CARDINAL FREEMAN VILLAGE

Supporting Documentation

Appendix I

Long Nosed Bandicoot Survey Report

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CARDINAL FREEMAN VILLAGE

Long-nosed Bandicoot Survey

For:

AEVUM LIMITED

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Draft Report

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Executive Summary

Surveys were undertaken by Cumberland Ecology at the Cardinal Freeman Village and surrounds to determine the occurrence of individuals of the endangered population of the Long-nosed Bandicoot (*Perameles nasuta*) in inner western Sydney. Targeted surveys for this species are a component of the Director General's Environmental Assessment Requirements (DGEARs) for the Cardinal Freeman Masterplan development application.

Background literature and database records pertaining to the Long-nosed Bandicoot, especially the endangered population in inner western Sydney, were reviewed to determine habitat suitability and likely occurrence of this species at the site. Methods employed during the survey were those prescribed by the NSW Department of Environment and Climate Change (DECC) in Attachment 1 of the DGEARs. These methods included:

- Daytime searches in suitable habitat on and adjacent to the site for signs of activity;
- Trapping in suitable habitat using small cage traps for a minimum of 4 nights; and
- Remote motion-triggered cameras used with baits installed at strategic locations at the site for a minimum of 2 weeks.

In addition to the prescribed methods outlined in the DGEARs, targeted surveys at the site included:

- Hair funnels deployed throughout the site for a minimum of 2 weeks; and
- Nocturnal searches using spotlight to determine the presence of bandicoots foraging at the site.

During the survey period no signs of the occurrence of the Long-nosed Bandicoot were detected at or in the vicinity of the site. Despite the absence of records, habitat assessment indicated that suitable habitat for the Long-nosed Bandicoot occurs both at the site and in surrounding locality. Suitable habitat features detected included:

- Established gardens and lawns providing suitable nocturnal forage areas;
- Old buildings and structures, dense vegetation and rubbish piles providing suitable shelter and breeding habitat; and
- Grass laneways, road verges, median strips, parks and gardens providing connectivity between suitable shelter, breeding and foraging habitat.

The absence of Long-nosed Bandicoots from the site may be a result of:

- Predation and harassment by domestic pets and feral predators in the locality;
- Use of pesticides and herbicides at the site and in the surrounding locality; and
- Traffic collisions with individual Long-nosed Bandicoots.

The combined impacts of these factors may have resulted in a local extinction of the Long-nosed Bandicoot on the site, or may be preventing this species from re-establishing a population in the locality. However, it is likely that despite these impacts and the absence of records a population of Long-nosed Bandicoots could occur in the locality, albeit at extremely low abundance.

The proposed development incorporates the removal of some existing buildings and the creation of additional green space areas. Removal of existing buildings is unlikely to impact on the Long-nosed Bandicoot as no individuals or signs were detected at the site or in the surrounding areas. However, precautions should be taken during demolition of these buildings to ensure that no individual Long-nosed Bandicoots are sheltering in the area.

The overall development has potential to result in an increase in suitable forage habitat for the Long-nosed Bandicoot if future habitat is managed correctly. Future management of the site should consider the provision of artificial shelter habitat and a restriction on the use of pesticides that are known to be toxic to the Long-nosed Bandicoot. This may facilitate use of the site in the future.

Chapter 1

Introduction

1.1 Purpose

Cumberland Ecology was contracted to undertake surveys of the Cardinal Freeman Village and surrounding areas (hereafter referred to as the "study area") to determine the occurrence of the Long-nosed Bandicoot (*Perameles nasuta*) and likely impacts on this species for the Cardinal Freeman Masterplan development application.

The purpose of this document is to present the results and recommendations of these surveys.

1.2 Background

The proposed development is located in Ashfield, within the Ashfield Local Government Area (LGA), and is bound by Victoria, Clissold, Queen and Seaview Streets (see **Figure 1.1).**

The proposed development will include the strategic demolition and rebuilding of new retirement units, new administration and community facilities and an Aged Care Facility. The new facilities will result in approximately 175 additional units/beds in the village. As part of the proposed development, a new "Village Green" open space will be created in the centre of the village.

The Department of Planning has issued Director General's Environmental Assessment Requirements (DGEARs) for the preparation of an Environmental Assessment under Part 3a of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the proposed refurbishment and expansion of existing aged care facilities at Cardinal Freeman Village.

The population of Long-nosed Bandicoots that remains in the inner west of Sydney has recently been listed as an endangered population under the NSW *Threatened Species Conservation Act 1995* (TSC Act). A known population of Long-nosed Bandicoots occurs in the Local Government Areas (LGA) of Marrickville and Canada Bay, with the likelihood that it also occurs in the Canterbury, Ashfield and Leichardt LGAs.

The Department of Environment and Climate Change (DECC) has recently become aware that a population of Long-nosed Bandicoots occurs to the east of Cardinal Freeman Village. Accordingly, the DGEARs require the proponent to conduct surveys in order to

clarify whether or not Long-nosed Bandicoots occur within, and make significant use of the subject site.

Figure 1.1 LOCALITY OF THE STUDY AREA

1.3 Biology of the Long-nosed Bandicoot

1.3.1 Introduction

Various native plant and animal species have demonstrated an ability to live within the matrix of Australia's largest towns and cities. On occasion, populations of animals of conservation significance can even persist within highly altered environments that no longer include native vegetation. Amongst such species are several species of bandicoots, including the Long-nosed Bandicoot.

Where such fauna populations occur there is a need to survey and assess population occurrence and habitat utilisation in order to acquire data for conservation management. This is the case with the Long-nosed Bandicoot, which has recently been discovered to occur in the inner west of Sydney.

*1.3.2 The Long-nosed Bandicoot (***Perameles nasuta***)*

The Long-nosed Bandicoot is a widespread species in eastern Australia and is not generally regarded as threatened. However, under the TSC Act there is potential to list individual populations of an otherwise widespread species as an endangered population. This is the case for the population that occurs on North Head near Manly and that which occurs around the inner western suburbs of Sydney. **Figure 1.2** shows a summary of recent records of bandicoots in inner western Sydney. Some such records occur in close proximity to the subject site.

The Long-nosed Bandicoot is a medium-sized (adults: 850 to 1100 g), omnivorous, ground-dwelling marsupial. Long-nosed Bandicoots forage for invertebrates on the soil surface and for invertebrate larvae, plant roots and hypogeal fungi by digging characteristic conical holes in the soil. Foraging is preferred in areas with an open understorey. It typically shelters during the day in one of several nests made with dry grass, twigs and leaves in a shallow depression or hidden amongst dense vegetation (NPWS 2000). Diurnal (day time) shelter sites are primarily in dense scrub vegetation, often comprising introduced species of plants.

At night, Long-nosed Bandicoots commonly use open grass macro-habitats disproportionately more for foraging than other macro-habitats (Chambers & Dickman 2002, Scott et. al. 1999). Lack of understorey and absence of leaf litter are the major micro-habitat features affecting habitat choice, although soil type probably also has some effect. Open areas may provide a more abundant and/or accessible food supply for Long-nosed Bandicoots, although better manoeuvrability or increased visibility to detect predators may also be important.

The dependence of Long-nosed Bandicoots on: (a) dense undergrowth for diurnal nesting and temporary nocturnal sheltering; and (b) open areas for foraging highlights the importance of recognising this mosaic of open and dense vegetation as required habitat for this species.

Home ranges of animals at North Head Sydney cover 4.4 ± 0.8 (s.e.) ha for males and 1.7 ± 0.2 ha for females (NSW Scientific Committee 2008). Breeding is seasonal at North Head with a peak of reproductive activity in late spring and early summer, and a cessation of breeding during late autumn and early winter. Up to four litters are produced per year with a mean litter size of 2.3. Very few sub-adult animals have been captured at North Head, suggesting a high rate of juvenile mortality. A pattern of high reproductive output with few successful recruits into the local population is common among bandicoots, in which juveniles disperse widely in an attempt to colonise habitat away from their mother's home range.

Long-nosed Bandicoots in inner western Sydney shelter mostly under older houses and buildings, and forage in parkland and backyards (NSW Scientific Committee 2008). The sub-adult and adult bandicoots presently living around the Dulwich Hill area may have dispersed from a source population occupying a larger area of remnant vegetation, such as Wolli Creek to the south. There are apparently no large blocks of suitable habitat, likely to support a large source population, on the Cooks River to the south, or along the southern foreshore of Parramatta River and Sydney Harbour to the north.

According to the Final Determination of the TSC Act, this population lives in a highly urbanised environment and faces numerous threats, including collision with vehicles and predation by dogs, cats and foxes (NSW Scientific Committee 2008). Renovation of old buildings, by replacing footings with concrete slabs and by closure of ground-level cracks and crevices, prevents the bandicoots' access to shelter sites in such 'crawl spaces'. Removal of weeds and dense vegetation along the freight rail corridor and in parks and gardens also reduces the value of this habitat for sheltering or dispersal. The population is small, fragmented and disjunct, and therefore at risk of extinction owing to local fluctuations in mortality and fecundity. 'Predation by the European Red Fox *Vulpes vulpes*' and 'Predation by the Feral Cat *Felis catus*' are two Key Threatening Processes listed under the TSC Act, that are likely to impact on this species.

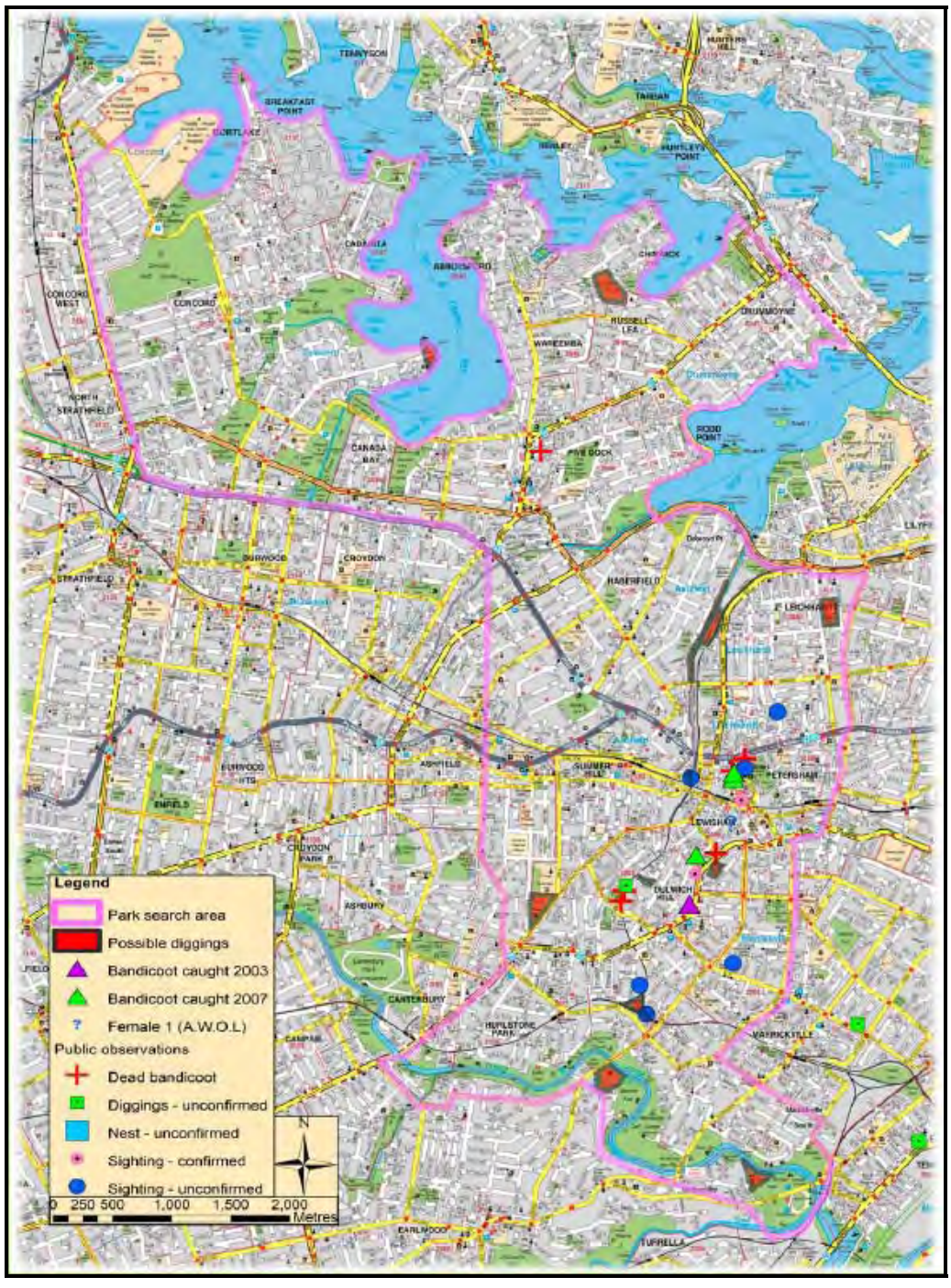

Figure 1.2 Recent records of Long-nosed Bandicoot in the Inner West of Sydney

1.3.3 Requirement to Survey

According to the DGEARs, the proponents are required to conduct a survey for the Long-nosed Bandicoot to ensure that the redevelopment does not jeopardise the status of the inner west population. Attachment 1 of the DGEARs stipulate the DECCs minimum survey requirements to effectively survey the study area for the occurrence of representatives of the endangered population of Long-nosed Bandicoots in inner western Sydney. As stated in Attachment 1, bandicoots have been recorded within 1km of the study area, and the project site contains suitable habitat for this species. Surveys for the Long-nosed Bandicoot within the study area are therefore justified.

Bandicoots are nocturnal animals and are sometimes difficult to locate when in small or sparse populations. Surveys were therefore carefully planned and conducted and utilised a variety different methods to ensure that the survey effort was effective and credible.

Cumberland Ecology conducted two stages of surveys on the subject site; initially a site reconnaissance followed by surveys using several different techniques. The first stage involved a fauna habitat assessment to determine areas of suitable habitat and to look for signs of habitat usage by bandicoots. The second stage involved the establishment of hair tubes, ground traps and covert camera surveillance of suitable areas on the site. These surveys were conducted according to the DECC guidelines for threatened species surveys and assessments. Details of survey methods are provided in Chapter 3.

Chapter 2

Literature Review and Database Analysis

2.1 Literature Review

Available literature on the site and the locality was collated and reviewed Particular emphasis was given to reviewing the details of:

- Attachment 1 to the DGEAR's;
- The final determinations of the NSW Scientific Committee regarding the Long-nosed Bandicoot in inner western Sydney – endangered population listing; and
- Leary T., Kwok A., Khan B. & Ibbetson P. (submitted). Yuppie bandicoots of inner west Sydney – in hiding or urban renewal? Manuscript submitted to *Australian Zoologist.*

Attachment 1 to the DGEAR's clearly outline the DECC's requirements to adequately survey the project site for representatives of the endangered population of the Long-nosed Bandicoot in inner western Sydney. As outlined in Attachment 1, the project has the potential to impact on bandicoots that may occur in the locality. The Long-nosed Bandicoot has been recorded within 1km of the project site, and as such has the potential to occur here.

Attachment 1 stipulates that surveys for bandicoots at the project site should be carried out by a suitably qualified person, and that the report should include details of the ecology of the bandicoots and the extent of suitable habitat both within the project site and in the surrounding areas. Survey techniques should be fully documented, and utilisation of the site and surrounding areas should be discussed in detail.

The final determinations of the NSW Scientific Committee provide details on the biology and ecology of the Long-nosed Bandicoot, particularly with regard to the endangered populations of this species in inner western Sydney. Descriptions of the Long-nosed Bandicoot and the biology and ecology of the species were incorporated into this report. Further, details regarding the pattern of distribution for the endangered population were incorporated into planning of surveys for this species.

Leary et al (submitted) provided valuable information regarding the distribution and habitat requirements of the endangered population of Long-nosed Bandicoots in inner western

Sydney. Further insight was gained into the specific requirements of this population of bandicoots for incorporation into the current surveys, and surveys of the wider locality surrounding the project site were structured in an attempt to expand upon the data provided by Leary et al (submitted).

2.2 Database Analysis

A review of threatened species databases was made to help assess the likelihood that Long-nosed Bandicoots could occur within the study area or in the wider locality. Database analysis was conducted for the locality (within a 10km radius of the subject site) using the DECC (**Appendix A**) database. The numbers of records of Long-nosed Bandicoots was used to assess the probability that a population could occur in the study area or surrounds. In total, 25 records of the Long-nosed Bandicoot were recorded from the Ashfield, Marrickville, Leicchardt, Canterbury and Canada Bay LGA's.

Maps of relevant bandicoot records were combined with assessment undertaken during the reconnaissance survey to inform the optimal design of bandicoot surveys of the study area.

Chapter 3

Methods

3.1 Survey Methods

Surveys for the Long-nosed Bandicoot at the site and in the surrounding area were carried out in accordance with the DGEARs for the Cardinal Freeman Masterplan development application. The survey methods prescribed by the DECC were:

- *Daytime searches in suitable habitat both on and adjacent to the site for any signs of activity (conical diggings, scratchings, burrows and scats);*
- *Trapping in suitable habitat both on and adjacent to the site using small cage traps (5 traps per 500m of suitable habitat for a period of 5 consecutive nights); and*
- *Remote motion-triggered infra-red cameras in combination with suitable baits installed at strategic locations (1 per every 500m of suitable habitat for a duration of 2 weeks).*

In addition to the requirements of the DGRs, hair funnels were utilised to increase the potential for detecting Long-nosed Bandicoots that may forage within the study area.

Five consecutive nights of trapping is not the standard minimum effort typically required by DECC. Deborah Stevensen of DECC amended the DGEARs by email on 5 May 2009 indicating that four consecutive nights would be an adequate minimum trapping requirement for the survey.

Surveys were conducted in accordance with the DEC Threatened Biodiversity Survey and Assessment Guidelines (DEC (NSW), 2004) and with strict adherence to requirements to conduct research under the Director General's Animal Care and Ethics Committee.

Long-nosed Bandicoot surveys and habitat assessment were undertaken from 11th to 22nd May 2009. A summary of trapping and sampling effort during the survey period is provided in **Table 3.1** and is shown in **Figure 3.1**.

Table 3.1 SURVEY EFFORT DURING MAY 2009 SURVEY

Survey Technique	CE Survey Effort
Reconnaissance Survey	4 hours for one day
Cage trapping	100 trap nights (25 cages deployed for 4 consecutive nights)
Hair funnels	500 sample nights (50 funnels deployed for 10 consecutive nights)
Remote Infra-red cameras	50 sample nights (5 cameras deployed for 10 consecutive nights)
Diurnal study area searches	10 hours (2 hours each day for 5 consecutive days)
Nocturnal searches	2 nights (1 hour each night) traverse of entire study area
Habitat assessment of study area	4 hours for one day
Locality searches	10 hours (2 hours each day for 5 consecutive days)

Figure 3.1 BANDICOOT SURVEY LOCATIONS

3.1.1 Reconnaissance Survey

Prior to the Long-nosed Bandicoot surveys a reconnaissance was undertaken of the study area and the wider locality to determine the optimal locations for equipment and efforts during the survey period. The reconnaissance survey included searches for suitable forage, shelter and breeding habitat within the study area as well as a search of the wider locality for potential habitat of the Long-nosed Bandicoot.

3.1.2 Trapping

Small cage traps were deployed during the survey period in order to capture Long-nosed Bandicoots that may occur within the study area for positive identification. Twenty-five cage traps were placed at various locations throughout the study area. The cage traps were baited with a standard bait mix of peanut butter, honey and rolled oats. Pieces of apple and raw sweet potato were also added to each trap. Traps were left out for a period of 4 nights and a total of 100 trap nights were surveyed across the survey period.

Cage traps were checked and closed early each morning, and any fauna captured were identified and released. Any bandicoots captured were photographed, weighed and sexed, and notes were taken about their general condition. All traps were re-opened late in the afternoon.

3.1.3 Hair Funnels

Hair funnels are a method for the survey and identification of mammals that rely upon collection and identification of hair samples. They are routinely used in Australian faunal surveys because they are very efficient means of searching for many animal species and many native fauna, including bandicoots.

Hair funnels are tubular or conical plastic devices that are baited and left in the field for up to 14 consecutive days. When animals try to eat the baits, they contact adhesive strips on plastic wafers that collect samples of hair. The plastic wafers are later taken from the hair funnels and sent to specialists who can identify the species using the trap based on the hairs collected.

The advantage of this method is that hair funnels do not need to be checked daily. They simply need to be deployed and then collected after a fortnight. The disadvantage of this method is that no photographs are collected of the animals and no data can be gleaned about numbers of individuals or their state of health.

Cumberland Ecology deployed 50 hair tubes for 10 nights across the study area during the survey period. Five hair funnels were deposited along each of ten transects, established throughout the study area. Hair funnels were baited with the standard bait mix as described for cage trapping.

3.1.4 Infra-red Cameras

Five motion-activated infra-red cameras were deployed at various locations throughout the study area over 10 consecutive nights. Cameras were located to maximise detection of Long-nosed Bandicoots that may be moving through the study area, and were often placed adjacent to features such as walls that would direct individual animals to travel past a specific point. Baits were placed in the image capture area of each camera in order to entice bandicoots to approach where they could be photographed.

At the end of the survey period data collected from all cameras were examined for images of bandicoots

3.1.5 Diurnal Searches

Diurnal searches were conducted of suitable habitat for the Long-nosed Bandicoot throughout the study area. Searches were conducted for:

- Conical pits that are signs of bandicoots digging for food;
- Scratch marks on surfaces indicating where bandicoots have removed surface material to detect food;
- Burrows indicating that bandicoots may be sheltering within the study area;
- Scats of bandicoots indicating their occurrence within the study area; and
- Individual bandicoots sheltering in suitable locations (e.g. under decking material) throughout the study area.

Diurnal searches were conducted for two hours each day for five consecutive days immediately following the checking and closing of cage traps within the study area.

3.1.6 Nocturnal Searches

Nocturnal searches of the study area were conducted on two non-consecutive nights (12th and 14th May 2009). Searches were conducted using a spotlight where necessary; however lighting was often adequate to successfully observe any bandicoots that may have been foraging throughout the study area. During each night of nocturnal searches the entire study area was traversed on foot by one observer looking and listening for bandicoots or recent signs of bandicoots feeding (e.g. conical diggings). In particular, all open grassy areas were thoroughly checked.

3.1.7 Habitat Assessment

Fauna habitat assessment was undertaken for four hours on one day within the study area to look for relevant areas of cover that could shelter bandicoots by day, and potential feeding areas where the animals may forage at night.

The site was assessed for ground and shrub/understorey cover, urban habitat features such as cleared lawns, drain pipes, abandoned/little-used long-term infrastructure, and signs of bandicoot usage such as scats and scratches. Indirect indicators of Long-nosed Bandicoot use of the site such as diggings, footprints, nests, burrows, paths and runways were also recorded.

3.1.8 Locality Searches

During the survey period, searches were conducted throughout the wider locality to detect signs or suitable habitat for the Long-nosed Bandicoot. **Figure 3.2** shows the boundaries within which searches were undertaken. Locality searches were similar to those described for diurnal searches and habitat assessment of the study area, but were conducted over a much wider area with limited time allocated to each area searched.

Locality searches involved surveying the wider area from a vehicle searching for potential bandicoot habitat, or traversing the area immediately surrounding the study area on foot. Suitable habitat for bandicoots was more closely examined on foot for any signs of bandicoot activity. In particular, specific searches were undertaken for conical diggings and scats at various locations in the wider locality.

Locality searches were undertaken for 2 hours on each of the five trapping days during the survey period. Locality searches were conducted immediately following diurnal searches of the study area.

3.2 Weather Conditions

A summary of weather conditions in the locality of the study area during the survey period are provided in **Table 3.2**. Weather conditions in the 2 weeks leading up to the survey period were generally mild with maximum daily temperatures of around 23°C and minimum temperatures of 10°C. Consistent light rainfall occurred on most days prior to the survey with a total of 46.9mm falling in the two week period (maximum of 13.0 mm on one day).

Weather conditions during the survey period were slightly cooler with the daily maximum temperature varying from 18.9°C to 21.4°C and daily minimum temperature ranging from 9.6°C to 15.6°C. Rainfall was minimal in the first week of the survey period, however rainfall increased towards the end of the survey period with 54.6mm falling in the last four days of survey.

Figure 3.2 BOUNDARIES OF THE LOCALITY SEARCH

Table 3.2 GENERAL WEATHER CONDITIONS

Date	°C min	°C max	Rain (mm)
11/05/2009	11.8	18.9	1.4
12/05/2009	9.6	20.1	0
13/05/2009	10.4	21.3	0
14/05/2009	11.1	21.5	0
15/05/2009	12.4	21.7	0
16/05/2009	14.2	21.7	0
17/05/2009	11.4	20.7	0
18/05/2009	10.5	20.9	0
19/05/2009	13.0	21.4	2.6
20/05/2009	14.5	21.2	20.2
21/05/2009	14.8	19.7	27.2
22/05/2009	15.6	19.6	4.6

Source: Bureau of Meteorology (2009)

3.3 Survey Limitations

The surveys are limited in being “snapshot” investigations and so present an indication of bandicoot activity in the study area and wider locality during the time of the surveys.

It is considered that the timing of a late autumn survey was suitable for detecting Long-nosed Bandicoots that may occur within the study area or in the surrounding locality. This species is active throughout the year and seasonality is unlikely to be a factor in survey success.

The mild and damp conditions experienced leading up to and during the survey period were suitable for detecting bandicoot activity in the study area. Damp conditions make it easier for bandicoots to dig and also promote activity of earthworms and other prey items. It is likely that the Long-nosed Bandicoot would take shelter during extremely heavy rainfall, however this species has been observed foraging at other locations during relatively heavy rain (C. Corden pers. obs.). Rainfall conditions experienced in the study area at the end of the survey period are therefore unlikely to have deterred bandicoots from foraging.

Accessing suitable bandicoot habitat on private property in the surrounding locality was a significant limitation to efforts during the survey period. It is probable that substantial forage and shelter habitat for bandicoots adjacent to the study area remained un-surveyed as these properties were not able to be accessed during the survey period.

Chapter 4

Results and Impact Assessment

4.1 Results of the Field Surveys

No bandicoots were detected on the subject land or in the locality surrounding it. The House Mouse (*Mus musculus*) and the Black Rat (*Rattus rattus*) were the only two terrestrial mammal species recorded within the study area during the survey period. Both species were recorded from hair samples collected in hair funnels. All other survey methods were unsuccessful at detecting any terrestrial mammals within the study area.

During the survey period no signs of the occurrence of the Long-nosed Bandicoot were detected within the study area or in the wider locality.

The absence of Long-nosed Bandicoots from the site may be a result of:

- Predation and harassment by domestic pets in the locality;
- Use of pesticides and herbicides at the site and in the surrounding locality; and
- Traffic collisions with individual Long-nosed Bandicoots.

It is possible that the combined impacts of these factors may have resulted in a local extinction of the Long-nosed Bandicoot in the locality, or may be preventing this species from re-establishing a population in the locality. However, it is more likely that despite these impacts and the absence of records a population of Long-nosed Bandicoots could occur in the locality, albeit at extremely low abundance.

Despite the absence of records, habitat assessment indicated that suitable habitat for the Long-nosed Bandicoot occurs both at the site and in surrounding locality. **Appendix B** illustrates some of these habitat features within the study area. Suitable habitat features detected included:

- Established gardens and lawns providing suitable nocturnal forage areas;
- Old buildings and structures, dense vegetation and rubbish piles providing suitable shelter and breeding habitat; and
- Grass laneways, road verges, median strips, parks and gardens providing connectivity between suitable shelter, breeding and foraging habitat.

4.2 Impact Assessment

The proposed development will involve the demolition of some existing buildings within the study area. No Long-nosed Bandicoots were found during the survey period and it is unlikely that the demolition works will have an impact on the endangered population of this species in inner western Sydney. However, it should be acknowledged that removal of existing buildings has the potential to remove suitable shelter habitat for bandicoots and to cause injury or fatality to individual bandicoots that may shelter beneath these buildings during demolition.

The proposed development will result in a consolidation of new buildings, and the creation of a larger "Village Green" at the centre of the village. The new green space created may result in an increase in potential forage and shelter habitat for bandicoots by providing lawn areas surrounded by some dense garden vegetation.

The proposed development is unlikely to result in any significant impacts on the endangered population of the Long-nosed Bandicoot in inner western Sydney. Despite intensive efforts over a 2 week survey period, bandicoots were not detected within the study area or in the wider locality. It is therefore unlikely that this species is resident within the study area.

Given the secretive nature and nocturnal habits of this species, combined with access limitations preventing a thorough survey of surrounding properties, it is possible that the Long-nosed Bandicoot does occur in the wider locality despite the absence of records during the survey period. This species may forage infrequently within the study area, and the potential exists for bandicoots to re-colonise the project site from surrounding areas in the future. The provision of suitable forage and shelter habitat for this species through landscaping and creation of green space may therefore benefit the endangered population of the Long-nosed Bandicoot in inner western Sydney over the long-term.

Chapter 5

Conclusion and Recommendations

Habitat assessment indicates that suitable forage and shelter habitat for bandicoots currently exists within the study area. The proposed development will not remove any significant habitat for the Long-nosed Bandicoot, and the creation of new green space areas will result in the continued occurrence of suitable habitat for this species following construction. Given the relatively small size of the proposed development and the occurrence of a much larger area of habitat in the wider locality it is unlikely that the development result in any significant impacts on the endangered population of the Long-nosed Bandicoot in inner western Sydney even if bandicoots did occur within the study area.

The proposed development involves the demolition of some existing buildings.. Removal of existing buildings is unlikely to impact on the Long-nosed Bandicoot as no individuals or signs were detected at the site or in the surrounding areas. However, precautions should be taken during demolition of these buildings to ensure that no individual Long-nosed Bandicoots are sheltering in the area.

The overall development has potential to result in an increase in suitable forage habitat for the Long-nosed Bandicoot and may in future be colonised by the bandicoots if managed appropriately. Bandicoots would not be a problem for the site and, if they did occur in the future, could be a feature of interest for the residents.

Future management of the landscape of the property could consider the provision of artificial shelter habitat and a restriction on the use of pesticides that are known to be toxic to the Long-nosed Bandicoot. Cat and fox controls, the use of native plants and creation of artificial shelter in landscaping plans and education of workers and residents at the project site may also be employed as measures increase the probability of bandicoot occurrence in the future.

References

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Appendix A

DECC database records

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Appendix B

Photos of suitable bandicoot habitat within the study area

Photograph B.1 **Artificial structure suitable as shelter habitat for bandicoots**

Photograph B.2 **Suitable forage habitat adjacent to dense vegetation**

Photograph B.3 **More suitable forage habitat adjacent to dense shelter**

Photograph B.4 **Dense vegetation providing suitable shelter habitat**

Photograph B.5 **Dense vegetation along the site boundary**

Photograph B.6 **Grassy lanes and dense garden vegetation near the site**