Travers environmental

Flora and Fauna Assessment

ALLIED FLOUR MILLS SITE

2-32 SMITH STREET &

16-32 EDWARD STREET,
SUMMER HILL

JANUARY 2009

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FLORA & FAUNA ASSESSMENT

ALLIED FLOUR MILLS SITE
2-32 SMITH STREET & 16-32 EDWARD STREET, SUMMER HILL

JANUARY 2009

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EXECUTIVE SUMMARY

A Flora and Fauna Assessment Report has been prepared by Travers Environmental to assess the potential flora and fauna impacts of a proposed development of the Allied Flour Mills site at 2-32 Smith Street & 16-32 Edward Street, Summer Hill.

The subject site includes:

- Lot 1 / DP 73521
- Lot 1 / DP171676
- Lot B / DP172600
- Lots 11, 13, 14 & 15 / DP315
- Lot 1 / DP 955011
- Lot 1 / DP 900501
- Lots 1 & 2 / DP 131120
- Lot 1 / DP 302585
- Lot 1 / DP 182276
- Lots A & B / DP 302421
- Lot 1 / DP 951124
- Lot B / DP171931
- Lot 16 / DP 130884
- Lot 100 / DP 221222

As a result of a briefing and consultation with DECC, target survey has been undertaken for Long-nosed Bandicoots which have been recorded win the Dulwich Hill, Lewisham, and Petersham area (refer to attachment 1 – Target Long-nosed Bandicoot Survey. This population has a preliminary listing as an endangered population under the Threatened Species Conservation Act 1995 (NSW).

A thorough search of the Allied Flour Mills site revealed no evidence of Long-nosed Bandicoot diggings. In addition hair tubes baited with truffle oil were laid out in areas of suitable passage. There were no recorded samples of bandicoot hair. The surrounding fence line was found to be in good condition with little to no opportunity for passage. The existing canal is of a profile that would not allow any bandicoot passage to and from the site. As a result of the target survey and inspection of surrounding barriers, it is considered unlikely that the subject site is utilised by Long-nosed Bandicoot.

Legislative Requirements

Ecological survey and assessment has been undertaken in accordance with relevant legislation, namely the Environmental Planning & Assessment Act 1979 (NSW), Threatened Species Conservation Act 1995 (NSW), Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) and the Fisheries Management Act 1994 (NSW).

In respect of matters required to be considered under the *Environmental Planning & Assessment Act* (1979) and relating to the species / provisions of the *Threatened Species Conservation Act* (1995), no threatened fauna species, no threatened flora species, and no endangered ecological communities were recorded within or in close proximity to the subject site.

In accordance with Section 5A of the EP&A Act, the 7 part test of significance concluded that the proposed development will not have a significant impact on any threatened species, populations or endangered ecological communities. Therefore, a Species Impact Statement should not be required for the proposed development.

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation Act* (1999), no threatened fauna species, no threatened flora species, and no endangered ecological communities listed under this Act were recorded within or in close proximity the subject site.

The proposed development was not considered to have a significant impact on the potential habitat of threatened species or endangered ecological communities. As such a referral to

Department of the Environment, Water, Heritage and the Arts (Commonwealth) should not be required.

In respect of matters relative to the *Fisheries Management Act 1994*, no suitable habitat for marine or aquatic species was observed within the subject site and there are no matters requiring further consideration under this Act.

Conclusion

It is concluded that the proposed development of 2-32 Smith Street & 16-32 Edward Street, Summer Hill, is unlikely to result in a significant impact on any threatened species, populations or endangered ecological communities or their habitats.

As such no further assessments are considered to be required under the *EP&A Act 1979, EPBC Act 1999 or FM Act 1994.*

Report prepared by:

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Corey Mead B. App. Sc. (Coastal Management) – Fauna Ecologist

Licences –

Individual staff members are licensed under Clause 20 of the *National Parks and Wildlife (Land Management) Regulation 1995* and Section 120 & 131 of the *National Parks and Wildlife Act, 1974* to conduct flora and fauna surveys within service and non-service areas. NPWS Scientific Licence Numbers: S10359.

The staff of *Travers environmental* are licensed under an Animal Research Authority issued by the Department of Agriculture. This authority allows *Travers environmental* staff to conduct various fauna surveys of native and introduced fauna for the purposes of environmental consulting throughout New South Wales.

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SECTION 1.0 – INTRODUCTION

Travers environmental has been engaged by *EG Funds Management* to carry out a Flora and Fauna Assessment within 2-32 Smith Street & 16-32 Edward Street, Summer Hill, hereafter referred to as the subject site.

Figure 1 provides an aerial appraisal of the subject site and provides the ecological survey effort undertaken on the subject site.

1.1 Aims of the assessment

The aims of the flora & fauna assessment are to:

- Carry out a botanical survey to describe the vegetation communities and their condition in accordance with the guidelines adopted by Ashfield and Marrickville Councils;
- Carry out a fauna survey for the detection and assessment of fauna and their habitats in accordance with the guidelines adopted by Ashfield and Marrickville Councils;
- Complete target surveys for threatened species, populations and ecological communities
- Assess the conservation value of the site
- Prepare a flora and fauna impact assessment in accordance with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999,* the *Threatened Species Conservation Act 1995,* the *Fisheries Management Act 1994* and guidelines issued by the National Parks and Wildlife Service.

1.2 Information collation

A review of the relevant information pertinent to the subject site was undertaken prior to the initiation of field surveys as background to the study. Information sources reviewed include the following:

Documents including:-

- Survey and mapping undertaken by *Watson Buchan Pty Ltd*
- Leary T., Kwok A., Khan B. and Robertson P. (2008) *Yuppie Bandicoots of the Inner West – Hiding or Urban Renewal?* Poster paper issued by DECC

Standard Technical Resources

- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (working draft) *(Department of Environment and Conservation (2004).*
- Aerial photographs (scale 1:25,000) and Topographical maps (scale 1:25,000)
- *Atlas of NSW Wildlife* (DECC, 2008) 1:100,000 scale map sheet
- The schedules of the *Threatened Species Conservation Act 1995*

- The schedules of the *Fisheries Management Act 1994*
- Lists of threatened species and communities in the *Environmental Protection and Biodiversity Act 1999*
- Rare or Threatened Australian Plants (ROTAP)

1.3 Statutory requirements

1.3.1 State

The specific requirements of the *Threatened Species Conservation (TSC) Act* (1995) must be addressed in the assessment of flora and fauna matters. This requires the consideration of potential impacts on threatened species, populations and ecological communities.

The factors to be taken into account in deciding whether there is a significant effect are set out in Section 5A of the *Environmental Planning & Assessment (EP&A) Act* (1979) and are based on a 7 part test of significance.

The *Fisheries Management Act* (1994) provides a list of threatened aquatic species, which require consideration when addressing the potential impacts of a proposed development.

Where a proposed activity is located in an area identified as critical habitat, or such that it is likely to significantly affect threatened species, populations, ecological communities, or their habitats, a Species Impact Statement (SIS) is required to be prepared and submitted to DECC for assessment under the *TSC Act* (1995).

1.3.2 National

The *Environment Protection and Biodiversity Conservation (EPBC) Act* (1999) requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals system for actions that have a significant impact on matters of National Environmental Significance (NES). These may include:

- Wetlands protected by international treaty (the Ramsar Convention),
- Nationally listed threatened species and ecological communities,
- Nationally listed migratory species, and
- Nationally listed marine species.

Actions are projects, developments, undertakings, activities, series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a matter of NES.

Where a proposed activity is located in an area identified to be a matter of NES, or such that it is likely to significantly affect nationally listed threatened species, ecological communities, migratory species or their habitats, the development proposal needs to be referred to the Department of the Environment, Water, Heritage and the Arts for assessment under the EPBC Act (1999).

1.4 Development proposal

The proposed development will see demolition of some buildings and structures on the site and redevelopment of the site for mixed use purposes.

1.5 Site description

The planning and cadastral details of the subject site are provided in Table 1.1 while Table 1.2 summarises the geographical characteristics of the site.

Table 1.1 - Site details

Location	2-32 Smith Street & 16-32 Edward Street, Summer Hill
Description of Location	The subject site is situated to the east of Edward Street between Smith St and Old Canterbury Road, Summer Hill. The Western boundary runs along the goods railway line to Dulwich Hill.
Area	24 789 m^2
Topographic Map	Botany Bay 1:25000
Grid Reference	328200E and 6248000N
Local Government Area	Ashfield (21 705m^2) and Marrickville (3 084m^2)
Existing Land Use	Industrial (Flour Mill)
Proposed Development	Mixed use development

Table 1.2 - Site characteristics

Elevation	Approximately 10m AHD
Topography	Situated on generally flat land with gentle slopes less than 5% gradients. Steep slopes occur within the north-eastern portion down to the exposed section of concrete canal.
Aspect	Various
Geology and Soils	Geology – Shale with some sandstone beds pertaining to the Liverpool Sub-group of the Wianamatta Shales in the Triassic Period. Soils – Birrong Soil Landscape – Deep yellow Podzolic and Solodic soils over Wianamatta Shales.
Vegetation	Cleared of natural vegetation and generally landscaped.
Drainage	A subterranean / surface drain traverses through the north eastern corner of the subject site.

The subject site has been affected by the following impacts:

Table 1.3 – Site disturbance

Clearing	Previous clearing of natural vegetation has occurred across the entire site. Currently, approximately 59% is totally cleared, 27% is landscaped and 14% contains exotic trees and shrubs.
Agriculture / Pastoral	No current use.
Earthworks	The complete site has been modified to some degree by previous earthworks.
Introduced Weeds	Landscaped gardens are impacted moderately by annuals whilst areas away from the main entrance are moderately to highly impacted by invasive and noxious weeds.
Evidence of Feral, Introduced or Domestic fauna	Feral Pigeons, Common Mynas, Red-whiskered Bulbuls and Spotted Turtle-doves.

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SECTION 2.0 - SURVEY TECHNIQUES

2.1 Background

It is important to note that field survey data collected during the survey period is representative of species occurring within the subject site for that occasion. Due to effects of fire, breeding cycles, migratory patterns, camouflage, weather conditions, time of day, visibility, predatory and / or feeding patterns, increased species frequency or richness may be observed within the subject site outside the nominated survey period. Habitat assessments based on the identification of micro-habitat features for various species of interest, including regionally significant and threatened species, has been used to overcome this survey limitation.

2.2 Flora survey techniques

To determine the likely and actual occurrence of flora species, fauna species and plant communities on the subject site a variety of assessments were undertaken to supplement previous surveys of the area and literature reviews. The methods utilised included:

- ***Literature Review*** - A review of readily available literature for the area was undertaken to obtain reference material and background information for this survey.

- ***Data Search*** - A search of the Atlas of NSW Wildlife (DECC 2008) was undertaken to identify records of threatened flora species located within a 10km radius of the site. This enabled the preparation of a list of threatened flora species that could potentially occur within the habitats found on the site.

- ***Aerial Photograph Interpretation*** - Aerial photographs at 1:25,000 scale were utilised to identify the extent of vegetation with respect to the site and surrounding areas.

- ***Field Survey -*** A flora survey using a systematic stratified sampling regime within each of the identified vegetation communities, incorporating the placement of one (1) 20x20 metre quadrat in addition to random meanders, was undertaken on 27th March 2008

- ***Accuracy of Identification*** - Specimens of plants not readily discernible in the field were collected for identification and, if required, samples of potential threatened species are sent to the Australian Botanic Gardens for confirmation of identification. Structural descriptions of the vegetation were made according to Specht *et. al.* (1995).

2.3 Fauna survey methodology

In preparation for fauna field work, a fauna data search of the Atlas of NSW Wildlife (2008) was undertaken to identify records of threatened fauna species located within a 10km radius of the site. This enabled the preparation of a list of threatened flora species that could potentially occur within the habitats found on the site.

2.3.1 Diurnal birds

Visual observation and call identification of birds was carried out during visits to the site.

Birds were observed and identified using handheld binoculars. Calls were generally identified in the field by the observer. If an unknown call was heard it is recorded and identified using reference libraries.

2.3.2 Nocturnal birds

A habitat assessment of the subject site during the field inspections revealed no habitat for threatened nocturnal bird species. Nocturnal target surveys for these species were therefore not undertaken.

2.3.3 Arboreal and terrestrial mammals

Hair tubes were used to target the presence of Long-nosed Bandicoot (*Parameles nasuta),* with a preliminary listing as an endangered population occurring at neighbouring suburbs of Lewisham, Dulwich Hill and Petersham. Confirmed records from this population occur within 1km to the north-east, south-east and south of the subject site. This population is utilising habitat similar to that provided by the cement foundations of the subject site and may be utilising the rail corridor for movement (Leary et al, 2008).

Three (3) hair tube transect lines each with six hair tubes were placed from 3 October to 13 October 2008, amounting to 180 terrestrial hair tube nights. Transect locations are shown on Figure 1. One transect was placed within the rail corridor to the east of the subject site to determine presence along the outer fence line. The separation distance varied between 10m and 20m. The tubes were baited with a mixture of rolled oats, honey peanut butter and black truffle oil. Double-sided tape was attached around the entry of tubes so hair samples of animals entering the tube were collected. Hair tube transects within the subject site were located near to the rail corridor within any existing areas providing surface vegetation or refuse hides. The southern line was placed along old existing building structures with characteristics similar to those utilised by the local bandicoot population. The locations of hair tube lines are provided in Figure 1. Hair samples collected were sent to Barbara Triggs for identification.

The site was assessed for the presence of any scats, markings, diggings, runways and scratches during visits. Any scats or pellets not readily identifiable are normally collected and sent to noted expert Barbara Triggs for identification of contents, hair or bone fragments. Habitat was also assessed to determine the likelihood of Long-nosed Bandicoots and threatened native species of fauna occurring within the subject site.

The habitat assessment of the subject site during the field visit revealed no habitat for threatened arboreal or terrestrial mammal species, nocturnal bird species, reptile or frog species. Habitat for the local Bandicoot population is considered sub-optimal and limited for access. Foraging habitat occurs for threatened bat species, subsequently nocturnal survey effort undertaken included the use of Anabat recordings for microchiropteran bats. No spotlighting or nocturnal call-playback surveys were considered necessary.

2.3.4 Bats

A habitat assessment of the subject site during the field visit revealed only marginal habitat for one threatened micro-chiropteran bat species Eastern Bentwing-bat (*Miniopterus schreibersii oceansis*). Nocturnal target surveys for the presence of this species was undertaken using echolocation recordings using an Anabat Mk 2 detector in both fixed and mobile positions throughout the subject site.

Mega-chiropteran bat species, such as Grey-headed Flying-fox (*Pteropus poliocephalus*) were surveyed by targeting potential roost sites during the habitat assessment. No suitable roosting habitat was found. The few potential foraging trees for these species did not appear to be fruiting at the time of survey, however given the limited foraging trees present, it is concluded that nocturnal spotlighting surveys for these species should not be required.

2.3.5 Amphibians

Amphibians were surveyed by vocal call identification, by using a tape recorder to record male calls in suitable places and then comparing these to known calls. Amphibians were also surveyed by habitat searches.

Any amphibians found are visually identified and when required to be examined are handled with Latex gloves and kept moist until release.

The habitat assessment revealed no suitable habitat for threatened amphibian species and as such nocturnal survey for call identification should not be required.

2.3.6 Reptiles

Searches for reptiles in likely localities such as under logs, rubbish debris, and in deep leaf litter were carried out during diurnal visits to the site.

A habitat assessment of the subject site during the field visit revealed no habitat for threatened reptile species. Nocturnal target surveys for these species were therefore not undertaken.

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Field Survey Method

Tables 2.1 and 2.2 below provide the flora and fauna survey effort undertaken for the subject site.

Table 2.1 – Flora survey methodology and dates

Flora Survey	Method	Dates
Vegetation Communities	Survey of the boundaries of all communities	27/03/08
Stratified Sampling	20x20 metre quadrats where applicable and random meanders	27/03/08
Target Searches	Target searches in known habitats	27/03/08

Table 2.2 – Fauna survey methodology and dates

Fauna Group	Date	Weather Conditions	Survey Method	Survey Effort / Time (24hr)
Diurnal Birds	27/03/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C	Diurnal Opportunistic	2hrs 50min 1040 - 1330
Nocturnal Birds	27/03/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C	Habitat Assessment	2hrs 50min 1040 - 1330
Arboreal Mammals	27/03/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C	Habitat Assessment	2hrs 50min 1040 - 1330
Terrestrial Mammals	27/03/08 3/10/08 – 13/10/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C Various	Habitat Assessment 6 x Hair Tubes (3 Transects) x 10 nights	2hrs 50min 1040 - 1330 180 Hair tube nights
Bats	27/03/08 13/10/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C 1/8 cloud, light NE wind, no rain, temp 20^{o}C	Habitat Assessment Anabat II x 2	2hrs 50min 1040 - 1330 3hrs 40min 1920 - 2300
Reptiles	27/03/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C	Habitat Search & Assessment / Opportunistic	2hrs 50min 1040 - 1330
Amphibians	27/03/08	1/8 cloud, light NW wind, no rain, temp 21.5^{o}C	Habitat Search & Assessment	2hrs 50min 1040 - 1330

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SECTION 3.0 - SURVEY RESULTS

3.1 Flora results

Two (2) vegetation communities were identified within the subject site through aerial photographic interpretations and extensive ground truthing. The vegetation communities include:

- Landscaped Gardens and Lawns
- Exotic Trees and Shrubs

The plants observed within the vegetation communities of the subject site are listed in Table 3.1 below.

Table 3.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name
TREES		
Myrtaceae	*Acmena smithii*	Lillypilly
Amaranthaceae	*Amaranthus viridis**	Green Amaranth
Arecaceae	*Archontophoenix cunninghamiana*	Bangalow Palm
Sterculiaceae	*Brachychiton acerifolius*	Illawarra Flame Tree
Ulmaceae	*Celtis sinensis**	Chinese Hackberry
Lauraceae	*Cinnamomum camphora**	Camphor Laurel
Cupressaceae	*Cupressus* sp*	Cypress
Moraceae	*Ficus macrophylla*	Moreton Bay Fig
Moraceae	*Ficus obliqua*	-
Oleaceae	*Fraxinus angustifolia* (cultivar)*	Claret Ash
Proteaceae	*Grevillea robusta**	Silky Oak
Bignoniaceae	*Jacaranda mimosifolia**	Jacaranda
Lythraceae	*Lagerstroemia indica**	Crepe Myrtle
Hamamelidaceae	*Liquidambar styraciflua**	Sweet Gum
Myrtaceae	*Lophostemon confertus**	Brush Box
Moraceae	*Morus alba**	Mulberry
Musaceae	*Musa acuminata**	Banana
Arecaceae	*Phoenix canariensis**	Canary Island Date Palm
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Rosaceae	*Prunus sp.**	Cherry Blossom Tree
Fagaceae	*Quercus sp.**	Oak
Araliaceae	*Schefflera actinophylla**	Umbrella Tree

Table 3.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name
Anacardiaceae	*Schinus molle* var. *areira**	Pepper Tree
SHRUBS		
Mimosaceae	*Acacia saligna**	Orange Wattle
Buxaceae	*Buxus sp.**	Buxus
Myrtaceae	*Callistemon* sp. (cultivar)*	Bottlebrush
Theaceae	*Camellia sp.* (cultivar)*	Camellia
Solanaceae	*Cestrum parqui**	Chilean Cestrum
Malaceae	*Cotoneaster glaucophyllus**	Grey-leaved Cotoneaster
Verbenaceae	*Lantana camara**	Lantana
Oleaceae	*Ligustrum lucidum**	Large-leaved Privet
Apocynaceae	*Nerium oleander**	Oleander Bush
Euphorbiaceae	*Omalanthus populifolius*	Bleeding Heart
Euphorbiaceae	*Ricinus communis**	Castor Oil Plant
GROUNDCOVERS		
Liliaceae	*Agapanthus praecox**	Agapanthus
Papaveraceae	*Argemone ochroleuca**	Mexican Poppy
Asparagaceae	*Asparagus aethiopicus**	Asparagus Fern
Asteraceae	*Bidens pilosa**	Cobbler's Pegs
Asteraceae	*Brachyscome graminea*	-
Cannaceae	*Canna indica**	Indian Shot
Amaranthaceae	*Celosia sp.**	-
Carophyllaceae	*Cerastium glomeratum**	Mouse-ear Chickweed
Liliaceae	*Chlorophytum comosum**	Spider Plant
Asteraceae	*Cirsium vulgare**	Spear Thistle
Amaryllidaceae	*Clivia sp.**	Clivia
Commelinaceae	*Commelina cyanea*	Scurvy Weed
Asteraceae	*Conyza sumatrensis**	Fleabane
Asteraceae	*Cotula australis*	Common Cotula
Poaceae	*Cynodon dactylon**	Common Couch
Iridaceae	*Dietes bicolor**	Spanish Iris
Poaceae	*Digitaria sanguinalis**	Crab Grass
Poaceae	*Ehrharta erecta**	Panic Veldtgrass
Poaceae	*Eleusine indica**	Crowsfoot Grass
Asteraceae	*Erechtites valerianifolia**	Brazilian Fireweed
Euphorbiaceae	*Euphorbia peplus**	Spurge
Asterceae	*Galinsoga parviflora**	Potato Weed
Zingiberaceae	*Hedychium gardnerianum**	Ginger Lily
Asteraceae	*Hypochaeris glabra**	Smooth Catsear
Asteraceae	*Hypochaeris radicata**	Flatweed
Malvaceae	*Malva sylvestris**	Tall Mallow
Fabaceae	*Medicago arabica**	Spotted Burr Medic
Scrophulariaceae	*Misopates orontium**	Lesser Snapdragon
Liliaceae	*Nothoscordum borbonicum**	Onion Weed
Liliaceae	*Ophiopogon japonicus**	Mondo Grass

Table 3.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name
Cactaceae	*Opuntia stricta**	Prickly Pear
Oxalidaceae	*Oxalis pes-caprae**	Soursob
Poaceae	*Panicum maximum**	Guinea Grass
Urticaceae	*Parietaria judaica**	Pellitory
Poaceae	*Pennisetum clandestinum**	Kikuyu
Plantaginaceae	*Plantago lanceolata**	Ribwort
Asteraceae	*Senecio vulgaris**	-
Solanaceae	*Solanum americanum**	Glossy Nightshade
Solanaceae	*Solanum nigrum**	Black Nightshade
Asteraceae	*Soliva sessilis**	Jojo
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
Asteraceae	*Tagetes erecta**	Marigold
Asteraceae	*Tagetes minuta**	Stinking Roger
Asteraceae	*Taraxacum officinale**	Dandelion
Plantaginaceae	*Veronica plebeia*	Creeping Speedwell
Violaceae	*Viola hederacea*	Ivy-leaved Violet
Araeceae	*Zantedeschia aethiopica**	White Arum Lily
VINES		
Basellaceae	*Anredera cordifolia**	Madiera Vine
Apocnyaceae	*Araujia sericifera**	Mothvine
Araliaceae	*Hedera helix**	English Ivy
Convolvulaceae	*Ipomoea indica**	Coastal Morning Glory
Oleaceae	*Jasminum polyanthum**	Jasmine
Species name^{TS} = Threatened Species * = Introduced Species		

3.2 Fauna results

Species observed throughout the duration of fauna surveys are listed in Table 3.2 below.

Table 3.2 Fauna Observations for the Study Area

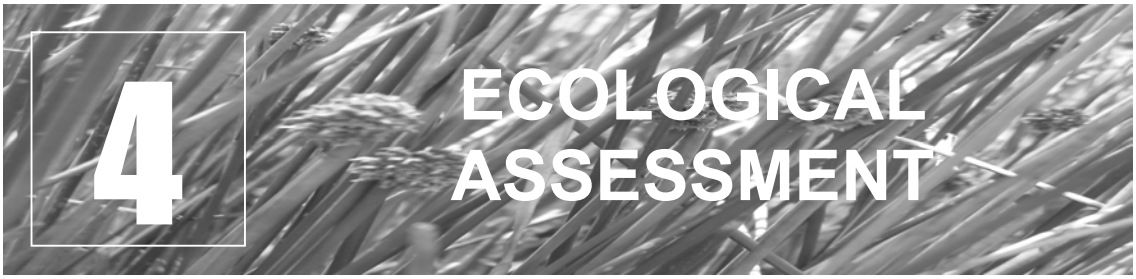
Common name	Scientific name	Method Observed
Birds		**March 2007**
Australian Magpie	*Gymnorhina tibicen*	O C
Australian Raven	*Corvus coronoides*	C
Australian White Ibis	*Threskiornis molucca*	O C
Common Myna *	*Acridotheres tristis*	O C
Fairy Martin	*Hirundo ariel*	O
Laughing Kookaburra	*Dacelo novaeguineae*	O
New Holland Honeyeater	*Phylidonyris novaehollandiae*	O C
Noisy Miner	*Manorina melanocephala*	O C
Pied Currawong	*Strepera graculina*	C
Rainbow Lorikeet	*Trichoglossus haematodus*	O C
Red-whiskered Bulbul *	*Pycnonotus jocosus*	O C
Rock Dove *	*Columba livia*	O

Table 3.2 Fauna Observations for the Study Area

Common name	Scientific name	Method Observed
Spotted Turtle-Dove *	*Streptopelia chinensis*	O C
Superb Fairy-wren	*Malurus cyaneus*	C
White-plumed Honeyeater	*Lichenostomus penicillatus*	O C
Willie Wagtail	*Rhipidura leucophrys*	C
Reptiles		
Cream-striped Shining Skink	*Cryptoblepharus virgatus*	O
Delicate Skink	*Lampropholis delicata*	O
Eastern Water Skink	*Eulamprus quoyii*	O
Grass Skink	*Lampropholis guichenoti*	O

Note: * indicates introduced species
^{TS} indicates threatened species

A	-	Anabat II	C	-	Call Identification
O	-	Observation	P	-	Call Playback Response
E	-	Trap (Elliot, cage, etc)	S	-	Habitat Search
Sp	-	Spotlight	Sc	-	Scat, Track or Sign Identification



SECTION 4.0 - ECOLOGICAL ASSESSMENT

4.1 Previous surveys reviewed

A review of *Benson and Howell* (1994) vegetation mapping of Sydney indicated that the site does not contain original bushland, however pre 1788, it is suggested that the vegetation would have been Turpentine Ironbark Forest over Wianamatta Shale.

4.2 Flora

A total of eighty seven (87) flora species were observed within the subject site during the survey. Only twelve (12) species were native whilst seventy five (75) species were identified as exotic or planted specimens.

All species are listed in Table 3.1.

4.2.1 Vegetation communities

Two (2) vegetation communities were identified within the subject site through ground truthing:

- Vegetation Community 1 – Landscaped Gardens and Lawns
- Vegetation Community 2 – Exotic Trees and Shrubs

Vegetation Community 1 – Landscaped Gardens and Lawns

Occurrence - This vegetation community occupies the garden beds and lawns surrounding the existing buildings and car park encompassing an area of approximately 0.58 ha.

Structure - Larger trees are planted in the central northern section of the subject site and along the north-eastern boundary. A line of *Cupressus* species have been planted along the main entry off Edward Street. Tall shrubs and standard low growing shrubs and groundcovers have been planted within the car park area, and vibrant coloured plants up to 50cm tall have been used in other gardens adjacent to buildings in the northern portion of the subject site.

Disturbances - Lawns are regularly maintained through mowing and garden beds within the car park area have a moderate incursion of weeds.

Common Species

Trees: *Ficus obliqua* (Small-leaved Fig), *Cupressus sp, Brachychiton acerifolius* (Illawarra Flame Tree), *Phoenix canariensis* (Canary Island Date Palm) and *Lophostemon confertus* (Brush Box).

Shrubs: *Buxus sp.* (Buxus), *Callistemon sp.* (Bottlebrush), *Camellia sp.* (Camellia) and *Nerium oleander* (Oleander).

Groundcovers: *Cynodon dactylon* (Common Couch), *Agapanthus praecox* (Agapanthus) and *Dietes bicolor* (Spanish Iris).

Vines: *Araujia sericifera* (Moth Vine).

Photo 1: Vegetation community 1, Brush Box Trees and Fig Tree adjacent to main access off Edward Street

Photo 2: Vegetation community 1, Planted trees and shrubs surrounding lawn area in the central northern portion of the subject site

Vegetation Community 2 – Exotic Trees and Shrubs

Occurrence - This vegetation community occupies the north-eastern corner of the subject site and southern corner, covering approximately 0.31 ha within the subject site.

Structure - The canopy layer consists of mostly Camphor Laurel trees and Sweet Pittosporum with a moderately dense shrub layer in the north-eastern section of Privet whilst absent in the southern corner. Both patches exhibit a moderate coverage of exotic vines and groundcovers.

Disturbances - This vegetation community is impacted by a high incursion of exotic weed species.

Common Species

Trees: *Cinnamomum camphora* (Camphor Laurel), *Morus alba* (Mulberry) and *Pittosporum undulatum* (Sweet Pittosporum)

Shrubs: *Ligustrum lucidum* (Large-leaved Privet), *Ricinus communis* (Castor Oil Plant), *Musa acuminata* (Banana), *Acacia saligna* (Orange Wattle) and *Cestrum parqui* (Green Cestrum).

Photo 3: Vegetation community 2 within north-eastern corner. In the vicinity of the Flora Quadrat as indicated on Figure 1.

Photo 4: Vegetation community 2 in southern corner looking south towards the railway line. Camphor Laurel trees dominate with vines prevalent along boundary.

Groundcovers: *Bidens pilosa* (Cobblers Pegs), *Digitaria sanguinalis* (Crab Grass), *Hypochaeris radicata* (Flatweed), *Malva sylvestris* (Tall Mallow), *Solanum nigrum* (Black Nightshade) and *Tagetes minuta* (Stinking Roger).

Vines: *Anredera cordifolia* (Madiera Vine) and *Araujia sericifera* (Moth Vine).

4.2.2 Vegetation connectivity

The vegetation within the study area is predominantly planted and landscaped and does not adjoin any areas of natural remnant bushland. The fragmentation and lack of shrub species would generally indicate a low biodiversity of fauna and would provide little refuge for any threatened fauna species. There is a very narrow corridor of vegetation running adjacent to the railway corridor however the majority of vegetation within the corridor is exotic.

4.2.3 Threatened flora legislation

In accordance with Table 4.1 below, no threatened flora species have the potential to occur within the subject site.

4.2.3.1 State legislative matters

TSC Act (1995) – A search of the Atlas of NSW Wildlife (DECC 2008) database indicated that twenty seven (27) threatened flora species have been recorded within a 10 km radius of the subject site. Those species are listed in Table 4.1 below.

Of those twenty seven (27) threatened flora species, none have the potential to occur within the study area and none were recorded during the March 2008 survey.

4.2.3.2 Endangered populations

There are three (3) known endangered populations within 10km of the subject site. *Pomaderris prunifolia var. prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown local government areas, *Wahlenbergia multicaulis* (Tadgell's Bluebell) in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield, and *Acacia prominens* in the Hurstville and Kogarah local government areas.

The subject site is situated within the Local Government Areas of Ashfield and Marrickville. Despite a targeted search for these species, they were not observed within the subject site.

4.2.3.3 National legislative matters

A review of the schedules of the *EPBC Act* (1999) indicated the potential for eleven (11) threatened flora species to occur within a 10km radius of the site (Table 4.1).

Of those eleven (11) threatened flora species, none have the potential to occur within the study area and none were recorded during the March 2008 survey.

The actions associated with the development are not likely to significantly effect any nationally listed threatened species or ecological communities.

Conclusion*:* A referral to Department of the Environment, Water, Heritage & The Arts should not be required.

4.2.4 Endangered ecological communities

No endangered ecological communities were recorded within the subject site.

4.2.5 Threatened flora species habitat assessment

Table 4.1 below provides an assessment of threatened flora species habitat likely to occur within the subject site.

Table 4.1 - Threatened Flora Habitat Assessment

Scientific name	Growth Form and Habitat Requirements	Conservation Status	Comments	TSC Act	EPBC Act
Acacia bynoeana TSC	Erect or spreading shrub to 0.3 m high growing in heath and dry sclerophyll open forest on sandy soils. Often associated with disturbed areas such as roadsides. Distribution limits N-Newcastle S- Berrima.	Blue Mountains NP, Royal NP, Castlereagh NR, Agnes Banks NR, Lake Macquarie SRA, Dharawal NR, Marramarra NP, Parr SRA	No potential habitat present within the subject site	E1	V
Acacia gordonii TSC	Erect or spreading shrub 0.5-1.5 m high growing in heath and dry sclerophyll forest on sandstone outcrops. Distribution limits N-Bilpin S- Faulconbridge.	Not currently known from conservation reserves.	No potential habitat present within the subject site	E1	E
Acacia pubescens TSC EPBC	Spreading shrub 1-4 m high open sclerophyll growing in open forest and woodlands on clay soils. Distribution limits N-Bilpin S- Georges River.	Wollemi NP, Scheyville NP	No potential habitat present within the subject site	V	V
Acacia terminalis ssp terminalis TSC EPBC	Erect or spreading shrub, 1.5 m high. Grows in a variety of habitats but usually in dry sclerophyll forest on sandstone, south from Tenterfield, chiefly on coasts and tablelands	Sydney Harbour NP	No potential habitat present within the subject site	E1	E

Table 4.1 - Threatened Flora Habitat Assessment

Scientific name	Growth Form and Habitat Requirements	Conservation Status	Comments	TSC Act	EPBC Act
Bothriochloa biloba EPBC	Erect or decumbent grass to 1 m high growing in Woodlands on poorer soils. Distribution limits N-Tweed Heads S- Sydney.	Not currently known from conservation reserves.	No potential habitat present within the subject site	V	V
Caladenia tessellata TSC EPBC	Terrestrial orchid. Clay-loam or sandy soils. Distribution limits N-Swansea S- south of Eden.	Munmorah SRA, Popran NP, Wyrrabalong NP	No potential habitat present within the subject site	E1	V
Callistemon linearifolius TSC	Shrub to 4 m high. Dry sclerophyll forest on coast and adjacent ranges. Distribution limits N-Nelson Bay S- Georges River.	Ku-ring-gai Chase NP Lion Island NR Spectacle Island Nature Reserve Yengo NP, Brisbane Water NP, Munmorah SRA, Werakata NP	No potential habitat present within the subject site	V	-
Camarophyllo-psis kearneyi TSC	Small gilled fungus known only from Lane Cove Bushland Park in Sydney	Nil	No potential habitat present within the subject site	E1	-
Darwinia biflora TSC EPBC	Erect or spreading shrub to 0.8 m high. Grows in heath or understorey of woodland on or near shale-capped ridges underlain by Hawkesbury sandstone. Distribution limits N - Gosford S - Cheltenham.	Ku-ring-gai Chase NP, Lane Cove NP, Marramarra NP, Berowra Valley RP	No potential habitat present within the subject site	V	V
Deyeuxia appressa EPBC	Erect grass to 0.9 m high. Grows on wet ground. Distribution limits N - Hornsby S - Bankstown.	Not currently known from conservation reserves.	No potential habitat present within the subject site	E1	E
Epacris purpurascens var. purpurascens EPBC	Erect shrub to 1.5m high growing in sclerophyll forest and scrub and near creeks and swamps on Sandstone. Distribution limits N-Gosford S- Blue Mountains	Ku-ring-gai Chase NP Muogamarra NR Brisbane Water NP Berowra Valley RP Bents Basin SRA	No potential habitat present within the subject site	V	-
Eucalyptus camfieldii EPBC	Stringybark to 10 m high. Grows on coastal shrub heath and woodlands on sandy soils derived from alluviums and Hawkesbury sandstone. Distribution limits N - Norah Head S - Royal NP.	Brisbane Water NP, Ku-ring-gai Chase NP, Royal NP, Sydney Harbour NP, Awabakal NR, Popran NP, Berowra Valley RP	No potential habitat present within the subject site	V	V

Table 4.1 - Threatened Flora Habitat Assessment

Scientific name	Growth Form and Habitat Requirements	Conservation Status	Comments	TSC Act	EPBC Act
Eucalyptus nicholii TSC	A medium-sized tree that grows in dry grassy woodland, on shallow and infertile soils, mainly on granite. Confined to the New England Tablelands. Distributed between Tenterfield and Nundle	Not currently known from conservation reserves.	No potential habitat present within the subject site	V	V
Eucalyptus pulverulenta TSC	Silver-leaved gum to 10m tall, grows in shallow soils. Distribution limits N – Bathurst S - Bredbo	Not currently known from conservation reserves.	No potential habitat present within the subject site	V	V
Eucalyptus scoparia TSC	Smooth-barked tree only known from vicinity of Bald Rock.	Bald Rock NP	No potential habitat present within the subject site	E1	V
Genoplesium baueri TSC	A terrestrial orchid that grows in sparse sclerophyll forest and moss gardens over sandstone. Distribution limits N – Hunter Valley S - Nowra	Not currently known from conservation reserves.	No potential habitat present within the subject site	E1	-
Hygrocybe anomala var. inanthinomarginata TSC	Small gilled fungus known only from Lane Cove Bushland Park, Blue Mountains National Park and Royal National Park	Blue Mountains NP Royal NP	No potential habitat present within the subject site	V	-
Hygrocybe aurantipes TSC	Small gilled fungus known only from Lane Cove Bushland Park and Blue Mountains National Park	Blue Mountains NP	No potential habitat present within the subject site	V	-
Hygrocybe austropratensis TSC	Small gilled fungus known only from Lane Cove Bushland Park	Nil	No potential habitat present within the subject site	E1	-
Hygrocybe collucera TSC	Small gilled fungus known only from Lane Cove Bushland Park	Nil	No potential habitat present within the subject site	E1	-
Hygrocybe griseoramosa TSC	Small gilled fungus known only from Lane Cove Bushland Park	Nil	No potential habitat present within the subject site	E1	-
Hygrocybe lanecovensis TSC	Small gilled fungus known only from Lane Cove Bushland Park	Nil	No potential habitat present within the subject site	E1	-

Table 4.1 - Threatened Flora Habitat Assessment

Scientific name	Growth Form and Habitat Requirements	Conservation Status	Comments	TSC Act	EPBC Act
Hygrocybe reesiae TSC	Small gilled fungus known only from Lane Cove Bushland Park and Blue Mountains National Park on moss covered banks under closed canopy.	Blue Mountains NP	No potential habitat present within the subject site	V	-
Hygrocybe rubronivea TSC	Small brightly coloured gilled fungus in warm temperate forest. Only known from Lane Cove Bushland Park	Nil	No potential habitat present within the subject site	V	-
Leptospermum deanei TSC	Shrub to 5 m high. Grows on forested slopes. Distribution limits Near watershed of Lane Cove River.	Garigal NP, Berowra Valley RP	No potential habitat present within the subject site	V	V
Melaleuca deanei TSC EPBC	Shrub to 3 m high. Grows in heath on sandstone. Distribution limits N - Gosford S - Nowra.	Berowra Valley Regional Park, Brisbane Water NP, Ku-ring-gai Chase NP, Garigal NP, Lane Cove NP, Royal NP, Heathcote NP	No potential habitat present within the subject site	V	V
Prostanthera marifolia EPBC	Erect shrub to 0.3m high. Woodland dominated by Eucalyptus sieberi and Corymbia gumnifera. In deeply weathered clay soil with ironstone nodules. Has been recorded previously in the Sydney Harbour region.	Not known from any conservation reserves	No potential habitat present within the subject site	Presu-med Extinct	Extinct
Syzygium paniculatum TSC	Small tree. Subtropical and littoral rainforest on sandy soil. Distribution limits N - Forster S - Jervis Bay.	Booti Booti NP, Myall Lakes NP, Wamberal Lagoon NR, Wyrrabalong NP, Captain Cooks Landing Place HS, Jervis Bay NP, Munmorah SRA, Glenrock SRA	No potential habitat present within the subject site	V	V
Tetratheca glandulosa TSC EPBC	Spreading shrub to 0.2 m high. Sandy or rocky heath or scrub. Distribution limits N - Mangrove Mountain S – Port Jackson.	Berowra Valley RP, Dharug NP, Garigal NP, Ku-ring-gai Chase NP, Popran NP, Parr SRA, Cattai NP, Brisbane Water NP, Yengo NP, Cattai NP, Marramarra NP, Muogamarra NR, Wollemi NP	No potential habitat present within the subject site	V	V

Table 4.1 - Threatened Flora Habitat Assessment

Scientific name	Growth Form and Habitat Requirements	Conservation Status	Comments	TSC Act	EPBC Act
Tetratheca juncea TSC	Prostrate shrub to 1 m high. Dry sclerophyll forest and heath. Distribution limits N - Bulahdelah S - Port Jackson.	Glenrock SRA, Awabakal NR, Munmorah SRA, Lake Macquarie SRA, Karuah NR, Wallaroo NR	No potential habitat present within the subject site	V	V
Thesium australe TSC EPBC	Erect herb to 0.4 m high. Root parasite. Grassland or woodland often damp. Distribution limits N - Tweed Heads S - south of Eden.	Bullen Range NR, Kosciuszko NP, Namadgi NP, Crowdy Bay NP, Hat Head NP, Kattang NR and Dooragan NP	No potential habitat present within the subject site	V	V
Wilsonia backhousei TSC	Perennial subshrub with procumbent branches. Grows in coastal saltmarshes. Distribution limits N - Sydney S – South of Eden.	Not known from any conservation reserves	No potential habitat present within the subject site	V	-

TSC	- Denotes species listed within 10km of the subject site on the Atlas of NSW Wildlife database
EPBC	- Denotes species listed within 10km of the subject site in the EPBC Act habitat search
TE	- Denotes species considered to have potential to utilise the subject site however not recorded in the NSW Wildlife Atlas or EPBC Act database searches

4.3 Fauna

A total of twenty (20) fauna species were observed within or in close proximity to the subject site during the survey. This number comprised of 16 species of birds and 4 species of reptile.

All species are listed in Table 3.2.

4.3.1 Habitat types

The fauna habitats present throughout the site include:

- Fruit producing Fig trees
- Nectar producing trees species, principally *Callistemon, Grevillea* and *Schefflera* (Umbrella Tree)
- Sparse to dense shrublayers
- Sparse to low density ground cover
- Loose soil suitable for foraging
- Sparse to moderate density litter layer
- Artificial debris & refuse

4.3.2 Habitat trees

No hollow-bearing trees were observed during the field habitat assessment.

4.3.3 Koala habitat assessment

No Koala food tree species as listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection were found within the subject site. As such the subject site is not considered to comprise Potential Koala Habitat as defined under SEPP 44 and no further assessment under this Policy is required.

4.3.4 Threatened fauna legislation

No threatened fauna species were recorded within the subject site. All fauna species are considered relatively common in the local area.

It is considered that the subject site provides limited foraging habitat for the threatened species Grey-headed Flying-fox (*Pteropus poliocephalus*) and Eastern Bentwing-bat (*Miniopterus schreibersii oceansis*). One record of Black Flying-fox (*Pteropus alecto*) was recorded within 10km of the subject site and therefore this species was included within the threatened species assessment. It is however considered unlikely that the region would support a population of this species as it is out of their known distribution limits.

There is no suitable habitat within the subject site for any other threatened mammal, bird, reptile or amphibian species.

4.3.4.1 State legislative matters

TSC Act (1995) – A search of the Atlas of NSW Wildlife (DECC 2008) database for threatened species resulted in twenty-eight (28) records of threatened fauna species within a 10 km radius of the subject site. These species are listed in Table 4.3 and are considered for potential habitat within the subject site.

Pelagic and estuarine shore birds and mammals occurring within the 10km range of the subject site have not been listed in Table 4.3 as no marine/aquatic habitats occur within the subject site.

Fisheries Management Act (1994) – No habitats suitable for marine/aquatic species were observed within the subject site and as such the provisions of this Act do not require any further consideration.

4.3.4.2 Endangered populations

There are no listed endangered fauna populations within the Ashfield and Marrickville LGAs. There is, however, a preliminary listing for the Long-nosed Bandicoot (*Parameles nasuta*) population of inner Western Sydney. The full extent of this population is yet to be determined and whether the population is a remnant or a result of recent dispersal. Given the proximity to records within the surrounding suburbs within 1km, the subject site has been assessed for habitat suitability and presence.

There is sub-optimal habitat for the Long-nosed Bandicoot within the subject site which appears to be utilising urban landscapes for foraging areas and, uncharacteristically, using cement structures for shelters. See Section 4.3.6 below for a site habitat assessment for this species.

Target surveys were undertaken for this species with no observations of presence within the subject site.

4.3.4.3 National legislative matters

EPBC Act (1999) – A review of the schedules of the *EPBC Act* (1999) identified the presence of thirteen (13) threatened fauna species or species habitat likely to occur within a 10km radius of the subject site.

These species have been listed in Table 4.3, and those with potential to utilise the subject site will be considered in the seven-part test within Section 5.

Of those thirteen (13) species, 1 was considered to have potential habitat within the subject site. No nationally listed threatened fauna species were recorded within the subject site.

Additionally listed Terrestrial, Wetland and Marine Migratory species of national significance likely to occur or with habitat for these species likely to occur within a 10km radius of the subject site are assessed in Table 4.2.

Table 4.2 - Migratory Fauna Habitat Assessment

COMMON NAME ***Scientific Name***	**COMMENTS**
White-bellied Sea Eagle (*Haliaeetus leucogaster*)	No suitable habitat present.
White-throated Needletail (*Hirundapus caudacutus*)	Sub-optimal foraging habitat present. Not recorded during surveys.
Rainbow Bee-eater (*Merops ornatus*)	No suitable habitat present.
Black-faced Monarch (*Monarcha melanopsis*)	No suitable habitat present.
Satin Flycatcher (*Myiagra cyanoleuca*)	Sub-optimal habitat present. Not recorded during surveys.
Orange-bellied Parrot (*Neophema chrysogaster)*	No suitable habitat present.
Rufous Fantail (*Rhipidura rufifrons*)	Sub-optimal habitat present. Not recorded during surveys.
Great Egret (*Ardea alba*)	No suitable habitat present.
Cattle Egret (*Ardea ibis*)	No suitable habitat present.
Latham's Snipe (*Gallinago hardwickii*)	No suitable habitat present.
Fork-tailed Swift (*Apus pacificus*)	Sub-optimal foraging habitat present. Not recorded during surveys.

Despite the presence of potential habitat for some of these species, it is considered that the proposal is unlikely to disrupt the life cycle of these species such that a viable local population would be placed at risk of extinction.

Conclusion*:* A referral to *Department of the Environment, Water, Heritage and the Arts* should not be required.

4.3.5 Threatened fauna species habitat assessment

Table 4.3 below provides an assessment of threatened fauna species habitat likely to occur within the subject site.

Table 4.3 - Threatened Fauna Habitat Assessment

COMMON NAME ***Scientific Name***	**PREFERRED HABITAT**	**COMMENTS**	**TSC Act**	**EPBC Act**
Wallum Froglet *Crinia tinnula* TSC	Found in acidic paperbark swamps and wallum country with dense groundcover. Breeds in temporary and permanent pools and ponds of high acidity. Distribution Limit- N-Tweed Heads S-Kurnell.	No suitable habitat present.	V	-
Giant Burrowing Frog *Heleioporus australiacus* EPBC	Inhabits open forests and riparian forests along non-perennial streams, digging burrows into sandy creek banks. Distribution Limit- N-Near Singleton. S-South of Eden.	No suitable habitat present.	V	V
Green and Golden Bell Frog *Litoria aurea* TSC EPBC	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. Distribution Limit - N-Byron Bay. S-South of Eden.	No suitable habitat present.	E	V
Stuttering Frog *Mixophyes balbus* EPBC	Terrestrial inhabitant of rainforest and wet sclerophyll forests. Distribution Limit - N-Near Tenterfield. S-South of Bombala.	No suitable habitat present.	E	V
Red-crowned Toadlet *Pseudophryne australis* TSC	Prefers sandstone areas, breeds in grass and debris beside non-perennial creeks or gutters. Individuals can also be found under logs and rocks in non breeding periods. Distribution Limit- N-Pokolbin S-Near Wollongong.	No suitable habitat present.	V	-
Broad-headed Snake *Hoplocephalus bungaroides* EPBC	Sandstone outcrops, exfoliated rock slabs and tree hollows in coastal and near coastal areas. Distribution Limit - N-Mudgee Park. S-Nowra.	No suitable habitat present.	E	E
Red Goshawk *Erythrotriorchis radiatus* TSC	Inhabits tall open forests and woodlands. Breeds in tall trees adjacent to watercourses of wetlands. Distribution Limit - N-Border Ranges National Park S-Foster.	No suitable habitat present.	E	V
Osprey *Pandion haliaetus* TSC	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding. Distribution Limit - N-Tweed Heads. S-South of Eden.	No suitable habitat present.	V	-

Table 4.3 - Threatened Fauna Habitat Assessment

COMMON NAME ***Scientific Name***	**PREFERRED HABITAT**	**COMMENTS**	**TSC Act**	**EPBC Act**
Australasian Bittern *Botaurus poiciloptilus* TSC	Inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges. Distribution Limit - N-North of Lismore. S- Eden.	No suitable habitat present.	V	-
Black Bittern *Ixobrychus flavicollis* TSC	Freshwater & brackish streams & ponds. Distribution Limit - N-Tweed Heads. S-South of Eden.	No suitable habitat present.	V	-
Magpie Goose *Anseranas semipalmata* TSC	A strongly nomadic species found in tropical through to sub-tropical wetlands, flood plains, large swamps, dams and wet grasslands with dense growths of rushes and sedges. Distribution Limit - N-Tweed Heads. S-Mulwala.	No suitable habitat present.	V	-
Painted Snipe *Rostratula benghalensis* EPBC	Most numerous within the Murray-Darling basin and inland Australia within marshes and freshwater wetlands with swampy vegetation. Distribution Limit- N-Tweed Heads S-South of Eden.	No suitable habitat present.	V	-
Freckled Duck *Stictonetta naevosa* TSC	Occurs mainly within the Murray-Darling basin and the channel country within large cool temperate to sub-tropical swamps, lakes and floodwaters with cumbungi, lignum or melaleucas. Distribution Limit - N-Tenterfield. S-Albury.	No suitable habitat present.	V	-
Bush Stone-curlew *Burhinus grallarius* TSC	Utilises open forests and savannah woodlands, sometimes dune scrub, savannah and mangrove fringes. Distribution Limit- N-Border Ranges National Park S-Near Nowra.	No suitable habitat present.	E	-
Superb Fruit-dove *Ptilinopus superbus* TSC	Rainforests, adjacent mangroves, eucalypt forests, scrubland with native fruits. Distribution Limit - N-Border Ranges National Park. S-Bateman's Bay.	No suitable habitat present.	V	-
Major Mitchell's Cockatoo *Cacatua leadbeateri* TSC	Commonly found within the arid interior of Australia within desert scrubs, open woodland, mallee, mulga, and callitris woodlands. Distribution Limit - N-Goodooga. S-Albury.	No suitable habitat present.	V	-

Table 4.3 - Threatened Fauna Habitat Assessment

COMMON NAME ***Scientific Name***	**PREFERRED HABITAT**	**COMMENTS**	**TSC Act**	**EPBC Act**
Glossy Black-Cockatoo *Calyptorhynchus lathami* TSC	Open forests with *Allocasuarina* species and hollows for nesting. Distribution Limit - N-Tweed Heads. S-South of Eden.	No suitable habitat present.	V	-
Gang-gang Cockatoo *Callocephalon fimbriatum* TSC	Prefers wetter forests and woodlands from sea level to > 2000m on Divide, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. Distribution Limit –mid north coast of NSW to western Victoria.	No suitable habitat present.	V	-
Swift Parrot *Lathamus discolour* TSC EPBC	Inhabits eucalypt forests and woodlands with winter flowering eucalypts. Distribution Limit - N-Border Ranges National Park. S-South of Eden.	No suitable habitat present.	E	E
Turquoise Parrot *Neophema pulchella* TSC	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. Distribution Limit - N-Near Tenterfield. S-South of Eden.	No suitable habitat present.	V	-
Regent Honeyeater *Xanthomyza Phrygia* TSC EPBC	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. Distribution Limit - N-Urbanville. S-Eden.	No suitable habitat present.	E	E
Barking Owl *Ninox connivens* TSC	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting. Distribution Limits- N-Border Ranges National Park S-Eden	No suitable habitat present.	V	-
Powerful Owl *Ninox strenua* TSC	Forests containing mature trees for shelter or breeding & densely vegetated gullies for roosting. Distribution Limits - N-Border Ranges National Park. S-Eden	No suitable habitat present.	V	-
Grass Owl *Tyto capensis* TSC	Inhabits grassland, coastal heath and lignum swamps, sheltering in dense grass tussocks by day. Distribution Limit - N-Tweed Heads. S-Lithgow.	No suitable habitat present.	V	-

Table 4.3 - Threatened Fauna Habitat Assessment

COMMON NAME ***Scientific Name***	**PREFERRED HABITAT**	**COMMENTS**	**TSC Act**	**EPBC Act**
Masked Owl *Tyto novaehollandiae* TSC	Open forest & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. Distribution Limit - N-Border Ranges National Park. S-Eden	No suitable habitat present.	V	-
Diamond Firetail *Stagonopleura guttata* TSC	Found in Eucalypt woodlands, forests and mallee where there is grassy understorey west of the Great Div. also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence River Valleys. Distribution Limit N Rockhampton Q. S- Eyre Pen Kangaroo Is. SA.	No suitable habitat present.	V	-
Spotted-tailed Quoll *Dasyurus maculates* TSC EPBC	Dry and moist open forests containing rock caves, hollow logs or trees. Distribution Limit- N-Mt Warning National Park S-South of Eden.	No suitable habitat present.	V	V
Eastern Quoll *Dasyurus viverrinus* TSC	Dry and moist sclerophyll forests containing hollow logs, rock caves, abandoned burrows or trees with open grazing land interspersed. Distribution Limit- N-Kempsey S-South of Eden	No suitable habitat present.	E	-
Eastern Pygmy Possum *Cercatetus nanus* TSC	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs. Distribution Limit – N – Tweed Heads S - Eden	No suitable habitat present.	V	-
Black Flying-fox *Pteropus alecto* TSC	Found in tropical and sub-tropical forests and woodlands. Camps are formed in mangroves, paperbark forest and rainforest. Distribution Limit – N – Tweed Heads S – Bowraville.	Marginal foraging habitat present.	V	-
Large-footed Myotis *Myotis adversus* TSC	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water. Distribution limits - N - Border Ranges National Park, S - South of Eden.	No suitable habitat present.	V	-

Table 4.3 - Threatened Fauna Habitat Assessment

COMMON NAME ***Scientific Name***	PREFERRED HABITAT	COMMENTS	TSC Act	EPBC Act
Eastern Bentwing-bat *Miniopterus schreibersii oceansis* TSC	Prefers areas where there are caves, old mines, tunnels, stormwater drains & well timbered areas. Distribution Limit - N-Border Ranges National Park. S-South of Eden.	Marginal foraging habitat present.	V	-
Long-nosed Potoroo *Potorous tridactylus* EPBC	Coastal heath and dry and wet sclerophyll forests with a dense understorey. Distribution Limit - N-Mt Warning National Park. S-South of Eden.	No suitable habitat present.	V	V
Brush-tailed Rock-wallaby *Petrogale penicillata* EPBC	Found in rocky gorges with a vegetation of rainforest or open forests to isolated rocky outcrops in semi-arid woodland country. Distribution Limit - N-North of Tenterfield. S-Bombala.	No suitable habitat present.	V	V
Grey-headed Flying-fox *Pteropus poliocephalus* EPBC	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy. Distribution Limit – N – Tweed Heads S - Eden	Suitable foraging habitat present. Not recorded during surveys.	V	V
Large-eared Pied Bat *Chalinolobus dwyeri* EPBC	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies of up to 30 animals. Distribution Limit - N-Border Ranges Nation Park. S-Wollongong.	No suitable habitat present.	V	V
Australian Greyling *Prototroctes maraena* EPBC	Clear, moderate to fast flowing water in the upper reaches of rivers (sometimes to altitudes above 1000m). Typically found in gravel bottom pools. Often forming aggregations below barriers to upstream movement (eg weirs, waterfalls).	No suitable habitat present.	Part 2, Section 19 – Protected Fish	V

TSC	- Denotes species listed within 10km of the subject site on the Atlas of NSW Wildlife database
EPBC	- Denotes species listed within 10km of the subject site in the EPBC Act habitat search
TE	- Denotes species considered to have potential to utilise the subject site however not recorded in the NSW Wildlife Atlas or EPBC Act database searches

A detailed assessment in accordance with Section 5A of the *EP&A Act* (1979) for these species is contained in Section 5 of this report.

4.3.6 Long-nosed Bandicoot habitat assessment

The Scientific Committee has made a Preliminary Determination to support a proposal to list the population of Long-nosed Bandicoot (*Parameles nasuta)* in inner Western Sydney as an Endangered Population. Since 2003 this population has become evident within the surrounding areas to the subject site with individuals reported from Lewisham, Dulwich Hill and Petersham. Confirmed records from this population occur within 1km to the north-east, south-east and the south. This population is utilising habitat similar to that provided by the cement foundations of the subject site.

It is considered there is only sub-optimal habitat for the Long-nosed Bandicoot (*Parameles nasuta*) within the subject site. Cement foundations and other structures to support likely shelters and nesting behaviour generally have open and/or trafficable surrounds with little protection from sight. The limited foraging areas which occur within the northern and southern limits of the site are generally sparse and/or difficult to access. Such areas may support some invertebrate, fungi and other feeding opportunities; however these areas provided no evidence of foraging such as characteristic diggings during field assessments.

Whilst the records are located around the rail corridor and water canals there is no evidence as yet to confirm use of such infrastructure by Long-nosed Bandicoots for movement (DECC, Leary et al 2008). Tracking of one individual suggests that the individuals move throughout the urban landscape and over roads to access suitable foraging gardens. A large stormwater canal runs open through the north-eastern portion of the subject site adjacent to landscaped and unmanaged areas and continues to the south below ground. There is no likely entrance to the site via usage of this canal given the steep concrete sides. There is no suitable habitat within the canal.

The chain mesh fencing observed between the site and the rail corridor is well maintained with only one observed opportunity for possible underpass in an open cemented area. Large buildings make up a large remaining portion of the central eastern property boundary. The only foraging areas within the rail corridor next to the site are on the other (eastern) side of the lines and the furthest ends to the site. The western side of the rail corridor along the subject site boundary is concrete, bitumen or gravel unsuitable for foraging, or shelter. There is no evidence of diggings along this fence or other fencing nearer to the more appropriate northern and southern foraging areas.

No evidence of diggings around structures likely to support shelters was observed. Hair tubes provided no recordings of terrestrial mammal activity in transect locations within the site grounds. Rats have however, been observed inside the flour storage buildings by workers. These are likely exotic Black Rats (*Rattus rattus*) or Brown Rats (*Rattus norvegicus*).

A more detailed survey for this species has been undertaken and attached (as attachment 1) to this report.

4.4 Potential ecological impact

The potential ecological impact on this site relates to the removal of foraging tree species for birds, arboreal mammals and megachiropteran bats.

4.5 Potential for improved environmental outcomes

It is recommended that future landscaping can potentially provide suitable foraging areas for the Long-nosed Bandicoot. Consequently, the location and design of beds should generally

be accessible at ground level and incorporate suitable shrub type vegetation that can protect and shelter bandcoots.

Landscaping should aim to retain or relocate the large Fig Trees as a foraging resource for arboreal native fauna species likely to currently utilise the site.

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SECTION 5.0 - 7 PART TEST OF SIGNIFICANCE (SECTION 5A EPA ACT 1979)

Council is required to consider the impact upon threatened species, populations and/or endangered ecological communities from any development or activity via the process of a 7 part test of significance. The significance of the assessment is then used to determine the need for a more detailed Species Impact Statement (SIS).

The following 7 part test of significance relies on the ecological assessment provided in Sections 3 & 4 of this report and should be read as such.

The '7 part test of significance' 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

Detailed flora and fauna investigations of the subject site, together with habitat assessments, have resulted in the identification of potential habitat for one threatened species. An assessment of this species is as follows:

Threatened Flora

No threatened flora species

Endangered Ecological Communities

No endangered ecological communities

Endangered Populations

- *Wahlenbergia multicaulis*
- *Pomaderris prunifolia*
- *Acacia pubescens*
- Long-nosed Bandicoot *(Parameles nasuta*) – *preliminary listing*

Threatened Fauna

- Grey-headed Flying-fox
- Eastern Bentwing-bat

No threatened species listed above were recorded during the flora and fauna survey. No suitable roosting and breeding habitat is present for the above mentioned fauna species.

Therefore, it is considered that the proposal is unlikely to disrupt the life cycle for any of these listed species such that a viable local population would be placed at risk of extinction.

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

There is one preliminary listing for an endangered fauna population within the Ashfield and Marrickville LGAs. This population is the Long-nosed Bandicoot (*Parameles nasuta*) in Inner-Western Sydney. The subject site contains limited and sub-optimal habitat for this population which is generally well fenced and difficult to access. There was no evidence to indicate the presence of this species within the site grounds and within the rail corridor area over the eastern fence. A full habitat assessment for this species is provided in Section 4.14 above.

There are three endangered flora populations within 10km of the subject site. These are:

- *Wahlenbergia multicaulis* in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield
- *Pomaderris prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas
- *Acacia pubescens* in the Hurstville and Kogarah Local Government Areas.

Despite searches undertaken for these three species within the subject site, no specimens were observed.

Therefore it is considered that the action proposed is not likely to have an adverse effect on the life cycle of these species that constitute the endangered populations such that a viable local population of these species is likely to be placed at risk of extinction.

c) In the case of a critically endangered or endangered ecological community, whether the action proposed:

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

No endangered ecological communities were observed within the study area.

ii. Is likely to substantially and adversely modify the composition such that its local occurrence is likely to be placed at risk of extinction

No endangered ecological communities were observed within the study area.

d) In relation to the habitat of threatened species, populations or ecological community:

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

It is considered that the habitat attributes of the subject site provide known or potential habitat for Grey-headed Flying-fox.

The subject site has an area of 2.48ha which is comprised of no natural vegetation. Approximately 0.58ha of this area represents landscaped vegetation whilst a further 0.31ha represents exotic trees and shrubs. The proposed development is likely to remove or modify approximately 0.89ha of vegetation that may provide habitat for the Grey-headed Flying-fox.

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

The subject site does not contain any remnant bushland. All vegetation on site is a result of either landscaping or disturbance.

Therefore, it is considered that known habitat for a threatened species, population or ecological community within the local area and region is unlikely to become isolated or fragmented as a result of the proposal.

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

Given the vegetation on site is not natural, the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population and ecological communities in the locality is considered to be minimal.

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

The site has not been identified as critical habitat within the provisions of the TSC Act (1995). Therefore this matter does not require any further consideration at this time.

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

No draft or approved recovery plans have been prepared for the threatened species with potential habitat within the subject site.

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.

Consultation with Schedule 3 of the *TSA* Act (1995) did not warrant for any Key Threatening Processes to be considered.

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SECTION 6.0 - CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

The document forms the basis of assessment required under Section 5A of the *Environmental Planning and Assessment Act* (1979). This assessment determines if future development of the site is likely to have a significant effect on threatened species, populations and/or endangered ecological communities.

Environmental Planning & Assessment Act 1979 & Threatened Species Conservation Act 1995

In respect of matters required to be considered under the *Environmental Planning & Assessment Act* (1979) and relating to the species / provisions of the *Threatened Species Conservation Act* (1995);

- No (0) threatened fauna species were recorded within the subject site;
- No (0) threatened flora species were recorded within the subject site; and
- No (0) endangered ecological communities were recorded within or in close proximity to the subject site

The 7 part test of significance (Section 5) has concluded that the proposed development will not have a significant impact on any threatened species, populations or endangered ecological communities. Therefore, a Species Impact Statement should not be required for the proposed development.

Environment Protection and Biodiversity Conservation Act 1999

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation Act* (1999);

- No (0) threatened fauna species were recorded within the subject site;
- No (0) threatened flora species were recorded within the subject site; and
- No (0) endangered populations or endangered ecological communities listed under this Act were recorded within or in close proximity the subject site.

Fisheries Management Act 1994

In respect of matters relative to the *Fisheries Management Act 1994*, no suitable habitat for marine/aquatic species was observed within the subject site and as such there are no matters requiring further consideration under this Act.

Conclusion

It is concluded that the proposed development of 2-32 Smith Street & 16-32 Edward Street, Summer Hill, is unlikely to result in a significant impact on any threatened species, populations or endangered ecological communities or their habitats. As such no further assessments are considered to be required under the *EP&A Act 1979, EPBC Act 1999 or FM Act 1994.*

6.2 Recommendations

- It is recommended that mature Fig trees are retained within the landscape plan to provide an ongoing foraging resource for birds, arboreal mammals and megachiropteran bats such as the threatened Grey-headed Flying-fox (*Pteropus policephalus*). Brush Box (*Lophostemon confertus*) is not an endemic native to the area, however retention of mature specimens, where possible, would provide an additional ongoing foraging resource for these species.

- The landscaping within the subject site could provide areas of vegetation that could contribute to foraging areas suitable for the Long-nosed Bandicoot. The proposed fencing should, where possible, allow for movement and access to the site for this species.

- It is recommended that any landscaping used on site should consider utilising locally occurring native species to support foraging habitat for local native fauna, particularly birds.

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ATTACHMENT 1

TARGET LONG-NOSED BANDICOOT SURVEY

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Travers environmental

Target Long-nosed Bandicoot Survey

ALLIED FLOUR MILLS SITE

2-32 SMITH STREET &

16-32 EDWARD STREET,
SUMMER HILL

JANUARY 2009
(REF: 8019)

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TARGET LONG-NOSED BANDICOOT SURVEY

Allied Flour Mills Site
2-32 Smith Street & 16-32 Edward Street, Summer Hill

JANUARY 2009

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ADDENDUM REPORT
Target Survey for Long-nosed Bandicoot – Allied Flour Mill, Summer Hill.

1 Introduction

Travers environmental has been engaged by *EG Funds Management* to carry out a Flora and Fauna Assessment within 2-32 Smith Street & 16-32 Edward Street, Summer Hill, hereafter referred to as the subject site. The proposed development will see demolition of existing Flour Mill buildings and structures on the site and redevelopment of the site for mixed use purposes.

Photo 1 - Long-nosed Bandicoot (*Parameles nasuta*) - PWD (Harbour North) sourced from Leary *etal.* (2008)

As a result of a briefing and consultation with DECC (Contact officer Mr Ray Giddens), target survey has been undertaken within the subject site for Long-nosed Bandicoots which have been recorded within the Dulwich Hill, Lewisham, and Petersham area. This Long-nosed Bandicoot (*Parameles nasuta*) population of inner Western Sydney has a preliminary listing as an endangered population under the Threatened Species Conservation Act 1995 (NSW). The full extent of this population is yet to be determined and whether the population is a remnant or a result of recent dispersal.

Confirmed records from this population occur within 1km to the north-east, south-east and south of the subject site. This population appears to be utilising urban landscapes for foraging areas and, uncharacteristically, using brick and cement structures (similar to that provided by the buildings of the subject site) for shelters. Although there is no supporting evidence, the recorded locations are in close proximity to the rail corridors which tends to suggest that the Long-nosed Bandicoot may be utilising infrastructure corridors for movement (Leary et al, 2008).

Whilst there is no physical evidence demonstrating a preferred movement corridor, there is limited radio tracking evidence of a female Long-nosed Bandicoot using remnant gardens and the urban streetscape for foraging and movement. Radio Tracking DECC found the female Long-nosed Bandicoot some 420 m from its den site which was found under brick steps that contained half brick gap and a void in which the nest was found. The poster paper (section 2 of report) identifies the preferred habitat in an urban landscape.

Given the close proximity of Long-nosed Bandicoot records in the surrounding suburbs (within 1km of the subject site), with the presence of the water canal and the rail corridor along the eastern perimeter of the subject site, it was considered appropriate to undertake target survey within the Allied Mills Flour Mill site.

This report summarises the findings of the target Long-nosed Bandicoot survey and a conclusion is made as to the presence or absence of this species and whether the proposed redevelopment of the site will result in a significant impact.

2 Summary of Existing Documentation

The following paragraphs summarise the outcomes of a poster paper prepared by Leary T. et al (undated publication but assumed to be 2008) as published by DECC on the internet titled: - "*Yuppie Bandicoots of the Inner West – Hiding or Urban Renewal?"* This poster paper represents the only publicly available written summary of the Long-nosed bandicoot survey conducted by DECC which identifies the population within the Dulwich Hill, Lewisham and Petersham suburban area. The entire poster paper is attached to this addendum report.

<u>Summary of the Poster Paper</u>

The Long-nosed Bandicoot *(Parameles nasuta)*, although the most common and widespread Bandicoot in eastern Australia was thought to have disappeared from inner-western Sydney in the late 1950's. In 2002 one adult male was trapped and evidence of another in Dulwich Hill sparked further surveys and requests for public information turning up little information.

Later, in November 2006 a Bandicoot was killed by a car in Dulwich Hill with other bodies turning up in quick succession which triggered renewed efforts of survey and media releases. Three of the dead animals were killed by cars, one by a dog in a backyard and two probably by foxes. Dead individuals and public sightings were mapped.

Figure 1 - Recorded locations for Long-nosed Bandicoot – Source Leary T. *et al* (undated publication but assumed to be 2008).

<u>Urban park survey for diggings</u>

In September 2007, 88 parks were visited from the Cooks River to West Concord based on mapped locations. 50 of these were searched on foot for signs of diggings given the presence for potential refuge/foraging areas. It was found that 12 parks had "possible" bandicoot diggings given that Pied Currawongs were observed to be making similar conical diggings during surveys.

<u>Pilot Radio-tracking Study</u>

Studies found a small population of Bandicoots on a church property at Lewisham. Two adult females from this population were trapped and fitted with tail-mounted radio-transmitters to determine where they were foraging and nesting. Home ranges were calculated along with core usage areas.

The nest of Female 1 was underneath a concrete staircase below an old hospital building. A small crack approximately the size of half a brick led into a large area below the steps with

the nest located inside a second entry inside the bottom step. The nest was a depression lined with shreds of vegetation. She foraged in garden beds and lawns and was recorded crossing a road. Several days she was tracked 420m away on the other side of the railway line.

Female 2 was tracked intermittently for a month spending most of the time foraging on the church property making three excursions across adjacent streets to backyards of different houses and a park.

Summary of Bandicoot Findings

- They like old buildings in need of renovation for nest sites.
- They appear to be foraging mainly in backyard gardens.
- Urban parks and the rail corridor may not be as important for nesting and foraging as first thought.
- The three animals caught were of good weight and condition.
- There can be high levels of mortality.
- They are active at or shortly after dark indicating that there is no evidence to suggest they are avoiding busy traffic periods.
- Short or no foraging over some nights may be a predator avoidance strategy.
- The church property at Lewisham provides a safe haven within a busy urban environment.

What is Still not Known

- If the inner west Bandicoots are a population or animals dispersing from elsewhere.
- If it is a population, are they a remnant population or a result of dispersal to an isolated locality?
- Size of the population and full extent of distribution.
- Is there a focal area?
- How to determine the population size given locations are predominantly on private land.
- If the vegetated railway corridor plays a role.

3 Target Survey Effort with Subject Site

Whilst the site was considered to provide marginal habitat for Long-nosed Bandicoot, the following survey was undertaken to confirm the presence or absence of this species within the subject site.

The site was assessed for the presence of any scats, markings, diggings, runways and scratches during visits. Any scats or pellets not readily identifiable are normally collected and sent to Barbara Triggs for identification of contents, hair or bone fragments. Habitat was also assessed to determine the likelihood of Long-nosed Bandicoots and threatened native species of fauna occurring within the subject site.

Hair tubes were used to target the presence of Long-nosed Bandicoot (*Parameles nasuta).* Three (3) hair tube transect lines each with six hair tubes were placed in areas of suitable passage from 3 October to 13 October 2008, amounting to 180 terrestrial hair tube nights. Transect locations are shown on Figure 1 of the Flora and Fauna Assessment Report. One transect was placed within the rail corridor to the east of the subject site to determine presence along the outer fence line. The separation distance varied between 10m and 20m.

The tubes were baited with a mixture of rolled oats, honey peanut butter and black truffle oil. Double-sided tape was attached around the entry of tubes so hair samples of animals entering the tube were collected. Hair tube transects within the subject site were located near to the rail corridor within any existing areas providing surface vegetation or refuse hides. The southern line was placed along old existing building structures with characteristics similar to those utilised by the local Bandicoot population. Hair samples collected were sent to noted expert Barbara Triggs for identification.

Alternative survey methods were considered such as cage Trapping and movement sensor cameras baited with Truffle Oil. However, as there was no evidence of diggings on site and the use of cameras was not practical, hair tube transects baited with truffle oil were considered to be a more effective survey method to determine presence of absence of Long-nosed Bandicoot onsite. As the hair tubes can be left onsite for an extended period, they are more likely to pick up presence or absence of this species.

4 Target Survey Results

A thorough search of the Allied Mills site revealed no evidence of Long-nosed Bandicoot diggings. There were no recorded samples of bandicoot hair from hair tube lines. The surrounding fence line was found to be in good condition with little to no opportunity for passage. The existing canal is of a profile that would not allow any bandicoot passage to and from the site. As a result of the target survey and inspection of surrounding barriers, it is considered unlikely that the subject site is utilised by Long-nosed Bandicoot.

4.1 Long-nosed Bandicoot Habitat Assessment

Whilst the records are generally located around the rail corridor and water canals in the local area there is no evidence as yet to confirm use of such infrastructure by Long-nosed Bandicoots for movement (DECC, Leary et al 2008). Tracking of one female Long-nosed Bandicoot suggests that individuals move throughout the urban landscape and over roads to access suitable foraging gardens. If the Long-nosed Bandicoot can access a garden, backyard, park or infrastructure corridor with suitable foraging habitat, then we have assumed that there is potential habitat for this species.

It is considered there is only sub-optimal habitat for the Long-nosed Bandicoot (*Parameles nasuta*) within the subject site. Cement foundations and other structures to support likely shelters and nesting behaviour generally have open and/or trafficable surrounds with little protection from sight.

Photo 1: *Canal showing almost vertical sides within a steeply cut channel.*

The limited foraging areas which occur within the northern and southern limits of the site are generally sparse and/or difficult to access. Such areas may support some invertebrate, fungi and other feeding opportunities; however these areas provided no evidence of foraging such as characteristic

diggings during field assessments.

The stormwater canal and the adjoining rail corridor were assessed for suitable habitat. The steeply sided open stormwater canal runs through the north-eastern portion of the subject site adjacent to landscaped and unmanaged areas and continues to the south below ground. There is no likely entrance to the site via usage of this canal given the steep concrete sides which provide very limited opportunity for animals to gain a foot hold. Any Long-nosed Bandicoot entering the canal will have to travel the entire length of the canal to find a suitable exit, which do not appear to exist within the subject site. There is no suitable foraging or burrowing habitat of any kind in the canal within the subject site.

The chain mesh fencing observed between the site and the rail corridor is well maintained with only one observed opportunity for possible underpass in an open cemented area. Large buildings make up the remaining portion of the central eastern property.

The only foraging areas within the rail corridor next to the site are on the eastern side of the railway lines and the furthest ends of the site. The western side of the rail corridor along the subject site boundary is concrete, bitumen or gravel, unsuitable for foraging or shelter. There is no evidence of diggings along this fence or other fencing nearer to the more appropriate northern and southern foraging areas.

There was no evidence of diggings around structures likely to support shelters for the Long-nosed Bandicoot. Hair tubes provided no recordings of terrestrial mammal activity in transect locations within the site grounds. Whilst rodents have been observed inside the flour storage buildings by workers, these animals are likely to be introduced Black Rats (*Rattus rattus*) or Brown Rats (*Rattus norvegicus*) which is supported by the dominance of rat hairs within hair samples collected from the hair tubes.

4.2 Potential for Improved Environmental Outcomes

Whilst survey has not identified the presence of Long-nosed bandiccot within the subject site, the sites grounds are potential foraging grounds for this species. Given the importance of this population, it is recommended that future landscaping within the site provide suitable foraging areas for the Long-nosed Bandicoot. Consequently, the location and design of beds should generally be accessible at ground level and incorporate suitable shrub type vegetation that can protect and shelter bandicoots.

5 Conclusion & Recommendations

There is a preliminary listing for the endangered fauna population Long-nosed Bandicoot (*Parameles nasuta*) within the Ashfield and Marrickville LGAs. The subject site contains limited and sub-optimal habitat for this population which is generally well fenced and difficult to access. Based on survey conducted to date, there was no evidence to indicate the presence of this species within the site's grounds.

The 7-part test assessment within the Flora and Fauna Assessment Report concluded that the proposal is not likely to have an adverse effect on the life cycle of the Long-nosed Bandicoot that constitute the endangered population in Inner-Western Sydney such that a viable local population of this species is likely to be placed at risk of extinction.

Given the close proximity of the site to recorded locations of Long-nosed Bandicoot, the landscape design should consider the provision of native landscape beds that can contribute

to foraging areas suitable for this species. The proposed fencing should, where possible, allow for movement and access to the site for this species.

ATTACHMENT

Leary, T., Kwok, A., & Ibbetson, P. *Yuppie Bandicoots of the inner West – in Hiding or Urban Renewal?* Parks and Wildlife Division – Department of Environment and Climate Change, NSW.

Yuppie bandicoots of the inner west – in hiding or urban renewal?

Photo: PWD (Harbour North)

Tanya Leary[1] , Alan Kwok[1] , Ben Khan[2] and Paul Ibbetson[2]

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Photo: PWD (Harbour North)

INTRODUCTION

** Yes, this seems like a long story - but believe us when we say it is worth reading!*

The Long-nosed Bandicoot (LNB) *Perameles nasuta* (the most common and widespread bandicoot in eastern Australia), was thought to have disappeared from inner western Sydney in the late 1950s. Populations still occur in the leafy suburbs north of the harbour & to the south in the Royal National Park, but inner western Sydney has virtually no remnant vegetation except for a few pockets along the Cooks River & the rail corridors. Bandicoots also appear to have disappeared from the Cumberland Plain. During four years of intensive fauna survey in western Sydney NPWS reserves we only recorded LNB's twice (1 trapped & 1 spotlighted), both from Agnes Banks Nature Reserve, which is not far from a known population at Yarramundi.

It came as a huge surprise when in 2002 we trapped an adult male LNB & found evidence of at least one other animal in an urban backyard in the suburb of Dulwich Hill, just off one of Sydney's major roads……And so began our quest to try to determine whether there really was a remnant bandicoot population in the suburbs of inner western Sydney. In 2003 we trapped & hair-tubed along the rail corridor at Dulwich Hill but found nothing but Black Rats *Rattus rattus* & House Mice *Mus musculus*. We also issued a media release asking for information from the public. This turned up lots of rat burrows & a few possible bandicoot diggings, but nothing terribly convincing. Frustratingly, nothing happened until November 2006, when a bandicoot was killed by a car in Dulwich Hill…. Several more bodies also turned up in quick succession. This poster presents our efforts to try to determine whether or not there really is a remnant population of Long-nosed Bandicoots in the inner west of Sydney.

METHODS, RESULTS AND DISCUSSION

Bodies & reports from the public

We mapped the locations of dead LNBs & the live animals that have been trapped, as well as the reports of bandicoots from local residents in the inner west in response to another media release in August 2007 (Figures 1 & 2). Many of the public sightings are still unconfirmed & many of the reports that we have checked have turned out to be rat holes.

Three of the dead animals were killed by cars, one by a dog in a backyard, & two probably by foxes. Excluding the outliers, the majority of the reports/signs are in an area approximately 5km long by 2km wide (Figure 2). There is no clear pattern to these sightings, though most are south of Parramatta Rd. Most of the sightings are within 700m of the railway corridor & water canal, however, there is little evidence at present to indicate any sort of reliance on this corridor.

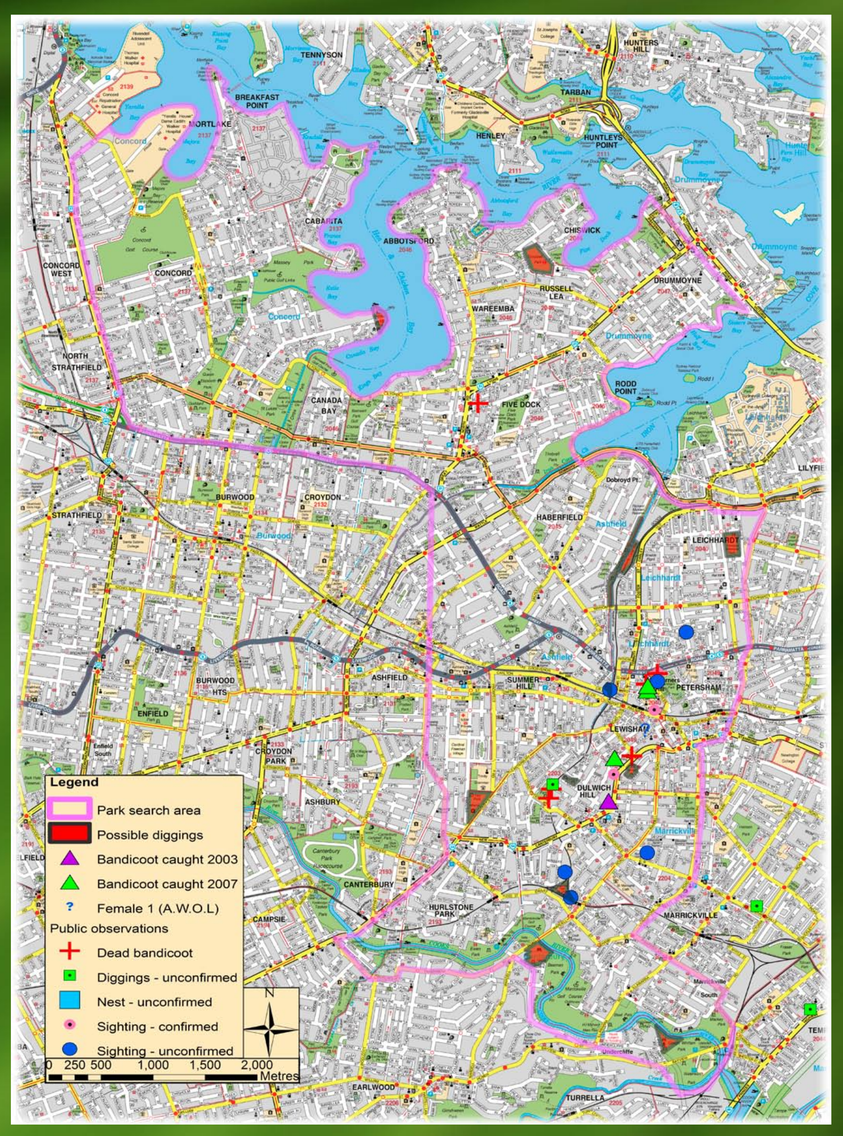

Figure 1: Inner west Sydney, showing search area for bandicoot diggings, as well as bodies and other reports.

Urban park survey for diggings

In September 2007 we searched every local park & recreational area from the Cooks River to West Concord (see Figure 1). The north-western search boundary was chosen because we had an unconfirmed report of a small population of LNBs at the repatriation hospital on Major's / Yaralla Bay in the 1990's (J. Sanders, DECC, pers. comm. 2007). We reasoned that if bandicoots had dispersed from that area, these parks, the water canal & the railway corridor would make a likely dispersal route. The southern boundary was chosen to incorporate another potential source area for animals – the Cooks River.

We visited 88 parks, & if they had potential refuge/foraging areas we searched them on foot (50) for signs of digging (see photo on right). On several occasions we observed Pied Currawongs *Strepera graculina* making "conical diggings" in loose mulch similar to a bandicoot. Consequently we cannot say with certainty that the diggings we observed are bandicoot diggings, & so have labelled these as "possible" bandicoot diggings (12 parks).

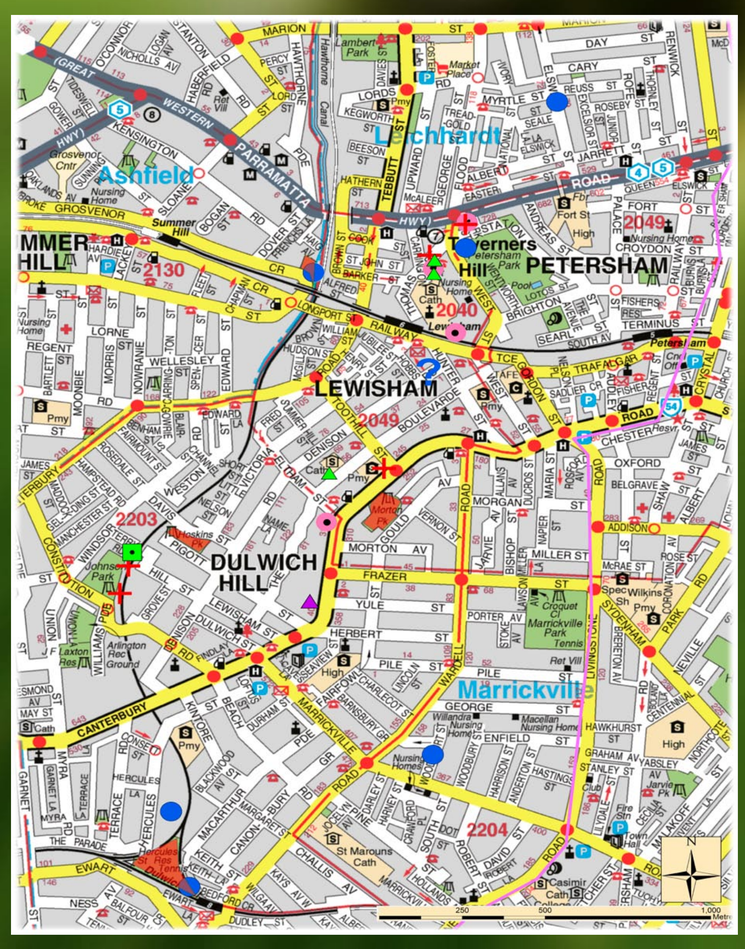

Figure 2: Finer scale location map showing majority of bandicoot sightings. For legend see Figure 1

Pilot radio-tracking study

When we became aware of a small population of between four & seven animals on a church property in Lewisham we fitted two adult females with tail-mounted radio transmitters (see photo below). We tracked these animals in late August/early September 2007 to gain insight into where they were nesting & foraging. We calculated the home range area for the single animal for which we had enough data using the minimum convex polygon (MCP) & fixed kernel method (KL). The 50%KL was defined as the core usage area.

Top left: *No no, we really did track a real bandicoot... we just don't have a transmitter photo!*

Above: *Betty Bandicoot's nest.*

Left: *An exceptionally neat bandicoot diggings They're not always this 'conical', and can be quite messy in loose soil.*

Female 1 – "Buggered off"

Nights 1 & 2

She remained in her nest, which was underneath an old hospital building on the church property. This nest was underneath a concrete staircase that led to the outside by a crack approximately the size of half a brick. Underneath the staircase was open to a space that could be entered by us, except for the lowest step, which only had a small opening (roughly 30cm in length). The step was essentially a hollow concrete rectangle – almost perfect protection for an animal. The nest itself was a shallow depression lined with shreds of vegetation.

Nights 3 to 5

On night 3 she foraged in the garden beds & lawns of the hospital & retirement village grounds until 4:00am, at which time we saw her cross the road & enter the garden of a Federation-aged house, under which she nested for the day. We did not radio-track for the next two nights.

Nights 6 to 9

We were unable to find her in this area on the 6th night. After 4 hours of systematically searching the streets we picked up her signal in the yard of another Federation terrace approximately 420m from her original location, & on the other side of the railway line (see Figure 2). She appeared to be nesting under this house, in a crawl space that we could not get to. While we were under the house the signal direction changed, indicating that she may have moved next door. Three days later the signal was still coming from this spot, & we concluded that she had either dropped her transmitter (which was pulsing at 60ppm rather than the 80ppm that it should be pulsing at if it had fallen off) &/or that this was some sort of weird signal matching our animal's frequency. We have been unable to find anything that might emit a signal at this frequency, & she did not return to her original trapped location with a working radio-transmitter.

Female 2 – "Betty bandicoot"

We tracked a second animal intermittently over a month, during which time she spent the majority of her time foraging in the church property. On several occasions she was active as early as 18:00, which was only half an hour after sunset. On some nights she either did not come out to forage or only foraged for an hour or two. This was often followed by a full night of foraging. She did however make three small excursions foraging in the backyards of different houses & a local park in adjacent streets (see Figure 3 below).

Most nights she nested under the same old hospital building as Female 1, but in a different section. However, she also nested under at least three other old buildings of either Federation or 1930s age. She had a home range of 2.6 ha & a core usage area of 0.11 ha.

Figure 3: Home range and core usage area for radiotracked Female 2 (Betty Bandicoot)

We retrieved her transmitter from the main nest once it had fallen off her tail. This nest was in a crawl space, which led to the outside world via a small hole in the brick-work. The crawl space was just like any other – dark & filled with loose dirt & old building material. Unlike the nesting area we identified for Female 1, this one was a relatively open crawl space, probably about 5m wide by 10m in length. The nest itself was underneath a piece of circular spongy-plastic-mesh, covered by loose dirt (see photo on left). One of the ends of the mesh was embedded into the soil, while the other end served as an entrance. A scrape was dug underneath the mesh – it was kidney-shaped & about 20cm at its deepest, 25-30cm at its longest & widest – the perfect fit for a bandicoot to snuggle up in!

What have we found out?

Habitat

We now know that, like yuppies, these bandicoots seem to like old buildings in need of renovation!!

1) They appear to be foraging mainly in backyard gardens. It appears that urban parks & the rail corridor might not be as important for nesting & foraging as we had first thought. Vegetation may be relatively unimportant as shelter, provided there are buildings that have external access (cracks & holes) to the space underneath.
2) It seems that bandicoots can find adequate food in urban backyards & aren't reliant soley on areas of remnant vegetation for foraging. The 3 animals that we have caught were heavy & in extremely good condition.

Mortality & behaviour

1) It is clear that there can be high levels of mortality (six bodies in nine months)!!
2) There is no evidence that the bandicoots are avoiding the busiest traffic periods to reduce the "risk of becoming roadkill" – both reports from residents & radio-tracking data show that the bandicoots are often active at or shortly after dusk.
3) The behaviour of "having a night in" or only foraging for a few hours per night may be a predator avoidance strategy. The inner west & the church property in particular have high numbers of cats, some of which are feral.
4) Overall, this particular church property probably represents a safe-haven in a hostile urban environment. The many garden beds provide food, there is minimal vehicular traffic & the bandicoots are able to move in relative safely, compared to nearby residential streets where the dangers of cars, dogs & cats abound.

What do we still not know?

The list of things that we don't know is massive! ☻ Some of the important questions include:

1) While growing evidence suggests there may be a population in the inner west, is this an actual population or just animals dispersing from elsewhere?
2) If it is a population, has it been hanging on for decades or are the animals just dispersing into a 'sink'? If they have been able to hang on in the inner west, why are they absent from the outer west of Sydney?
3) How large is this population? Also, we only have a little information as to how widely it may be dispersed.
4) Is there is a focal area for this population? Given that the majority of records are on private property we are running out of ideas on how we might obtain an estimate of the population size.
5) What is the role of the vegetated railway corridor, if any? For example, is it used for dispersal at a particular time of the year, or for foraging at all?

We will continue to try & answer some of these questions & if you have any information (including historical information) about bandicoots in the inner west, please contact the first author.

NSW National Parks and Wildlife Service

Department of Environment & Climate Change NSW

Legend

- Subject Site
- Fauna surveys for Birds and Reptiles (Main Locations)
- Anabat Station
- Landscaped Gardens and lawns
- Exotic Trees and Shrubs (High proportion of noxious and environmental weeds)
- Flora Quadrat (20 x 20m)
- Flora Random Meanders
- Hair Tube Transect
- Surface Canal
- Subterranean Canal

N

Flora and fauna survey locations are approximate and have not been fixed by land survey.

**Subject Site boundary subject to final survey*

Travers environmental

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0 10 20 30 40 50 m

1:1,500

Original plan produced in A3 colour

Drawing No.	8019	Date	
Drawn By	KF/TM/JP	24/10/08	
Amendment		Date	
A			
B			
C			

Figure 1 -

Fauna & Flora Survey

Edward Street & Smith Street, Summer Hill

Source: DLWC 1:25,000 Aerial Photograph,