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# FLORA AND FAUNA ASSESSMENT

## FOR THE

## PROPOSED DEVELOPMENT

## AT

## 5 MID DURAL ROAD & 392 GALSTON ROAD, GALSTON, NSW (LOT C DP 38865 & LOT 1 DP 654433)

## MAY 2011

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## APPENDIX



| **Quality Control for Clarke Dowdle and Associates** | | | |
|---|---|---|---|
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# 1.0 INTRODUCTION

Clarke Dowdle & Associates were engaged to conduct a Flora and Fauna Assessment on the property located 5 Mid Dural Road & 392 Galston Road, Galston, NSW. The assessment was undertaken in May 2010 and subsequently updated in May 2011 and was limited to the environment within and surrounding the boundaries of the study site.

The general purpose of the assessment was to assess the impact of the proposed development upon any threatened species, populations and ecological communities that may occur within the area.

## 1.1 Scope of the Study

This study was designed to:

- identify any remnant native vegetation within the study area and make an assessment of conservation significance;
- identify any threatened flora and fauna species or presence of potentially important habitat attributes;
- assess the suitability of the habitat(s) present for native species in general;
- address the possibility of the site, or parts thereof, being significant for any threatened species, populations or ecological communities and if necessary, provide appropriate recommendations to prevent or mitigate any potential impacts on threatened flora and fauna; and
- identify the potential for environmental impacts upon the adjacent habitats and recommend impact mitigation or prevention measures.

This study has been structured on the guidelines laid down in the *EP&A Act 1979*, which requires consideration of the impact of the proposed development upon any protected fauna but particularly on 'Threatened' species, Endangered Populations or Endangered Ecological Communities expected or occurring on the site. Consideration of potential constraints has also been undertaken in relation to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EP&BC Act 1999*).

## 1.2 Limitations

Field surveys were conducted over two days during autumn 2010. Flora and fauna field survey was based on the recommendations of *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities. Working Draft* (DEC, 2004) with particular reference to the size of the subject site and a relatively homogeneous disturbed landscape. Accordingly, the brevity of the survey and its timing mean that the full spectrum of flora and fauna species and ecological processes likely to occur on the site cannot be fully quantified or described in this report. These limitations have been partly addressed by identifying potential habitats for flora and fauna species and assessing the potential for these species to occur on the site based on previous records, the type and condition of habitats present, the land use throughout the subject site, surrounds and the landscape context.

## 1.3 Licenses and Approvals

This flora and fauna survey was conducted under:

- National Parks and Wildlife Service Scientific Investigation Number S11333
- Animal Research Authority issued by the Director-General of NSW Agriculture
- Approval of the Animal Care and Ethics Committee of the Director-General of NSW Agriculture

## 2.0 SITE DESCRIPTION

### 2.1 Site Location

The site is located upon two parcels of land. The first portion is known as 5 Mid Dural Road, Galston (Lot C DP 38865) and the second parcel known as 392 Galston Road, Galston (Lot 1 DP 654433). Both allotments have a combined area of approximately 4 hectares. The property is located within the Hornsby Shire Council Local Government Area (LGA).


**Figure 1. Aerial Photograph of the site**
**Source: Department of Planning, 2010**

Both allotments are rural and contain a residential dwelling with a mixture of old orchards, disused hydroponic areas and pastoral grasslands. The northern areas on 5 Mid Dural Road contain a small forested area.

### 2.2 Proposed Development

The proposal is for the construction of a large senior's development within the two allotments. The proposal will contain internal roads, landscaped areas and approximately 70-80 units within. The proposal will be set back approximately 15 metres of each road boundary (Galston Road and Mid Dural Road) Figure 2 outlines the proposed development.

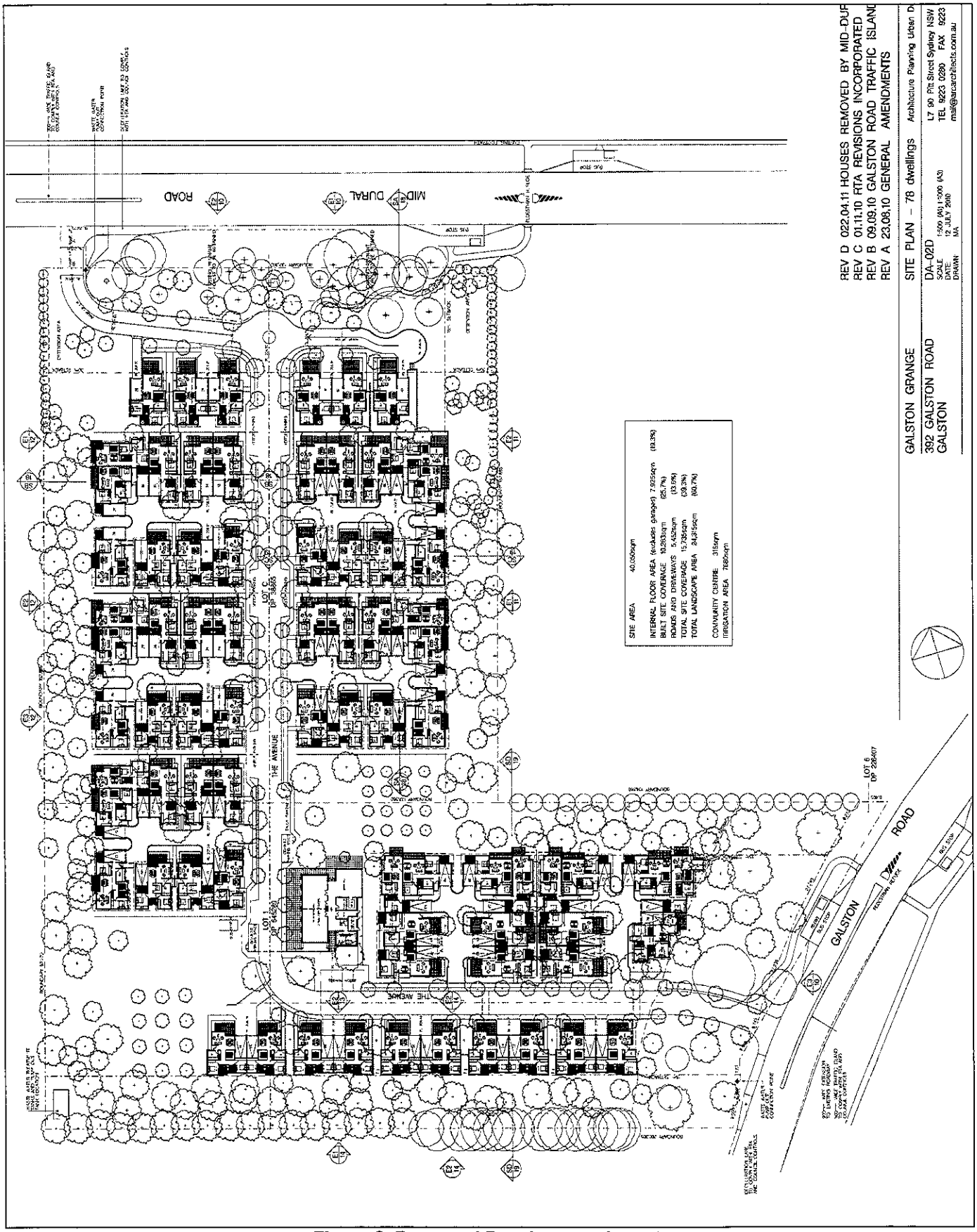


**Figure 2. Proposed Development layout**

# 3.0 PREVIOUS STUDIES AND REPORTS

## 3.1 Native Vegetation Communities of Hornsby Shire

In 1990-1993 P&J Smith Ecological Consultants identified and mapped the native vegetation communities in the bushland of Hornsby Shire. The recent study, carried out between 2006 and 2008, updates the classification and mapping of the communities and was used for this assessment.

The survey area included all of the Hornsby Local Government Area, from Eastwood to Brooklyn and Wisemans Ferry, except for Marramarra National Park, Muogamarra Nature Reserve, Long Island Nature Reserve, and Ku-ring-gai Chase National Park east of the Sydney-Newcastle Freeway. Department of Environment and Climate Change lands that have been included in the mapping include Berowra Valley Regional Park, Lane Cove River National Park, Maroota Historic Site, Mount Kuring-gai Aboriginal Area, and the fragments of Ku-ring-gai Chase National Park west of the Sydney-Newcastle Freeway.

A total of 34 native vegetation communities have been distinguished in the survey area.

## 3.2 Native Vegetation of the Cumberland Plain

At a regional scale *The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities* (Tozer, 2003), provides a survey of vegetation communities occurring on the Cumberland Plain and adjacent plateaus characterised by Wianamatta Shale soils. This study recognises that most of the native vegetation communities of the Cumberland Plain and neighbouring Wianamatta Shales are listed as endangered under the *Threatened Species Conservation Act 1995* and states that Due to the rate of urban development in western Sydney there is a large potential for development proposals to significantly impact on listed communities (Tozer,2003). As such, part of the rationale for the survey was to address the need for quantitative data to assist in the identification of native plant communities and provide an assessment of the conservation value of vegetation remnants.

The aim of the survey was to revise the existing plant community classification to take account of; recently described communities and other communities warranting recognition; provide quantitative data for characteristic species in each community (frequency of occurrence and relative abundance);identify species showing high fidelity to each community as a basis for diagnosing community type in the field; estimate the present cover of native vegetation; and derive a spatial model as a basis for predicting the vegetation type and conservation value of all remaining remnants (Tozer, 2003). In classifying communities interpreted in light of previous publications and endangered ecological communities listed under the TSC Act, Tozer (2003) recognises and describes more than one unit for four community types and these are as follows;

- Cumberland Plains Woodland incorporating Shale Plains Woodland and Shale Hills Woodland.
- Sydney Coastal River Flat Forest incorporating Riparian Woodland, Riparian Forest, and Alluvial Woodland.
- Shale/Sandstone Transition Forest incorporating Shale/Sandstone Transition Forest (low sandstone influence) and Shale/Sandstone Transition Forest (high sandstone influence).
- Sydney Turpentine-Ironbark Forest incorporating Turpentine-Ironbark Forest and Turpentine- Ironbark Margin Forest.

The survey incorporated systematic, stratified field sampling to record floristic structure and composition, a classification procedure based on hierarchical, agglomerative clustering analysis; spatial modelling of community distributions using geological, climatic and topographic variables; and the interpretation of patterns in canopy composition and remnant condition in aerial photographs. The resulting *Native Vegetation of the Cumberland Plain, Western Sydney – 1:25 000 Map Series* (NPWS, 2002) incorporates Hornsby LGA in Map 13 of the series.

## 3.3 Geology

The site has been mapped by Chapman and Murphy (1989) as being underlain the Ashfield Shales of the Wianamatta Group Shales. Surface soils are friable loams, overlying clay loams with various clay sub soils deeper through the profile. This soil type has a generally low to moderate fertility and erodibility increases from low for surface soils through to moderate for subsoils.

Soil composition includes sandy loams on the surface followed by stony sandy clay loams through to clays in the lower part of the profile. This soil landscape generally has a low fertility and overall moderate to high erodibility (Chapman and Murphy 1989).

Soils of the subject site are most likely to be altered from a natural condition due to the land cultivation and pastoral land usage. Although the northern vegetated area of the site may contain soils in a more natural state.

# 4.0 METHODS

## 4.1 Desktop Review

Prior to field surveys, records of all threatened species, populations and endangered ecological communities previously recorded within a 10km radius of the subject site were obtained from the Office of Environment and Heritage (OEH) Wildlife Atlas database. An EPBC Act Protected Matters Report was generated using the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool for a 10km radius of the subject site. The report identifies matters of national environmental significance in the study area including threatened biodiversity and other matters protected by the EPBC Act.

Threatened species, threatened populations, threatened communities, or their habitats, were targeted during the field survey. Recent existing reports of the biodiversity of the locality were also reviewed prior to field surveys and these are summarised in earlier sections.

## 4.2 Botanical Survey

The flora survey was undertaken in two stages. Firstly, a targeted traverse over the site and adjoining areas was conducted for the presence of any rare or endangered plant species obtained from the OEH National Parks and Wildlife Service (NPWS) Atlas of NSW Wildlife records. Secondly, a botanical survey was conducted using the random meander method to document the majority of plant species on the site. For the flora survey, the following information was recorded:

- Primary structural layers present divided up into tallest, middle layers and ground layers
- Searching for targeted threatened species
- Height and foliage or canopy cover of structural layers
- Species identified and their abundances
- Cover abundance rating of each species in each separate vegetation stratum for transects and quadrats utilised the Braun-Blanquette system

The flora survey was conducted by Kristan Dowdle for a total of 3 hours.

Threatened flora species found within 10km radius (Source BioNet, 2010) of the site are listed below along with the likelihood of occurrence within the site. This list was used for the targeted searches within the site.

## 4.3 Fauna Survey

A detailed and targeted traverse over the site and adjoining areas was conducted for the presence and/or signs of any rare or endangered fauna species obtained from the OEH NPWS wildlife atlas records (see Table 1). The survey on the site involved the following sequence of works;

- Searching for targeted threatened species
- Habitat identification
- Searches amongst ground litter and rocks (reptiles and amphibians)
- Scat Identification
- Identification through visual encounters and vocal recognition
- Searches for tree and limb hollows
- Searches for scratches, nests, diggings, white wash, bones and other traces of fauna

During the survey, attention was given to habitat found throughout the study area. A diverse range of habitats which include overstorey, understorey and groundcover vegetation, rock outcrops, large rocks, dense and open vegetation, feed trees, fallen timber, leaf and bark litter etc are all important habitat components for a wide range of flora and fauna. Note was taken of the habitat types and any valuable or sensitive habitat found within the study area that may be impacted by the proposed development. Observations were also made as to whether the site forms a corridor or is part of a corridor or part of a chain of remnant islands of vegetation and whether the proposed development is likely to enhance or compromise that corridor.

# 5.0 FLORA

## 5.1 Species Diversity

A total of 50 plant species were recorded in the subject site and adjoining targeted area of native vegetation during the current flora survey. The survey identified 21 locally endemic native species, 5 non-locally endemic native species and 24 introduced species.

## 5.2 Vegetation Communities

Two vegetation communities, Exotic/Pastoral Grassland and a remanent Sydney Turpentine-Ironbark Forest (STIF) were identified within the subject site and immediately adjacent.

Smith & Smith (2008) has not identified any native plant communities either on, or immediately adjacent to, the subject site (See Figure 3). Although not identified within the site, the mapping project by NPWS (2002) has identified several stands of Sydney Turpentine-Ironbark Forest and Turpentine Ironbark Margin Forest within three kilometres, to the west and south of the subject site (See Figure 4).

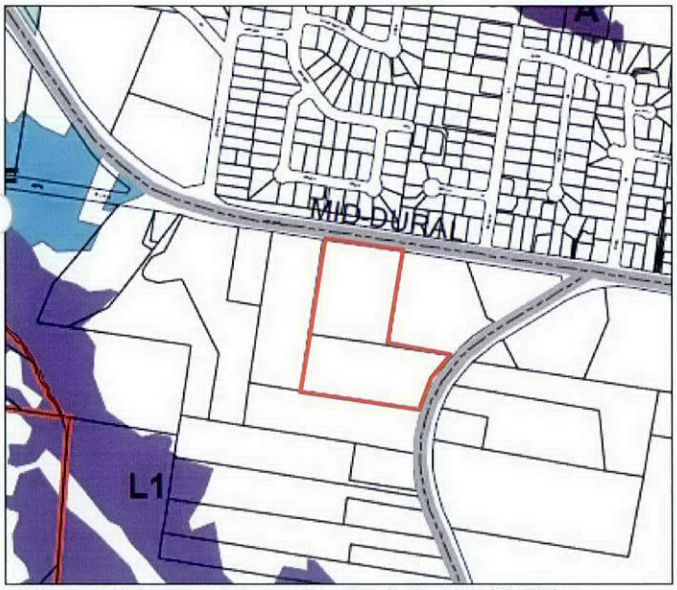


**Figure 3. Extract from Smith & Smith (2008)**

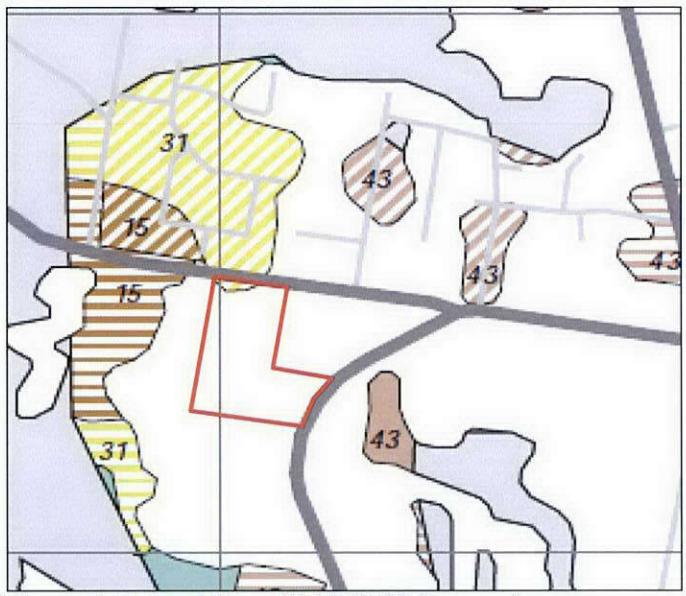


**Figure 4. Extract from NPWS(2002) mapping**

The distribution of plant communities identified in the current survey is shown in, Appendix B. Floristic composition; structure and distribution of the plant communities are described in the following sub sections.

### *5.2.1 Exotic/Pastoral Grassland*

Exotic Grassland occurs over the majority of the site. Both allotments have been used as orchards and a large amount of dead orchard trees exits. Also within this area are grazing areas which are utilised by live stock including goats.

This community is predominately overgrown grass with areas of Blackberry and Privet infestation. Scattered planted native and exotic trees include planted *Eucalyptus microcorys, Acacia longifolia* and other planted exotic species surrounding each of the existing dwellings.

No natural resilience remains in this highly modified and disturbed plant community.

### *5.2.2 Sydney Turpentine Ironbark Forest*

Sydney Turpentine Ironbark Forest (STIF) is mapped in this occurring within the northern boundary of Lot C and immediately adjacent within the Mid Dural Road reserve. In determining the classification of the community this report has applied the diagnostic tests described for the community by Tozer (2003) and further detail on the outcome of the test is provided in following sections of the report.

Canopy of community is from 20 to 25m and dominated by *Eucalyptus paniculata* Grey Iron Bark, *Eucalyptus resinifera spp resinifera* and *Eucalyptus acmenoides* White Mahogany, with and *Syncarpia glomulifera* ssp *glomulifera* Turpentine also present. A sparse midstorey to 10m of regenerating canopy species is present. The sparse understorey is between 1 and 2m with common species including *Pittosporum undulatum* Sweet Pittosporum, with shrubs such as *Acacia longifolia* ssp *longifolia* Sydney Golden Wattle and exotic species including *Lantana camara* Lantana and *Cottoneaster sp.* Cottoneaster, and also present. The regenerated area of groundcover stratum is dominated by a mix of native and exotic groundcover species. Dominant native groundcover species throughout are, *Entolasia* spp and *Imperata cylindrica* Blady Grass

Regrowth woody weeds and vines including *Cinnamomum camphora* Camphor Laurel, *Lingustrum sinense* Small-leaved Privet and *Ligustrum lucidum* Large Leaved Privet are present and exotic grasses and annual or perennial herbs include *Digitaria sanguinalis* Summer Grass, *Conyza* sp Fleabane, *Ehrharta erecta* Panic Veldtgrass, *Paspalum dilatatum* Paspalum and *Taraxacum officinale* Dandelion.

## 5.3 Threatened Species

A search of the NPWS Wildlife Atlas and EPBC Act Protected Matters Report identified 18 threatened plant species previously recorded within 10km of the site (Table 1). Fourteen species have a dual listing under the TSC Act and EBPC Act. Also an assessment of the potential habitat and likelihood of occurrence was conducted.

**Table 1. OEH NPWS Atlas of NSW Wildlife and Wildlife Atlas EPBC Act Protected Matters Report for Threatened flora species previously recorded within the locality (10km of the subject site)**

| Scientific Name | Common Name | TSC Act, Status | EPBC Act, Status | Likelihood of Occurrence |
|---|---|---|---|---|
| *Acacia bynoeana* | Bynoe's Wattle | E1 | V | **Low**-Lack of suitable habitat |
| *Acacia gordonii* | | E1 | E | **Low**-Lack of suitable habitat |
| *Acacia pubescens* | Downy Wattle | V | V | **Low**-Lack of suitable habitat |
| *Ancistrachne maidenii* | | V | | **Low**-Lack of suitable habitat |
| *Caladenia tessellate* | Thick Lip Spider Orchid | E1 | | **Low**-Lack of suitable habitat |
| *Callistemon linearifolius* | Netted Bottle Brush | V | | **Low**-Lack of suitable habitat |
| *Darwinia biflora* | | V | V | **Low**-Lack of suitable habitat |
| *Epacris purpurascens var. Purpurascens* | | V | | **Low**-Lack of suitable habitat |

**Table 1 (Cont)**

| | | | | |
|---|---|---|---|---|
| *Eucalyptus camfieldii* | Heart-leaved Stringybark | V | V | **Low**-Lack of suitable habitat |
| *Eucalyptus nicholii* | Narrow-leaved Black Peppermint | V | | **Low**-Lack of suitable habitat |
| *Eucalyptus scoparia* | Wallangarra White Gum | E1 | | **Low**-Lack of suitable habitat |
| *Eucalyptus sp. Cattai* | | E1 | | **Low**-Lack of suitable habitat |
| *Galium australe* | Tangled Bedstraw | E1 | | **Low**-Lack of suitable habitat |
| *Genoplesium baueri* | Bauer's Midge Orchid | V | | **Low**-Lack of suitable habitat |
| *Genoplesium plumosum* | Tallong Midge Orchid | E4A | | **Low**-Lack of suitable habitat |
| *Grammitis stenophylla* | Narrow-leaf Finger Fern | | | **Low**-Lack of suitable habitat |
| *Grevillea caleyi* | Caley's Grevillea | E1 | | **Low**-Lack of suitable habitat |
| *Grevillea parviflora* | | V | | **Low**-Lack of suitable habitat |
| *Grevillea parviflora subsp. supplicans* | | E1 | | **Low**-Lack of suitable habitat |
| *Grevillea shiressii* | | V | | **Low**-Lack of suitable habitat |
| *Haloragodendron lucasii* | | E1 | E | **Low**-Lack of suitable habitat |
| *Hibbertia superans* | | E1 | | **Low**-Lack of suitable habitat |
| *Lasiopetalum joyceae* | | V | V | **Low**-Lack of suitable habitat |
| *Leucopogon fletcheri subsp. fletcheri* | | E1 | | **Low**-Lack of suitable habitat |
| *Melaleuca biconvexa* | Biconvex Paperbark | V | V | **Low**-Lack of suitable habitat |
| *Melaleuca deanei* | Deane's Paperbark | V | | **Low**-Lack of suitable habitat |
| *Micromyrtus blakelyi* | | V | | **Low**-Lack of suitable habitat |
| *Persoonia hirsute* | Hairy Geebung | E1 | E | **Low**-Lack of suitable habitat |
| *Persoonia mollis subsp. maxima* | | E1 | E | **Low**-Lack of suitable habitat |
| *Persoonia nutans* | Nodding Geebung | E1 | | **Low**-Lack of suitable habitat |
| *Pimelea curviflora var. curviflora* | | V | V | **Low**-Lack of suitable habitat |
| *Pterostylis nigricans* | Dark Greenhood | V | | **Low**-Lack of suitable habitat |
| *Syzygium paniculatum* | Magenta Lilly Pilly | E1 | | **High**-Planted specimens onsite |
| *Tetratheca glandulosa* | | V | V | **Low**-Lack of suitable habitat |
| *Zieria involucrate* | | E1 | | **Low**-Lack of suitable habitat |

Four (4) planted specimens on the north portions of the site of the threatened species *Syzygium paniculatum* were identified surrounding the existing dwelling on 5 Mid Dural Road.

## 5.4 Endangered Populations

No threatened flora populations listed under the TSC Act or EPBC Act were recorded on the subject site in the current investigation.

## 5.5 Endangered Ecological Communities

One endangered ecological community, Sydney Turpentine-Ironbark Forest (STIF) is recorded adjacent to the subject site in the current and previous surveys. STIF is listed as endangered under the TSC Act and critically endangered under the EPBC Act. In determining the identification of STIF, adjacent to the subject site, this report has applied the diagnostic tests described by Tozer (2003) for the two subunits of the community which are Turpentine-Ironbark Forest and Turpentine-Ironbark Margin Forest. In the first instance the 0.04 ha sample quadrat did not meet the required minimum native species for the test to proceed to diagnosis by floristic composition for Turpentine-Ironbark Forest (33 species) or Turpentine-Ironbark Margin Forest (38 species). However, the understorey and groundcover stratums are not at an advanced phase of regeneration and a total of 27 native species were recorded from all stratums. In proceeding with the test for Turpentine-Ironbark Forest (Tozer, 2003) the 9 positive diagnostic species present in the survey quadrat did not meet the required 18 to confirm the presence of the community. Alternatively in proceeding with the test for Turpentine- Ironbark Margin Forest the sample quadrat contained the minimum 11 positive diagnostic species to confirm the presence of the sub unit. Therefore STIF of the subject site in this assessment most closely corresponds to the Turpentine-Ironbark Margin Forest subunit described by Tozer (2003).

Regionally, Turpentine Ironbark Margin Forest occurs in higher rainfall areas on the margins of the Cumberland Plain in close proximity to a sandstone/shale boundary. The parent geology consists predominantly of Wianamatta Shale with lesser components of Mittagong Formation and Hawkesbury Sandstone. In areas with lower rainfall the community grades with Turpentine-Ironbark Forest and these two subunits cumulatively represent STIF (Tozer, 2003). STIF is an Open Forest community with a sparse shrub stratum and well developed groundcover stratum but can exist as woodland or as remnant trees dependant on disturbance history (NSW Scientific Committee, 1998).

STIF occurs within the local government areas Ashfield, Auburn, Canterbury, Concord, Drummoyne, Leichhardt, Marrickville, Bankstown, Ryde, Hunters Hill, Baulkham Hills, Ku-ring-gai, Hornsby, Parramatta, Bankstown, Rockdale, Kogarah, Hurstville, and Sutherland and is restricted to the Sydney Basin Bioregion. Large areas of STIF have been cleared for agriculture and urban development with remnants small and scattered and only small areas of STIF are presently included in conservation reserves (NSW Scientific Committee, 1998). In many of the LGA's where the community is known, particularly in the inner western suburbs, only remnant trees may remain.

The NSW Scientific Committee (1998) suggests that these stands may have particular ecological and genetic significance and may be important sources of propagation material for use in rehabilitation projects. Various estimates of the remaining area of the community range from 0.5% (NSW Scientific Committee, 1998) to 4.5% (NPWS, 2004) of its original extent. Threats to the community include clearing, physical damage from recreational activities, rubbish dumping, grazing, mowing and weed invasion (NSW Scientific Committee, 1998).

The OEH has identified a total of 9 strategies to help recover this endangered ecological community and these are accompanied by a total of 16 priority actions.

# 6.0 FAUNA

## 6.1 Species Identified

A total of 12 vertebrate fauna species were recorded during the current field survey including two mammals, 9 birds and 1 amphibian. Both mammals and one bird species are introduced and all fauna species recorded during the current survey are listed below in table 2.

**Table 2. Fauna Species Recorded**

| Common Name | Scientific Name | Detection Method |
|---|---|---|
| Australian Magpie | *Cracticus tibicen* | Observed |
| Common Eastern Froglet | *Crinia signifera* | Heard |
| Currawong | *Strepera graculina* | Observed |
| Eastern Rosella | *Platycercus eximius* | Observed |
| European Rabbit | *Oryctolagus cuniculus* | Scat |
| Fox | *Vulpes vulpes* | Scat |
| Grey Butcherbird | *Cracticus torquatus* | Observed |
| Indian Myna | *Acridotheres tristis* | Observed |
| Magpie Lark | *Grallina cyanoleuca* | Observed |
| Noisy Myna | *Manorina melanocephala* | Observed |
| Superb Fairy Wren | *Malurus cyaneus* | Observed |
| Wattle Bird | *Anthochaera carunculata* | Observed |
| Yellow Tailed Black Cockatoo | *Calyptorhynchus funereus* | Heard |

All species recorded on the subject site are generally typical of urban areas, urban fringes and adjoining natural areas within the Sydney Basin region and are widespread in distribution and common to abundant within their ranges.

## 6.2 Habitat Values

The site habitat values were assessed both on a local and site specific scale. Fauna habitat features and resources at a local scale form part of the broader landscape of the study area. Site specific fauna habitat features and resources provide the key elements required by native fauna. Fauna habitats for both scales are listed in Table 3.

**Table 3. Habitat attributes for the site and surrounding areas**

| Scale | Habitat Features | Habitat for Fauna |
|---|---|---|
| Local | Adjoining treed properties and street trees | Scattered native or exotic shrubs and trees with some connectivity. |
| Site Specific | Broken canopy of native and/or exotic trees | Foraging, nesting, roosting and sheltering for small, medium and large birds, reptiles, arboreal mammals and flying foxes and Microchiropteran bat species. |
| | Sparse and disjunct midstorey and/or understorey | Limited foraging, nesting, roosting and sheltering for small and medium birds, reptiles, arboreal mammals and arboreal frogs |
| | Highly modified groundcover | Limited foraging for small and medium birds, reptiles, amphibians and terrestrial mammals. |
| | Low occurrence of stags and tree hollows | Nesting, sheltering and roosting for small, medium and large birds, reptiles, arboreal mammals and Microchiropteran bats |

In summary the vegetated portion of the site (STIF) is likely to provide the majority of fauna habitat resources. However this habitat type is mainly limited to the provision of canopy with the lower stratums discontinuous, highly modified and disturbed by past and current land use. Some general foraging for medium size birds and common reptiles or amphibians is provided by the Exotic/Pastoral Grassland but this very marginal.

Overall the subject site is a highly modified landscape that lacks many of the natural habitat features and resources that are important in the maintenance of native fauna diversity and life cycles, including fully structured vegetation, a diverse shrub layer for food sources and protection, leaf litter and loose surface soils, sandstone outcrops and ledges, loose rocks, logs on the ground and rotting stumps. In addition to the altered nature of fauna habitats, intense human activities within the subject site and surrounding area are likely to reduce fauna habitat potential. These activities include farming and orchard plantations.

## 6.3 Threatened Fauna Species

No threatened fauna species listed under the TSC Act and EBPC Act were recorded in the current field surveys. A search of the OEH NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Report identified 39 threatened fauna species previously recorded within 10km of the site (Table 3). Eight species have a dual listing under the TSC Act and EBPC Act. Also an assessment of potential habitat and likelihood of occurrence was conducted. It is noted that water dependant species are not included in this list.

**Table 4. Fauna Threatened Species**

| Scientific Name | Common Name | TSC Act, Status | EPBC Act, Status | Likelihood of Occurrence |
|---|---|---|---|---|
| ***Amphibia*** | | | | |
| *Litoria aurea* | Green and Golden Bell Frog | E1 | V | **Low**-Lack of suitable habitat |
| *Pseudophryne australis* | Red-crowned Toadlet | V | | **Low**-Lack of suitable habitat |
| *Heleioporus australiacus* | Giant Burrowing Frog | V | **V** | **Low**-Lack of suitable habitat |
| ***Avian*** | | | | |
| *Calyptorhynchus lathami* | Glossy Black-Cockatoo | V | | **Low**-Lack of suitable habitat trees |
| *Hieraaetus morphnoides* | Little Eagle | V | | **Low**-Lack of suitable habitat |
| *Lophoictinia isura* | Square-tailed Kite | V | | **Low**-Lack of suitable habitat |
| *Climacteris picumnus* | Brown Treecreeper | V | | **Low**-Lack of suitable habitat |
| *Melithreptus gularis gularis* | Black chinned Honeyeater | V | | **Low**-Lack of suitable habitat |
| *Petroica rodinogaster* | Pink Robin | V | | **Low**-Lack of suitable habitat |
| *Petroica phoenicea* | Flame Robin | V | | **Low**-Lack of suitable habitat |
| *Petroica boodang* | Scarlet Robin | V | | **Low**-Lack of suitable habitat |
| *Melanodryas cucullata* | Hooded Robin | V | | **Low**-Lack of suitable habitat |

**Table 3. (Cont)**

| | | | | |
|---|---|---|---|---|
| *Daphoenositta chrysoptera* | Varied Sittella | V | | **Low**-Lack of suitable habitat |
| *Xanthomyza phrygia* | Regent Honeyeater | E1 | | **Low**-Lack of suitable habitat |
| *Lathamus discolor* | Swift Parrot | E1 | E | **Low**-Lack of suitable habitat |
| *Neophema pulchella* | Turquoise Parrot | V | | **Low**-Lack of suitable habitat |
| *Polytelis swainsonii* | Superb Parrot | v | | **Low**-Lack of suitable habitat |
| *Callocephalon fimbriatum* | Gang-gang Cockatoo | V | | **Low**-Lack of suitable habitat |
| *Glossopsitta pusilla* | Little Lorikeet | V | | **Low**-Lack of suitable habitat |
| *Ninox connivens* | Barking Owl | V | | **Low**-Lack of suitable habitat |
| *Ninox strenua* | Powerful Owl | V | | **Low**-Lack of suitable habitat |
| *Tyto novaehollandiae* | Masked Owl | V | | **Low**-Lack of suitable habitat |
| *Tyto tenebricosa* | Sooty Owl | V | | **Low**-Lack of suitable habitat |
| **Gastropoda** | | | | |
| *Meridolum corneovirens* | Cumberland Plain Land Snail | E1 | | **Low**-Lack of suitable habitat |
| **Mammalia** | | | | |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V | V | **Low**-Lack of suitable habitat |
| *Mormopterus norfolkensis* | Eastern Freetail-bat | V | | **Low**-Lack of suitable habitat |
| *Isoodon obesulus obesulus* | Southern Brown Bandicoot | E1 | E | **Low**-Lack of suitable habitat |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | **Low**-Lack of suitable habitat |
| *Miniopterus australis* | Little Bent-wing Bat | V | | **Low**-Lack of suitable habitat |
| *Miniopterus schreibersii* | Large Bentwing-bat | V | | **Low**-Lack of suitable habitat |
| *Myotis adversus* | Large-footed Myotis | V | | **Low**-Lack of suitable habitat |
| *Saccolaimus flaviventris* | Yellow-bellied sheathtail-bat | V | | **Low**-Lack of suitable habitat |
| *Scoteanax rueppellii* | Greater Broad-nosed Bat | V | | **Low**-Lack of suitable habitat |
| *Petaurus australis* | Yellow-bellied Glider | V | | **Low**-Lack of suitable habitat |
| *Petaurus norfolcensis* | Squirrel Glider | V | | **Low**-Lack of suitable habitat |
| *Dasyurus maculatus* | Spotted-tailed Quoll | V | E | **Low**-Lack of suitable habitat |
| *Cercartetus nanus* | Eastern Pigmy-possum | V | | **Low**-Lack of suitable habitat |
| *Phascolarctos cinereus* | Koala | V | | **Low**-Lack of suitable habitat |

**Table 3. (Cont)**

| Reptilia | | | | |
|---|---|---|---|---|
| *Varanus rosenbergi* | Rosenberg's Goanna | v | | **Low**-Lack of suitable habitat |

## 6.4 Endangered Populations

No listed endangered populations were identified to occur on site however the OEH NPWS wildlife atlas found one endangered population within the 10km radius of the site. Table 5 outlines the results.

**Table 5. Listed Endangered Populations**

| Scientific Name | Common Name | TSC Act, Status | EPBC Act, Status | Likelihood of Occurrence |
|---|---|---|---|---|
| *Callocephalon fimbriatum* | Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai LGAs | **E2** | | **Low**-Lack of suitable habitat |

## 7.0 WILDLIFE CORRIDORS

The importance of natural corridors such as drainage lines and fully or partially contiguous vegetation cover, for the movement and genetic exchange of flora and fauna, is well documented (e.g. Recher *et al*, 1986). At a locality scale the remnant stand of Sydney Turpentine Ironbark Forest is providing some level of wildlife habitat and therefore in association with other adjacent habitats form part of a fragmented corridor from the adjoining allotment to the east . However the structure of the community, the narrow width of the vegetation, significant weed infestation on the adjoining allotments are not likely to form a significant wildlife corridor for the movement and dispersal of native flora and fauna for the locality.

# 8.0 RELEVANT LEGISLATION

## 8.1 National Legislation

### *8.1.1 Environmental Protection and Biodiversity Conservation Act, 1999.*

Actions are defined in the Act as projects, developments, undertakings, activities, series of activities or alterations or any of these. This report will assess whether the proposed action (residential development) is likely to have a significant impact on a Matter of National Environmental Significance under the EPBC Act 1999. Matters of National Environmental Significance defined in the Act are outlined in Appendix E

The likelihood of the proposed development to significantly affect on any of these Matters of National Environmental Significance is assessed in Section 8.2.1 of this report. If any of the Matters are deemed to be significantly affected, the proposed development is deemed a controlled action under the Act and it must be referred to Environment Australia.

## 8.2 State Legislation

### *8.2.1 Environmental Protection and Assessment Act, 1979*

Part 5A of the EP&A Act (1979) states that a determining authority must not carry out an activity or grant approval in relation to an activity that is likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities, or their habitats. The Act specifies factors that must be taken into account when deciding whether there is likely to be a significant effect on any of the above areas. These factors are summarised in a Seven-Part Test of Significance. Where the seven-part test determines that a proposed development or activity is likely to significant affect critical habitat or threatened species, populations or ecological communities or their habitats, a Species Impact Statement (SIS) must be prepared. The seven-part test of significance for this study is presented in Appendix D of this report.

### *8.2.2 Threatened Species Conservation Act, 1995*

Schedules 1 and 2 of this Act lists the threatened flora and fauna that must be addressed when preparing the Seven-Part Test of Significance for a proposed development or activity. These requirements take into account the potential impacts of the action on threatened species, populations or ecological communities, or their habitats.

The Act also lists thirty-five (35) Key Threatening Processes. It must be assessed whether the proposed activity contributes towards any of these Key Threatening Processes. The Key Threatening Process most relevant to this assessment is Clearing of Native Vegetation. Such clearing is recognised as a major factor contributing to the loss of biological diversity (NPWS, 2001). Examples of the impacts of native vegetation clearing include the destruction and fragmentation of habitat; increased greenhouse gas emissions; increased habitat for invasive species; loss of litter layer and loss or disruption to ecological function.

### *8.2.3 Fisheries Management Act, 1994*

The Threatened Species Schedules of the Fisheries Management Act, 1994 lists threatened species, populations and ecological communities and key threatening processes that must be

addressed under the seven part test when determining the potential impacts of a proposed development.

### *8.2.4 SEPP No. 44: Koala Habitat Protection*

*State Environmental Planning Policy No.44 - Koala Habitat Protection* (SEPP 44) aims to protect the Koala and its habitat by incorporating prescriptions for consent authorities to consider during the assessment of development applications. SEPP 44 contains prescriptions for the consideration of 'potential koala habitat' and 'core koala habitat' for developments within Local Government Areas listed on Schedule 1 of the Policy. Hornsby LGA is listed on Schedule 1 as an area to which SEPP 44 applies.

'Potential koala habitat' is defined by SEPP 44 as 'areas of native vegetation where the trees of types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component'. On tree species recorded within the study area, *Eucalyptus microcorys* Tallowwood (which has been planted), is listed under Schedule 2 of the Policy as Koala 'feed tree species'. This species constitutes less than 15% of the total number of trees in the canopy stratum in any of the plant communities described in the current survey of the subject site. As such the subject site does not support 'potential koala habitat', as defined under SEPP 44.

'Core koala habitat' is defined under SEPP 44 as areas of land that contain 'a resident population of koalas, evidenced by attributes such as breeding females and recent sightings of and historical records of a population'. No evidence (such as sightings, calls, scats and fur) of a resident population of the Koala were recorded during the current investigation. As such the subject site does not support and 'core koala habitat', within the meaning of SEPP 44.

## 9.0 DISCUSSION

This flora and fauna assessment has found that one remanent plant community existed on the site. Assessment of the potential habitats on the subject and adjacent areas for threatened flora and fauna species previously recorded from the locality have not identified significant habitat for any species investigated.

The plant community Sydney Turpentine-Ironbark Forest is identified within and adjacent to the subject site (Appendix B) and it is listed as an endangered ecological community under the TSC Act and critically endangered under the EPBC Act. Accordingly assessments of significance have been prepared under the provisions of both Acts and these are provided in full in Appendix C.

*Syzygium paniculatum* Magenta Lilly Pilly is listed as Vulnerable under the TSC Act. Accordingly assessments of significance have been prepared under the TSC Act are provided in full in Appendix C.

Sittings of the Little Eagle (*Hieraaetus morphnoides*) which is a listed threatened species have been documented by an objector to the original development application. Although not observed in the original survey, it is acknowledged that the species may periodically fly through and forage upon habitats and prey found within the subject site and adjoining areas. An assessment of significance was therefore conducted for this species (See Appendix D).

In relation to the current proposal for the subject site within this report assesses that:

- there is unlikely to be a significant impact on the general native flora and fauna of the subject site and study area as a result of the proposal;
- there is unlikely significant impact on native flora and fauna habitats as a result of the proposal;
- the assessments of the 7-part Test under Section 5A of the EP&A Act and Assessment of Significance under the EPBC Act have concluded that there is unlikely to be an impact on the STIF endangered ecological community within and adjacent to the subject site as a result of a buffer area and retention of this community provided precautionary measures to protect the area are implemented during construction and design elements consider the potential for ongoing impacts during operation of the proposed facility;
- the assessments of the 7-part Test under Section 5A of the EP&A Act and Assessment of have concluded that there is unlikely to be an impact on the *Syzygium paniculatum* Magenta Lilly Pilly of the subject site as a result of the removal of the two specimens under the current proposal. Primarily this is due to the fact that; neither specimen forms part of an important population of the species as the occurrence is well outside both species natural range and distribution; and the subject site does not support important habitat features and preferences that would be required for either species to naturally recruit to form part of a perpetuating natural population and ecological community.

## 10.0 RECOMMENDATIONS AND MANAGEMENT DETAILS

The proposal is unlikely to have a significant impact on any threatened species, endangered ecological communities or populations, if the following points are taken into consideration and followed to minimise any disturbances on the ecological values of the study area.

### Pre-Construction

#### 10.1 Introduced Species

- The infestation of weeds within the site STIF area poses a threat to the integrity endangered community. The introduced species Blackberry, *Rubus ulmifoliu,* Cottoneaster *Cottoneaster sp.* and Lantana *Lantana camara* are to be removed within the entire site before the commencement of construction to prevent their potential spread.

- Weeds are to be eradicated under the supervision of a suitable qualified Bush Regeneration Officer.

- Blackberry is classified as a non native noxious weed in Australia which is mostly dispersed by humans. Strict hygiene measurements, such as clearing of mud from boots, should apply when entering Blackberry infested areas during and after treatment to minimise further potential spread.

- Weeds will be removed in accordance with contemporary bush regeneration practices.

- After the initial weeding treatment, the topsoil, which is proposed to be removed for clearing or other earthworks on the site, is to be placed in a properly secured area protected by a erosion control fence. This weed free topsoil will contain native seeds and nutrient and can be used for the re-vegetation.

#### 10.2 Erosion Control Management and Protective Fencing

- Before site clearing commences, Tree Protection Zone fencing (TPZ) should be installed around the STIF area to inhibit disturbance from work machinery

- Before site clearing commences, erosion and sediment control measures will be put into place to minimize the likelihood of soil loss and sedimentation into the endangered STIF.

- Any native tree removed from the site (excluding the STIF) should be mulched and the material stored onsite for future revegetation, landscaping or erosion control works.

### During the Construction

#### 10.3 Clearing

- Vegetation clearing for the proposed development should not occur within the STIF area. No trees should be removed from this area.

- Any trees with large hollows will be taken down in sections using an Arborist to avoid potential harm to any animal. Removed hollows will be relocated to other suitable trees

within the site and permanently fixed or placed in position where possible. These can substitute as nest boxes if appropriately modified.

- Any native animals captured during clearing must be taken to a Vet or **WIRES** for treatment.

- No vehicles, machinery or staff will enter the STIF area during construction unless for the purpose of releasing animals or placing logs into the area or for the construction of the bridge. This is for the purposes of hygiene, which is required to stop weeds and to minimize vegetation disturbance.

- Following clearing, topsoil and leaf debris will be stripped and stored on site. It may be later used for erosion control.

- All stored topsoil will be protected by a sediment erosion control fence.

10.4 Tree Management and Protection

- Trees to be removed that have branches extending into the canopy of trees to remain must be removed by a qualified Arborist. The Arborist shall remove the tree in a manner that causes no damage to the other trees and understorey vegetation.

- Trees that are to be removed must be cut and felled in a way that does not impact adjoining trees.

10.5 Drainage

- Site drainage should be designed to maintain the natural volume and seasonal distribution of water.

- Excess mulch can be placed as parallel strips along the contours of the site as erosion and sediment control and to retard drainage. It can be used to retard the downward flow of stormwater across the site.

10.6 Threatened Species Management

- Retain the STIF vegetation in good order and condition to maintain a diversity of food sources.

- Landscaping within the site should include the planting of at least 4 Magenta Lilly Pilly's (*Syzygium paniculatum*) to compensate for their removal

- The Project Site should be planned with low downward pointing night lighting towards the STIF area so that small bats will not avoid the area for foraging.

**After Construction**

10.7 Management

- Implement an effective Weed Management Plan/Vegetation Management Plan within the STIF area for the lifetime of the development

In conclusion, no further concerns have been raised for the proposed development as a result of this report

For and behalf of
**Clarke Dowdle & Associates**

**Kristan Dowdle**
Ecologist

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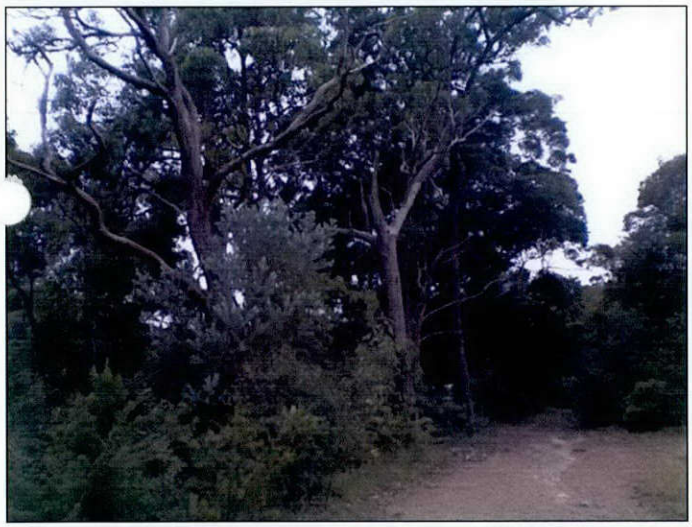
## APPENDIX A SITE PHOTOGRAPHS

See Appendix B for location and direction of photographs

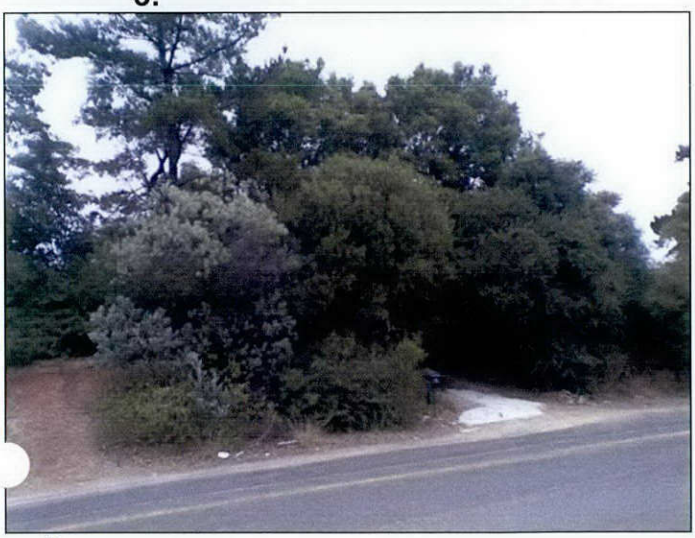
1.

2.



3.

4



5.

6.

7.

8.

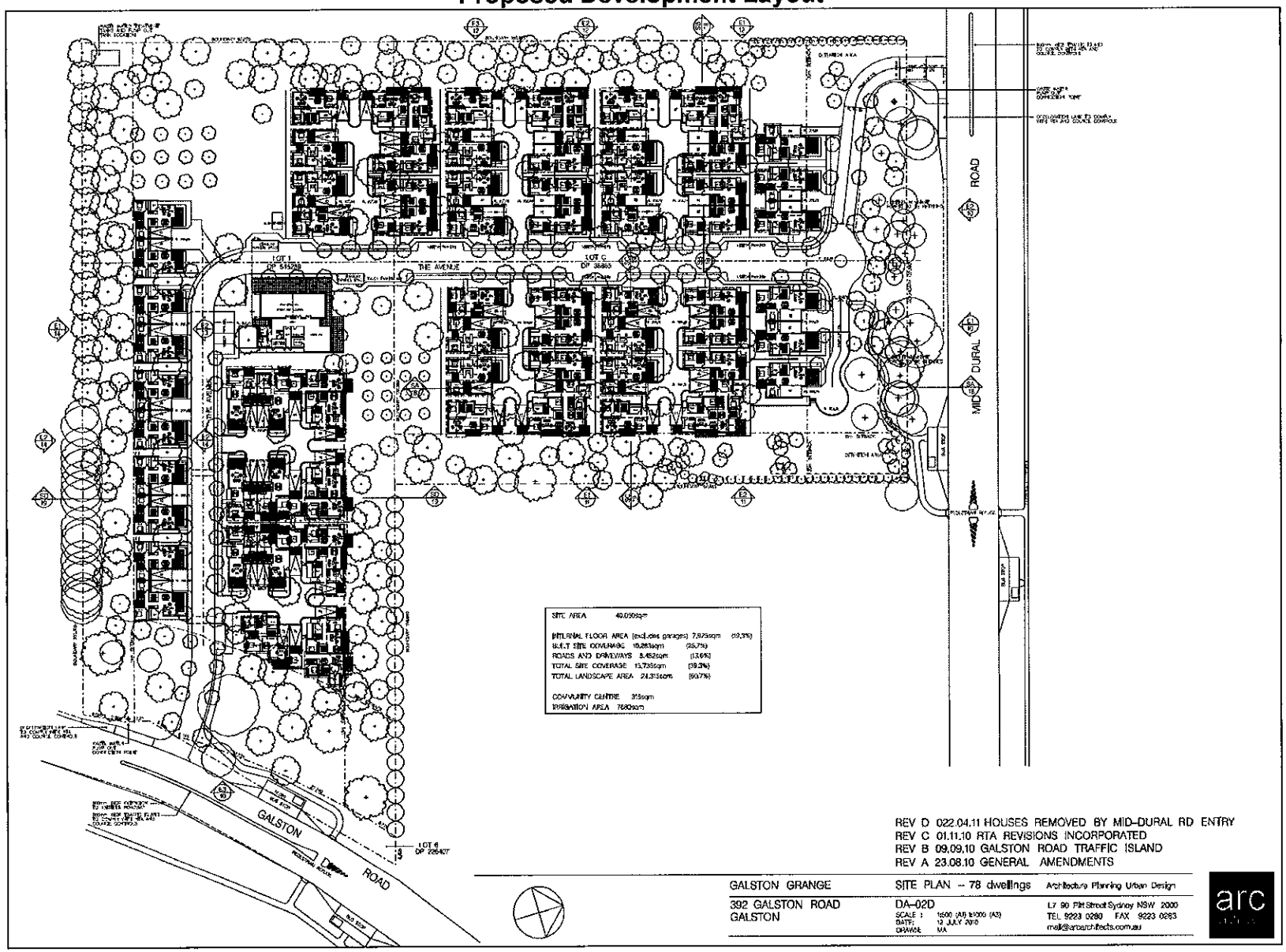
## APPENDIX B


**LEGEND**

1 –Photograph Number, Location and Direction

## Vegetation Communities & Threatened Species

## Proposed Development Layout



## APPENDIX C FLORA SPECIES LIST

**Native**

**BuildSpeciesListWithFrequencies**

| CAPS Number | Family | DisplayName |
|---|---|---|
| 2222 | Convolvulaceae | Dichondra repens |
| 2840 | Fabaceae (Faboideae) | Desmodium varians |
| 2873 | Fabaceae (Faboideae) | Hardenbergia violacea |
| 10790 | Fabaceae (Mimosoideae) | Acacia longifolia subsp. longifolia |
| 3771 | Fabaceae (Mimosoideae) | Acacia falcata |
| 3777 | Fabaceae (Mimosoideae) | Acacia floribunda |
| 3844 | Fabaceae (Mimosoideae) | Acacia oxycedrus |
| 3846 | Fabaceae (Mimosoideae) | Acacia parramattensis |
| 3857 | Fabaceae (Mimosoideae) | Acacia prominens |
| 6015 | Luzuriagaceae | Eustrephus latifolius |
| 4293 | Myrtaceae | Syzygium paniculatum |
| 4087 | Myrtaceae | Eucalyptus eugenioides |
| 10748 | Myrtaceae | Syncarpia glomulifera subsp. glomulifera |
| 4128 | Myrtaceae | Eucalyptus microcorys |
| 7027 | Myrtaceae | Eucalyptus acmenoides |
| 8831 | Myrtaceae | Eucalyptus paniculata subsp. paniculata |
| 9450 | Myrtaceae | Eucalyptus resinifera subsp. resinifera |
| Crym | Myrtaceae | Corymbia spp. |
| 6423 | Oleaceae | Notelaea longifolia forma longifolia |
| 4685 | Pittosporaceae | Pittosporum undulatum |
| Seta | Poaceae | Setaria spp. |
| 4946 | Poaceae | Entolasia marginata |
| 8511 | Poaceae | Imperata cylindrica var. major |
| 5396 | Proteaceae | Grevillea robusta |
| 5446 | Proteaceae | Macadamia tetraphylla |
| 6126 | Sterculiaceae | Brachychiton acerifolius |

Exotic

| BuildSpeciesListWithFrequencies | | |
|---|---|---|
| **CAPS Number** | **Family** | **DisplayName** |
| 11784 | Asparagaceae | Asparagus aethiopicus |
| 6465 | Asteraceae | Senecio madagascariensis |
| 1255 | Asteraceae | Ageratina adenophora |
| 1283 | Asteraceae | Bidens pilosa |
| 1400 | Asteraceae | Cirsium vulgare |
| 8688 | Bignoniaceae | Jacaranda mimosifolia |
| 10508 | Commelinaceae | Tradescantia fluminensis |
| 3097 | Fabaceae (Faboideae) | Vicia sativa |
| 11353 | Hamamelidaceae | Liquidambar styraciflua |
| 3471 | Lauraceae | Cinnamomum camphora |
| Coto | Malaceae | Cotoneaster spp. |
| 3930 | Moraceae | Morus alba |
| 4324 | Oleaceae | Olea europaea |
| 4313 | Oleaceae | Ligustrum sinense |
| 4312 | Oleaceae | Ligustrum lucidum |
| 11789 | Pinaceae | Pinus patula |
| 4699 | Plantaginaceae | Plantago lanceolata |
| 4937 | Poaceae | Ehrharta erecta |
| 5086 | Poaceae | Paspalum dilatatum |
| 5096 | Poaceae | Pennisetum clandestinum |
| 9680 | Proteaceae | Macadamia integrifolia |
| 5646 | Rosaceae | Rubus ulmifolius |
| 6248 | Verbenaceae | Lantana camara |
| 6256 | Verbenaceae | Verbena bonariensis |

## APPENDIX D SEVEN PART TEST OF SIGIFICANCE

The OEH NPWS Atlas if NSW wildlife records were used as well as an assessment of site conditions to determine the potential occurrence and/or habitat presence of any listed threatened species. The site was determined to potentially contain habitat for the following species;

**Endangered Ecological Communities**
Sydney Turpentine Ironbark Forest

**Flora**
Magenta Lilly Pilly- *Syzygium paniculatum*

**Fauna**
Little Eagle- *Hieraaetus morphnoides*

It is noted that although the wildlife atlas records did reveal other threatened species occurring within the local area, these species were not found during the various surveys and/or not expected to occur on the site due to site conditions. Under Section 5A of the *Environmental Planning and Assessment Act 1979* and the *Threatened Species Conservation Amendment Act 2005*, seven factors must be addressed to determine whether any proposed development will have a significant impact on these threatened species or habitats, populations or ecological communities. The factors relating to the Seven-Part Test require decision- makers to consider known and potential habitat, biological and ecological factors as well as the local and regional significance of individual populations. The seven factors to be addressed can be found in Section 5A of *the Environmental Planning & Assessment Act, 1979.* The Seven-Part Test is as follows;

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

**Endangered Ecological Community**
**Sydney Turpentine Iron Bark Forest**

This community is not a listed Threatened Species. There this section is not relevant to this community.

**Flora**
**Magenta Lilly Pilly** ***Syzygium paniculatum***

This species is a small to medium tree, 3-8m high, with dark, dense foliage. White flowers are in small dense auxiliary cymes with unequal sepals in summer. The common name of this species is derived from the pink to red colouring of the ripe fruit. The Magenta Lilly Pilly has been widely cultivated, and is readily available at whole sale and retail nurseries. Known populations on the Central Coast as Ourimbah Creek Valley, North Entrance, Wamberal Lagoon, Hardys Bay, and Springfield with other populations found at Canton Beach, Black Neds Bay, Jenny Dixon Beach, Martinsville, Seals Rocks, Captain Cook Reserve and Earlwood (Payne, 1997).

The site contained 4 specimens surrounding the existing dwelling on 5 Mid Dural Road. The proposal will involve the removal of approximately 2 of this species. However, all of these trees are likely to be have been planted and do not naturally exist on the site.

The current proposal will involve the removal of the 2 known specimen of *Syzygium paniculatum* of the subject site. The subject site and study area are unlikely to support a 'viable local population' of the species or preferred habitat for the species. Therefore the removal of the specimen is not likely to place at risk of extinction a 'viable local population'.

**Little Eagle** ***Hieraaetus morphnoides***
The Little Eagle is a small, stocky eagle, with a short broad head and moderately long tail. Its plumage varies from light to dark brown, it has a short crest that is obvious when perched and the legs are heavily feathered. It has long broad wings, spanning over 1m, with dark 'fingered' tips. It soars in tight circles, very high on thermals or up-draughts, gliding on flat wings (Birds Australia 2010).

It is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment (OEH 2011). The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland (NSW Scientific Committee 2011). Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used (OEH 2011).

This species nests in tall, mature living trees in remnant patches of open woodland or tree-lined watercourses (OEH 2011). They rarely nest in isolated trees (Birds Australia 2010). It searches for prey on the wing or from a high exposed perch, taking prey from the ground, the shrub layer or the canopy (Birds Australia 2011). It eats birds, reptiles and mammals, occasionally adding large insects and carrion but was formerly heavily dependent on rabbits (NSW Scientific Committee 2010). The recent decline in rabbit numbers in arid and semi-arid areas means that this species is more reliant on native prey but most of the native mammals of an appropriate size in inland NSW are extinct (NSW Scientific Committee 2011).

Aspects of the life cycle of this species are greatly influenced by the availability of prey, perching sites from which to hunt and nest sites. The optimal foraging habitat for this species, found within the site, would be within the remnant STIF. The species may periodically forage within the site, however the proposed development will not result in the removal of any vegetation within this area and therefore it is considered that the optimal hunting and/or nesting habitat for this species would not be directly impacted. The proposal is unlikely to place a local population at risk of extinction.

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

None of these species are an example of an 'endangered' population.

**(c) *In the case of an endangered ecological community, whether the action proposed:***

- ***is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- ***is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***

**Endangered Ecological Community**
**Sydney Turpentine Iron Bark Forest**

No clearing or construction works are proposed in the STIF area due to the buffer area existing from Mid Dural Road. However some potential exists for other direct impacts during construction and operation. This is likely in the construction of the access driveway and associated construction works.

Accordingly the impacts of stormwater runoff such as sedimentation, erosion and altered water chemistry have some potential to directly impact on the STIF during construction and operation of the proposal.

Some potential exists for the northern buildings of the proposal to increase shading on the STIF that may influence the floristic composition of the STIF (i.e. establishment and growth of some plant species). However, all buildings of the proposal have an east west longitudinal orientation and this will minimise the potential for effects from shading on the STIF.

Provided that potential for stormwater impacts are addressed in the design phases, the recommendations outlined within this report are followed, the current proposal is not likely to have and adverse effect on the extent or substantially and adversely modify the composition of the STIF of the subject site such that its local occurrence is places at the risk of extinction.

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

- ***the extent to which habitat is likely to be removed or modified as a result of***

***the action proposed, and***

- ***whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and***
- ***the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.***

**Endangered Ecological Community**

**Sydney Turpentine Iron Bark Forest**

No clearing or construction works are proposed in the STIF of the study area. Additionally the subject site and study area have undergone significant clearing for the current land use and this will have included introduction of fill material and inversion, destruction or modification of the original soil profile and seedbank over the majority of the study area.

STIF has been identified over the wider locality in previous surveys (NPWS 2002 and Smith & Smith, 2008). The area of STIF described and mapped in the current survey is an isolated fragment of this community type in the wider locality (Figures 3 and 4). The current proposal will not further fragment it, or cause it to become further isolated from other nearby known or predicted remnants of STIF, or potential STIF habitats. No known area of, or habitat for, STIF will be removed, modified fragmented or isolated as a result of the current proposal.

The preparation of a Weed Management Plan for the STIF area is likely to address long term management of the stand including issues such as stormwater, weed removal and control and planting of locally endemic native vegetation in either riparian restoration or landscaped areas. Ultimately the works recommended in the Weed Management Plan will improve the habitat of STIF in the study area by managing threats and improving resilience.

**Flora**

**Magenta Lilly Pilly** ***Syzygium paniculatum***

As stated above, there is no preferred habitat for Magenta Lilly Pilly located within the subject site including natural soils or vegetation associations. Additionally the species is recorded as planted observation in an area that is subject to landscape maintenance and other land uses that have resulted in a high level of medication of the previous natural vegetation and soil profiles.

The habitat for Magenta Lilly Pilly on the subject site is considered to be of relatively low importance in a regional context. As such, the current proposal will not significantly affect the species as no habitat will be removed, habitat will not become fragmented or isolated from other areas of habitat such that it will effect the species long term survival in the locality or its natural range

**Fauna**

**Little Eagle** ***Hieraaetus morphnoides***

As stated no clearing or construction works are proposed in the STIF of the study area. Additionally the subject site and study area have undergone significant clearing with only grasslands existing. The proposal will result in the alteration of sub optimal hunting areas.

The development will not result in the fragmentation of habitat, particularly for such a highly mobile species.

The subject site provides potential habitat only. This cannot be regarded as important to the survival of a local population.

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

There has been no critical habitat declared for these species.

***(f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan***

**Endangered Ecological Community**

**Sydney Turpentine Iron Bark Forest**
There is currently no Recovery Plan in place for STIF. There are no Threat Abatement Plans currently in operation for any Key Threatening Processes threatening the STIF. There are 16 priority actions identified by the OEH to assist the recovery of this community. The proposed development is not inconsistent with the overall strategies and actions listed in the priority action statement. The STIF will be consistent with the following priority actions for STIF;

- Promote best practice management guidelines;
- Incorporate consideration of EEC protection in regional open space planning;
- Manage, to best practice standards, areas of EECs which have conservation as a primary objective, or where conservation is compatible;
- Public authorities will promote management agreements to landholders through their ongoing land use planning activities.

**Flora**
**Magenta Lilly Pilly** ***Syzygium paniculatum***
There is no recovery plan or threat abatement plan for this species. However, a number of recovery strategies have been identified (OEH 2011):

- Protect known sites from fire; ensure that personnel planning and undertaking hazard reduction burns are able to identify the species and are aware of its habitat.
- Reduce or remove heavy grazing by domestic stock in areas of known or potential habitat.
- Undertake weed control, but avoid spraying weeds close to Magenta Lilly Pilly plants to ensure they are not affected by poison.
- Protect known habitat areas from clearing and disturbance

The site contains planted specimens of this species and is unlikely to naturally occur upon the site prior to disturbance. However it has been recommended to incorporate at least 4 plants of this species within the landscaping of the site to compensate for the removal of the species. Therefore he proposal is largely consistent with these recovery strategies

**Fauna**

**Little Eagle** ***Hieraaetus morphnoides***

There is no recovery plan or threat abatement plan for this species. However, a number of recovery strategies have been identified (OEH 2011):

1. Buffer habitat areas from the impacts of other activities;
2. Protect known populations and areas of potential habitat from clearing, fragmentation or disturbance;
3. Rehabilitate known and potential habitat; and
4. Retain and protect nesting and foraging habitat.

The proposal retains the remnant STIF vegetated area that represents the majority of potential habitat within the site. The proposal is largely consistent with these recovery strategies.

***(g) Whether the action proposed constitutes or is part of a 'Key Threatening Process' or is likely to result in the operation of, or increase the impact of, a key threatening process.***

The TSC Act defines 'threatening process' as 'a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities'. Schedule 3 of the TSC Act provides a list of the 'key threatening processes' (KTP). Of the KTP's listed in Schedule 3 of the TSC Act the following are currently in operation that may impact the STIF and Magenta Lilly Pilly of the study area;

- Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus*. The current survey has identified the presence of European Rabbit on the subject site;
- Invasion and establishment of exotic vines and scramblers.
- Invasion of native plant communities by exotic perennial grasses. Several species of exotic perennial grass are recorded in the STIF of the study area.

KTP's as listed in Schedule 3 of the TSC Act that have the potential to either be introduced to the subject site, or operate as a result of the current proposal and which may impact on the STIF of the study area are;

- Infection of native plants by *Phytophthora cinnamomi*. One mechanism of dispersal of this plant pathogen is the movement of soil from an infected area attached to machinery and plant (NSW Scientific Committee, 2003) as would be used in the construction of the current proposal;
- Loss of hollow-bearing trees. Some small tree hollows were observed in the current survey in the subject site and study area; and
- Removal of dead wood and dead trees.

The proposed development does not constitute a scheduled or preliminary KTP.

**Conclusion**

In light of the consideration of the above seven factors (1 -7), the proposed activity on the subject site is not likely to impose 'a significant effect' on the STIF endangered ecological community or the Magenta Lilly Pilly threatened species of the study area as a result of the current proposal, as:

- The proposal will not adversely affect the extent or composition of the ecological community;

- The proposal will not further fragment or isolate the community or affect its long term survival;
- The proposal will not compromise the viability of a 'local population' through impact on the species;
- The proposal will not involve the removal or modification, fragmentation or isolation of a 'significant area of known habitat' for the species; and
- The proposal does not significantly contribute to any KTP threatening the community or species.

Consequently, a Species Impact Statement is not required to be prepared.

## APPENDIX E EPBC ACT SIGNFICANT IMPACT CRITERIA

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

**reduce the extent of an ecological community;**
Clearing of vegetation for the current proposal is to be limited to the development footprint of the subject site (Appendix B) and the Sydney Turpentine-Ironbark Forest (STIF) will not be cleared. The current proposed action will not reduce the extent of STIF in the study area or wider locality.

**fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;**
No vegetation clearing or construction works are proposed in the STIF of the study area and clearing of vegetation for the current proposal is to be limited to the development footprint of the subject site (, Appendix B). Clearing of vegetation on the subject site (Exotic Grassland) will not further fragment or increase the current fragmentation of the stand of STIF from other stands of the ecological community identified from the locality (NPWS 2002 and Smith & Smith, 2008).

**adversely affect habitat critical to the survival of an ecological community;**
Areas immediately surrounding the STIF of the study area are highly modified due to past and continuing land use including significant earthworks that have altered soil profiles and maintenance of landscaped open space. This land use and management has severely altered the potential habitat for the ecological community and this affects and limits the dispersal of the ecological community to reestablishment in previously occupied areas. The current proposed action will not adversely affect habitat critical to the survival of STIF.

**modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;**

Some potential exists for the northern buildings of the proposal to increase shading on the STIF that may influence ecological processes of the STIF (ie establishment and growth of some plant species). However, all buildings of the proposal have an east west longitudinal orientation and this will minimise the potential for effects from shading on the STIF.

**cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;**

As noted, there is potential for some changes to abiotic factors that will be affecting the ecological integrity of the STIF, as a result of the proposed action. These are potential for altered hydrological processes and insolation. Specification has been made by consent authorities to address the potential for general environmental impacts of stormwater and design features will limit the potential for shading to occurring. It is unlikely that the proposed action will substantially change the ecological function of the STIF of the study area such that keystone or integral species of the ecological community are substantially affected or lost entirely.

**cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established;**

The integrity of the STIF of the study area is limited by the current surrounding land use, previous and potential continuing disturbances (including weed invasion) and a high edge to area ratio. However through minimal removal of vegetation and the implementation of a Weed Management Plan minimising the impact. This will include weed control and planting of locally occurring native plant species. In view of the above the proposed action is not likely to cause a substantial reduction in the quality, integrity or occurrence of STIF in the study area and specification of the assessment and approvals processes may enhance the condition of the stand.

**or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community;**

There is potential for the modification of stormwater processes during and post construction of the proposed action that may affect the STIF of the study area. This modification may include increased sediment loads, plant nutrients or chemicals. Given the specification for design solutions works, as part of the approval and assessment process for the proposed action to limit and control stormwater impacts, the proposed action is unlikely to have a significant impact on the ecological community.

**interfere with the recovery of an ecological community.**

The potential of the stand of STIF in the subject site to recover is currently limited by factors such as past and ongoing impacts as previously highlighted. The proposed action is not likely to significantly increase or affect the operation of these factors such that it further limits the recovery of the STIF of the study area or other stands known or predicted from the locality.