Terrestrial Biodiversity Report

for a

s4.55 Mofification of DA for Replacement Dwelling

at

8 Bower Street, Manly

by

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March 2024

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1. Introduction

1.1. Background

This report updates a previous report to refect proposed changes (s4.55 Modification) to an approved Development application DA2018/062 for a replacement house at 8 Bower Street, Manly, then assesses the likely combined impact of a proposed development including the amendments to the proposed development, on the terrestrial flora, fauna and ecological communities, in particular the Endangered Long-nosed Bandicoot population on North Head. The NSW Biodiversity Conservation Act Scientific Committee and Department of Planning and Environment (DPE) Profile have determined that this population is a risk of extinction unless threats cease. They have identified that the Key Threatening Processes are loss of habitat and change to habitat access as potential impacts and to the Endangered Long-nosed Bandicoot population. This report also makes recommendations on ways to avoid or reduce impacts caused by the development.

1.2. Legislation Addressed by this Report

This section describes the Local, State and Federal legislation that provide the legal framework for the protection and conservation of native flora and fauna relevant to this proposal.

1.2.1. Environment Planning and Assessment Act 1979, EP&A Act

The NSW Environment Planning and Assessment Act 1979 is the framework for approval of development in NSW. This proposal will be assessed under Part 4 of the EP&A Act, which requires the determining authority (usually Council) to not approve local development (Development Applications, DA's) without considering the heads of consideration in S 4.15 of the EPA Act, which requires the assessment of relevant legislation (Biodiversity Conservation Act, SEPP, LEPs, DCPs ect.)(4.15a), the environmental impact of the proposal (4.15b) and the suitability of the site for development (4.15c). Section 6.3 of this report addresses the BC Act and the relevant heads of consideration.

1.2.2. Biodiversity Conservation Act 2016

Section 7.2 of the Biodiversity Conservation Act requires that all local developments (Development Applications DAs, Part 4 EP&A Act):

- *Implement the core purpose of the Act a hierarchy to "Avoid" and "Minimise" impacts; only then can "Offsets" be used for any residual impacts.*
- *Be assessed to determine whether they trigger the BOS Threshold Test specified in the Biodiversity Conservation Regulation 2017, which has two parts; the area of native vegetation that the proposal will impact and a check of whether the impact is within an area of mapped "biodiversity" on the biodiversity values map; and*
- *Be assessed by a qualified ecologist to determine if there may be a positive a 5-Part Test of Significance as outlined in part 7.3 of the BC Act for each Threatened species or ecological community (listed in the schedules of the BC Act) or their habitats (listed in the schedules of the BC Act) that may occur on the site.*
- *Be assessed to determine if the proposal may impact on an Area of Outstanding Biodiversity Value (AOBV).*

Developments that trigger the Threshold Test or have a positive 5-Part Test of Significance, or impact on an AOBV, need to enter the Biodiversity Offset Scheme (BOS), and require that the Biodiversity Assessment Method (BAM) be applied and include a Biodiversity Development Assessment Report (BDAR) with the DA application. The proposal also needs to be assessed to determine if it may result in a Serious and Irreversible Impact (SAII).

If a development application does not meet the threshold or any other triggers, then a smaller report is still required to address the "heads of consideration" (section 4.15 of the EP&A Act), 5-part Test of Significance as required by the Manly DCP, SEPPs and Local Council's LEP/DCP requirements.

1.2.3. Biodiversity Conservation Act 2016, Threshold Test

This proposal is **not** considered to meet the BC Act threshold as;

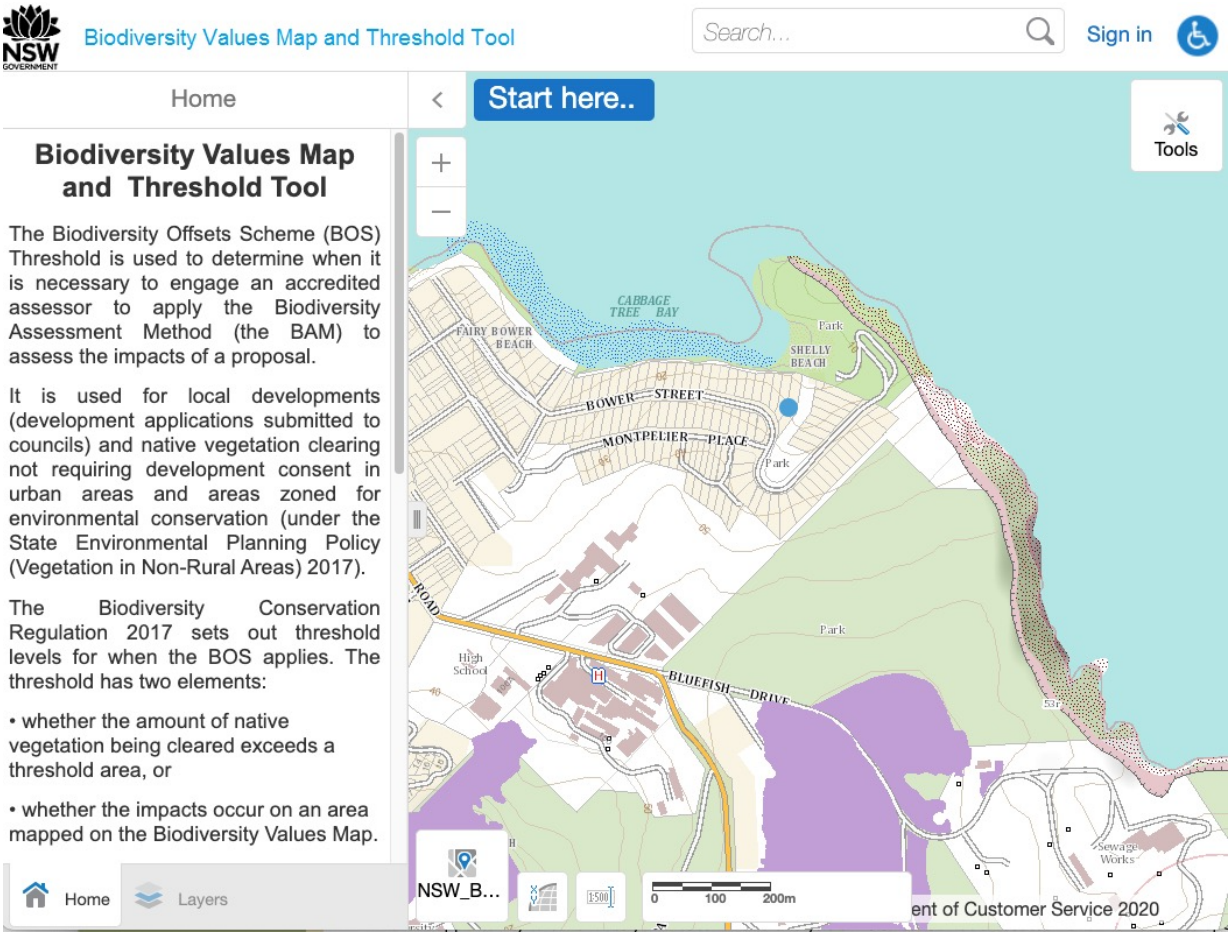
The lot size is less than 1ha and there is less than 0.25ha of native vegetation being removed. **and**

The proposal will not directly or indirectly impact a declared Area or Outstanding Biodiversity Significance (AOBV) or an area mapped as having high biodiversity value on the "Biodiversity Values Map". See figure below. **and**

There is not likely to be a significant affect (5-part test of significance test in Section 7.3, BC Act) on any Threatened species or ecological community or their habitat, as has been determined by section 6.1 of this report.

Therefore, the proposal does not need a Biodiversity Development Assessment Report (BDAR).

The Threshold Test, 5-Part Test, assessment of AOBV, heads of consideration, SEPP LEP/DCP requirements are all assessed in Section 4 of this report.



1.2.4. Manly Local Environment Plan, MLEP 2013

The development proposal has been assessed against the following Local Government provisions: Manly LEP Clause 5.23 (Public Bushland) - Manly LEP Clause 6.5 (Terrestrial Biodiversity) - Manly DCP Clause 5.3.2.1 (Threatened Species and Critical Habitat Lands) - Manly DCP Clause Manly DCP Clause 3.3.1.iv) (Landscaping in Bandicoot Habitat).

The property boarder's public bushland on its rear western boundary. Development applications boarding land, that meets the definition of public bushland, require consideration of Clause 5.23 (7) 'Public Bushland' (Manly LEP 2013). Development proposals need to be consistent with the objectives of this clause and include appropriate measures to avoid, minimise or mitigate possible impacts of the development on the biodiversity of adjacent bushland.

The Manly (Northern Beaches Council) Local Environment Plan's (2013) 'Terrestrial Biodiversity Map' identifies this property as having high terrestrial biodiversity value. Development applications in the mapped area require consideration of Clause 6.5 (3) and (4) 'Terrestrial Biodiversity' (Manly LEP 2013). Development proposals need to be consistent with the objectives of this clause and include appropriate measures to avoid, minimise or mitigate possible impacts of the development on biodiversity.

The property is located within known habitat for the endangered population of Long-nosed Bandicoots at North Head; as such, assessment of potential impacts is required to be undertaken in accordance with Section 7.3 of the NSW Biodiversity Conservation Act (i.e. the threatened species "test of significance"). This assessment has been undertaken.

Extract from MLEP 2013:

5.23 Public Bushland

(1) The objective of this clause is to protect and ensure the ecological viability of bushland, including rehabilitated areas in urban areas, by—

(a) preserving biodiversity, habitat corridors and links between public bushland and other nearby bushland, and

(b) preserving bushland as a natural stabiliser of the soil surface, and

(c) preserving existing hydrological landforms, processes and functions, including natural drainage lines, watercourses, wetlands and foreshores, and

(d) preserving the recreational, educational, scientific, aesthetic, environmental, ecological and cultural values and potential of bushland, and

(e) mitigating disturbance caused by development.

(2) Development that will disturb, or is reasonably likely to disturb, public bushland is permitted with development consent.

(3) Development consent must not be granted to development that will disturb, or is reasonably likely to disturb, public bushland unless the consent authority is satisfied of the following—

(a) the disturbance of the bushland is essential for a purpose in the public interest,

(b) there is no reasonable alternative to the disturbance,

(c) the development minimises the amount of bushland to be disturbed,

(d) the development includes measures to remediate the disturbed bushland.

(4) Despite subclause (2), development that will disturb, or is reasonably likely to disturb, public bushland is permitted without development consent if the development is for the following purposes—

(a) the construction, operation or maintenance of pipelines to carry water, sewerage or gas or pipelines licensed under the Pipelines Act 1967,

(b) the construction, operation or maintenance of electricity or telecommunication lines,

(c) bush fire hazard reduction,

(d) the construction or maintenance of classified roads,

(e) facilitating the recreational use of the public bushland.

(5) Development specified in subclause (4)(e) is permitted without development consent only if it is carried out in accordance with a plan of management for the public bushland, adopted by the Council in the same way a plan of management is required to be adopted for community land under the Local Government Act 1993, Chapter 6, Part 2, Division 2, that includes measures for the following—

(a) the recreational use of the land,

(b) bush fire hazard reduction,

(c) the prevention of degradation, including the alteration of drainage patterns, rubbish dumping, vehicle intrusion and infestation with weeds or non-native plants,

(d) the remediation of degraded public bushland.

(6) This clause does not require development consent for clearing of native vegetation if the clearing is of a kind that is authorised under the Local Land Services Act 2013, section 60O.

(7) In deciding whether to grant development consent to development on land adjoining public bushland, the consent authority must consider the following—

(a) the need to retain public bushland adjoining the site of the development,

(b) the likely effect of the development on public bushland, including the following—

(i) the erosion of soil,

(ii) the siltation of streams and waterways,

(iii) the spread of weeds and non-native plants within public bushland,

(c) other matters the consent authority considers relevant to the protection and preservation of public bushland.

(8) This clause does not apply to the following land that is public bushland—

(a) land in Zone RU1, RU2, RU3, RU4 or RU5,

(b) land reserved, dedicated or acquired under the National Parks and Wildlife Act 1974,

(c) land within a State forest, flora reserve or timber reserve within the meaning of the Forestry Act 2012,

(d) land to which State Environmental Planning Policy (Precincts—Western Parkland City) 2021, Chapter 7 applies.

(9) In this clause—

***disturb** public bushland means—*

(a) remove vegetation from public bushland, or

(b) cause a change in the natural ecology of public bushland that results in the destruction or degradation of the public bushland.

***non-native plant** means a plant that is not native vegetation.*

***public bushland** means land—*

(a) on which there is vegetation that is—

(i) a remainder of the natural vegetation of the land, or

(ii) representative of the structure and floristics of the natural vegetation of the land, and

(b) that is owned, managed, or reserved for open space or environmental conservation by the Council or a public authority.

6.5 Terrestrial biodiversity

(1) The objective of this clause is to maintain terrestrial biodiversity by:

(a) protecting native fauna and flora, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

(2) This clause applies to land identified as "Biodiversity" on the Terrestrial Biodiversity Map.

(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:

(a) whether the development is likely to have:

(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and

(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and

(iii) any potential to fragment, disturb or diminish the biodiversity structure, function, and composition of the land, and

(iv) any adverse impact on the habitat elements providing connectivity on the land, and

(b) any appropriate measures proposed to avoid, minimise, or mitigate the impacts of the development.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited, and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited, and will be managed to minimise that impact, or

(c) if that impact cannot be minimised - the development will be managed to mitigate that impact.

These sections of the Manly LEP are addressed within this report.

1.2.5. Manly Development Control Plan, DCP

Manly Development Control Plan 2013 Section 2.1.15 'Threatened Flora and Fauna Assessment of Significance Report, including the Long-nosed Bandicoot, and Little Penguins' requires the assessment of the significance of impact on threatened species, populations or ecological communities or their habitats.

Manly DCP 2013

DCP extract 2.1.15 'Threatened Flora and Fauna Assessment of Significance Report'

Objective 1) To ensure the assessment of any significant effect on threatened species, populations or ecological communities or their habitats (as listed in the Threatened Species Conservation Act 1995) in accordance with Section 5A of the Environmental Planning and Assessment Act 1979 (now superseded by section 7.3 of the Biodiversity Conservation Act 2016).

DCP extract 5.4.2 'Threatened Species and Critical Habitat'

Any development of land with known habitat for threatened species must consider the likely impacts of the development and whether further assessment needs to be undertaken by a Species Impact Statement.

DCP 3.3.1 Landscape Character

iv) *The design, quantity and quality of open space should respond to the character of the area. In particular:*

iv) In areas of habitat for the long-nosed bandicoot: (see paragraph 5.4.2), landscape *design must include native plant species to provide new and/or improved low dense clumping habitat to provide for potential foraging and nesting. The planting schedule should comprise species such as Lomandra sp. Dianella sp., Banksia spinulosa, Caustis sp., Xanthorrhoea sp., Isolepis sp., Juncus sp., Adiantum sp., Calochlaena sp., Callistemon sp., Grevillea juniperina, Gleichenia sp., Grevillea 'Robyn Gordon' and tussocky native grasses (eg. Kangaroo Grass)*

DCP Extract - Schedule 1 - Map D - Areas where Assessment of Significance is required (for Little Penguins and/or Long Nosed Bandicoots)

This report includes a Test of Significance (5-part test) for the Endangered Long-nosed Bandicoot population at North Head and other Threatened Species, Populations or Endangered Ecological Communities that may be impacted by the proposal. The Impact Assessment section of this report addresses these clauses.

1.2.6. State Environmental Planning Policies and Sydney Regional Environmental Plans

The SEPPs and SREPs which are relevant to Northern Beaches LGA and which may be relevant to this proposal are Sydney Regional Environmental Plan (Sydney Harbour Catchment) (SREP SHC) 2005 (which amends SEPP No 56 Sydney Harbour Foreshores and Tributaries).

The Impact Assessment section of this report assesses the specific ecological matters that are to be considered.

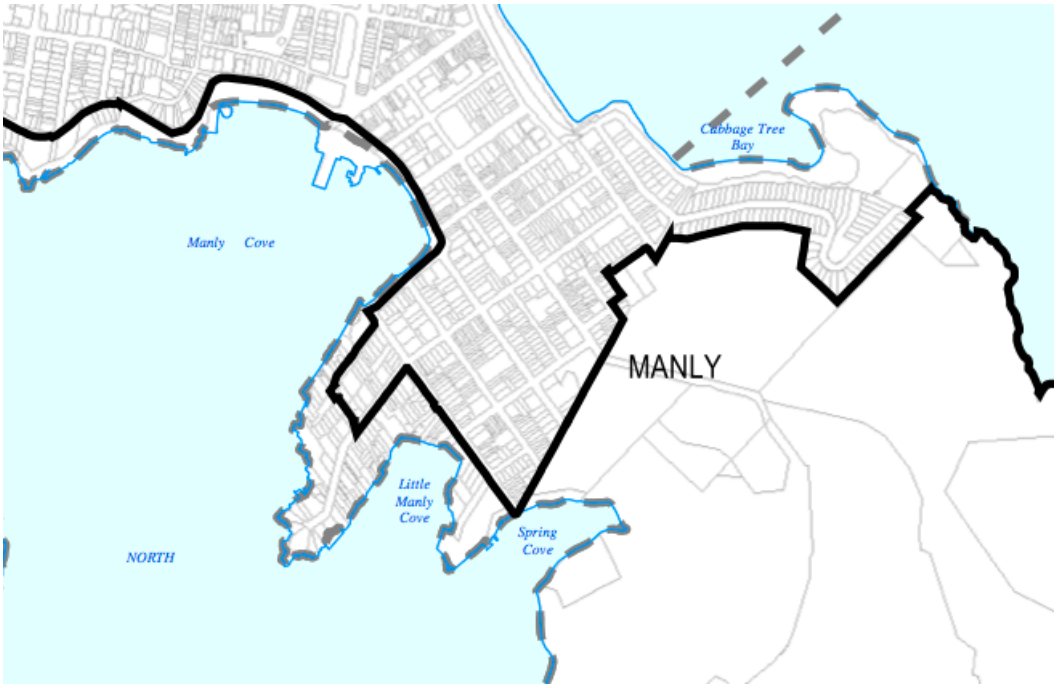


Image: Strategic Foreshores and Waterways Area – Part of Sheet 4 SREP SHC

Resilience and Hazards SEPP 2022

This SEPP defines four coastal management areas and specifies the assessment of development within these management areas.

The Resilience and Hazards SEPP also maps Coastal Wetlands and Littoral Rainforest and areas within proximity of Coastal Wetland and Littoral Rainforest and includes controls for development within those areas.

The site and the adjacent land are not mapped as Littoral rainforest.

The SEPP Resilience and Hazards (2021) 'Coastal Environment Area Map' identifies this property as having Coastal Environment Area present in the North-west corner of the site. Development applications in the mapped area require consideration of Clause 2.10 (1a, b, c, and d) and (2) 'Development on Land within the Coastal Environment Area' (Resilience and Hazards SEPP 2022). Development proposals need to be consistent with the objectives of this clause and include appropriate measures to avoid, minimise or mitigate possible impacts of the development on biodiversity.

1.2.7. Federal Environment Protection and Biodiversity Conservation Act 1999, EPBC Act

The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) will need detailed assessment if the proposal is considered likely to have an impact on a 'Matter of National Environmental Significance (MNES), thus providing a trigger for referral of the proposal to the Department of the Environment and Water Resources. Matters of national environmental significance identified in the Act are; world heritage properties; national heritage places; RAMSAR wetlands; nationally threatened species and communities; migratory species protected under international agreements; the Commonwealth marine environment; and nuclear actions.

Section 6.3 of this report addresses this requirement.

1.3. Definitions

Assessment of Significance (5-Part Test) - Assessment under Section 7.3 of the BC Act to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. The minister has provided a guide under 7.3(2) titled Threatened Species Assessment Guidelines.

BC Act - NSW Biodiversity Conservation Act 2016 contains the lists of threatened species, the definitions of the threatened ecological communities, the 5-part Test of Significance and the Biodiversity Offset Scheme (BOS). There are associated Biodiversity Conservation regulations which refers to the BAM.

Clearing – clearing of native vegetation including cutting down, felling, uprooting, thinning or otherwise removing native vegetation, killing destroying, poisoning, ringbarking or burning native vegetation and includes establishment and maintenance of bushfire protection Asset Protection Zones (APZ) inner and outer zones.

Direct Impacts - are impacts that directly affect habitat, ecosystems and individuals. They include, but are not limited to, death, trampling, poisoning of the animal/plant itself and the removal of vegetation and suitable habitat. When applying each factor, consideration must be given to all the likely direct impacts of the proposed activity or development during construction. As defined by the 2018 Threatened Species Assessment Guidelines.

DPI – NSW government of Department of Primary Industries

EPA Act (EP&A Act) – NSW Environment Planning and Assessment Act 1979, controls development in NSW, includes the requirement to consider SEPPs, LEPs, DCPs, BC Act 2016.

EPBC Act – Federal Environment Protection and Biodiversity Conservation Act 1999.

Indirect Impacts - occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas. Indirect impacts may occur after construction during the life of the development, e.g. escape of garden plants, excess nutrients and changes in fire frequency and grazing. As with direct impacts, consideration must be given to all of the likely indirect impacts of the proposed activity or development (2006 DECC Assessment of Significance Guidelines)

LEP – Local Environment Plan, a local planning instrument for each Council area.

Native Vegetation - is defined in the LLS Act as any plants native to NSW including trees, understory plants or groundcover plants including wetland. Marine vegetation is protected by the Fisheries Act.

OEH – NSW Office of Environment and Heritage, formerly NPWS, DEC, DECC and DECCW. Government organisation responsible for the conservation of native flora and fauna.

Property – The lot(s) that are the subject of the proposal. In this report, this is the same as the Study Area, the Subject Site and "site".

Proposal – The works/actions that are proposed on the property that is the subject of the development application.

Protected Fauna - refers to any native bird, mammal, reptile or frog in NSW.

Site - In this report this is the same as the Study Area and the Subject Site and the property.

Study Area - means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account. In this report, this is the same as the Subject Site, the property and "site".

Subject Site - means the area directly affected by the proposal. In this report, this is the same as the Study Area, the property and "site".

Threatened Species - refers to those species listed in the schedules of the Biodiversity Conservation Act 2016 as "Critically Endangered ", "Endangered" or "Vulnerable".

For definitions that are relevant to the Assessment of Significant test see the Appendices.

1.4. Assumptions and Limitations

- This document assesses the impacts of the proposal, and proposed amendments described in this report and shown on Map 1 and the cited plans.
- This report does not take into account the cumulative impact of other developments on this property or on adjacent land.
- This report does not include assessment of soil suitability or European/Aboriginal heritage.
- It can never be proven that other Threatened Species have not, do not or will not use the site as habitat. The conclusions drawn in this report are a result of testing, observation and experience.
- This report describes the habitat and species of the site at the time of the field survey. Vegetation, habitat and legislation will change over time and therefore the findings of this report are only relevant for 6 months.
- This report should be read in its entirety and no part should be taken out of context.
- No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

1.5. Endangered Bandicoot Population at North Head

The main species of interest on this site is the Long-nosed Bandicoot, *Perameles nasuta*, (Geoffrey 1804) and in particular, the Endangered population at North Head, Manly, which is known to occur in the vicinity of the Subject Site.

The Final Determination (TSC Act Scientific Committee 1997) for the listing of this population in the schedules of the Threatened Species Conservation Act described the population as:

> *"P. nasuta was once widespread in the Sydney region but many formerly recorded populations have become extinct. The North Head population is now isolated and disjunct."*
>
> *"…the North Head population of P. nasuta is in immediate danger of extinction."*
>
> *"…the North Head P. nasuta population is of significant conservation value on the grounds that it is:*
>
> - *A disjunct population*
> - *One of the few surviving populations within the Sydney region*

- *A population which has been the subject of a number of scientific studies, and is thus an important reference population*
- *Accorded considerable value by the local community, and thus serves to promote conservation more generally"*

The Office of Environment and Heritage has identified 25 priority actions to help recover the Long-nosed Bandicoot population on North Head in New South Wales (as of July 2013). These priority actions relate to OEH, Northern Beaches Council and other determining authorities developing, implementing and continuing the fox, feral cat and rabbit control program, weed control program, monitoring program, community awareness program, collecting mortality data, finalising and reviewing Long-nosed Bandicoot Recovery Plan, and Sydney Harbour National Park Fire Management Strategy and Plan of Management.

1.5.1. Long-nosed Bandicoot (Perameles nasuta) Biology

Description: The Long-nosed Bandicoot (*Perameles nasuta*) is a solitary nocturnal marsupial that grows to a size of between 850 and 1100 g, 310 to 425 mm in head and body length, and with a tail length of 120 to 155 mm (Stoddart 1995). The males are larger than females. These bandicoots characteristically dark, greyish-brown above and creamy white below. The forefeet and upper surfaces of the hind feet are also creamy white (NPWS 2000b). The muzzle is long and pointed and the ears are markedly larger and more pointed than short-nosed bandicoots of the genus Isoodon, such as the other bandicoot that lives in Sydney, the Southern Brown Bandicoot (Stoddart 1995). See inset image above.

Distribution: Long-nosed Bandicoots are locally common along the east coast of Australia and adjacent mountains from north-eastern Queensland to south-western Victoria. This Endangered population is restricted to the relatively isolated area of habitat on North Head in the Manly Local Government Area, south of Addison Road (NSW Scientific Committee 2003). See above the DCP extract, Schedule 1 - Map D - Areas where Assessment (test) of Significance is required. There is another Threatened population in the inner western part of Sydney.

Habitat: At North Head, Long-nosed Bandicoots inhabit, to varying extents, all of the habitat types available including woodlands, scrub, heath open areas and the urban landscape. Recent research indicates that urban areas are important for the population and that there are individuals who live their entire lives within the urban area. Long-nosed Bandicoots prefer sites with sandy soils, as well as with low undergrowth and leaf litter cover and does not have a particular preference for proportion of canopy cover (Chambers & Dickman 2002). This species depends on a mosaic of vegetation types at a landscape level, including feeding grounds in patches of moist, soft soil located close to shelter with an abundance of invertebrates (Scott et al. 1999). These types of habitat can be found in both bushland and urban environments including native vegetation and residential gardens. Resting and nesting habitat is low, dense vegetation or litter where a bandicoot can take shelter in during the day. Bandicoot diggings are more abundant in areas of moist, soft soils close to cover (Hughes and Banks 2010).

Individuals build diurnal nests that are typically made in a shallow hole or depression on ground surface and are lined with leaf litter and dry grasses. The entrance to each nest is closed when occupied making them generally difficult to locate. Nests on North Head have been found in a variety of habitat types, such as at the base of large trees and within tall grasses including residential backyards (Scott 1995; Scott *et al.* 1999). Long-nosed Bandicoots typically have more than 1 nest that is in regular use within their territory (Chambers & Dickman 2002). It is expected that bandicoots in the wild may live up to 2 to 2.5 years.

Diet: Long-nosed Bandicoots feed on invertebrates, plants, tubers, fungi and vertebrates (Menkhorst & Knight 2004, Scott et al. 1999, Claridge 1993). Invertebrates mostly include insects from the orders Coleoptera and Hymenoptera (> 80%). Plants preferred are mainly the leaves

and stems of monocotyledons (>76%). Fungi are consumed in a high proportion (> 63%), mostly those hypogeal from the family Zygomicetes, in particular the species *Glomus fueglanum*. Vertebrates, even though contribute little to bandicoots' diet include skinks, birds and sometimes eggs of the Eastern Water Dragon (Scott et al. 1999).

Breeding: At North Head, Long-nosed Bandicoots were recorded breeding from June to March (Scott 1995), however mating can occur throughout the year. The average recorded litter size for the North Head population is 2.3 babies (Stoddart 1995). In productive years, females may have up to 4 litters.

Litters are typically 2-3 (>76%), with the young weaned at about 7 weeks and reaching maturity at 20 weeks. Females tend to overlap their home ranges (i.e., 1.7 ha) throughout the year, as well as to reduce their size during the breeding season. By contrast, home ranges of males (i.e., 4.4 ha) only overlap during the breeding season, as they also enlarge their home ranges (Scott et al. 1999, Menkhorst & Knight 2004).

1.5.2. Population Viability

There have been many studies on this population over the last 20 years including; micro-chipping, radio tracking, extensive trapping, diet analysis, population viability estimation (Banks, 2000; Banks, 2004; Chambers and Dickman, 2002; Hughes and Banks, 2006; Hughes and Banks, 2010; Lenehan and Banks, 2004; Scott, Hume, and Dickman, 1999). There is ongoing biannual monitoring program by the Office of Environment and Heritage (OEH; formerly DECCW, DECC and NPWS) in collaboration with Manly Council and Sydney University.

Every two years there is a more extensive Long-nosed Bandicoot trapping survey conducted in the bushland part of North Head. This survey does not include the urban environment part of North Head, which is now known to have permanent bandicoot residence. These areas are likely to be the same population. Population viability estimates within the urban environment most recently occurring in November 2012 and March 2013. This urban study utilised 14 transects across Eastern Hill and used the same methods as the current study by NPWS within the bushland habitat on North Head (Hughes and Banks, 2010).

In May 2015, a total of 152 individual Long-nosed Bandicoots were trapped at North Head, compared to 99 in 2014, and 71 in 2010. The sex ratio of the bushland population is relatively even. Under current conditions, the North Head Long-nosed Bandicoot population has a 62% chance of persisting after 50 years. This figure has dropped from 80% in since the previous PVA, due to the slightly higher sex specific adult mortality rates used in the current PVA's (Price & Banks, 2015). The latest PVA analysis determined that the population is stable and has been for the last few years. It has been calculated that only a small loss to the population could cause the local population to become extinct.

1.5.3. Previous Years Survey Results for the Bushland Area of Habitat

See below text results from the Long-Nosed Bandicoot Urban Monitoring Program (Cumberland Ecology) 2016:

- A total of 34 (14 males and 19 females, adults 72%) individual Long-nosed Bandicoots were trapped in the urban area of Manly, in May 2016, compared with 31 (19 males and 12 females, 75% adult) in March 2013.
- Four of the females captured had 1-2 young in their pouch.
- 25% of the total population on North Head are living within the urban environment with 28 – 45 individuals in the **urban** environment compared with 120 - 140 individuals in the **bushland** environment (NPWS).
- There are individuals with their home range within the urban environment

- Individuals were trapped across Eastern Hill and all the way down to Ashburner Street.

See below text results from the Long-Nosed Bandicoot Urban Monitoring Program 2018:

- *A total of 36 individual Long-nosed Bandicoot (86% Adults, 19 males and 17 females), these numbers are similar to 2016 and 2017 results. The number of recaptures has increased over recent years likely meaning the majority of the population has been surveyed.*
- *One of the females captured had 4 young in its pouch.*
- *Majority of the population abundance was captured closer to North Head, although the individuals were captured as far as Ashburner street at the furthest urban edge of the study area.*
- *The greatest distance on male travelled was 620m.*

1.5.4. Threats to the North Head Population

The major threats to this population are thought to be vehicle traffic, loss of habitat through development and, to a lesser degree, predation by dogs, cats and foxes. Other threats include inbreeding depression, loss of genetic variation, risk of catastrophic events (such as bushfires or disease), inappropriate fire regimes, clearing of native vegetation and invasion of native plant communities by Bitou Bush. Bandicoots are also susceptible to infection by cats carrying the disease toxoplasmosis. If urban developments keep reducing the area of accessible habitat available it is likely to result in population decrease and the likelihood of the population becoming extinct in the near future (i.e., 20 years) range between 31% and 46%.

The removal of habitat or prevention of access to habitat on a site may constitute a significant impact to the conservation of the threatened population and may require modifications to the development so there is no significant impact or a more extensive assessment in the form of a Species Impact Statement, a Section 91 licence or modification of the proposal.

1.6. The Study Site

The site is the whole of Lot 34 DP 8075, known as 8 Bower Street, Manly. The property is almost rectangular in shape with an area of 953m^2. Previously, the property contained a one and two-storey brick dwelling with an attached garage. In the front yard (east) There was a concrete driveway and two areas of lawn separated by a low retaining wall. Immediately to the west of the dwelling was a steep area with exposed sandstone rock and stone retaining walls leading to a large area of lawn. There was a small timber building in the rear yard. There was also a mixture of native, exotic and weed trees in clumps around the site.

Currently, the site is part-way through demolition, with some of the pre-exiting house demolished, the timber structure and shed in the yard completely removed and the trees and lawn mostly removed as per the approved DA. The property is accessed from Bower Street to the east. See Map 1 for plans showing the site, habitat, and access.

There are areas of urban habitat surrounding the site, and an extensive area of bushland reserve on North Head to the south, which is mostly Sydney Harbour National Park and Sydney Harbour Federation Trust land. Residential properties occur on the north, south and east. Bower Street Gully Reserve is immediately adjacent western boundary of the property. Shelly Beach is approximately 100m to the north-west of the site.

The geographic co-ordinates of the site are -33.801505 º S and 151.298534º E.

1.7. The Proposed Development

The Approved DA (2018/0628) is for:

- Demolition of existing brick building, smaller timber building, and shed;
- Construction of a new four-storey building with decking extending into the yard
- Construction of a new swimming pool and spa in the rear yard;
- Construction of a studio in the rear of the yard along the western boundary;
- Landscaping

The proposed Modification is for:

- Changes to the orientation of the pool and spa;
- Reconfiguration of landscaped and lawn areas in the rear yard;
- Construction of a new undercover Cabana and storage areas;
- Removal of the rear studio, in favour of more landscaped areas.

The landscaping includes lawn and garden beds in the rear yard.

For further information on locations, extent of the development and details of the proposal, see Map 1.

The plans and documents used for this report are:

1.7.1. Plans and Documents Used

Title	Author	Rev	DWG./Doc. No./Ref. No.	Date Modified or Accessed
Detail and Level Survey	Stutchbury Jaques Pty Ltd	-	6623/07	23/10/07
Site Analysis	SketchArc	-	DA03	13/02/18
Site Plan	Serenescapes	A	L-01	18/01/18
Landscape Plan	Landart.	A	DA-001, DA-100, DA-200, DA-201, DA201, DA-300, DA-301	31/01/24
Alterations and Additions	BASIXCertificate	-	A312650_05	01/02/24
Additions and Alterations C4.55 development application	SketchArc	A	C4.55-1 to C4.55-27	01/02/24

1.7.2. Bushfire Asset Protection

There is no known disturbance to vegetation on this land for bushfire protection.

2. Methods

The site was inspected on 3 occations the 13th March 2018, 12 December 2023 and 21 February 2024 all by the experienced and qualified ecologist Nicholas Skelton for a total of 3 person hours. This locality has been visited on manly previous occasions by the authors for various other ecological survey projects. Nicholas Skelton has 20 years of experience in Flora and Fauna surveys in the Sydney Metropolitan area and has completed over 200 bandicoot surveys and assessments in Manly for NPWS, Council, SHFT and private landowners. The field survey searched for evidence of all Threatened Species, Populations and Endangered Ecological Communities that are known to, or that may have potential habitat within the site, especially the Endangered population of Long-nosed Bandicoot.

Existing and potential foraging, resting, and nesting Long-nosed Bandicoot habitat was determined and quantified and is shown on Map 1. Existing bandicoot access to, from and within the site was also determined and mapped.

The plans referenced within this report were assessed to determine the amount and type of habitat and the access that would be altered as a result of the proposal. The change in amount of habitat and access is also shown in Map 1.

The habitat potential of the site for bandicoots was determined by detailed onsite assessment of the access, shelter and food sources. The recent use of the property by bandicoots was determined by an ecologist with extensive experience in bandicoot survey in urban environments, by searching for diggings, scats, frequently used trails and boundaries were thoroughly searched for accessibility by bandicoots. The road reserve and accessible parts of nearby properties were searched for evidence of bandicoot activity and habitat value. Photographs were taken of the site. The findings from other reports from nearby surveys and studies were also used to provide additional habitat use information. Habitat for other Threatened species was searched for. Field notes are available for scrutiny.

3. Findings

3.1. The site is currently a construction site

Photo dated 21 February 2024

3.2. Long-nosed Bandicoot Use of Adjacent Land

During the previous field survey evidence was found of bandicoots using the adjacent properties including the adjacent Bower Street Gully Reserve. Evidence of bandicoot activity (diggings) were found in the rear of the site, as it is easily accessible from the Bower Street Gully Reserve. It is likely that bandicoots use adjacent properties and nearby bushland areas for resting, breeding, and foraging due to the presence of good quality foraging and resting habitat in gardens, the road reserve, and other areas of public and Council land. Long-nosed Bandicoots from the endangered population at North Head have been regularly recorded in this locality by GIS Environmental Consultants, and other consultants and researchers.

3.3. Existing Bandicoot Habitat and Access

Prevoiuosly the site contained 700m^2 of bandicoot foraging habitat (73% of the site) in the garden beds and lawn in the front and rear yards. Currently, the site contains very limited foraging habitat, as it is being subjected to demolition, as per the approved DA.

The habitat on the site is currently accessed from the front of the property (east, Bower Street), through gaps in the wooden fence at the rear of the property (west) and through unfenced areas at the centre of the southern boundary and the western part of the northern boundary. There is access to all habitat within the property down either side of the existing dwelling and across the rear yard.

There is good habitat on all properties immediately adjacent to the site.

See Map 1 for a diagram showing the existing bandicoot access to, from and within the site and a comparison with the proposed and recommended access.

3.4. Bandicoot Access from Adjacent Land

Adjacent Land	Bandicoot Access and Habitat
North- Neighbouring property	Habitat in the rear of adjacent property and access to the property along unfenced part of northern boundary.
East - Bower Street	Good quality habitat along road, access from front of the property.
South- Neighbouring property	Some habitat in front and rear yard, access through unfenced part of southern boundary.
West - Bower St Gully Reserve	Good quality habitat, access through gaps in the fence at the rear of the property.

3.5. Proposed Bandicoot Habitat and Access

The amount of bandicoot accessible habiat with the new proposal is 356m^2 excluding roof gardens and landscaping within pool areas which is 51% of the habitat.

Access to and from the property is currently planned to be changed. Access is recommended to be provided at all locations where there is light blue on Map 1. To maintain access to the front of the property, it is recommended that a continuous gap of at least 150mm be provided under the full length new front gate. Access is to also be provided from through the front carport.

Access to the rear yard should be maintained along the northern side of the new dwelling down a set of stairs along the northern boundary. The northern boundary currently has a steep slope. To maintain access, it is recommended that the steep slope maintained, and no retaining walls be put along this boundary (see Map 1). To maintain access to the rear yard along the north-western boundary it is recommended that any internal gate have a continuous gap of at least 150mm at the base of the gate.

Access will be provided throughout multilevel backyard through a series of terraced levels connected with small sets of stairs, shallow enough to maintain bandicoot access. There is access to habitat along the southern boundary and to the southern neighbouring property through unfenced area. A boundary fence will be installed; however, any boundary fences will have 150mm x 300mm (w) void at the base every 2m for bandicoot passage. Additionally, a garden bed will run along the southern boundary at the same level as the adjacent property, providing high quality foraging habitat. This long corridor transitions into additional garden beds along the western boundary, improving access across the entirety of the site.

It is recommended that access be provided between Bower Street Gully Reserve and the rear yard through a continuous 150mm gap under the gate at the rear boundary (western)

Access from the neighbouring property to the north is most likely to change as a large masonry retaining wall is proposed along this boundary, preventing access. However, if all other access routes are maintained and improved this should not be a problem.

See Map 1 for existing and proposed bandicoot habitat and access to, from and within the site.

If the recommendations of this report are followed there will be no change in access to habitat on the property as a result of the proposal.

3.6. Proposed Bandicoot Access from Adjacent Land

Adjacent Land	Bandicoot Habitat
North- Neighbouring property	Habitat in the rear of adjacent property and access to the property along unfenced part of northern boundary.
East - Bower Street	Good quality habitat along road, recommended access under front gate.
South- Neighbouring property	Some habitat in front and rear yard, access through unfenced part of southern boundary.
West - Bower St Gully Reserve	Good quality habitat, recommended access under rear gate.

3.7. During Construction Impacts

Likely impacts during construction are:

- Temporary restriction of access to habitat for bandicoots and other fauna due to skips, site fences and storage of materials. **Medium impact**;
- Temporary potential hazards to bandicoots and other fauna including falling into open pits and drowning hazards. **Low risk**, this is not very likely at this site;
- Temporary additional traffic movement around the street. **Low risk**.

Measures to ameliorate these potential impacts are discussed in the Recommendations and Ameliorative Conditions sections of this report.

3.8. Habitat and Presence of Other Flora and Fauna Species

There are, Rainbow Lorikeets (*Trichoglossus moluccanus*), Laughing Kookaburras (*Dacelo novaeguineae*), Eastern Blue-tongue Lizards (*Tiliqua scincoides*), Garden Skink (*Lampropholis guichenoti*), Eastern Water Skink (*Eulamprus quoyii*), Sulphur-crested Cockatoo (*Cacatua galerita*) and Noisy Miners (*Manorina melanocephala*) using the site.

Evidence of Brush-tailed Possums (Trichosurus vulpecula) and European Rabbits (*Oryctolagus cuniculus*) were observed on the site. Brush Turkey (*Alectura lathami*)

were observed adjacent to the site during the survey.

There are also many Eastern Water Dragons (Physignathus lesueurii) living in the surrounding locality. The existing exposed sandstone rock and retaining walls provide good habitat for reptiles.

Threatened Grey-headed Flying-foxes (*Pteropus poliocephalus*) and micro-bats would regularly fly over this property. Grey-headed Flying-foxes have been recorded in the adjacent Bower Street Gully Reserve (GIS Environmental Consultants, 2003) There are two small fig trees in the rear yard of the property that is foraging habitat for the Grey-headed Flying-fox that will be removed by the proposal. A Test of Significance on the impact to Grey-headed Flying-fox has been completed in section 4.2 of this report.

Two frog species have been recorded in the adjacent Bower Street Gully Reserve (GIS Environmental Consultants, 2003) including the Brown-striped Frog (*Limnodynastes peronei*) and the Common Eastern Froglet (*Crinia signifera*)

No evidence was found of any other Threatened Species, Population or Endangered Ecological Community on this property at the time of the survey.

There are local populations of the endangered Magenta Lillypilly, *Syzygium paniculatum and* Sunshine Wattle (*Acacia terminalis subsp. terminalis*) on North Head and the Magenta Lillypilly has been recorded in the adjacent Bower Street Gully Reserve but it does not occur on this site.

None of the other six (6) endangered and twenty-eight (28) vulnerable fauna species that occur in the manly area where found on the site or have important habitat on the site.

There is currently no dog living on the property.

3.9. Endangered Ecological Communities

Eastern Suburbs Banksia Scrub EEC and Littoral Rainforest EEC occur on North Head. No Endangered Ecological Community occurs on the site.

Littoral Rainforest Endangered Ecological Community

Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions endangered Ecological Community (EEC) is generally a closed forest, the structure and composition of which is strongly influenced by proximity to the ocean. The plant species in this ecological community are predominantly rainforest species with evergreen mesic or coriaceous leaves.

The adjacent Bower Street Gully Reserve has been mapped as Littoral Rainforest EEC (GIS Environmental Consultants). The majority of the species within the reserve have been planted.

The site contains eight local native species (see Table 1 below). Of the eight species four of them (*A.smithii, F.rubiginosa, L.longifolia & P.undulatum*) are characteristic of Littoral Rainforest EEC. The four species are approximately 3.4% of the total number of characteristic species (117) listed in the determination for Littoral Rainforest EEC. Therefore, the site does not meet the definition of this community.

There are not enough native species on the site or the correct structure for the vegetation on the site to represent any native vegetation community .

Table 1. Native Plant Species on the Site

8 Bower St, Manly
Thursday, 8 March 2018
by Nichlas Skelton, GIS Environmental Consultants

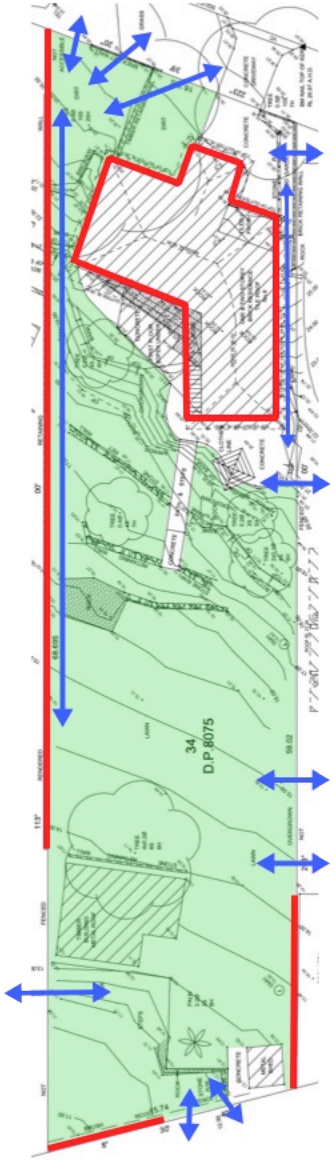
GIS Environmental Consultants
Ph: (02) 9939 5129, Mobile: 0419 438 672
ecology@ecology.net.au, ecology.net.au

Summary of Growth Form and Status

Row Labels	Local Native
Fern	1
Grass	
Herb	1
Shrub	
Tree	5
Vine	1
Lichen	
Sedge	
Total	**8**

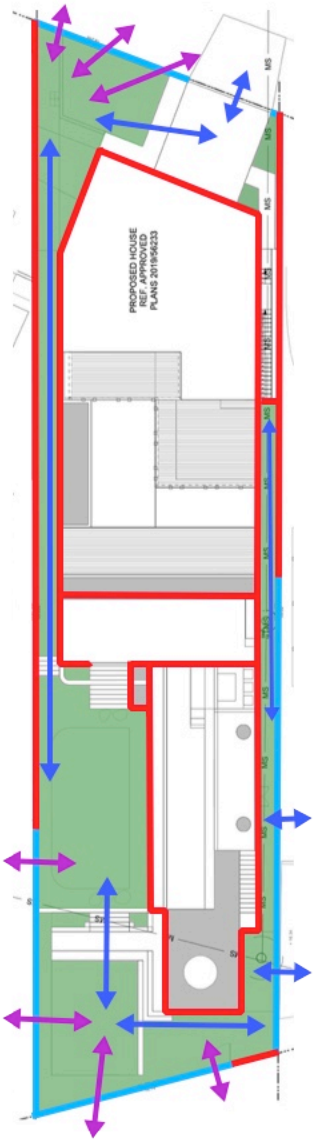
Name	Family	rowth For	Order	Common Name	Status
Acmena smithii	MYRTACEAE	Tree	DICOTYLEDON	Lily Pilly	Local Native Species
Brachychiton acerifolius	STERCULIACEAE	Tree	DICOTYLEDON	Flame Tree	Local Native Species
Cyathea cooperi	CYATHEACEAE	Fern	FERN	Straw Tree Fern	Local Native Species
Ficus rubiginosa	MORACEAE	Tree	DICOTYLEDON	Port Jackson Fig	Local Native Species
Kennedia rubicunda	FABACEAE	Vine	DICOTYLEDON	Dusky Coral-pea	Local Native Species
Lomandra longifolia	LOMANDRACEAE	Herb	MONOCOTYLEDON	Spiny-headed Mat-rush	Local Native Species
Pittosporum revolutum	PITTOSPORACEAE	Tree	DICOTYLEDON	Rough-fruit Pittosporum	Local Native Species
Pittosporum undulatum	PITTOSPORACEAE	Tree	DICOTYLEDON	Sweet Pittosporum	Local Native Species

Map 1: Changes to Bandicoot Habitat and Access



sqm

Existing



sqm

Proposed

Bandicoot Access
Barrier to Bandicoot Movement
Bandicoot Habitat
Recommended Access

N

Map to be viewed in colour

8 Bower St, Manly

21st February 2024

GIS Environmental Consultants

4. Impact Assessment

This Test of Significance is in accordance with the Threatened Species Assessment Guidelines recommended for use by Manly Development Control Plan 2013 (MDCP 2013) in section 2.1.15.2 (a).

4.1. Test of Significance (5-part test) for the Long-nosed Bandicoot Population

Part 7.3 of the BC Act, Test of Significance (5-part test) for impact of the proposed development on the Long-nosed Bandicoot Population at North Head

> *(a) in the case of a threatened species, whether the proposed development or activity 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,*

Response:

The Long-nosed Bandicoot population on North Head is listed in Schedule 1, Part 2, Division 4 of the BC Act 2016 as an Endangered Species Population.

The local population is viable at least in the short term. In May 2015, a total of 152 individual Long-nosed Bandicoots were trapped at North Head, compared to 99 in 2014, and 71 in 2010. The sex ratio of the bushland population is relatively even. Under current conditions, the North Head Long-nosed Bandicoot population has a 62% chance of persisting after 50 years. This figure has dropped from 80% in since the previous PVA, due to the slightly higher sex specific adult mortality rates used in the current PVA's (Price & Banks, 2015). The latest PVA analysis determined that the population is stable and has been for the last few years.

The study site currently provides 700m^2 (or 73% of the site) of good quality foraging habitat. The proposal will remove 344m^2 habitat from the property and will result in 356m^2 of potential foraging habitat being retained. (See before and after green areas on Map 1).

Access to habitat on the property (See dark blue arrows on Map 1) along eastern and western boundary and through the property is currently planned be changed by the proposal, however, recommendations (light blue lines and Magenta arrows) are made to retain access to and from the eastern and western boundaries and throughout the property. See Map 1 for proposed bandicoot habitat and access to, from and within the site.

This population is restricted to North Head, which has an area of 385 ha, of which only a negligible amount will be lost due to the proposed development. The change in bandicoot habitat is of a scale that is not likely to lead to the reduction in the population size or reproduction success of individuals, the population or their habitat. The proposal is not likely to have a significant negative effect on the life cycle of this population such that the viability of the population is compromised and placed at risk of extinction.

> *(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:*
>
> > *(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*
> >
> > *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

Response: The Long-nosed Bandicoot Population at North Head is listed as a threatened population and not an Endangered or Critically Endangered Ecological Community; therefore, this question is not applicable.

> *(c) in relation to the habitat of a threatened species, population, or ecological community:*
>
> *i) the **extent** to which habitat is likely to be removed or modified as a result of the action proposed, and*
>
> *ii) whether an area of habitat is likely to become **fragmented or isolated** from other areas of habitat as a result of the action proposed, and*
>
> *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*

Response:

The study site currently provides 700m^2 (or 73% of the site) of good quality foraging habitat. The proposal will remove 344m^2 habitat from the property and will result in 356m^2 of potential foraging habitat being retained. (See before and after green areas on Map 1).

This population is restricted to North Head, which has an area of 385 ha, of which only a negligible amount will be lost due to the proposed development.

This population and a large part of the suitable habitat on North Head is situated within Sydney Harbour National Park and land managed by the Sydney Harbour Federation Trust as a conservation area. A significant proportion of this population also occurs on St Patrick's Estate and other private urban land on North Head.

The change in the **extent** of bandicoot habitat is of a scale that is not likely to lead to the reduction in the population size or reproduction success of individuals, the population or their habitat. If the recommendations of this report are followed, the proposed development will not change the access to this habitat .

ii) Access to habitat on the property (See dark blue arrows on Map 1) along eastern and western boundary and through the property is currently planned be changed by the proposal, however, recommendations (light blue lines and Magenta arrows) are made to retain access to and from the eastern and western boundaries and throughout the property. See Map 1 for proposed bandicoot habitat and access to, from and within the site.

The current and proposed bandicoot access between habitat areas is shown on Map 1. **If the recommendations are followed then the proposal will not further fragment or isolate** any bandicoot habitat on this or adjacent properties.

iii) The study site currently provides 700m^2 (or 73% of the site) of good quality foraging habitat. The proposal will remove 344m^2 habitat from the property and will result in 356m^2 of potential foraging habitat being retained. (See before and after green areas on Map 1).

This population is restricted to North Head, which has an area of 385 ha, of which only a negligible amount will be lost due to the proposed development. The change in bandicoot habitat is of a scale that is not likely to lead to the reduction in the population size or reproduction success of

individuals, the population or their habitat. **The proposal is not likely to have a significant negative effect on the life cycle of this population such that the viability of the population is compromised and placed at risk of extinction.**

> *(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

Response: There is no Area of Outstanding Biodiversity on the site. The proposal will not directly or indirectly effect any Area of Outstanding Biodiversity Value.

> *(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.*

Response: The *BC Act* defines "threatening process" as "a process that threatens or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities".

Threatening processes listed for the Long-nosed Bandicoot population at North Head are (a) habitat loss and fragmentation as a result of urban development, (c) increased levels of road mortality.

This proposal generally meets the definition of the key threatening process "loss of habitat through urbanisation", however, due to the constraint of the small size of this property and the dense urbanization on this area it is not likely to result in the significant increase of the impact of a key threatening process. The impact can be reduced by the measures recommended in this report.

Other 'key threatening processes' listed for the Long-nosed Bandicoot population include predation by domestic cats, dogs and introduced foxes, in-breeding depression and disease (toxoplasmosis) spread by cats, high fire frequency, clearing of native vegetation and invasion of native plant communities by Bitou Bush. The proposal is unlikely to change the use of the bandicoot accessible areas by dogs and cats. These other threatening processes are not relevant to this site or to this proposal.

Conclusion: It is not likely that the proposal will have a significant impact on the Long-nosed Bandicoot population at North Head and further assessment in the form of a Species Impact Statement is not considered necessary for this population.

4.2. Test of Significance (5-part Test) for the Grey-headed Flying-Fox *Pteropus poliocephalus*

Part 7.3 of the BC Act, Test of Significance (5-part test) for impact of the proposed development on the Vulnerable Grey-headed Flying-fox

> *(a) in the case of a threatened species, whether the proposed development or activity 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,*

Response: The Grey-headed Flying-fox is listed as a vulnerable species in Schedule 1 Part 3 of the BC Act 2016. The local population is likely to be viable, the nearest known roosting colony is

at Balgowlah approximately 3.5km west of the site. Grey-headed Flying-foxes were recorded in the adjacent Bower Street Gully Reserve (GIS Environmental Consultants, 2003) There is no roosting colony on the site.

The rear yard contains a two small *Ficus rubiginosa* tree which provide potential foraging habitat for the Grey-headed Flying-fox. The tree will be removed. The Fig trees to be removed are both small and therefore only provide a small amount of potential foraging habitat. The removal of this small amount of foraging habitat will unlikely have an adverse effect on the lifecycle of this species such that the local population is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(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

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Response: The Grey-headed Flying-fox is not listed as an Endangered or Critically Endangered Ecological Community and therefore this question is not applicable.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

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

Response:

i) The proposal will remove two small *Ficus rubiginosa* from the rear yard of the property.

ii) The Grey-headed Flying-fox is a highly mobile species and there is similar habitat in the locality. Therefore, the removal of a small amount of potential foraging habitat will unlikely fragment areas of habitat for this species.

iii) The Fig trees to be removed are both small and therefore only provide a small amount of potential foraging habitat. There are large amounts of similar habitat in the locality, including several large fig trees in the park less than 100m away, and the Grey-headed Flying-fox is a highly mobile species. Therefore, the small amount of foraging habitat to be removed from the site is unlikely to be very important for this species. There is not roosting/breeding colony on the property.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

Response: The site does not have any declared Area of Outstanding Biodiversity Value. The proposal will not directly or indirectly impact any declared Area of Outstanding Biodiversity Value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The following Key Threatening Processes are relent to the Site and/or the proposal

Response:

Clearing of native vegetation: The proposal will remove several native species including two small Figs (*Ficus rubiginosa*) however, the site is not considered to meet the description of any native vegetation community. The removal of a few native plants is unlikely to increase the impact of this Key Threatening Process.

Competition and grazing by the feral European Rabbit: Evidence of Rabbits were observed using the property during the survey. The proposal will remove potential habitat for Rabbits and therefore will unlikely increase the impact of this Key Threatening Process.

Conclusion to the Impact of the Proposal on the Grey-headed Flying-fox

The proposal will remove 2 small Fig (*Ficus rubiginosa*) trees from the rear yard of the property. These trees are potential foraging habitat for the Grey-headed Flying-fox. There is no roosting or breeding habitat or roosting colony on the site. Given the amount of suitable habitat (including large Fig trees in the nearby park and the adjacent Bower Street Gully Reserve) in the locality it is unlikely that the removal of two small Fig trees will result in a significant impact to the local population of Grey-headed Flying-fox and a Biodiversity Development Assessment Report (BDAR) is not recommend for this proposal.

4.3. Manly LEP 2013 Assessment of Clause 6.5 (3) & (4), Terrestrial Biodiversity

Manly LEP 2013 'Terrestrial Biodiversity Map' shows the subject property is located within an area identified as of 'Terrestrial Biodiversity'.

Therefore Clause 6.5 of MLEP 2013 applies to this Development Application and the objectives of the clause and in particular points (3) and (4) must be considered in regard to this proposal.

4.3.1. Clause 6.5 (3) Assessment

a) Whether the development is likely to have:

i. Any adverse impact on the condition, ecological value and significance of the fauna and flora on the land?

Response: The site survey found evidence of the Long-nosed Bandicoot utilising the site and adjacent land. It is likely that bandicoots use the adjacent properties and nearby bushland areas for foraging and probably resting and breeding, and they have been recorded regularly in the locality.

Other fauna that are likely to use site include possums, Rainbow Lorikeets, Noisy Minors, Sulphur Crested Cockatoo, Garden Skinks and Eastern Water Dragon. Brush turkeys were observed adjacent to the site during the survey. There was also evidence of Rabbits using the site.

The study site currently provides 700m^2 (or 73% of the site) of good quality foraging habitat. The proposal will remove 344m^2 habitat from the property and will result in 356m^2 of potential foraging habitat being retained. (See before and after green areas on Map 1).

The proposal will remove 344m^2 of habitat from the front of the property. This is considered to be a small loss, considering the amount of similar or better quality habitat on the property and the locality. The proposal will result in 356m^2 of bandicoot foraging habitat.

Access to the habitat will not change for reptiles, birds or mammals such as possums that are using the site.

Access to the habitat for bandicoots (See dark blue arrows on Map 1) is currently planned be changed by the proposal, however, recommendations (light blue lines and Magenta arrows) are made to retain the access from the south-eastern (front) side of the property.

No evidence was found of any other Threatened Species, Populations or Endangered Ecological Communities utilising this property.

Based on the information gathered and the assessments of potential impacts of the proposal on flora and fauna in section 3 of this report, it is considered that the proposal will not have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land.

ii. Any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna?

Response: The vegetation on the site is medium quality habitat for a wide range of fauna including reptiles, birds and mammals. See table 2 for a list of native plants found at the site.

Brush-tailed and Ring-tailed Possums are likely to occur. Based on the findings and assessment of the impact of this proposal on flora and fauna in sections 3 and 4 of this report, fauna habitat is not likely to be adversely impacted by the proposal and the habitat is not likely to be important habitat for these species due to the higher quality bushland habitat to the east in Sydney Harbour National Park. The proposed development will not have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna.

iii. Any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land?

Response: Based on the findings and assessment of the impact of this proposal on flora and fauna in sections 3 and 4 of this report, the proposed development will not significantly fragment, disturb or diminish the current biodiversity structure, function and composition of the subject site. See section 4 for details.

Any adverse impact on the habitat elements providing connectivity on the land?

Response: The site is located in a residential area surrounded by other private properties with a dis-contiguous canopy of trees. The site is not part of an important wildlife corridor. Based on the findings and assessment of the impact of this proposal on flora and fauna in sections 3 and 4 of this report, this proposal will not adversely impact on the habitat elements providing connectivity to other areas of suitable habitat.

b) Are there appropriate measures proposed to avoid, minimise or mitigate the impacts of the development?

Response: This report makes recommendations for appropriate measures to avoid, minimise or mitigate the impacts of the development. See the Ameliorative Conditions and Management Recommendations sections of this report for further information.

4.3.2. Clause 6.5 (4) Assessment

a) Is the development designed, sited and will be managed to avoid any significant adverse environmental impact? OR

Response: Due to the constraint of the small lot size, the small amount of habitat on the site and the dense urbanization in the area, the proposal is designed and sited to reduce significant adverse impacts by having minimal changes to the existing development footprint. The recommendations and ameliorative conditions in this report provide measures to manage and mitigate impacts.

b) If the impact cannot be reasonably avoided by adopting feasible alternatives—is the development designed, sited and will be managed to minimise that impact? OR

Response: Due to the constraint of the small lot size, the small amount of habitat on the site and the dense urbanisation in the area, the proposal is designed and sited to reduce significant adverse impacts by having minimal changes to the existing development footprint. The recommendations and ameliorative conditions in this report provide measures to manage and mitigate impacts.

c) *If that impact cannot be minimised—will the development will be managed to mitigate that impact?*

Response: N/A

Conclusion to the Assessment of Clause 6.5 of the MLEP

The proposal is consistent with the requirements of Clause 6.5 of the MLEP 2013 and is not considered to have a significant adverse impact on terrestrial biodiversity

4.4. State Environmental Planning Policies and Sydney Regional Environmental Plan

4.4.1. SEPP 19 Bushland in Urban Areas Assessment

The site does not contain natural vegetation with intact structure and floristics and therefore does not fit the definition of Bushland as described in SEPP 19 (Bushland in Urban Areas 1986).

The proposed works, with the amelioration recommendations described in this report, will have a very low impact on the environment, they will not disrupt any fauna corridor, they will not endanger and plant or animal species, they will not cause significant erosion and they will not change the accessibility or recreational value of bushland. The proposed works therefore are considered generally to meet the objectives of SEPP 19.

4.4.2. SREP Sydney Harbour Catchment 2005 Assessment

The site is not included within the Sydney Harbour Catchment Map and therefore assessment with respect to SREP Sydney Harbour Catchment is not required. However, this proposal is consistent with the matters to consider in respect to the biodiversity, ecology and environment protection of the site.

4.5. EPBC Act 1999 Assessment

Flora, fauna and ecological communities within Manly LGA, which are listed under the EPBC Act:

Eastern Suburbs Banksia Scrub is listed as Endangered.

Grey-headed Flying Fox (*Pteropus poliocephalus*) is listed as Vulnerable.

Littoral Rainforest and Coastal Vine Thickets of Eastern Australia is listed as Critically Endangered.

Sunshine Wattle (*Acacia terminalis subsp. terminalis*) is listed as Endangered.

Seaforth Mintbush (*Prostanthera marifolia*) is listed as Critically Endangered.

Pimelea curviflora var. curviflora is listed as Vulnerable.

North Head is listed as a National Heritage Place. About 277ha, at Manly, comprising the whole of the headland, to Low Water, south of a line commencing at Low Water north of Collins Beach on the alignment of the north-west boundary of Lot 2763 DP752038, then easterly via that alignment and boundary and then following the north-westerly boundaries of Lot 2774 DP752038 Lot 2728 DP752038, Lot 2764 DP752038 and Lot 2763

DP752038 to the most northerly point of Lot 2763 DP752038, then generally easterly via the north-east and northern boundaries of Lot 2763 DP752038 and the alignment of the latter segment to Low Water. Excluded is the North Head Sewage Treatment Plant being the whole of Lot 1 DP604428.

The only matters of relevance to this proposal are migratory species, threatened species and communities and national heritage places. North Head is on the National Heritage List as of 12 May 2006 but the listing does not include this part of North Head. This Endangered Bandicoot Population is not listed in this Act. The relevant matters of National Environmental Significance have been considered. This proposal is not considered likely to have an impact on any matter of National Environmental Significance and referral is not required.

5. Conclusions

The site surveys found evidence of the Long-nosed Bandicoot using the rear garden at the site. It is likely that bandicoots use the adjacent properties and nearby bushland areas for foraging and probably resting and breeding, and they have been recorded regularly in the locality.

The study site currently provides 700m^2 (or 73% of the site) of good quality foraging habitat. The proposal will remove 344m^2 habitat from the property and will result in 356m^2 of potential foraging habitat being retained. (See before and after green areas on Map 1).

Access to this habitat (See dark blue arrows on Map 1) is currently planned be changed by the proposal, however, recommendations (light blue lines and Magenta arrows) are made to retain this access.

Recommendations are made for access to be provided by way of a continuous gap of at least 150mm under the front and rear gates (See Recommendations section and light blue arrows on Map 1). Access is to be maintained down the steep slope along the northern boundary.

A recommendation has also been made to provide continuous gaps of at least 150mm under any internal gates to maintain access from the front of the property to the rear habitat. See Map 1 for proposed bandicoot habitat and access to, from and within the site. Any replacement or new boundary fences along the north-western, south-eastern and south-western boundaries are to have 300mm by 150mm gaps at 2m intervals.

The development is unlikely to have a significant impact on the conservation of any Endangered Population, Threatened Species or Endangered Ecological Community. Further assessment of the impact of this proposal in the form of a Species Impact Statement (SIS) is not recommended in relation to this development application at this site.

The ecological impact is not considered an unacceptable impact under section 4.15 (79C(b)) of the Environmental Planning and Assessment Act 1979 or a significant impact under Section 7.3 of the Biodiversity Conservation Act 2016.

The proposal is not considered to be a 'matter of National Environmental Significance (NES)' EPBC Act referral of the proposal to the Department of the Environment and Water Resources is not considered necessary.

The proposal will not have a significant impact to terrestrial biodiversity and meets the requirement of clause 6.5 of the MLEP.

We recommend that the ameliorative conditions and management recommendations in this report be followed to limit disturbance during construction and to further reduce the impact of the proposal on potential bandicoot habitat and access.

6. Ameliorative Conditions

- Access is recommended to be provided at all locations where there is light blue on Map 1.
- Access for bandicoots is to be maintained to the properties to the north and south through unfenced parts of the northern and southern boundaries.
- Access is to be provided from the front of the property (eastern boundary) via continuous gaps of at 150mm under the full length of front gate, including the part across the driveway/carport.
- The northern boundary currently has a steep slope. To maintain access, it is recommended that the steep slope maintained, and no retaining walls be put along this boundary (see Map 1).
- Access is to be provided across underneath the pool level deck, north to south across the property.
- There is to be a ramp down retaining wall (adjacent to the western wall of the studio) that provides access from the rear yard to habitat along the southern boundary
- All new **gates (including internal gates) are to have a gap** at the base a minimum of 150mm high for the full length of the base of the gate to allow bandicoot access.
- **New or replacement boundary fences are to have gaps at the base to allow bandicoot access.** Gaps are to be a minimum 300mm by 150mm (or 150mm in diameter for circular holes) and are to be at no more than 2m intervals along the length of the fence in areas where the ground level is similar on both sides of the fence.
- If the plans change from what is described in this report or what is shown on Map 1 then the impacts will change and this report may need reviewing.
- To the untrained eye an Endangered Long-nosed Bandicoot may be mistaken for a rat. To avoid direct physical harm to Long-nosed Bandicoots, it is important that workers on the site are aware of their presence and their conservation significance and the steps to take to protect them.
- While temporary fencing around the construction area is usually a standard requirement, even purpose built fencing has been known to be ineffective in excluding bandicoots from construction sites. It is therefore essential that daily checks be undertaken to ensure the construction/works areas are free of bandicoot occupation including sheltering sites. All excavations and stockpiles of construction material are to be inspected daily prior to commencing operation to ensure that no bandicoots are sheltering in these areas. In the case that a Long-nosed Bandicoot is encountered within one of these work areas, no work shall proceed until the bandicoot has safely vacated the works area.
- In areas of habitat for the long-nosed bandicoot, landscape design should include native plant species to provide new and/or improved low dense clumping habitat to provide for potential foraging and nesting. The planting schedule should comprise species such as *Lomandra sp. Dianella* sp., *Banksia spinulosa, Caustis* sp., *Xanthorrhoea* sp., *Isolepis* sp., *Juncus* sp., *Calochlaena* sp., *Callistemon* sp., *Gleichenia sp.* and *Grevillea* 'Robyn Gordon' (Manly DCP 2013 Section 3.3.1 [a][iv]).
- **Noise and vibration** discourages bandicoot occupation of this and adjacent sites. Normal construction hours are to be adhered to, with no machinery to be used outside the hours of 7:30am and 4:30pm.
- **Bright lighting** discourages bandicoot occupation. No bright lighting or motion detectors are to be installed to illuminate the lawn or garden areas. A modest amount of low lighting is acceptable for safety purposes only.

- While bandicoots can swim short distances, they are not strong swimmers and as such pools and ponds, which present a fairly unnatural water body edge, can become a drowning hazard for bandicoots. Bandicoots are to be excluded from man-made water body areas (e.g.: pools, ponds, spas or water features), while maintaining access to the surrounding soft landscaping. For example, pool fencing could be constructed with a surrounding barrier 300mm in height or greater, or a base gap of less than 120mm, so as to exclude bandicoots from entering the pool areas but not the garden or grassed areas. Alternatively, pools or ponds could contain ramped edges or a ramp at one end to enable escape should a bandicoot enter the water.

7. Management Recommendations

- The Companion Animals Act 1998 requires that dog and cat owners ensure that their cat or dog does not threaten or harm a person or animals.
- Domestic cats and dogs should be kept indoors from dusk to dawn. Cats should only be allowed outside if in a sealed cat run. Example solutions can be seen at these internet addresses:

  http://www.catnip.com.au/design_ideas.html

  http://www.catnets.com.au/

  http://www.catcagesaustralia.com.au/gallery/index.html

  http://www.cat-world.com.au/cat-worldenclosures.htm

  http://www.catmax.com.au/photo-gallery.php
- Dog owners must take all reasonable precautions to prevent your dog from escaping from the property on which it is being kept. If you fail to comply with this requirement, you may be liable for a penalty of $880.
- **Cats should be kept indoors at night,** as there are benefits to both the cat and the community. Yowling and fighting is more of a problem at night. The noise is likely to be intrusive and may keep your neighbours awake. Keeping your cat indoors at night is recommended in the interests of both your cat's safety and community harmony. Many kinds of native wildlife are more active or more vulnerable to hunting at night. There is also evidence that cats hunt more during the night. By keeping your cat indoors, you can help reduce the number of native birds and animals that are killed in your area. Kittens can quickly become accustomed to staying indoors at night. Consider also containing your cat in a cat enclosure on your premises both during the day and during the night. Council Rangers can issue nuisance orders to cat owners.
- Injured bandicoots should be given expert care in order that they can be rehabilitated and returned to the population where possible. It is also important that any deceased bandicoots are reported, so that appropriate investigations can be undertaken to understand the cause of death to inform the future management and recovery of the endangered Long-nosed bandicoot population. Any **injured or dead Long-nosed Bandicoots** should be reported by phoning Manly Council on 9976 1500 or Office of the Environment and Heritage (OEH) on 131 555
- Modest, low external lighting in the garden should be used at the minimum level required for safety.
- Landscaping watering and additional cover in the form of planting low, dense vegetation will increase the value of the foraging habitat and facilitate bandicoot persistence in the urban mosaic.
- Bandicoots and other native animals should **not be fed artificial foods** as it may cause them nutritional problems and may increase predation.

- Feral animals including cats and/or foxes should never be fed, nor should food be left out where they can access it, such as rubbish bins without lids, or in pet food bowls, as these animals present a significant threat to Long-nosed Bandicoots and other wildlife.
- Rat baiting is to only occur within buildings. No Rat baiting should occur under or around houses.
- The use of insecticides, fertilisers, or snail baits should be avoided on the property. Garden insects will be kept in low numbers if Long-nosed Bandicoots are present.
- When the final North Head Long-nosed Bandicoot Recovery Plan is released it should be implemented where relevant.
- Care should be taken when driving in the area, especially at night as bandicoots have little road sense and cars are a major threat to bandicoots.
- Dead bandicoots should be reported by phoning Manly Council on 9976 1500 as they will assist in monitoring the program.
- Please report all sightings of feral rabbits, feral or stray cats and/or foxes to Manly Council on 9976 1500 or NPWS (OEH) on 9997 6102.

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Figure 1. Example of gap under boundary fence for bandicoot access

Figure 2. Example of gap under boundary fence for bandicoot access

Figure 3. Example of gap under boundary fence for bandicoot access