	95+
3	0	70	95+	95+
4	0	50	80	80
5	0	5	100	90
6	0	90	70	95+
7	100	absent	100	70
8	0	absent	100	40
9	20	absent	absent	90

¹² **Note** that the flora list in Appendix 2 does not include all the horticultural plantings at Rippon Grange.



Data presented in Table 4.3 indicates that throughout the BGHF Zone, most of the understorey strata contained very high proportions of introduced species. The distribution of the tree stratum varied greatly, while the small trees stratum generally contained high proportions of exotic weeds (especially Privet *Ligustrum* spp and *Ochna serrulata*). Groundcovers in most quadrats were almost totally dominated by weeds and introduced garden plants, which is not surprising considering that most of the area now described as BGHF Habitat was established and for many years maintained as a garden.

The following introduced species recorded within the Subject Property are listed as ‘**Noxious Plants**’ in Ku-ring-gai Local Control Area (*Noxious Weeds Act 1993 – Amended 2005*).

- Asparagus ‘Fern’ (*Asparagus aethiopicus*) – Class 4;
- Blackberry (*Rubus fruticosus*) – Class 4 ;
- Camphor Laurel (*Cinnamomum camphora*) – Class 4;
- Cape Broom (*Genista monspessulana*) – Class 3;
- Climbing Asparagus (*Asparagus plumosus*) – Class 4;
- Madeira Vine (*Anredera cordifolia*) – Class 4;
- Morning Glory (*Ipomoea indica*) – Class 4;
- Ochna (*Ochna serrulata*)- Class 4;
- Oxalis (*Oxalis* spp.) – Class 5;
- Privet – Broad-leaf (*Ligustrum lucidum*) – Class 4;
- Privet – Narrow-leaf (*Ligustrum sinense*) – Class 4;
- Rhizomatous Bamboo (*Phyllostachys* spp.) – Class 5; and
- Wandering Jew (*Tradescantia fluminensis*) – Class 4.

Actions Required For Noxious Weed Classes

- 1 The plant must be eradicated from the land and the land must be kept free of the plant
- 2 The plant must be eradicated from the land and the land must be kept free of the plant
- 3 The plant must be fully and continuously suppressed and destroyed
- 4 The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
- 5 The requirements in the *Noxious Weeds Act 1993* (as amended 2005) for a notifiable weed must be complied with

In addition to the 13 Noxious Weeds listed above, many garden plants popular in the last Century have naturalised widely throughout the property: such garden escapes are considered to be ‘**Environmental Weeds**’ when they invade native bushland.

A list of indigenous and introduced plant species recorded within the Subject Property is provided in Appendix 2, along with an indication of relative abundance (UBMC 2006 & 2007).

Note: The list of species provided in Appendix 2 is not intended to be a comprehensive list of all species present, and represents only those species that were recorded while undertaking searches for indigenous species of National or State conservation concern known for, or expected to occur, in



the Region. It is quite possible that this list could be increased as additional surveys are undertaken, particularly as variations in seasonal and climatic conditions come into play.

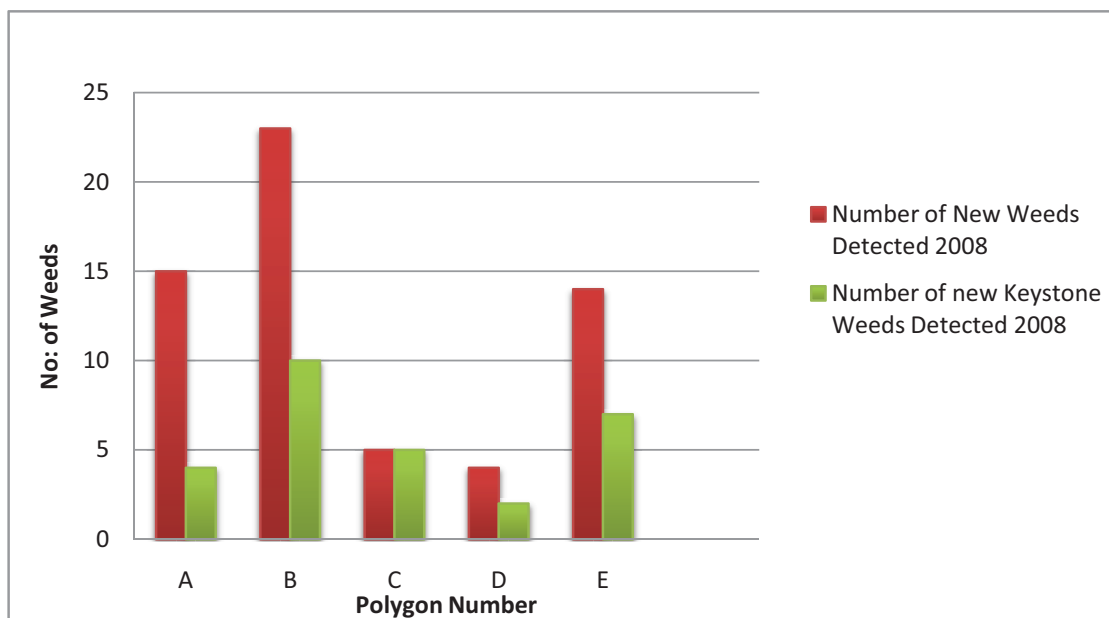
4.3.5 Updated Weed Mapping

In order to provide some point of comparison with weed mapping undertaken by UBM in 2007, the weed polygons established in the BGHF Habitat approximately 12 months ago were revisited.

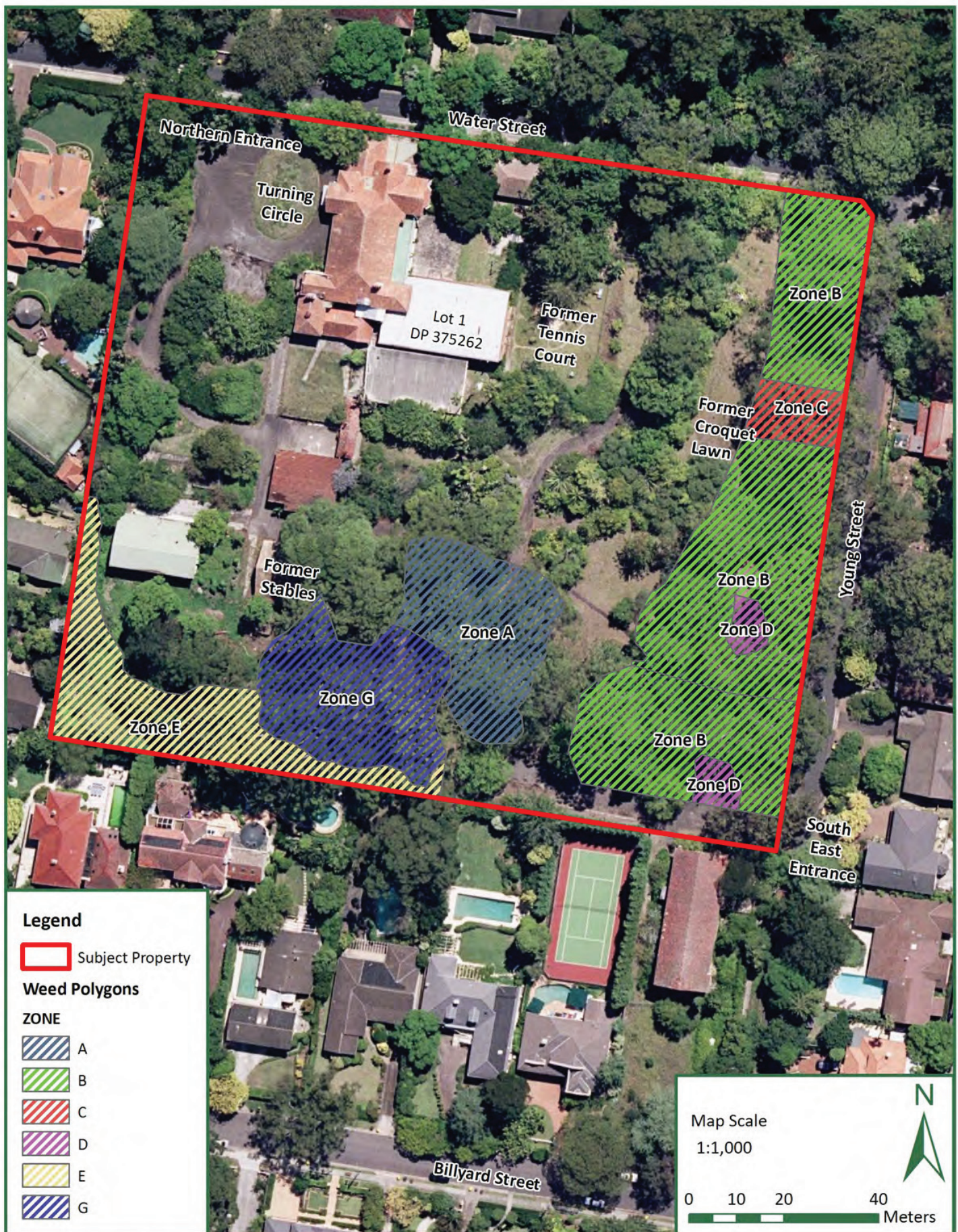
The results of the weed polygons resurveyed indicate that there has been an overall increase in the number of weeds in each polygon, when compared to survey results in 2007. Changes in the abundance of individual weed species have been highlighted in Figure 4.2.

Results of the six (6) weed polygons surveyed in 2008 are presented in Appendix 4.

Figure 4.2: Changes in Weed Species Numbers between 2007 and 2008 for each Polygon



A site map showing vegetation condition and location of weed polygons recently surveyed (October 2008) is presented in Figure 4.3.





4.4 CONDITION & INTEGRITY OF BLUE GUM HIGH FOREST

BGHF Habitat mapped by UBMC (2006) comprised two (2) separate stands of native vegetation, totalling ~ 2,600 sq metres in size and located in the eastern, south-eastern and central sectors of the Property. For the purposes of this VMP, these areas are described as Core BGHF Habitat areas.

These **Core BGHF Habitat** areas have a generally intact canopy of characteristic Sydney Blue Gums, Blackbutts and other mature trees over a weed infested mid-storey and groundcover strata. The mid-storey contains dense woody weed thickets, generally dominated by two (2) species of Privet – a noxious weed. However, some native resilience is indicated by the scattered occurrence of a small number of disturbance-tolerant native shrubs such as Wattles *Acacia* spp, Forest-oak *Allocasuarina torulosa*, and Sweet Pittosporum *Pittosporum undulatum*. The groundcover is occupied by Asparagus 'Fern' *Asparagus aethiopicus*, Fishbone Fern *Nephrolepis cordifolia*, Agapanthus *Agapanthus praecox*, Japanese Honeysuckle *Lonicera japonica*, and other garden escapes.

Within these stands are several small clearings which were formerly open lawn. Garden escapes and other scattered weeds are present, although recent site investigations (September/October 2008) indicate that these lawns are being progressively invaded from the edges (see Plate 5). Some disturbance-tolerant native groundcovers are also present, growing in gaps in the sparse turf or on edges where light levels are highest. These include Love Creeper or Glycine *Glycine clandestina*, Basket Grass *Oplismenus imbecillis*, Weeping Meadow Grass *Microlaena stipoides*, Hedgehog Grasses *Echinopogon* spp., and Kidney Weed *Dichondra repens*.

Some natural regeneration of native shrubs, including Acacias¹³, White Tick Bush *Kunzea ambigua*, Celerywood *Polyscias elegans*, and a single Woolly Pomaderris *Pomaderris lanigera* (the latter probably a planted specimen) were noted in clearings (as indicated above), adjacent to the existing remnants.

¹³ Not all *Acacia* species regenerating are locally indigenous species (e.g. *Acacia baileyana*, *A. podyriformia*)



Plate 5: Progressive weed invasion in the open lawn area, Management Zone 1: woody weeds encroaching into grassland from the edges

A third '**Non-Core BGHF Habitat**' area (as mapped by Smith & Smith 2006) is located in the south-western sector of the Subject Property behind the Stables – an area which includes part of the former Service Area (see Figure 4.5). The inclusion of this area as BGHF because individual BGHF canopy trees remain *in situ*, added another 3,750 sq metres to the area originally identified as BGHF (Habitat).

This Non-Core area comprises mature canopy trees (Sydney Blue Gums and others) over rock-edged garden beds containing introduced horticultural specimens (Camellia, Azalea, Photinia, Agapanthus and Clivia) and unmaintained lawns (Plate 6). Large parts of this area are rapidly being overtaken by exotic vines and scramblers such as Morning Glory *Ipomoea indica*, Black-eyed Susan *Thunbergia alata*, and the succulent ground cover Wandering Jew *Tradescantia fluminensis*.

Because this area lacks (native) floristic diversity in the mid-storey and ground cover layers, and consequently lacked structural integrity, and because of its long-term use, partly as a cultivated garden and partly as a Service Area, this third Non-Core Area was not included in the original BGHF mapping undertaken by UBMC 2006).

Despite the floristic and structural traits exhibited by this third Non-Core area, Smith & Smith (2006) have chosen to interpret the description of the Ecological Community provided in the new Final Determination (see Appendix 1) in a very broad sense; thus providing for remnant trees over lawn and/or an introduced or weedy understorey to be considered as part of the BGHF community.



Plate 6: Mature canopy trees over rock-edged garden beds with horticultural specimens and weeds, adjoining unmaintained lawns within Non-Core BGHF Habitat Area, Management Zones 3-4



4.5 BIOLOGICAL ENVIRONMENT – FAUNA

Information in the following section of the VMP has been sourced from the Flora and Fauna Assessment for the Former John Williams Respite Care Centre (UBMC July 2006), Vegetation Management Plan (UBM February 2009) and Species Impact Statements (Cumberland Ecology March 2009).

4.5.1 Fauna Species

During the field survey conducted (UBMC 2006); four (4) native mammals, 15 native birds and two (2) reptiles were recorded within the Subject Property. In addition to these native species, a number of introduced animals were also detected, or indicated as occurring (see Appendix 3).

In relation to those native species recorded, it is interesting to note that none of the smaller, understorey-associated birds such as Thornbills, Wrens or Finches were detected during the field surveys. The developed, landscaped and regularly maintained nature of the hospital site pre-closure is considered to have modified the site to such an extent that these birds have become locally extinct.

Remediation strategies set out in this VMP are aimed at meeting the habitat needs of these species, and may in time attract small birds back into the site (provided that local populations remain to facilitate the re-colonization of the site). Provision of some areas of open grassland and some areas with dense plantings of shrubs would provide refuge, breeding and foraging opportunities for these small birds should they be present within the surrounding urban area (see Section 4.5).

The presence of the native, (although highly aggressive and territorial) Noisy Miner *Manorina melanocephala* is considered to limit the diversity of Honeyeaters and other canopy birds. Similarly, predators that have benefited from the modified urban landscape such as Magpies *Gymnorhina tibicen*, Currawongs *Strepera glaucina*, Butcherbirds *Cracticus* spp, and the Australian Raven *Corvus coronoides* are considered to have adversely affected the diversity of the site. Such species - known as 'Increasers' (Reid 1999) - are highly adaptable species that have thrived in urban environments.

Rehabilitation of the bushland remnants to exclude these larger birds, thereby attracting other native species back into the site, would require the creation of a well developed vegetation community comprising dense mid-storey, understorey and ground cover strata. However, as this type of dense understorey vegetation is not characteristic of the BGHF Ecological Community, it may not be practical to attempt to implement these works.

Conservation Value of the Native Fauna Species in the Subject Property

Of those native animals recorded:

- The Grey-headed Flying Fox (*Pteropus poliocephalus*), is listed as 'vulnerable' under both the EPBC and TSC Acts; and
- The Gang-gang Cockatoo (*Callocephalon fimbriatum*) is listed as both a 'vulnerable' species throughout NSW and as an 'endangered population' within the Ku-ring-gai and Hornsby Local Government Areas.



During the field survey (UBMC 2006), these animals were observed either adjacent to the Subject Property or flying overhead. Given these species' habit of foraging on eucalypts, there is some potential that one or both species will be recorded within the Subject Property at some stage.

Rehabilitation of the BGHF Habitat using locally occurring eucalypts, combined with the retention of (non-weedy) existing native and exotic trees (the Grey-headed Flying Fox is known to forage on fruits and pollen of exotic plants), would ensure that foraging opportunities for these species are maintained within the Subject Property (see Section 7.9).

The remainder of the native species recorded within the Subject Property are 'Protected' (as defined by the NSW *National Parks and Wildlife Act 1974*), but are considered to be common to abundant throughout the surrounding Region. None of the species recorded were of regional conservation concern within the Ku-ring-gai Local Government Area; all species being likely, or known to be present within the surrounding network of residential areas and conservation reserves (Ku-ring-gai Council 2003).

A comprehensive list of fauna species recorded or known to have historically occurred in the vicinity of the study area, along with their detection methods, can be sourced from the *Flora and Fauna Assessment for the Former John Williams Respite Centre* (UBMC 2006).

4.5.2 Description of Habitat Types

Two (2) habitat types¹⁴ were observed within the Subject Property:

- A modified environment; and
- A eucalypt woodland.

Descriptions of the structure and value of each of these habitats for native species are provided below.

Modified Environment

The Modified Environment occupies approximately half of the Subject Property, incorporating the unoccupied hospital, and its associated abandoned playgrounds, driveways, footpaths, carports, cleared land, unkempt landscaped areas, paved areas, retaining walls, garden beds and so forth. The vegetation is dominated by a wide range of landscape and horticultural species (both native and introduced plants), as well as the occasional remnant native species.

The majority of trees present are up to 15 metres in height, with no hollows suitable for the roosting or breeding needs of native species being evident. However, it is acknowledged that at least one (1) of the exotic, landscape plantings is hollow-bearing. The understorey is to four (4) metres in height, while groundcovers are about 30 cm high and of a high density in most places.

An ephemeral drainage line runs from north to south along the western side of the driveway in the south-eastern portion of the site. Due to its apparently ephemeral nature, its location within an

¹⁴ Habitat types are described according to their structure or formation, and not according to the nomenclature provided by a plant community description (eg BGHF).



urban catchment, and the presence of high concentrations of weeds and other exotic plants, this drainage channel was not considered to provide any significant resources for any native animals.

The Modified Environment is characteristic of the gardens and residential properties that surround the Subject Property: no habitat features within this area are unique to the Subject Property or locality generally. The modified environment is considered not to be significant for the local occurrence of any viable populations of those animals listed under the Schedules to either the Commonwealth *EPBC Act* or NSW *TSC Act*.

A number of common to abundant urban-tolerant native animals have been recorded within this Modified Environment: this habitat type meeting components of these species' life cycle requirements.

The development of this habitat type (whether through construction of dwellings and associated infrastructure, or clearing and reconstruction of BGHF Habitat – as proposed in this VMP) will cause the loss and local displacement of a number of these individuals, although as a group their tolerance and adaptability to modified areas is expected to permit their re-establishment/re-occupation of the site post-development.

While the proposed development may result in the loss of a number of individuals from the fauna groups recorded, the proposed development is not expected to decrease the diversity of species present post-development due to the species' tolerance and urban adaptability.

To minimise the loss of any individuals that may be present within the Modified Environment, recommendations have been provided that are expected to cater for the foraging, dispersal and sheltering needs of these animals (see Section 7.9).

Eucalypt Woodland

The Eucalypt Woodland is mainly located within the eastern and southern portions of the Subject Property (see Figure 4.4). At these locations, a canopy of 25 metre high mature eucalypts is present; seven (7) of which are hollow-bearing (hollow diameter $\leq 100\text{mm}$).

Given the size of those hollows present, it is possible that they would be suitable for the roosting and breeding needs of several of the smaller hollow-dependant native animals (particularly the microchiropterans [insectivorous bats]). Several Common Ringtail Possums *Pseudocheirus peregrinus* and during field investigations, Common Brushtail Possums *Trichosurus vulpecula* were observed foraging within this environment. Therefore, the Eucalypt Woodland is considered to be of some value for the local presence of these species.

Note: the loss of hollow-bearing trees has been given a preliminary listing as a Key Threatening Process ('KTP') by the NSW Scientific Committee established under the NSW *TSC Act*.