55 Coonara Avenue, West Pennant Hills

Fauna Management Plan for Concept Masterplan DA

Mirvac

2 May 2023

Final

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The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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1	9/02/2023	BC/GK	Draft for Council comment.
2	10/03/2023	HG/GK	Final for submission to Council
3	19/04/2023	GK	Updated final for Council comments
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Position:	Senior Project Manager/Ecologist
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Date:	2 May, 2023

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Glossary

Approved Works	The areas approved for the proposed works for Concept Masterplan under the approved Development Application number 860/2022/JP
APZ	Asset Protection Zone
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BGHF	Blue Gum High Forest
Council	The Hills Shire Council
FMP	Fauna Management Plan
ha	hectares
LGA	Local Government Area
MP	Monitoring Point
SHT	Significant Habitat Tree
STIF	Sydney Turpentine Ironbark Forest
The Property	Land located at 55 Coonara Avenue, West Pennant Hills. Legally known as Lot 61 DP 737386
VMP	Vegetation Management Plan

1. Introduction

Cumberland Ecology has been commissioned by Mirvac (the 'client') to prepare a Fauna Management Plan (FMP) in accordance with Condition 44 of the approved Concept Masterplan Development Application DA860/2022/JP (the Consent) for proposed works at 55 Coonara Avenue, West Pennant Hills NSW (the 'Property').

The Property is located in the Hills Local Government Area (LGA) and is identified as Lot 61 DP 737386 (see **Figure 1**). The proposed works (hereafter referred to as the Approved Works') includes the development of 417 dwellings, comprising 252 apartments and 165 dwelling houses including civil works comprising new roads, earthworks, stormwater and services infrastructure, landscaped areas and Asset Protection Zones (APZs). The location of areas subject to the Approved Works within the Property, is shown in **Figure 1**.

The Property contains significant areas of native bushland immediately adjacent to the Approved Works area. Some parts of the bushland are proposed to be dedicated to the NSW State Government and managed by NSW Forestry Commission with the remainder retained within a Community Lot and placed under community title. The areas under community title as well as areas of retained vegetation, such as vegetated APZs, are to be managed in accordance with a Vegetation Management Plan (VMP) that is to be submitted to Hills Shire Council (Council) for approval. The location of vegetated areas, including vegetated APZs within the Approved Works area that are to be managed under a VMP are shown in **Figure 1**.

A Biodiversity Development Assessment Report (BDAR) was prepared for submission to Council by Keystone Ecological Pty Ltd (Keystone Ecological) dated June 2022 to support the DA for the Approved Works. The Approved Works were given consent by the Local Planning Panel in November 2022 subject to Conditions of Consent. Of relevance to this report, Condition 44 of the Consent requires that a FMP is prepared for submission and approval by Council before its implementation (see ***Section 1.3***).

The purpose of this document is to provide a FMP for the Approved Works in accordance with Council's consent conditions. This FMP provides a description of the faunal biodiversity values of the Approved Works area and wider Property, and measures to be implemented to avoid and minimise impacts on these values. This includes:

- Conducting pre-clearance surveys for fauna,
- Relocation of individuals (if found) into areas of retained native vegetation within the Property;
- Fauna handling protocols;
- Methodology for the identification, numbering and marking of habitat proposed to be removed
- Targeted surveys for habitat including process for recording details of survey effort and timing, and procedures for protection of encountered fauna;
- Targeted searches for and relocation of the Dural Land Snail;
- Mapping and details of proposed installation of nest boxes or augered hollows to supplement habitat for displaced hollow-dependent species (including replacement type, design, and quantity for use by displaced fauna; and

- Procedures for the rescue and relocation of fauna encountered during the clearing process, including number and type of personnel required to undertake each task, including recording of details for the treatment and rehabilitation of any injured fauna.

Project works are proposed to be undertaken in stages. Prior to any works associated with the Approved Works commencing onsite, a primary pre-clearance survey of the entire Approved Works area is to be completed by the project ecologists in accordance with ***Section 3.1*** of this FMP with the accompanying report to be provided to Council in accordance with ***Section 5.1*** of this FMP, before commencing with the staged work. Additional pre-clearance surveys will be conducted at each stage of the approved works in line with the procedures outlined in this FMP.

All fauna surveys are to be undertaken by an Ecologist with a minimum of a Tertiary qualification in Biology, Conservation, Ecology or similar. Where appropriate, less qualified staff may work under the direction and supervision of the Project Ecologist. These staff are to have a minimum qualification of TAFE Certificate III in Conservation and Land Management or equivalent and have undergone appropriate fauna 'Spotter-Catcher training to undertake fauna works. Only appropriately vaccinated personnel are to handle bats.

All personnel undertaking fauna works required under this FMP will hold/be covered by appropriate licences listed in ***Section 3.1***.

1.1. Description of the Property and Approved Works

1.1.1. The Property

The Property is approximately 26 hectares (ha) in area and was previously a business park (now vacated and demolished) within former B7 Business Park zoned land. The Property is currently rezoned as a mix of R3 – Medium Density Residential, R4 – High Density Residential and C2 – Environmental Conservation under *The Hills Shire Council Local Environment Plan 2019* (The Hills LEP 2019). It is irregular in shape and is bound by Coonara Avenue to the north and north-west, residential development (the Glades residential development) to the west and bushland areas of Cumberland State Forest to the south and east (**Figure 1**).

1.2. The Approved Works

The Approved works include the following:

- Establishment of the works site and security including establishment of site facilities for workers and hoarding along the Coonara Avenue boundary;
- Installation of stormwater and environmental controls to manage stormwater flows and sediment runoff, including treatment, prior to discharge into the creek downstream;
- Installation of wildlife friendly site security fencing, and temporary services, including stockpiles, within the Approved Works area;
- Installation of stormwater and environmental controls to manage stormwater flows and sediment runoff, including treatment, prior to discharge into the creek downstream;

- Removal of the existing trees and other associated vegetation within the Approved Works area required to safely facilitate the construction works and establish approved APZ zones;
- Bulk Earthworks of the site to meet approved design levels including shoring walls to the apartments precinct area to establish the basement footprint.
- Construction of civil infrastructure, including sewer, stormwater, gas, electrical, telecommunication reticulation services, road pavement (including kerb and gutter), footpaths, and retaining walls;
- Construction of the residential buildings and open spaces;
- Landscaping of street verges and public spaces;
- Ongoing management of vegetation within the Asset Protection Zone (APZ); and
- Conservation management of vegetation retained within the Approved Works area.

The location of the Approved Works within the Property is shown in **Figure 1**. The Approved Works area is largely located in historically disturbed/modified parts of the Property, adjacent to and surrounding the now demolished business park office buildings and is largely comprised of outdoor car parks and landscaping. The Approved Works area is approximately 10.01 ha in area and is largely located in the northern and western section of the Property (see **Figure 1**).

Parts of the previously approved Demolition DA (DA 585/2021/HC) lie within the Approved Works area (see **Figure 1**). These areas have been cleared under a separate FMP that has been approved by Council and therefore are excluded from this FMP. The existing multistorey carpark in the eastern parts of the Property is also covered by the Demolition DA FMP and therefore excluded from this VMP.

Bushland areas within the Property but outside of the Approved works area have been identified as potentially being appropriate areas for the relocation of native fauna that may occur within the Approved Works area. These areas either comprise lands zoned C2 under the Hills LEP 2019 that are to be retained and managed as part of this DA or comprise the approximately 10 ha of the Property proposed for dedication to the NSW Government to be managed by the Forestry Corporation of NSW as an extension of the Cumberland State Forest. These bushland areas comprise a mix of Blue Gum High Forest (BGHF) and Sydney Turpentine Ironbark Forest (STIF) and extend beyond the Property into Cumberland State Forest.

1.3. Relevant Conditions of Consent

The project was approved by the Sydney Central City Planning Panel in November 2022 subject to several consent conditions. Of these, Consent Conditions 14, 36a, 44, 63, 81 and 100 contain conditions related to ecology. Of particular relevance is Condition 44, that stipulates the preparation of an FMP (this document) and the mitigation measures to be included therein. The relevant Consent Conditions are reproduced verbatim below.

14. Tree Removal

A suitably qualified Project Ecologist shall be onsite during all tree, vegetation, and habitat removal, to rescue and re-locate any displaced fauna that may be disturbed during this activity.

36a. Fauna Friendly Construction Fencing

All fencing used throughout the development must comply with the Fauna Friendly Construction Fencing requirements of the Fauna Management Plan. This includes tree protection fencing, barrier fencing, exclusion fencing and any other fence used during the construction period.

44. Fauna Management Plan

A Fauna Management Plan (FMP) is to be prepared and submitted to Council's Manager – Environment & Health for approval. The fauna management plan must contain relevant details for pre-clearance surveys, fauna protection, rescue, relocation and installation of fauna nest boxes and timelines for work. The FMP is to include (but is not limited to) the following:

a) *Methodology for the identification, numbering and marking of hollow-bearing trees and other habitat features such as active nests or hollow logs proposed to be removed. A system for marking native vegetation that does not meet Council's definition of a tree is to be included in the FMP. Details of survey effort and timing must be included.*

b) *Targeted surveys for the Powerful Owl roosting and/or nesting within the surrounding forest (including Cumberland State Forest and C2 land) undertaken by an expert Owl Ecologist in this field (to be approved by Council). Surveys must be completed monthly during the nest selection period and throughout the breeding season (April to September) for the duration of clearing and construction phases in order to identify whether a pair has established a breeding territory and success of the breeding attempt. A map showing the location of roosting/nesting owls in relation to clearing/demolition works is to be included. Consultation with Birdlife and other relevant stakeholders is recommended. Monitoring reports are to be submitted to Council monthly following survey.*

c) *Targeted searches and relocation for Dural Land Snail is to be undertaken by an expert Ecologist in this field. The surveys must be undertaken both during the day and at night, particularly during or after rain. Details of survey effort and personnel must be included. Any Dural Land Snails found within the proposed development area are to be relocated to an area of appropriate habitat onsite (preferably E2 Zone area). Relocation is to be undertaken in accordance with the NSW Office of Environment and Heritage's Translocation Operational Policy (May 2019).*

d) *Requirements for fauna exclusion fencing where appropriate including a plan to detail locations.*

e) *Specific recommendations for the rescue, handling and care of Echidnas that are known to occur within the forest.*

f) *A nest box/habitat supplementation strategy for the salvage and relocation of tree hollows/crevices/habitat features (e.g. Ring-tailed Possum dreys) or substitution with artificial nest*

boxes/habitat features where this cannot be achieved. Nest boxes/habitat features area to be installed at the ratio of 2:1 for every hollow/habitat feature removed. This is to provide displaced fauna a greater variety of options when seeking new habitat. Nest boxes/habitat features are to be installed prior to vegetation removal following the preclearance survey. Where additional hollows or nests are identified during tree removal an appropriate number of nest boxes/habitat features are to be installed. The strategy is to include a map showing the location of installed nest boxes/habitat features and details of nest box/habitat feature type, design and quantity. A monitoring and maintenance program for nest boxes is to be provided.

g) *Procedures for the rescue and relocation of fauna encountered during the clearing/demolition process, including number and type of personnel required to undertake each task.*

h) *Details for the treatment and rehabilitation of any injured fauna including contact information for veterinary surgeries for emergency treatment of injured fauna.*

i) *Details for notifying registered wildlife carer organisations following placement of injured fauna into veterinary care.*

j) *Protocols for dealing with fauna (e.g. macropods) encountered within construction zones post vegetation clearing works.*

k) *Fauna management induction checklist for the induction of all staff involved in vegetation clearance works.*

l) *Details of relevant qualifications and appropriate licences for personnel involved in wildlife rescue and relocation.*

m) *The requirement to provide reports of pre-clearance fauna surveys and relocation on a weekly basis to be provided for the records of The Hills Shire Council.*

n) *The requirement to report all fauna deaths or injuries to The Hills Shire Council within 24 hours of the incident occurring,*

o) *Specifications for fauna friendly construction fencing. This is to include designs that are suitably visible to reduce the likelihood of collision by fauna and no sharp tops or materials that could potentially injure or entangle wildlife.*

The pre-clearance survey, fauna relocation and installation of nest boxes (items a-o) are to be undertaken strictly in accordance with the approved plan and implemented in accordance with the approved timelines. Certification by the project Ecologist shall be submitted to Council's Manager – Environment & Health for endorsement two weeks prior to any work commencing.

63. Project Ecologist

Prior to any works commencing, a Project Ecologist is to be appointed and the following details provided to The Hills Shire Council's Manager – Environment & Health:

a) Name:

b) Qualification/s:

c) Telephone number/s:

d) Email:

If the Project Ecologist is replaced, The Hills Shire Council's Manager – Environment & Health is to be notified in writing of the reason for the change and the details of the new Project Ecologist within 7 days.

81. Tree/Vegetation Removal & Fauna Protection

All tree and vegetation clearance works area to be carried out strictly in accordance with the approved Fauna Management Plan required by this consent unless otherwise approved by Council's Manager – Environment & Health.

The Project Ecologist is to be onsite during all tree, vegetation and habitat removal, to rescue and re-locate any displaced fauna that may be disturbed during this activity. Trees shall be lopped in such a way that the risk of injury or mortality to fauna is minimised, such as top-down lopping, with lopped sections gently lowered to the ground, or by lowering whole trees to the ground with the "grab" attachment of a machine. Following tree felling, the project ecologist is to inspect all hollows/crevices for resident fauna prior to trees being chipped or removed from the site.

Any injured fauna is to be placed into the hands of a wildlife carer or taken to a veterinary clinic for treatment (please note only appropriately vaccinated personnel are to handle bats).

Tree hollows are to be salvaged from trees removed and placed within the bushland areas of the allotment/s. This is to be done by a qualified and experience arborist, under the direction of the Project Ecologist.

100. Biodiversity Certification

Certification that the following measures have been undertaken shall be submitted to The Hills Shire Council's Manager – Environment & Health:

*a) **Fauna Nest Boxes** – Location plan and photographs of installed nest boxes.*

*b) **Tree Removal & Fauna Protection** – Details prepared by the project ecologist demonstrating compliance with the Fauna Management Plan and Tree/Vegetation Removal and Fauna Protection condition/s of this consent.*

1.3.1. Compliance with Conditions of Consent

Table 1 below shows where each of the conditions of consent relevant to this FMP have been addressed in this document.

Table 1 Compliance with Conditions of Consent

Number	Condition of Consent	Where addressed in this FMP
14	A suitably qualified Project Ecologist shall be onsite during all tree, vegetation, and habitat removal, to rescue and re-locate any displaced fauna that may be disturbed during this activity	Addressed in Section 3.4 and 3.5
36a	All fencing used throughout the development must comply with the Fauna Friendly Construction Fencing requirements of the Fauna Management Plan. This includes tree protection fencing, barrier fencing, exclusion fencing and any other fence used during the construction period.	Addressed in Section 3.3
44	A Fauna Management Plan (FMP) is to be prepared and submitted to Council's Manager – Environment & Health for approval. The fauna management plan must contain relevant details for pre-clearance surveys, fauna protection, rescue, relocation and installation of fauna nest boxes and timelines for work. The FMP is to include (but is not limited to) the following:	This document
a)	Methodology for the identification, numbering and marking of hollow-bearing trees and other habitat features such as active nests or hollow logs proposed to be removed. A system for marking native vegetation that does not meet Council's definition of a tree is to be included in the FMP. Details of survey effort and timing must be included.	Addressed in Section 3.4
b)	Targeted surveys for the Powerful Owl roosting and/or nesting within the surrounding forest (including Cumberland State Forest and C2 land) undertaken by an expert Owl Ecologist in this field (to be approved by Council). Surveys must be completed monthly during the nest selection period and throughout the breeding season (April to September) for the duration of clearing and construction phases in order to identify whether a pair has established a breeding territory and success of the breeding attempt. A map showing the location of roosting/nesting owls in relation to clearing/demolition works is to be included. Consultation with Birdlife and other relevant stakeholders is recommended. Monitoring reports	Addressed in Section 3.8 and Section 5.3 (reporting)

Number	Condition of Consent	Where addressed in this FMP
	are to be submitted to Council monthly following survey.	
c)	Targeted searches and relocation for Dural Land Snail is to be undertaken by an expert Ecologist in this field. The surveys must be undertaken both during the day and at night, particularly during or after rain. Details of survey effort and personnel must be included. Any Dural Land Snails found within the proposed development area are to be relocated to an area of appropriate habitat onsite (preferably E2 Zone area). Relocation is to be undertaken in accordance with the NSW Office of Environment and Heritage's Translocation Operational Policy (May 2019).	Addressed in Section 3.4.4
d)	Requirements for fauna exclusion fencing where appropriate including a plan to detail locations.	Addressed in Section 3.3
e)	Specific recommendations for the rescue, handling and care of Echidnas that are known to occur within the forest.	Provided in Section 4.3.4.2i
f)	A nest box/habitat supplementation strategy for the salvage and relocation of tree hollows/crevices/habitat features (e.g. Ring-tailed Possum dreys) or substitution with artificial nest boxes/habitat features where this cannot be achieved. Nest boxes/habitat features area to be installed at the ratio of 2:1 for every hollow/habitat feature removed. This is to provide displaced fauna a greater variety of options when seeking new habitat. Nest boxes/habitat features are to be installed prior to vegetation removal following the preclearance survey. Where additional hollows or nests are identified during tree removal an appropriate number of nest boxes/habitat features are to be installed. The strategy is to include a map showing the location of installed nest boxes/habitat features and details of nest box/habitat feature type, design and quantity. A monitoring and maintenance program for nest boxes is to be provided.	Addressed in Section 3.6

Number	Condition of Consent	Where addressed in this FMP
g)	Procedures for the rescue and relocation of fauna encountered during the clearing/demolition process, including number and type of personnel required to undertake each task.	Addressed in Section 3.5
h)	Details for the treatment and rehabilitation of any injured fauna including contact information for veterinary surgeries for emergency treatment of injured fauna.	Provided in Section 3.5.1
i)	Details for notifying registered wildlife carer organisations following placement of injured fauna into veterinary care.	Provided in Section 3.5.1
j)	Protocols for dealing with fauna (e.g. macropods) encountered within construction zones post vegetation clearing works.	Provided in Section 4.4
k)	Fauna management induction checklist for the induction of all staff involved in vegetation clearance works.	Addressed in Section 3.2
l)	Details of relevant qualifications and appropriate licences for personnel involved in wildlife rescue and relocation.	Addressed in Section 3.1
m)	The requirement to provide reports of pre-clearance fauna surveys and relocation on a weekly basis to be provided for the records of The Hills Shire Council.	Addressed in Section 5.1
n)	The requirement to report all fauna deaths or injuries to The Hills Shire Council within 24 hours of the incident occurring,	Addressed in Section 3.5.1
o)	Specifications for fauna friendly construction fencing. This is to include designs that are suitably visible to reduce the likelihood of collision by fauna and no sharp tops or materials that could potentially injure or entangle wildlife.	Addressed in Section 3.3
44 (cont'd)	The pre-clearance survey, fauna relocation and installation of nest boxes (items a-o) are to be undertaken strictly in accordance with the approved plan and implemented in accordance with the approved timelines. Certification by the project Ecologist shall be submitted to Council's Manager – Environment & Health for endorsement two weeks prior to any work commencing.	Addressed in Chapter 3 and Certification is addressed in Section 5.4
81	Tree/Vegetation Removal & Fauna Protection	

Number	Condition of Consent	Where addressed in this FMP
	All tree and vegetation clearance works area to be carried out strictly in accordance with the approved Fauna Management Plan required by this consent unless otherwise approved by Council's Manager – Environment & Health.	This document
	The Project Ecologist is to be onsite during all tree, vegetation and habitat removal, to rescue and re-locate any displaced fauna that may be disturbed during this activity. Trees shall be lopped in such a way that the risk of injury or mortality to fauna is minimised, such as top-down lopping, with lopped sections gently lowered to the ground, or by lowering whole trees to the ground with the "grab" attachment of a machine. Following tree felling, the project ecologist is to inspect all hollows/crevices for resident fauna prior to trees being chipped or removed from the site.	Addressed in Section 3.5
	Any injured fauna is to be placed into the hands of a wildlife carer or taken to a veterinary clinic for treatment (please note only appropriately vaccinated personnel are to handle bats).	Addressed in Section 3.5 and Section 4.3
	Tree hollows are to be salvaged from trees removed and placed within the bushland areas of the allotment/s. This is to be done by a qualified and experience arborist, under the direction of the Project Ecologist.	Addressed in Section 3.6.1
100	Biodiversity Certification	
	Certification that the following measures have been undertaken shall be submitted to The Hills Shire Council's Manager – Environment & Health:	Addressed in Section 5.4
a)	Fauna Nest Boxes – Location plan and photographs of installed nest boxes.	Addressed in Section 3.6.2 and Section 5.4
b)	Tree Removal & Fauna Protection – Details prepared by the project ecologist demonstrating compliance with the Fauna Management Plan and Tree/Vegetation Removal and Fauna Protection condition/s of this consent.	Addressed in Section 5.4

1.4. Acknowledgements

This FMP was prepared with the assistance and input of Dr Stephanie Clark (Invertebrate Identification Australasia) and Mr Corey Mead (TreeHouse Ecology).

2. Fauna Habitat and Expected Fauna

This chapter presents an overview of the fauna habitats present in the Approved Works area and surrounding Property and a description of the fauna species considered to have potential to occur.

2.1. Fauna Habitat

As described previously, the Property is located directly adjacent to the Cumberland State Forest, a large area of native vegetation that has been allowed to regenerate for over 100 years. This area provides high quality fauna habitat for a wide range of native species including several threatened species. The ecological values present in the areas surrounding the Approved Works area include, but are not limited to:

- A combined open forest extent of over 52 ha confined within the local urban landscape with otherwise only fragmented connectivity to the south-west along Darling Mills Creek;
- Large, recorded hollows of both potential and previous use by Powerful Owl (*Ninox strenua*), Southern Boobook (*Ninox boobook*) and cockatoos;
- Dense stands of gully forest vegetation providing roosting habitat potential for both of the above mentioned owl species;
- Powerful Owl prey species habitat including seasonal foraging by the threatened Grey-headed Flying-fox (*Pteropus poliocephalus*) as well as Sugar Glider (*Petaurus breviceps*), Common Ringtail Possum (*Pseudocheirus peregrinus*) and Brushtail Possum (*Trichosurus vulpecula*);
- Large dams nearby to the east supporting frog breeding habitat as well as concentrated foraging by insectivorous birds and microbats; and
- Riparian gully habitats to the immediate east, below the dams and continuing to the south within the Approved Works area.

Although land adjacent to the Approved Works area has significant biodiversity values, the Approved Works area itself has been highly modified and is currently dominated by car parks and some small areas of landscaped gardens (Keystone Ecological 2022). While these areas do not provide high quality habitat for fauna species, fauna habitat is nonetheless present in the vegetated areas of the Approved Works area. The vacant office buildings, and the vegetation around the outer extent of the buildings have now been demolished and the existing worksite in its current state does not provide habitat for fauna.

As assessed in the Concept DA BDAR (Keystone Ecological 2022), the vegetation present in the Approved Works area is predominantly comprised of landscaped gardens within the remaining carparks with scattered occurrences of BGHF and STIF. The majority of the areas surrounding and within the carparks were extensively landscaped and integrated in the surrounding landscape by the planting of mostly Australian native species (Keystone Ecological 2022). The landscaping is now in a mature state such that it provides potential habitat for a number of fauna species, including potential habitat use by the endangered Dural Land Snail (see ***Section 2.3***). Some sections in the north-eastern parts of the Approved Works area, immediately adjacent to future Forestry dedication areas comprise potential sub-optimal roosting habitat for the threatened Powerful Owl (see ***Section 2.4***).

Some parts of the natural riparian area adjacent to the Approved Works area were "enriched" with plantings of tree ferns and other terrestrial ferns, and understorey plantings were generally restricted to fast-growing species such as *Acacia* (Keystone Ecological 2022). Despite their habitat values, the planted landscaped gardens do not represent a natural system, which reduces their value as fauna habitat compared to the surrounding native bushland. In particular they do not possess large hollow-bearing trees. Hollows are an important habitat feature for many species of fauna, including several threatened species known from the local area including the Powerful Owl, and no suitable hollows for this species are present within the Approved Works area.

As part of the previous business park development trees were also planted in a series of narrow garden beds in the car parking bays. However due to their design and location, development of these trees has been poor and comprise lower habitat value for fauna.

Despite its artificial nature, there are some notable habitat features for fauna within the Approved Works area including the following:

- Dense mid-storey foliage providing suitable and likely periodic roosting opportunity for locally known hawk-owls including Powerful Owl (limited to the north-east parts of the Approved works area) and Southern Boobook;
- Seasonal floristics and fruiting trees for foraging by nectarivore and frugivore species;
- Common Ring-tail Possum dreys (constructed nests) observed within the landscaped vegetation areas;
- Placed rockpiles and rock edges to garden beds, and fallen logs within landscaped areas providing shelter habitat for frogs, reptiles and invertebrate species;
- Potential for small hollows providing shelter habitat for hollow-dependent species; and
- Potential nesting trees for passerine birds.

The Approved Works area provides potential roosting habitat for microbats in small hollows within trees, and several microbat species have been recorded from the Approved Works area (see ***Section 2.2*** below).

2.2. Recorded and Likely Fauna Species

A wide range of species has been recorded within the Property and adjacent Cumberland State Forest. However due to the degradation/modification of habitats within the Approved Works area, a lower diversity has been recorded within the Approved Works area. That notwithstanding, the vegetation and still provide habitat for an array of native species, including several threatened species.

The most abundant native fauna group in the Approved Works area is the birds. A total of 40 bird species have been recorded within and immediately adjacent to the Approved Works area, comprising a wide range of species known from the locality. One of the notable bird species recorded from the Approved Works area is the Australian Brush Turkey (*Alectura lathami*), and several breeding mounds have been recorded in close proximity to the Approved Works area. This species is widespread on the eastern coast of Australia and is

known to inhabit a range of habitats including urban areas. Details of procedures to mitigate any impacts to this species and to prevent it from breeding in the Approved Works area are provided in ***Section 3.9***.

No threatened bird species were recorded directly within the Approved Works area. However, the Powerful Owl utilises the adjacent Cumberland State Forest to the immediate east of the Approved Works area for recent years' nesting and breeding roosts. The species has utilised different large nesting hollows in the nearby surrounds with records now spanning back 20 years. The last recorded breeding event within the now Mirvac lands was located within SHT4 in 2015 (Keystone Ecological 2022), which is located closer to the recent demolitions area to the south.

While this species is unable to nest in the Approved Works area due to the absence of large tree hollows, there are suitable large tree hollows located within 150 m of the Approved Works area including three that are known to have been used in the past for nesting. The Powerful Owl is known to occur in the Cumberland State Forest and is known to forage in a section of the Approved Works area on occasion as part of a much larger foraging range and utilise available dense vegetation for roosting.

Further details of the occurrence and biology of the Powerful Owl are presented later in this chapter in **Section 2.4**. Specific management strategies to avoid impacts to the Powerful Owl are presented in **Section 3.8**.

Five common amphibian species have been recorded from the Property during demolition of the seven office buildings and previous surveys (Keystone Ecological 2021); Peron's Tree Frog (*Litoria peronii*), the Common Eastern Froglet (*Crinia signifera*), the Eastern Dwarf Tree Frog (*Litoria fallax*), the Leaf Green Tree Frog (*Litoria phyllochroa*) and the Striped Marsh Frog (*Lymnodynastes peronii*). Seven common reptile species: the Pale-flecked Garden Sunskink (*Lampropholis guichenoti*), the Delicate Skink (*Lampropholis delicata*), the Weasel Skink (*Saproscincus mustelinus*), the Eastern Water Skink (*Eulamprus quoyii*), the Eastern Water Dragon (*Intellagama lesueurii lesueurii*), Eastern Blue-tongue Lizard (*Tiliqua scincoides*) and Golden Crowned Snakes (*Cacophis squamulosus*) have been recorded during demolition of the seven office buildings and surveys to date. No threatened amphibians or reptiles have been recorded or are considered likely to occur.

One threatened invertebrate species has been recorded from the Property, the Dural Land Snail (*Pommerhelix duralensis*). This species has not been recorded from within the Approved Works area to date. However, it has potential to occur due to the presence of suitable habitat. Further details of this species biology and occurrence is presented in **Section 2.3** and specific management strategies to avoid impacts to the Dural Land Snail are presented in **Section 3.7**.

Several common arboreal mammal species have been recorded from the Approved Works area including the Sugar Glider (*Petaurus breviceps*), Common Ringtail Possum (*Pseudocheirus peregrinus*) and Common Brushtail Possum (*Trichosurus vulpecula*). These species are significant in that they are known food sources for the Powerful Owl. Camera monitoring conducted as part of the FMP works for the Demolition DA confirmed that Echidnas (*Tachyglossus aculeatus*) also occur within the Property.

Several microbat species have been recorded during site surveys and others are known from the immediate locality. **Table 2** below provides a summary of the conservation status and roosting habits for the locally occurring microbat species recorded within the Property during surveys and within 1 km of the Approved Works area as per Bionet database records.

Table 2 Roost preference of locally occurring microbat species

Scientific Name	Common Name	BC Act status	Hollow-roosting	Structure roosting
Austronomus australis	White-striped Freetail-bat	Protected	✓	✓
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	x	x
Chalinolobus gouldii	Gould's Wattled Bat	Protected	✓	✓
Chalinolobus morio	Chocolate Wattled Bat	Protected	✓	✓
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	✓	✓
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable	✓	✓
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable	x	✓
Nyctophilus geoffroyi	Lesser Long-eared Bat	Protected	✓	✓
Nyctophilus gouldi	Gould's Long-eared Bat	Protected	✓	x
Ozimops ridei	Eastern Free-tailed Bat	Protected	✓	✓
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	✓	✓
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	✓	✓
Scotorepens orion	Eastern Broad-nosed Bat	Protected	✓	✓
Vespadelus pumilus	Eastern Forest Bat	Protected	✓	x
Vespadelus vulturnus	Little Forest Bat	Protected	✓	✓

As indicated in **Table 2**, several microbats listed as Vulnerable under the BC Act have been recorded from the Property, including areas within/near the Approved Works area, or are highly likely to occur, including the Yellow-bellied Sheathtail bat (*Saccolaimus flaviventris*), Eastern Coastal Freetail-bat (*Micronomus norfolkensis*), Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Large Bent-wing Bat (*Miniopterus orianae oceanensis*) and Greater Broad-nosed Bat (*Scoteanax rueppellii*). These species are likely able to forage over the vegetated parts of the Approved Works area. Procedures to effectively recover tree roosting microbats during clearing are outlined below in ***Section 3.5***.

The Grey-headed Flying-fox (*Pteropus poliocephalus*) has also been recorded from the Property although this has been limited to observations of individuals flying over the site. This species is listed as Vulnerable under the EPBC Act and the BC Act and has potential foraging habitat in the Approved Works area, although no roosting camps are present.

Several feral animals have been recorded from the Cumberland State Forest adjacent to the Property, and two species have been recorded from the Demolition Footprint (located within the Concept Masterplan Approved Works); the European Red Fox (*Vulpes vulpes*), and the Black Rat (*Rattus rattus*). The fox was likely to have denned underneath Building G and is assumed to have self-relocated during the demolition process. These species have potential to occur in the Approved Works area on occasion.

2.3. Dural Land Snail

2.3.1. Breeding Cycle and Biology

The Dural Land Snail is endemic to the Cumberland subregion in the north western portion of Sydney, from Wisemans Ferry in the north to Parramatta in the south and from Epping in the east to about Kurrajong in the west (Clark 2009). The species is definitely found within the Local Government Areas of The Hills Shire, Hawkesbury Shire and Hornsby Shire (EES 2021). The total number of individuals of this species across its range is unknown, nor the densities that the species can occur. The species can be relatively common when suitable habitat is present. However, most known populations are found on relatively small, isolated patches of habitat that are often surrounded by some combination of industrial, agricultural or urban development.

It is primarily associated with Hawkesbury Sandstone Vegetation, Shale Sandstone Transition Forest and Sydney Turpentine-Ironbark Forest. However, it has also been found in the following listed ecological communities: Shale Sandstone Transition Forest, Sydney Turpentine-Ironbark Forest, Shale Gravel Transition Forest, Castlereagh Scribbly Gum Woodland, Blue Gum High Forest and Agnes Banks Woodland. It can be found in leaf litter, grass tussocks, under logs and non-natural debris such as cardboard and old furniture and so on (Clark 2009, Ridgeway et al. 2014).

Little is known of the reproductive biology, fecundity, and longevity for the Dural Land Snail. It is a hermaphrodite and capable of selfing, it lays clutches of about 20-25 small, round, white eggs (Clark, 2009, Ridgeway et al., 2014) in moist, dark places such as at the base of grass clumps and under logs and are virtually identical to those of *Meridolum corneovirens* (**Photograph 1**). The snails probably live between 2-5 years but can certainly estivate in the soil or under logs etc. for several months, especially when conditions are dry, such as those prevailing in Sydney in 2019. They feed predominately on fungi (**Photograph 2**) but have been observed eating fresh dead individuals of *P. duralensis* and other carrion, paper, plant detritus and old shells (Clark, personal observations; Ridgeway et al., 2014). The snails are generally active at night or on moist, warm overcast days.

Photograph 1 An individual of *Meridolum corneovirens* laying eggs in a grass clump at Mount Druitt (Photo by S.A. Clark)

Photograph 2 An individual of *P. duralensis* feeding on fungus at Hunts Creek Reserve, Carlingford, Sydney (Photo by S.A. Clark)

2.3.2. Occurrence within the Property

A total of 18 live individuals of this species (comprising both adults and juveniles) were recorded from the Property during surveys conducted for the Concept DA BDAR in three areas (see **Figure 2**):

- Along the eastern edge of the multi-storey car park;

- In an area of vegetation between the ring road and the southeastern corner of the (now demolished) main office building; and
- The southern half of the Property

The vegetation found in the above areas has been mapped in the Keystone BDAR as VZ 3a (highly modified edges), VZ 6a (old regrowth/remnant Sydney Turpentine Ironbark Forest, past management) and VZ 6b (old regrowth / remnant STIF, moderate condition).

These were observed over two nights in the first half of December 2020. There had been light rain prior to and during the day of the first survey night and again it had rained prior to the second night survey 11 days later. The temperatures were mild to cool at night and the humidity was relatively high, but the ground layer was not very moist. The conditions were not optimal but were sufficient to detect snail activity at night. Most of the 18 individuals observed over the two nights were observed the first time as it was wetter and a little warmer than the conditions present at the second visit.

A total of 12.81 hectares of potential habitat for this species was identified across the Property, of which 0.42 ha occurs in the Approved Works area (0.22 ha of VZ 3a, 0.19 ha of VZ 4a, 0.002 ha of VZ 5b, 0.008 ha of VZ 5c). Based on the survey results from the BDAR, it has been calculated that there is a density of 8 snails per hectare of suitable habitat in the Property giving a likely total population size of 102 across the 12.81 ha of suitable habitat identified and mapped in the Property. Applying the same density measure to the 0.42 ha of suitable habitat within the Approved Works area means that 3-4 individuals could be expected to be impacted. However, survey conditions were not optimal and therefore the size of the population in the area surveyed is therefore considered to be larger than the 18 live animals observed.

Additional individuals recorded during pre-clearance surveys conducted under the approved Demolition DA FMP were all located along the eastern edge of the multi-storey car park which has been established as the main location for occurrence by Dr Clark.

2.4. Powerful Owl

2.4.1. Breeding Cycle and Biology

The Powerful Owl is listed as vulnerable under the BC Act. The sedentary species inhabits mature rainforest and a wide range of eucalypt forest and woodland types from Queensland to Victoria. It occupies tall, moist productive eucalypt forests of the eastern tableland edge and the mosaic of wet and dry sclerophyll forests occurring on undulating, gentle terrain nearer the coast (Kavanagh 2003). Powerful Owls feed mainly on medium-sized species of arboreal marsupials that are most readily available at any given locality (Lavazanian et al. 1994). Optimal habitat includes a tall shrub layer and abundant hollows supporting high densities of arboreal mammals.

Roosting (daytime rest) is generally within dense foliage of mid-canopy trees in sheltered gullies, also including rainforest or exotic pine plantations (Garnett and Crowley 2000). Large old trees; usually living Eucalypts, with hollows at least 45cm in diameter and 100cm deep, within or below the canopy, are required for nesting (Higgins 1999). Mated pairs of Powerful Owl roost together or separately, maintaining several roost sites

throughout their territory, which are used in rotation (Lindsey 1992), shifting with the availability of prey. A pair is generally faithful to a traditional nesting hollow. Powerful Owls form pairs for life and are strongly territorial. Estimates of the home range of this species vary greatly, but territories are thought to range from 800 to 1500 hectares (Kavanagh 1997).

Laying is strictly seasonal, typically occurring between mid-May to mid-July. However possibly due to climate change owls in the Sydney region have recently been recorded nesting as early as April (pers com. Dr Kavanagh). The breeding season extends either side of laying, commencing at the early pairing up stage and finishing after fledging of the young. Therefore, local breeding activity may occur between March – September.

The Powerful Owl is widely distributed, albeit at very low population density, throughout the outer suburbs of the greater Sydney metropolitan area, particularly where these suburbs adjoin substantial areas of bushland and reserves (Kavanagh 2003).

2.4.2. Occurrence within the Property

The Powerful Owl is known to occur in the Cumberland State Forest and is known to forage in a section of the Approved Works area on occasion as part of a much larger foraging range and utilise available dense vegetation for roosting. Following a sighting near the boundary with Cumberland State Forest in February 2022, additonal areas of roosting/foraging habitat have been mapped as occurring in the north-east parts of the Approved works area (**Figure 3**). Under the Biodiversity Assessment Method (BAM), the Powerful Owl is classified as a Dual Credit species with breeding habitat requiring species credits and foraging habitat requiring ecosystem credits. As the habitat within the Approved works boundary does not comprise breeding habitat (i.e it is not within a 100m radius of a known nest tree), the removal of this habitat is offset by the retirement of ecosystem credits for removal of the habitat surrogates (namely PCT 1237 credits).

While the Powerful Owl is unable to nest in the Approved Works area due to the absence of large tree hollows, there are suitable large tree hollows located within 150 m of the Approved Works area including three that are known to have been used in the past for nesting.

A breeding pair of Powerful Owls are well known to the combined Cumberland State Forest and the Property areas to the east and south, outside of the Approved Works area. This pair have also been studied by owl expert Dr Rod Kavanagh during his period stationed within the Cumberland State Forest offices from 1977 to 2011. Dr Kavanagh did his PhD on large forest owls (Kavanagh 1997) and together with John Young, the leading naturalist on owls, undertook some surveillance of nesting by the local pair as part of studies. Dr Kavanagh subsequently prepared the Recovery Plan for Large Forest Owls (DEC (NSW) 2006).

It is likely that individuals from the pair have been replaced under natural succession over the last 4 decades, with the combined connective local forest remnant remaining as their core breeding territory. This pair is known to have cycled through at least five nest trees over the past 20 years, including two on the Property identified as SHT4 and SHT7 (see **Figure 3**). Although these two trees are not known to be used since 2015 and 2007 respectively (Keystone Ecological 2022), there is the potential for them to use the nest trees again in future breeding seasons. SHT8, located in the adjacent Cumberland State Forest area, has been utilised in more recent years (see **Figure 3**).

Trees previously known to be utilised for nesting that occur within or close to the 150m buffer distance of the Approved Works boundary are identified in **Figure 3**, These four large hollow-bearing trees are referred to as 'significant habitat trees' (SHT) and have been allocated reference numbers for identification and monitoring purposes.

Field work by TreeHouse Ecology in 2021 led to the nomination of four (4) additional trees within 150m of the Demolition Footprint area for monitoring during the March – October 2022 breeding season. These trees were nominated as Monitoring Points (MPs) as they contain a large opening that could be potentially accessed by large hollow dependent birds. A further four (4) additional trees are also located within 150m of the Concept Masterplan DA footprint. Although no evidence or record of Powerful Owl use exists for these eight trees to date and given other large hollow dependent birds such as Cockatoos have been observed using some of them, as a precautionary measure these trees have been included for monitoring.

As per information provided by Birdlife Australia, a further tree, referred to as SHT9, was used for nesting/breeding in 2000, i.e more than 20 years ago. While field surveys were conducted around the area of the provided co-ordinates for SHT9 in 2021 and 2022, a tree with a suitably sized hollow was not located in the vicinity of the provided co-ordinates. Birdlife Australia will be contacted to reconfirm accuracy of the provided co-ordinates. However, it is concluded that surveys conducted have located all suitable hollows for Powerful Owl within 150m of the Approved Works boundary.

Tree and hollow data associated with these SHTs, and MPs is summarised in **Table 3** below.

Table 3 Relevant Powerful Owl SHT and MP data within 150m of the site

Ref.	Common Name	Hollow(s) size/type	Easting	Northing	Notes
SHT1	Smooth-barked Apple	50cm+ broken trunk	318203	6264577	Used in 2016 and 2017
MP2	Smooth-barked Apple	30-40cm branch, 20cm branch	318206	6264554	
MP3	Sydney Blue Gum	20-30cm trunk, 15-20 trunk	318094	6264446	Cockatoos observed in hollow
SHT4	Sydney Blue Gum	30-40cm trunk, 20-30cm trunk	318087	6264329	Used in 2008, 2014 & 2015
MP5	Sydney Blue Gum	20-30cm trunk	318015	6264231	
MP6	Smooth-barked Apple	20-30cm trunk	318022	6264211	
SHT7	Smooth-barked Apple	20-30cm trunk	317905	6264164	Used in 2007
SHT8	Sydney Blue Gum	20-30cm trunk	318296	6264654	Just outside 150m buffer but used in 2020 and 2022
SHT9	*Tree not present at or near co-ordinates provided by Birdlife*				Used in 2000

Ref.	Common Name	Hollow(s) size/type	Easting	Northing	Notes
	Australia during 2021-2022 surveys				
MP10	Sydney Blue Gum	20-30cm trunk x2	318170	6264799	
MP11	Sydney Blue Gum	20-30cm trunk	318170	6264850	
MP12	Sydney Blue Gum	20-30cm trunk x2	318211	6264856	
MP13	Sydney Blue Gum	20-30cm trunk	318152	6264906	

The owl pair were setting up to nest at a tree further to the south in the Cumberland State Forest area in 2021 (beyond the 150m buffer for the Approved Works area) but this was unsuccessful at this location. Rarely, a replacement clutch may be laid if the first attempt fails early in the egg stage (DEC (NSW) 2006).

Birdlife Australia reported a sighting of a roosting adult near the northern parts of the fenceline between the Property and Cumberland State Forest on 16 and 17 February 2022 with a further sighting of a juvenile to the east of the café within Cumberland State Forest on 16 February 2022.

Detailed Powerful Owl monitoring by *TreeHouse Ecology* continued during the 2022 breeding period concurrent with works for the approved Demolition DA. This involved placement of full-covert infra-red and motion sensing cellular cameras on all six hollows located within 100m of the demolition DA area. This was within five trees (SHT1, MP2, MP3, SHT4 (x2) & SHT5) as shown on **Figure 3.**

Cameras were placed out in March prior to hollow selections for nesting and recorded through the entire winter nesting period. The cameras provided real-time images of any nocturnal activity at the hollows to indicate when works may need immediate progressive management to prevent any disturbance. Activity surveys were also extended throughout the remaining connective landscape into Cumberland State Forest, also utilising song-meters at select locations that were analysed with cluster analysis software.

TreeHouse Ecology recorded the nest tree in 2020 at SHT8 and found that nesting at trees close to the male's winter roost site was abandoned in the south of Cumberland Sate Forest in 2021. SHT8 was again selected for nesting in 2022, however excessive rainfall (264mm over 7 days) in early July temporarily flooded the hollows and both of the four-week-old chicks drowned. Similar monitoring will continue during all of the future demolition and construction phases that extend into the winter periods, to advise on any emerging indirect impacts on breeding behaviour. There are expansive areas of suitable roosting habitat outside the Approved Works area throughout the combined connective forest remnant supporting mostly STIF and BGHF communities. Roosting habitat is typically along the moist gully areas specifically supporting Turpentine and Sweet Pittosporum trees which are favoured given their dense mid-storey structure and protective foliage as a diurnal resting shelter. **Figure 3** also shows all quality roosting habitat areas within 150 m of the Approved Works area, as well as the male breeding roost areas over the last two early breeding seasons (2020 & 2021).

2.4.3. Potential Impacts on the Powerful Owl

The proposed works are not likely to cause direct harm to the breeding pair or their young as no large hollows are present. The works do however have potential to cause some indirect impacts on Powerful Owl which are considered in subsequent sections. Specific management strategies to avoid impacts to the Powerful Owl are presented in **Section 3.7**.

2.4.3.1. Indirect Impacts on Nesting Behaviour

Indirect impacts on nesting behaviour may occur if works are undertaken during the breeding season and where the owls choose to occupy any trees identified on **Figure 3.** Powerful Owl are sensitive to nest disturbance during the egg and chick stages and will readily abandon the nest if disturbed (DEC (NSW) 2006). This has been previously recorded by the local pair. If works are undertaken through the breeding season, excessive noise and activity may discourage the owls from establishing a breeding site close to the works area. An established nest site may also become abandoned.

Bain et al. (2014) developed a set of guidelines specifically aimed at avoiding and mitigating development impacts on the Powerful Owl, the most important of which is the observation of a minimum distance of 100 metres from any development footprint to a nest site and 50 metres to roosting habitat during the breeding season. The current buffer to nesting areas identified by the DPIE Threatened Biodiversity Data Collection constraints is 100m. For this FMP, a conservative buffer distance of 150 m between the potential nest trees and the Approved Works area has been applied. This is consistent with the buffers applied in the approved FMP for the Demolition DA footprint. Due to the implementation of this buffer, the works are not likely to indirectly impact nesting behaviour.

2.4.3.2. Impacts on Roosting Locations

The female Powerful Owl occupies the nesting hollow during the laying and early chick stages. The male at this time, and both sexes and fledglings at all other times of the year, occupy suitable dense foliage roost sites during the day. These are when the owls are at rest. Suitable roosting habitat areas within 150 m of the Approved Works area are mapped on **Figure 3**. Owls may occupy these potential roosting areas, as well as any other suitable habitat within the remaining connective forests and 1000 ha home range areas. Therefore, there is a large extent of available local roosting habitat. The roosting areas occupied by the male proximate to the nest trees from 2020 and 2021 are also shown on **Figure 3**. Some suitable roosting habitat as well as sub-optimal roosting habitat for the Powerful Owl occurs within the Approved Works area.

2.4.3.3. Impacts on Foraging

The Powerful Owl is a specialist predator of arboreal marsupials, particularly the Common Ringtail Possum. Other preferred prey species occurring in the local region include the Sugar Glider, Common Brushtail Possum, Grey-headed Flying-fox and to a lesser extent large birds.

Due to the young age of mostly landscaped and planted vegetation proposed for removal within the Approved Works area area, suitably sized hollows for prey mammal species are in very low numbers, if present at all. Constructed dreys (dome nests in dense foliage) of Common Ringtail Possum have also been observed within the landscaped areas and this species is considered to be resident in the Approved Works area. The Common Brushtail Possum is also likely to occur as it is a very widespread, urban adapted species.

Prey species have potential to occur within vegetation in the Approved Works area at night, although the Grey-headed Flying-fox is only likely to occur when seasonal flowering or fruiting of trees permit. Hence it must be recognised that Powerful Owls may be actively foraging within the vegetated works areas at night and any barbed wire fencing, excessive lighting or overnight noise (such as generators) may have some impact or deterrence to this. As foraging is only likely to occur outside of the standard daylight works period, works will generally only have low potential to impact on owl foraging. Impacts may occur however, where a direct impact on individual possums of either species may occur during vegetation clearance works. This FMP therefore also gives due consideration to effective recovery of possums including the provision of supplementary habitat for these species (see ***Section 3.6***).

3. Fauna Management Measures

This FMP has been prepared to provide detailed specifications of the measures that will be implemented to avoid impacts to native fauna as a result of the project. Measures to avoid and mitigate any unnecessary impacts from the project on fauna species are detailed in this chapter and include:

- Licences
- Environmental Inductions;
- Pre-clearance surveys;
- Staged clearing process;
- Clearance supervision by ecologists;
- Relocation of captured fauna;
- Salvage of habitat materials;
- Nest box installation;
- Preventing Brush Turkeys breeding in the Approved Works area; and
- Monitoring for the Powerful Owl.

The methods to minimise impacts are described in detail below. All fauna handling is only to be undertaken by appropriately trained and qualified ecologists. All diurnal and nocturnal pre-clearance surveys must be conducted by trained and qualified ecologists under the direction of the Project Ecologist. Trained and qualified ecologists, as directed by the Project Ecologist, must also be present onsite during all vegetation clearing works, including clearing of areas not identified as habitat features during pre-clearing surveys.

3.1. Licences

It is noted that Condition 44 l) of the Consent states that Details of relevant qualifications and appropriate licences for personnel involved in wildlife rescue and relocation is to be provided. Cumberland Ecology is an ecological consultancy that holds a Scientific Licence (REF: SL100103) under Section 132c of the *National Parks & Wildlife Act 1974* for survey purposes. Cumberland Ecology also holds an Animal Research Authority licence (ACEC ARA No: 17/1197) under the *Animal Research Act 1985* for fauna surveying and monitoring. These licences are held by the company director and cover all Cumberland Ecology staff.

However, the activities being implemented under this FMP are for the purpose of protecting fauna and minimising impact on fauna as a result of clearing works – termed 'Spotter/Catcher' works. It should be noted that NSW does not issue licences for Spotter/Catcher works and approvals for Spotter/Catcher works are dictated by issued conditions of consent and management plans, as approved by relevant consent authorities.

Therefore, while the Spotter/Catcher works required under the FMP are not considered to constitute 'animal research' or a 'recognised research purpose' under the *Animal Research Act 1985*, as NSW does not issue licences for Spotter/Catcher works, Cumberland Ecology has listed our Scientific Licence (REF: SL100103) and

associated Animal Ethics licence (REF: 17/1197) as evidence of Cumberland Ecology staff being appropriately trained/licenced for handling fauna.

Furthermore, a Cumberland Ecology staff member is a subject matter expert and trainer for a nationally accredited Fauna Spotter Catcher course that provides AHCFAU301A - Respond to Wildlife Emergencies' competency. All Cumberland Ecology staff undergo the Spotter-Catcher training, either as formally attending the course or as internal company training by the subject matter expert/trainer.

3.2. Environmental Inductions

Environmental inductions will be undertaken for all personnel who will work within the Property prior to the commencement of any works to communicate environmental features to be protected and measures to be implemented. Fauna management and procedures will form part of the site induction and all persons working on the vegetation clearing or other feature removal will be briefed about the possible fauna present at the time of construction, and what procedures must be undertaken in the event of an animal being injured or disturbed. The Project Ecologist will provide information for induction slides and the supervising ecologist on the day will provide a prestart briefing prior to works. The inductions or daily pre-starts will specify in detail which areas of vegetation are approved to be removed and the importance of not damaging retained vegetation. The induction will specify that unauthorised personnel are not permitted to enter retained vegetation areas, and that no machinery or stockpiling of materials is permitted outside the approved works areas. Other environmental matters to be included within inductions include details of what fauna species to look out for, triggers for stop works, what to do when fauna are encountered, who to contact and what do if someone is bitten or scratched, and the contact phone number/radio frequency for the supervising ecologist. In order to ensure the requisite information is passed on to all contractors, a Fauna Management Induction Fact Sheet and Checklist has been developed (Appendix A) and will be given to all contractors entering the Property. Note the provided fact sheet in Appendix A may be further updated/refined with further details (e.g colour of markings for habitat features) once available.

3.3. Boundary Demarcation

As the Approved Works area will be subject to a range of different management activities depending on the objectives for each area, boundaries of each management area will be demarcated as described below depending on the required works to identify management zones and restrict works to appropriate areas.

3.3.1. Marking Limits of Approved Works

Prior to any clearing works being undertaken, the boundary of the limit of works for the Approved Works is to be clearly delineated and fenced with temporary mesh fencing that will exclude fauna from entering the works area, particularly terrestrial species captured from within the development area. The fencing will be fauna friendly (see **Section 3.3.3**) and will include shading comprised of 70% shade cloth, a minimum of 1.8 m tall, that will be affixed to the temporary fencing panels using cable ties or similar. Staging of the fencing is to follow the sequencing of approved works and the Contractor is to ensure shading is installed at each relevant area in line with this sequencing. The fencing is most important close to adjacent or nearby vegetated habitats. The base of this fencing is to support silt fencing which is to be dug into the soil or otherwise pinned to the surface to prevent small fauna (e.g. skinks and frogs) passing through or burrowing below the fencing. This silt

fencing will also act as a drift fence for funnel traps placed along the base of the fencing to recover small frogs and reptiles frog the site.

Marking of clearing limits will also be supplemented with high visibility tape or other appropriate boundary markers. To avoid unnecessary damage to adjacent vegetation or inadvertent habitat removal, disturbance is to be restricted within the delineated area.

No stockpiling of equipment, soils, or machinery will occur beyond the delineated works zones or within the Tree Protection Zones (TPZs) of trees to be retained within the delineated works area. The clearing contractor is responsible for the installation of the boundary markers to delineate each staged worksite. The boundary markers are to be inspected by the appropriately trained and qualified ecologist responsible for the clearance activities to ensure that the boundary markers are suitable to enable the environmental and technical inspections of the proposed disturbance to be undertaken.

3.3.2. Fencing to Delineate Management Zones

Some areas within the north-eastern parts of the Approved Works area will be partially cleared for Asset Protection Zones (APZs). In order to clearly identify the APZ areas and their different management requirements (e.g Inner Protection areas (IPA) vs Outer Protection areas (OPA)), the boundary between APZs and areas to be fully cleared will be clearly demarcated prior to the commencement of works. Webbing, bunting, or similar material may be utilised to demarcate the APZ areas from those to be fully cleared provided the material is highly visible and does not contain any sharp tops or edges. Appropriate signage or other distinct markers will also be required to distinguish IPA and OPA areas as clearing limits differ between these zones.

3.3.3. Fauna Friendly Fencing

Fauna friendly fencing will be installed between areas of retained native vegetation and the Approved Works area in order to prevent native fauna species accessing the Approved Works area and to avoid impacts to these species during the construction stage.

Fauna friendly fencing comprises fencing that avoids the use of barbed wire or other sharp materials and is highly visible. Current fencing installed around the Property as part of the Demolition DA works meets the requirements for fauna friendly fencing as it does not contain any sharp tops or materials that could potentially injure or entangle wildlife and is highly visible due to application of shade cloth. Any fencing installed for the Approved Works will utilise the same format as that for the Demolition DA. Fauna friendly fencing will be installed along the Approved Works boundary to demarcate the limit of works prior to any works commencing at that location.

3.4. Preclearance Surveys

This section provides details of the pre-clearance surveys that will be undertaken prior to the commencement of works. This includes general preclearance surveys as well as more detailed specifications for particular fauna groups of relevance to the project including the Powerful Owl and the Dural Land Snail.

As the approved works will be conducted across several stages, all requisite pre-clearing works will also be staged accordingly. As required by the Conditions of Consent, reports of pre-clearance fauna surveys and relocation will be provided on a weekly basis to be provided for the records of The Hills Shire Council.

3.4.1. General Preclearance Surveys

General fauna pre-clearance surveys will be conducted within a one-two week period prior to activities for each relevant stage of vegetation clearing works commencing. This will comprise a single primary preclearance survey of the Approved Works area for certification by Project Ecologist and issue to Council to satisfy Condition 44 of the Consent followed by subsequent pre-clearance surveys of each phase of development to ensure data is within acceptable timeframes for the relevant stage of works. The purpose of the pre-clearance survey is to identify and mark habitat features that will need to be removed under ecologist supervision and will also identify habitat features suitable for later salvage and re-instatement in areas of retained vegetation outside the Approved Works area. Specific pre-clearing procedures that will be implemented for specific fauna species including the Dural Land Snail and the Powerful Owl are presented in later sections of this chapter (**Section 3.4.4** and **Section 3.4.5**).

Fauna pre-clearance surveys will consist of identifying, marking and documenting suitable fauna habitat features. These features include potential owl roosting areas, significant rock outcrops and crevices, large boulders, nests, decorticating bark, stags, and hollow-bearing trees. These fauna habitat features have the potential to support species such as bats, gliders, possums, reptiles and birds. Artificial structures that may be utilised as habitat by fauna, such as poles, junction boxes and other elevated structures will also be checked for indications of fauna use.

Features identified as likely to support resident fauna will be marked with a large "H" using fluorescent spray paint as well as with flagging tape. Habitat feature details will be recorded including:

- Type of habitat feature (tree, hollow, nest, log, log pile or rock pile);
- Location using a handheld GPS; and
- Record of a unique identifying code.

If a hollow bearing tree is recorded, the following data will be collected:

- Species;
- Number of hollows; and
- Average hollow size class (small, medium or large);

During the pre-clearance surveys, habitat items suitable for salvage will be identified, recorded, flagged with fluorescent marking tape, and marked with a large (>1 m) "S" using spray paint on two sides of the tree and given a unique identifying code.

The requisite survey effort for the general pre-clearance survey is outlined in **Table 4** below. The requisite survey effort for subsequent pre-clearance surveys for each stage of works will be dependent on the findings

of the general pre-clearance survey and will be stratified based on the extent of habitat present within each stage and weather conditions during and preceding the commencement of the relevant stage with due consideration to species specific survey periods as outlined in ***Sections 3.4.3*** – ***3.4.4*** below.

Table 4 Requisite survey effort for pre-clearance surveys

Survey Type	Survey Method	Survey Effort
Primary Pre-clearance	Identification and mark up to habitat features, including natural features and artificial features	Until entire Approved Works area is traversed to identify habitat features present, likely one week of survey
Staged pre-clearance	Rechecks of vegetation within relevant stages to determine any changes in condition since primary pre-clearance and determined any potential additional features not identified during primary preclearance surveys	Until entire relevant stage of works is traversed. Survey effort variable depending on the size of the relevant stage of works
Pre-clearance for Dural Land Snail	Searches including turning natural and non-natural debris such as logs and fence palings, raking the leaf litter and searching amongst clumping plants such as Lomandra.	5 days/5 nights with requirement for surveys from day four onwards dependent on weather conditions and extent of detection of specimens in on previous days. Searches are to comprise a minimum of one hour searching at each area of suitable habitat during the day or two laps of the site whichever takes longer.
Pre-clearance for Powerful Owl	Inspections to be conducted by experienced ecologists to look for any roosting owls or signs of roosting such as pellets or white-wash on the ground within or close to the works area	Searches are to be conducted until entire works area is traversed

No works are to commence until the primary pre-clearance survey is completed, the accompanying report has been issued to Council in accordance with ***Section 1.3*** above, and Project Ecologist direction has been given to the contractor. Subsequent phases of vegetation clearing works are not to commence until the subsequent pre-clearance surveys are conducted in line with the preceding protocols to the satisfaction of the Project Ecologist. The accompanying reports will be submitted to Council and the Contractor prior to works commencing in accordance with ***Section 5*** of this FMP.

3.4.2. Trapping and Direct Recovery of Fauna

Recovery of fauna is to be undertaken from within the Approved Works area following the installation of perimeter fencing. This is to include trapping effort for capture, but also include use of baited surveillance camera stations to identify fauna species occurring within the Approved Works area.

The recent demolition phase to the south recovered several fauna species from within the Demolition Footprint via baited cage traps (possums), arboreal Elliott traps (gliders) terrestrial Elliott traps (rats), pitfall traps and funnel traps (frogs and lizards). A similar assortment of traps will be installed across the Approved Works area with the number and location of different trap types to be based on the findings of the primary pre-clearing surveys.

Funnel traps should be placed at the base of the perimeter fencing, but may also be using in conjunction with installed drift fences and pitfall buckets.

Several previous captures of Sugar Gliders, Common Brushtail Possums and Ringtail Possum within the Demolition Footprint were individuals re-entering the site for an easy feed from within traps, particularly over the winter period when other glider feed resources are restricted. Trees located within the perimeter fence that provide canopy connectivity between the site and vegetation outside are to be trimmed to reduce the potential for re-entry to the site by possums.

Once fencing is installed then surveillance cameras should be placed at strategic locations within the Approved Works area to give an indication of the presence and activity by more cryptic species know to be locally present such as Short-beaked Echidna and European Red Fox. The presence of these species will then prompt further target recovery methods. Any evidence of echidnas will prompt late afternoon, dusk and night surveys (particularly during warmer months) to visually find active individuals. This is because they may dig themselves into the upper soil profile to avoid heat (and detection) during the day. If this proves ineffective then camera surveys must continue until all individuals are accounted for, and active searches through the upper soil surface in suitable locations close to the recorded camera sightings is to continue with dusk efforts. Any echidna burrows detected on the site must be investigated with camera probes prior to any works commencing in that location to ensure no echidna puggles are in the burrows. As mothers can seal up the nursery burrows, this must be accounted for when using camera probes.

If the European Red Fox is detected, this will then require cage trapping to be undertaken. In common with the survey effort required for echidnas, camera trapping efforts should continue until all individuals are recovered and humanely removed. All euthanasia of foxes must be performed by a current practicing veterinarian with evidence/records of any euthanasia to be kept.

Once perimeter fencing is installed night surveys are to be ideally undertaken following local rainfall. This will aid in the detection of any calling frogs, for direct capture.

3.4.3. Preclearance Surveys for Microbats

The current approved works area lacks structures such as buildings or culverts that could comprise roosting habitats for microbats and roosting habitat is limited to hollows in trees for hollow-roosting species.

Following determination of presence of hollows during general preclearing surveys (primary or staged), an evening survey is to be undertaken within three days to the commenced removal of relevant hollow bearing trees (preferably the previous night) for microbats.

As surveys such as use of harp traps or ultrasonic detectors will also record presence of microbats that are likely to utilise the vegetation as part of a foraging range, targeted preclearance surveys for microbats will comprise roost watches of any recorded hollows within trees to be removed. Roost watches will be conducted for approximately one hour before and after dusk and will comprise active monitoring of hollows to determine the presence of microbats exiting the hollows.

3.4.4. Preclearance Surveys for the Dural Land Snail

Pre-clearance surveys for the Dural Land Snail will be conducted in the Approved Works area prior to works to capture and relocate any snails that may be present. Surveys will be conducted by an expert ecologist in this field, Dr Stephanie Clark over a minimum period of 3 days/3 nights. Searches will include turning natural and non-natural debris such as logs and fence palings, raking leaf litter beneath trees and searching amongst clumping plants such as *Lomandra*.

As required by the Condition 44 of Consent, the surveys will be conducted during the day and at night, particularly during or after rain. Optimal conditions would be warm nights (e.g. 18°C), high humidity (e.g. > 80%) and the ground layer very moist to wet. However, as temperatures and humidity decrease and the ground layer gets drier, snail activity correspondingly decreases as well with almost no activity once nightly temperature drops to about 11°C or less.

As recommended by Dr Clark, searches are to comprise a minimum of one hour searching at each area of suitable habitat during the day or two laps of the site whichever takes longer. The length of time spent searching during each particular survey period will be highly dependent on the environmental conditions occurring at the time of the survey and will continue until no (further) snails are observed in the area being searched.

For the purposes of this FMP, the initial pre-clearance survey will involve a minimum of three days of day and night searches initially with additional surveys potentially required during clearing of areas within or adjacent to identified Dural Land Snail habitat. If the prevailing conditions are hot and dry in the days leading up to the vegetation clearance works, then it is very likely that any individuals that might be present within the potential impact area may not be detected. In such instances, further advice from the Snail specialist Dr Clark will be sought to determine options to maximise detection of any potentially occurring individuals.

3.4.5. Preclearance Surveys for the Powerful Owl

Between March and October (the breeding period for the Powerful Owl) a site inspection by a fauna ecologist experienced in Powerful Owl ecology will be conducted on the morning prior to the following works:

- Removal of any vegetation;
- Operating of any machinery or other requirement for loud noises, or

- Presence of more than one person working within the vegetated areas identified on **Figure 3** as potential roosting habitat.

The above inspection is to look for any roosting owls or signs of roosting such as pellets or owl-wash on the ground within or close to the works area. If a nest site has been confirmed elsewhere (outside of the buffer area) at this time of year, then the inspection is not warranted, and the above works may proceed. Where roosting is identified, the works are to assume nesting until the actual nest site is located, or established breeding roosts have otherwise been confirmed elsewhere.

Any vegetation clearing works outside of the March-October period will require a pre-clearance inspection which is to include a search of owl activity by a fauna ecologist. Where roosting activity is recorded, no works may proceed within 50 m until roosting has moved on. This may be the following day.

3.5. Clearing Supervision

Following completion of primary and relevant staged preclearance surveys and establishment of requisite exclusion zones for the relevant stage of works, the clearing of vegetation or other features (such as sandstone blocks or artificial structures) will be conducted using a two-stage clearing process as outlined below under strict qualified ecologist supervision to rescue and re-locate any displaced fauna that may be disturbed during this activity. This may be commenced after a minimum of 1 week of trapping efforts as outlined in **Section 3.4.2**. A minimum of two ecologists will be on-site during clearing of significant areas of trees/vegetation/other habitat to provide appropriate supervision and rescue fauna as required.

Stage 1: Firstly, vegetation or other features not identified during pre-clearance surveys as potential fauna habitat is cleared under ecological supervision. All vegetation around the habitat item is cleared so that the potential fauna habitat is isolated.

Stage 2: Secondly, potential habitat trees are left to stand overnight to allow resident fauna to voluntarily move from the area before being cleared under ecological supervision.

An appropriately qualified Ecologist, or fauna handler under Project Ecologist supervision, will then manually recover any fauna still present where it is safe and possible to do so. For fauna species that are high in trees and are unable to be recovered from the ground, an accredited tree-climber will check the trees for fauna under ecological supervision and remove the complete nest, hollow drey or habitat in sections if safe to do so for relocation on site.

The following protocols are to be implemented under strict Project Ecologist supervision for all identified habitat trees:

- Trees will be gently shaken by machinery prior to clearing to awaken sleeping fauna and encourage any resident fauna to self-relocate;
- All potential habitat trees are to be lowered to the ground slowly by an excavator with a grab mechanism, thus minimising the risk of injury or mortality to fauna;

- The supervising ecologist will inspect all visible hollows for the presence of fauna following felling of the tree; and
- If salvageable, branches with hollows and sections of trunk will be marked and set aside for transfer to a storage area for eventual placement within areas to be revegetated under the VMP.

The two-stage clearing process is designed to enable fauna to feel secure whilst clearing occurs around their tree, and to allow them a chance to self-relocate at night to coincide with typical foraging behaviours of arboreal animals. The supervising ecologist has discretion to request the Stage 2 tree removal protocol should additional fauna or habitat be identified during the clearing process. In the event that additional habitat is identified during the clearing process, details, as per the pre-clearance requirements listed in ***Section 3.4***, of the newly identified habitat is to be recorded by the supervision ecologist.

Ecologists are to be present while clearing to rescue animals identified during the clearance operation. Any fauna found will be captured and relocated to nearby remnant vegetation and released as identified in the release location map (**Figure 4**). All fauna handing and fauna care is to be conducted as per the processes for specific fauna groups detailed in ***Sections 4.1 - 4.3*** of this FMP.

If any bat species are found, the extraction from the hollow and any handling will only be done by an experienced ecologist who is vaccinated to handle bat species. Where bat species are found following felling of the tree but not able to be accessed, the section of the tree will be removed using a chainsaw (or a suitable alternative low-impact method) to extract the bats. The ends of the extracted tree section and cavity openings will be temporarily blocked with a piece of cloth during transportation to the fauna release location. It is a requirement to release microchiropteran bats after nightfall to minimise the risk of predation by diurnal predators and harassment by birds.

3.5.1. Veterinary Hospitals and Wildlife Rescue Organisations

All measures will be taken to ensure the safe and secure relocation of located fauna residing within the Approved Works area. However, in the unlikely event that any animals are inadvertently injured, they will be taken to the nearest veterinary clinic for treatment. All fauna deaths or injuries must be reported to The Hills Shire Council within 24 hours of the incident occurring.

The contact details for veterinary hospitals that have been contacted and agreed to receive fauna are listed in order of preference below. The relevant experience of the veterinarian will need to be confirmed against the fauna proposed to be brought to the hospital prior to attendance:

- Small Animal Specialist Hospital (SASH), 1 Richardson Pl, North Ryde NSW (15km from Site - 15min drive) Telephone: (02) 9889 0289. Hours: 24/7 emergency department available, native, exotic, and avian wildlife capabilities (no venomous snakes). Lyssavirus vaccination status: vaccinated, wildlife specialist avian and exotics team available Mon - Fri 8am - 6pm;
- North Shore Veterinary Hospital (NSVH), 63 Herbert St, Artarmon NSW (20km from Site – 25 min drive) Telephone: (02) 9436 1213 (open 24 hours)

- Castle Hill Veterinary Hospital, 1 Francis Street, Castle Hill NSW 2154 (5km from Site - 9min drive). Telephone: (02) 9634 2712. Hours: Mon - Fri 7am - 7pm Sat - Sun 8am - 4pm. Lyssavirus vaccination status: not vaccinated;
- Beecroft Vet, Shop 2 & 3/5 Wongala Crescent, Beecroft NSW 2119 (5km from Site - 9min drive). Telephone: (02) 8914 0828. Hours: Mon - Fri 7:30am - 8pm Sat - Sun 9am - 6pm. Lyssavirus vaccination status: not vaccinated;
- Baulkham Hills Veterinary Hospital, 332 Windsor Road, Baulkham Hills NSW 2153 (10km from Site - 12min drive). Telephone (02) 9639 6399. Hours: Mon - Fri 8am - 7pm Sat - Sun 9am - 5pm. Lyssavirus vaccination status: not vaccinated;

Prior to taking the animal to a veterinary clinic, a registered wildlife carer organisation is to be contacted and a call sheet/reference number obtained for the animal. The wildlife carer contact is to be either Sydney Wildlife Rescue 9413 4300 (24/7 emergency service available) or WIRES (1300 094 737; 24 hours). The veterinary clinic is to then be phoned to advise that the animal is being brought in and the reference number provided to the vet to ensure the animal can be appropriately cared for and tracked after its release from the veterinary clinic.

3.6. Habitat Supplementation Strategy

In accordance with the Conditions of Consent, a nest box/habitat supplementation strategy is required for the salvage and relocation of tree hollows/habitat features present in the Approved Works area or substitution with artificial nest boxes/habitat features where this cannot be achieved.

3.6.1. Salvage of Habitat Features

Habitat features such as hollow-bearing trees, hollow-bearing logs and rocks removed from the Approved Works area are to be salvaged for reuse in the VMP areas and/or selected recipient areas within nearby retained vegetation in the Site (refer **Figure 4**). Where feasible, whole trees will be transported into the area of retained vegetation in the Site using existing roads for transport as much as possible. Vegetation to be retained must not be damaged during transport and placement of habitat features. This will ensure that key habitat resources are retained and utilised in rehabilitation and offset areas (where appropriate).

Hollow trees will be considered for salvage based on structural integrity, number and size of hollows. Hollows to be salvaged will include a range of diameter sizes. Trees will be favoured if single stemmed to ensure that they remain intact during felling. Stags (dead trees) can be selected if they appear solid and have good hollows in the trunk.

Trees and fallen logs without hollows can be collected for retention in addition to those marked by ecologists during pre-clearing. Large, flat or creviced rocks (>500 mm width) that appear solid enough to survive translocation will also be considered for translocation.

3.6.2. Installation of Habitat Features/Nestboxes

In accordance with the Conditions of consent, nest boxes/habitat features area to be installed at the ratio of 2:1 for every hollow/habitat feature removed. This is to provide displaced fauna a greater variety of options when seeking new habitat. As the habitat features salvaged and installed in areas of retained native vegetation

will only provide a 1:1 replacement ratio for their removal, an additional nest box will be installed for every habitat feature that is removed and relocated in order to achieve the 2:1 replacement ratio.

The Conditions of Consent state that nest boxes/habitat features are to be installed prior to vegetation removal following the preclearance survey. However, this is only possible for features such as hollows and/or dreys, as other habitat features such as logs, bush rock etc will be physically relocated if feasible during the clearing operation. If additional hollows or nests are identified during tree removal, an appropriate number of additional nest boxes/habitat features will be installed.

The number of requisite nest boxes will be determined during the pre-clearance surveys for each respective stage of works. Any hollows encountered will be either prepared for relocation into a recipient tree within the conserved habitat areas or otherwise replaced with nest boxes at a minimum final ratio of 2:1. If additional boxes are required to meet this figure, additional boxes will be installed post habitat removal.

A total of 33 nest boxes have already been installed prior to the demolition of the seven office buildings, to provide habitat for displaced fauna during the demolition process. Additional nest boxes will need to be installed for the Concept Masterplan works, to provide additional habitat for fauna displaced during the Approved Works. The final number of nest-boxes will be dependent on the findings of the primary preclearance surveys as well as staged pre-clearing surveys. Based on the findings of the primary preclearance surveys, a specific number of nest boxes/other habitat features will be installed prior to commencement of works to provide habitat for displaced fauna.

The nest boxes will be of varying size and design to cater for a range of species including microbats, gliders and possums and hollow-dependent birds such as parrots and cockatoos. The Powerful Owl requires very large tree hollows and as the Approved Works area does not contain any suitable nest trees for this species and the species does not readily take to boxes, no Powerful Owl nest boxes are proposed to be installed. The installation of the arboreal mammal nest boxes will encourage the breeding of preferred prey species for the Powerful Owl, including the Ring-tailed Possum and Sugar Glider.

While the type of the nest boxes to be installed will be dependent on the findings of primary preclearing surveys, indicative types of nest boxes that are likely to be installed include:

- Microbat boxes (variable between 450-600 mm x 230-400mm x 75mm) with a slit as entrance;
- Large arboreal mammal (possum) nest boxes) (250 mm × 250 mm × 500 mm) with 120 mm entrance;
- Small arboreal mammal (gliders and small possums) nest boxes (250 mm × 250 mm × 300 mm) with 50-70 mm entrance;
- Additional arboreal mammal nest boxes must also be installed with dimensions to be drey dependant and determined by the Project Ecologist onsite.
- Medium bird nest boxes (parrots) (400 mm x 170 mm x 170 mm) with 65 mm entrance;
- Large bird nest boxes (cockatoos) (600 mm x 250 mm X 250 mm) with 120mm entrance.

Nest boxes and habitat features shall be installed by qualified tree climber using climbing ropes. Installation will be supervised by a qualified ecologist who will ensure appropriate location, orientation and stability of recipient tree. The details of all next boxes installed prior to clearing will be included in the primary pre-clearing report submitted to Council.

Locations for installation of nest boxes/habitat features will be dependent on the number and type of nest boxes required. Indicative locations for nest boxes will be determined during primary preclearing surveys and will be shown in a figure in the primary preclearance survey report.

Consideration should also be given to the opportunity to identify suitable augered hollow locations within trees as an alternative to nest boxes. Augered hollows have been found to provide more stable temperatures than nest boxes (Briscoe and Griffiths 2020). This method has been trialled by Transport for NSW under a pilot habitat replacement project whereby more than 800 hollows have been installed to replace habitat lost in bushfire affected areas using the Hollowhog technology (HollowHog).

3.6.3. Nest Box Monitoring and Maintenance Program

In order to determine if the nest boxes are being utilised and by what species, and to ensure that the nest boxes continue to provide habitat in the long term, a nest box monitoring and maintenance program will be implemented.

This will comprise an annual monitoring and maintenance inspection and brief report for submission to Council. During the annual monitoring and maintenance inspection, each nest box will be inspected for occupancy using a long handled camera and any species utilising the nest box will be recorded as well as the number of individuals.

The condition of the nest box will also be examined during the inspection. Damaged nest boxes are to be taken down and repaired on site where possible or an alternative one of similar type added. If the nest box needs to be removed, then a replacement nest box is to be installed until repairs are completed.

If nest boxes show evidence of being occupied by feral animals (e.g. European Honeybees) they will be removed or modified to prevent occupation by such species. If removal/modification is deemed unsafe, then the nest box will be replaced with the same size nest box in a nearby relocation. Specific details of appropriate measures to be implemented relating to feral animals will be provided within the recommendations of each monitoring report.

3.7. Dural Land Snail Management Strategies

In addition to the pre-clearance surveys specified in **Section 3.4**, the following specific measures will be implemented to minimise impacts to the Dural Land Snail during clearance and construction:

- Installation of additional temporary protective fencing, if required beyond that already established for the Demolition DA, between the Approved Works area and known locations of Dural Land Snail;
- Prior to scheduled works, intensive pre-clearing survey for Dural Land Snails by a snail specialist (or under guidance by a snail specialist) in suitable snail habitat in the Approved Works area; and

- Relocation of all Dural Land Snails found in the Approved Works area in accordance with a relocation protocol, as recommended by a snail expert.

It is very likely that any materials, equipment etc that are left/stored along the edges of the construction areas for short or extended periods, particularly those close to native vegetation may provide shelter for the snails. Therefore, these must be checked before or during their removal for the presence of any snails. No materials, equipment etc shall be left/stored within the Tree Protection Zones (TPZs) of vegetation to be retained.

3.8. Powerful Owl Management Strategies

The proposed works are not likely to cause direct harm to the breeding pair that have previously been known to occur in Cumberland State Forest, and therefore the vicinity of the Approved Works area, or their young as no large hollows will be removed. However, disturbances close to their breeding habitat in the breeding season can interfere with the breeding success of that pair. To identify if any impacts are occurring to the Powerful Owl as a result of the project and to determine appropriate mitigation measures, monitoring of the Powerful Owl is therefore proposed as outlined in subsequent sections. All monitoring is to be undertaken by a fauna ecologist with demonstrated experience in owl ecology. Previous informal communications with owl expert Dr Rod Kavanagh have been conducted in relation to his studies of the breeding pair. Further consultation with other relevant stakeholders such as Birdlife Australia, Powerful Owl Project, will be conducted, as required throughout the breeding period.

3.8.1. Monitoring

3.8.1.1. Hollow-bearing Trees

Formal monitoring of all SHTs and MPs identified within 150m of the Approved Works area (**Figure 3**) is to be undertaken if any site works are proposed during the March – October period. Four previously known nesting trees with large hollows are known within or in close proximity to the 150 m buffer and these have been identified for formal monitoring as a precautionary conservative measure. Monitoring is to include:

- Full covert infra-red cellular surveillance cameras placed on all potential SHTs/MPs located within 100 m of the Approved Works area area leading into the nesting period. This includes SHT1, MP2, MP3, SHT4 and MP5. These cameras are to provide ongoing real-time monitoring of all hollows most at risk of indirect impacts. This procedure was undertaken on each of these trees during the recent 2022 breeding period, with recorded visits by Powerful Owl to SHT1, MP2, and both hollows in SHT4. SHT4 & SHT7 (being the closest 2 potential nest trees) were also monitored in the year prior by TreeHouse Ecology (2021) during sewer upgrade works in the early 2021 breeding period.

- Full covert cameras do not emit any white or red flash. A 'low-glo' red flash has been documented to deter Powerful Owls from a nest hollow (recorded by Treehouse Ecology at Wadalba NSW at a 9T relocated trunk section monitored for Central Coast Council). Any movement combined with a variation of heat from the ambient surrounds will trigger an image to be taken by wildlife surveillance cameras.

- Cellular cameras have the added function that images can be sent to a network device in real time. The benefit of this is that any pre-nesting visit to the hollows by the owls will be captured and known prior to

the next day of works commencing. Cellular cameras contain their own sim card and operate off a local phone network.

- The cameras are to be installed at a distance greater than 2m and less than 4m from the hollow by a tree climber. Cameras are to be programmed to record only during the nocturnal period and batteries must be specifically Lithium (and preferably 12V) to attain longevity to the nest period. The camera images and settings are to be monitored by an experienced fauna ecologist experienced in Powerful Owl ecology. Rapid fire is to be avoided, with a 5 second delay set between images and a maximum of 3 images per trigger.

The remaining three large hollow-bearing trees (MP6, SHT7 and & SHT8) within or in close proximity to the 150m buffer are to be regularly monitored for breeding activity by on-ground surveys on no less than a monthly basis during the breeding period. Survey of the remaining three large hollow-bearing trees within 150m will also incorporate the use of song-meters placed at strategic locations, which will assist in identifying breeding areas in the time leading up to laying. This proved very effective in determining the 2022 selected hollow. Owls tend to quieten down after laying with most vocalisations then being direct calls between the breeding pair (rather than louder territory calls). Where a nest site is identified, a song-meter can then be used to document calling behaviour close to the nest for future reference. The breeding recordings by TreeHouse Ecology over the 2022 survey period also assisted in determining exactly when the female nested, when the pair abandoned the dead chicks and also all of the anthropogenic noise during this period, from both the demolition process and otherwise. Low flights from Sydney airport and traffic leaving the Cumberland State Forest at the time the pair were making dusk associations were most notable.

Specific procedures for any nesting recorded within the 10 trees located within 150m of the works areas are provided in ***Section 3.8.2*** below.

3.8.1.2. Targeted Surveys

In addition to the monitoring of hollow-bearing trees identified above, in accordance with Condition 44 of Consent, targeted surveys for the Powerful Owl roosting and/or nesting within the surrounding forest (including Cumberland State Forest) will be undertaken by an expert owl ecologist (to be approved by Council). Surveys must be completed monthly during the nest selection period and throughout the breeding season (April to September) for the duration of clearing and construction phases in order to identify whether a pair has established a breeding territory and success of the breeding attempt. Monitoring reports are to be submitted to Council monthly following each survey and a map showing the location of roosting/nesting owls in relation to clearing/demolition works is to be included. The targeted Powerful Owl reporting requirements are further detailed in **Section 5.3**.

3.8.2. Requirements if the Powerful Owl is Recorded

If nesting is recorded within close proximity to the works areas, the following requirements apply:

- Within 50m (SHT1, MP2, MP3 and SHT4):
    - Work is discouraged within this distance.

- Where nesting (or suggested nesting activity) is recorded at any of these trees then no works within 50m may commence until a works plan is prepared demonstrating all possible measures to prevent indirect impacts on the specific tree. This is to include considerations to placement of screens and noise controls and are to involve the fauna ecologist. Council will be made aware of nesting owls and provided a copy of the works plan.
- Any works required within this distance is to be supervised by a fauna ecologist following a pre-work inspection to establish roost locations(s).
- Daily monitoring of the surveillance cameras by an ecologist with Powerful Owl ecology experience is required with detailed notes on owl behaviour and times for a week prior to and up to a week following these works. In the event of any altered behaviour, then works are to cease immediately.

- Within 100m (SHT1, MP2, MP3, SHT4, & MP5):
  - Work is not to start until 1 hour after sunrise and must finish by 4 pm.
- Within/In proximity to 150m buffer (SHT1, MP2, MP3, SHT4, MP5, MP6, SHT7, SHT8):
  - The fauna ecologist is to be notified prior to each day's work on the proposed works involved. The fauna ecologist will then determine needed presence.
  - Any unsuccessful nesting within this area is to be documented with a detailed report from the fauna ecologist outlining timing for failure, associated works and likely reasons.

Where owl roosting activity is recorded within the Approved Works area, no works may proceed within 50m until roosting has moved on. This may be the following day.

3.8.3. Other Requirements

The following measures are required at all times during the construction period in order to avoid impacts to the Powerful Owl:

- There is to be no lighting spill-over into the retained natural forest area habitats. This includes the canopy area. All lights and light fittings for the work sites are to be located, directed or shielded to avoid lighting anything but the target object or area. Lighting intensity is to be appropriate for the activity and only the minimum number and intensity of lights needed to provide safe and secure illumination for the area at the time required must be utilised. Any existing lights can be modified by installing a shield.
- There is to be no machinery, motors, generators or periodic noise emitted from the Approved Works area during the complete nocturnal period between sunset and sunrise in order to avoid impacts to this nocturnal species. If machinery is required to be operated at night, it will need inspection and appropriate measures advised by the Project Ecologist in order to minimise impacts to the Powerful Owl. Noisy works must not begin until after 7am and be completed before 4pm with respite periods as outlined by the Consent.

- There is to be no barbed wire used anywhere or fine mesh fencing placed in any potential flyways to avoid potential entanglement of the Powerful Owl. Chain mesh barrier fencing is suitable and covered in shade cloth or equivalent.

3.9. Australian Brush Turkey Management Strategies

The Australian Brush Turkey has been recorded within the Site and multiple mounds are known to occur to date, though currently outside the Approved Works area. Male brush turkeys build large mulch nests between August to February each year, and females usually lay one egg every 2 to 5 days until around 20 eggs are laid. The females do not stay around the mound once they have laid the eggs and it is the male that then incubates the eggs for 50 days. Chicks take up to 48 hours to dig themselves out to an independent life and they receive no further parental care.

Communication with the NSW National Parks and Wildlife Service (NPWS) has recommended that vegetation clearance works be scheduled for after the brush turkey chicks have hatched and left the mounds. Relocation of brush turkeys can prove to be difficult, as they tend to fly back and therefore subsequent management activities will need to prevent them from laying more eggs or re-building mounds in unsuitable locations. This will involve using methods such as:

- The supervising ecologist may spray the brush turkey early in the morning with a hose or water pistol when it first shows signs in entering an area or nesting at a site. A water pistol is good for this, but do not aim for the head, only the body, to give it a fright. This allows accuracy without using too much water. The person carrying out the procedure must try to hide from view, so it is the location the bird is wary of. Do not continually squirt or chase the bird with the water device as this is harassment and not permitted.
- Make it harder to access the mulch or compost they use to build their mounds by:
    - Pegging a tarpaulin over the mulch
    - Putting eucalyptus sticks or other obstacles such as rocks in the ground around plants
    - Removing overhanging branches so the area gets more sunlight. Brush Turkeys don't want to build mounds in areas that aren't shady.
- Try to attract the birds to nest in a more suitable location by putting mulch or a compost heap next to at least one large tree providing 80 to 95 per cent shade. The brush turkey may see this as a better nesting option than battling the above deterrents.

In the event of the requirement to dismantle of any mounds in the Approved Works area, an application to NSW NPWS for a *Licence to Harm Native Animals* under the BC Act is required. This licence allows authorised person(s) to control protected native animals if shown to be causing a serious threat to safety, property damage or economic hardship on a property. Although, as the title of the licence alludes to, a licence to harm may include to trap and euthanise, catch and release, or kill, the licence to harm for these project works would be to catch and release any Australian Brush Turkeys within zoned C2 areas of the Property outside of the Approved Works boundary.

4. Fauna Handling Protocols

Fauna ecologists are responsible for capturing vertebrate fauna during the habitat clearing process, as this maximises the number of vertebrate fauna able to be rescued Although every precaution will be taken to avoid injuring fauna during the course of the scope of this FMP or the project works, in the unlikely event an injured animal is encountered, the onsite presence of a fauna ecologist will allow injured animals to be assessed quickly and efficiently as required. An appropriately qualified fauna ecologist must be present onsite during all vegetation and habitat clearing works.

The following protocols for fauna handling and care have been based on the fauna handling procedures of the nationally accredited Fauna Spotter Catcher course that provides AHCFAU301A - Respond to Wildlife Emergencies' competency. All Cumberland Ecology staff undergo the Spotter-Catcher training, either as formally attending the course or as internal company training by a subject matter expert/trainer for the course.

This FMP has also considered fauna handling, fauna care and release protocols outlined in the *Code of Practice for Injured, Sick and Orphaned Protected Fauna* (OEH 2011) and has incorporated relevant protocols, where feasible for Spotter/Catcher works, in the development of the fauna handling protocols for this FMP.

4.1. Fauna Care

Any fauna handling is only to be conducted by the supervising fauna ecologist. Animals caught are to be placed in appropriate calico bags, cardboard boxes or capture cages whether alive or dead. A judgement is required on animals with superficial injuries (e.g non-bleeding scratches) as to whether they are suitable for release or if transport to a vet is required. A precautionary approach should be taken for superficial injuries and the individual should be transported to a vet in the event of any doubt on extent of injuries. All fauna handling, care and transport should also have due consideration to the *Prevention of Cruelty to Animals Act 1979*.

Any fauna assessed as requiring treatment by a qualified vet are to be taken to one of the veterinary clinics listed in ***Section 3.5.1.*** The supervising fauna ecologist is to ensure the veterinary hospital nominated is available, sufficiently equipped and experienced to handle the fauna prior to transportation. All injured native fauna are to be taken to a veterinary clinic within the shortest possible time frame. Any injured fauna are to be monitored by the supervising fauna ecologist prior to transport and no obviously injured animal shall be left longer than 15 minutes before being taken to a vet.

The general protocol for release or veterinary treatment of injured fauna comprise:

1. If a captured animal is critically injured and transport is feasible, it is to be transported to the nearest available vet emergency service in the shortest feasible timeframe;
2. If the animal is seriously injured, it is to be taken to one of the nominated veterinary clinics capable of dealing with the fauna under care within required timeframes;
3. If the animal is not seriously injured, it is to be taken to one of the nominated veterinary clinics capable of dealing with the fauna under care within the shortest possible time frame; or
4. If a captured animal shows no obvious signs of injury but is not locomotive, it is to be held in an area designated for animal care (which is to be quiet and maintained at a mild temperature) and contained within an appropriate capture enclosure and checked at an interval of 1 and 2 hours:

a. After 2 hours if the animal is locomotive and still shows no obvious signs of injury, it is to be released.

b. If the animal is not locomotive after 2 hours, it is to be taken immediately to one of the nominated veterinary clinics capable of dealing with the fauna under care.

c. In the event of injured fauna being located during any night surveys conducted, the injured fauna is to be taken to one of the nominated veterinary clinics with a 24/7 emergency service.

4.2. Stop Works Procedures

The following stop work protocols must be followed when animals are encountered by clearing contractors, or spotted by the fauna ecologist:

- Where an animal is encountered by a contractor:
  - If not in the vicinity of machinery the ecologist/handler is to be notified but work not stopped.
  - if in the vicinity of a piece of machinery the ecologist/handler is to be notified, work stopped, bucket lowered, and the animal captured and removed or until it has self-relocated.
- If the animal is spotted by fauna ecologist:
  - the fauna ecologist has the authority to advise machinery operating in close proximity to the animal to stop work and lower bucket until the animal is captured and removed or has self-relocated.
  - The fauna ecologist is the only person authorised to advise that work can recommence by that piece of machinery. All personnel must be well clear of the machinery prior to work recommencing and Safe Work practices strictly adhered to.

4.3. Fauna Handling Protocols

4.3.1. Birds

Birds are likely to be encountered during clearing operations. Birds commonly occur throughout the site, including some threatened species. Birds utilise tree hollows, trees and shrubs and groundcover as suitable nesting locations. Small bird nests are to be detected during the pre-clearing phase, with all hollows and other habitat features being checked for faunal activity prior to clearing.

If a small bird is injured, or struck but with no clear injuries during clearing, it must be handled carefully and inspected. If the animal has obvious significant injuries, it must be taken to a vet immediately for assessment. If the individual has no obvious injuries, it is to be captured using a towel and contained within a cardboard box with a lid and towels placed on the bottom for grip. The bird is to be taken to the designated fauna care area (maintained at a mild temperature) and left to destress and reassessed after 1 hour and again at 2 hours. If normal locomotion is observed, the animal will be released. If normal locomotion is not observed, the animal must be taken to the vet.

If young birds are detected during clearing and parents are detected nearby, an attempt should be made by the supervising fauna ecologist to relocate the nest or hollow to a nearby tree and monitored to ensure parents

recommence care. Adequate PPE (eye protection, head protection and gloves) should be worn by all personnel during relocation in the event of swooping attacks by parents. If parents are not detected, do not resume care on relocation or in some instances the habitat cannot be relocated, the chicks are to be removed from the nest or hollow and contained in the designated fauna care area with a suitable substrate such as a calico bag or kitchen towel and handed over to a wildlife carer as soon as is practical and a report made immediately to either WIRES or Sydney Wildlife Rescue. If a wildlife carer is unavailable for handover, the chicks must be taken to the vet.

Handling of birds of prey such as the raptors requires full PPE as there are risks of significant injury to humans from being gripped by strong talons, or from the beak. To this end, all raptors and other large birds must be handled wearing thick gloves and must be captured by two supervising fauna ecologists using a calico bag or towel to cover the animal, and one hand to grasp the bird around the base of wings when folded down and talons and place in a suitably sized container that allows sufficient airflow. All raptors captured and/or injured are to be reported to WIRES or Sydney Wildlife Rescue immediately. If identified as injured the raptor will be immediately taken to an approved vet. Raptors are to be released following assessment by experienced wildlife carer (WIRES or Sydney Wildlife) or other experienced handlers and must be released by an experienced handler as soon as possible but only at the optimum time of day for the species in consultation with wildlife carers.

If nests with eggs are detected, the relevant species should be identified (if nest is not abandoned) and a wildlife rescue service should be contacted to confirm that eggs can be collected for incubation. If collection of eggs is deemed not viable by the wildlife rescue service or identity of species remains unknown, guidance for appropriate disposal of eggs should be sought from the wildlife rescue service.

4.3.2. Reptiles

For clearing works that occur during winter months, consideration should be given to the fact that reptiles may be in torpor. Any reptiles captured during winter months should be released during the warmest part of the day.

4.3.2.1. Small Lizards

Small lizards are the most commonly captured fauna within clearing operations. Types of lizard detected typically include skinks, geckoes and legless lizards. These fauna are fast moving and small and can be easily injured with incorrect handling techniques. For the purposes of clearing operations, small lizards are classified as arboreal or terrestrial. Protocols for the capture of both are provided below:

Terrestrial small lizards are typically detected during machinery movements and when clearing log piles. When one is detected, radio your machinery operator, instruct them to lower their blade or bucket, and after positive communications have been established, enter the machinery exclusion zone. Following this, track the animal and cup it with an open hand on the surface. Move your other hand under the first hand, and feel for the animal's head, and place light pressure on the neck, pinning the animal to the ground, then use the thumb and forefinger to gain control of the base of the animal's head, ensuring support is provided along the body. Alternately, if the animal is in litter, it is appropriate to grasp a handful of litter then place the litter inside a container with air flow.

Identification of legless lizards must take place before handling, as some species of lizards mimic the juvenile colouration of juvenile venomous snakes. Identifying features of lizards include visible ear holes, small vestigial limbs and the lack of a forked tongue. A legless lizard must not be captured until these features have been identified;

Arboreal small lizards are to be captured in much the same way, noting that large sheets of decorticating bark are to be pulled back and checked under for presence of lizards.

Following capture, the supervising fauna ecologist will inspect the animal for obvious external injuries or lack of locomotion. If injuries are detected or normal locomotion is not witnessed, the injured fauna must be taken to the vet for further assessment. If uninjured, place the animal inside a vertically held plastic container, with the lid opened at one corner and release as soon as practicable. The container is to have adequate airflow, some shelter such as bark within it and placed in the designated fauna care area prior to release.

4.3.2.2. Large Lizards

Large lizards on site include monitors (varanids), Eastern Water dragons and large skinks such as Blue tongue Lizards. Varanids often flee up trees when disturbed, which is highly likely during clearing operations. They are fast-moving over short distances, but tire over longer distances, thus can be effectively chased down if not captured immediately on detection. Varanids have large claws and have high densities of mouth bacteria, which can cause infection if bitten. Therefore, there is a high risk of personal injury when capturing this group. Only suitably qualified and trained ecologists are to attempt to capture.

When large lizards are detected, the situation must be assessed for personal safety and self-relocation by the species should be the priority, provided there is a suitable nearby area that will not be cleared and is not near hazards such as roads. If the individual is spotted during felling, positive communications must be established with the machinery operator by the supervising fauna ecologist and works stopped before attempting capture. Once the area is safe to enter, the animal is to be approached from the side, and not cornered if possible. Due to the sharp claws typically encountered, welding gloves are to be utilised to capture the animal. For varanids, the animal should be first captured approximately half way up the tail, while allowing the body to remain along the ground. If there is a suitable area for release nearby, the animal can be 'walked off' site while holding the tail to reduce the stress of using a full restraint. This method is not suitable for skink species that drop their tails. If further restraint is required, the animal is to be pinned by the catcher, with a "V" grip using the hand around the back of the animal's skull, and the second hand should either around the base of the tail for varanids or supporting the body of skinks. Once captured, the animal is to be faced with claws away from the catcher at all times.

The animal is to be assessed for health following capture by supervising fauna ecologists. If healthy, the animal is to be placed into a secure catch cage, and the animal is to be held in the designated fauna care area and kept calm until released. The transfer into the capture cage will occur by the ecologist/handler placing the cage on the ground and opening the door, while the other releases the front part of the animal first, ensuring it is well inside the cage before releasing the rear. If the animal is too large for the catch cage, it will be placed in a modified nally bin with sufficient air flow. Care must be taken that the animal does not overheat in the container.

Uninjured large lizards will be relocated by ecologists immediately, following positive identification to species level. If injuries are detected, the injured fauna **must be** taken to the vet for assessment.

4.3.2.3. Snakes

A variety of snakes are known to occur within the project area, ranging from relatively harmless snakes to those with potential to cause life-threatening envenomation. Within the project, all snakes are to be treated as venomous.

Snakes are not to be handled by ecologists unless experienced, trained and competent to do so. The Project Ecologist is to be notified whenever a snake is detected and will determine the most appropriate and safest course of action. **If a snake is detected, stop work and notify your supervisor.**

Self-relocation should be the priority for snake species. Snake handling is to be minimised and only a suitably qualified, licenced and experienced snake handler is permitted to handle snakes. If required, a snake bag and hook is to be used by the snake handler. The open bag is to be placed in front of the snake, allowing it a dark spot to self-relocate to. It can be encouraged into the bag with the use of the hook or hooked into the bag with the bag being held upright and the hook placed approximately one third of the way along the body of the snake. Suitably sprung grab sticks may be used if a snake is located in an inaccessible location, such as in a tree hollow. Snakes are to be deposited in a bag, and the bag given a strong downward shake to ensure that the snake is at the bottom of the bag. Once in the bag, the bag is to be twisted and tied off, and the tabs on the exterior of the bag used to place the snake into the flat area created by the hoop.

Uninjured snakes are to be immediately released at a suitable location by the trained snake handler. If a snake is injured during clearing, the supervising fauna ecologist must be notified and a trained snake handler will take the injured fauna to the vet clinic that is able to accept snakes for assessment. When taking a venomous snake to a vet, it must be securely bagged and boxed, and the box clearly labelled as containing a Dangerous Animal.

Snake Bite Kits are kept on site in easily accessible locations and all contractors are to be informed of First Aid procedures for snake bites during site induction.

4.3.2.4. Turtles

Suitable habitat for turtles exists within the Site in the form of dams and areas of wet mud and soaks (refer Figure 4). This FMP includes a section on handling Turtles in the event one is encountered during the pre-clearance survey of the Approved Works area given that turtles have been recorded in the wider Site. Turtles are relatively harmless and are to be captured by gripping them from the side, with a firm grip on both their shell (carapace) and belly (plastron). It should be noted that they will often excrete a strong-smelling liquid, with which contact must be avoided due to its overpowering smell.

Uninjured animals are to be kept in a nally bin with a damp towel on the bottom or if suitable some mud and water from the point of capture. These are to be moved to suitable cool areas in the designated fauna care area until release in a suitable similar habitat outside the Approved Works area nominated on **Figure 4**.

If a turtle is injured during clearing, the supervising fauna ecologist will take the injured fauna to the vet for assessment. The animal is to be kept moist with a damp towel during transport.

4.3.2.5. Eggs

If nests with eggs are detected, the relevant species should be identified (if nest is not abandoned) and a wildlife rescue service should be contacted to confirm that eggs can be collected for incubation. If collection of eggs is deemed not viable by the wildlife rescue service or identity of species remains unknown, guidance for appropriate disposal of eggs should be sought from the wildlife rescue service.

4.3.3. Amphibians

Frogs that may be encountered within the Site include those which utilise trees (arboreal), those that utilise ground habitat (terrestrial) and those that burrow (fossorial).

Tree dwelling frogs are typically detected in tree hollows following tree felling. These are to be caught by hand by cupping them on a surface and closing the hand around them. Food preparation gloves are to be worn to avoid oils from hands touching their skin. The frogs are to be checked for health, and then placed in a plastic container with sufficient air flow and containing a substrate similar to that in which it was caught. Note that water is not to be added to containers, only moist soil. The individuals are to be placed in the designated fauna care areas until release.

Terrestrial frogs will likely be detected during the clearing of ground debris such as rocks and logs. These are to also be caught by hand wearing food handling gloves, checked for health and placed in a plastic container, with airflow, moist soil and litter provided for shelter.

Fossorial frogs will likely be detected during clearing where soil is disturbed, particularly in the vicinity of drainage lines. There is a high likelihood of these types of frogs being injured due to disturbance of soil by machinery.

When frogs are detected, they are to be checked for obvious external injuries, and an assessment made of their health. Frogs must be capable of normal locomotion, and responsive when handled. Frogs that are unresponsive or do not locomote normally must be assessed by an Ecologist and taken to the vet for assessment.

Frogs should be handled in accordance with Frog Hygiene Protocols to prevent the spread of pathogens.

4.3.4. Mammals

4.3.4.1. Macropods

For the purposes of this protocol, macropods include all wallabies and kangaroos. Although there is no record of a macropod being found on the Property or surrounds, as a precautionary measure this FMP includes a section on handling macropods in the unlikely event one is encountered during the pre-clearance survey. Many of these will flee prior to clearing; however, there is potential for vehicle strikes to occur coming into the site or while travelling on site.

If macropods are detected within the Approved Works area, they will be allowed to self-relocate to an area of adjacent vegetation by temporarily removing of one or more fencing panels and encouraging the macropods to go through the gap, before immediate replacement of fencing panels to secure the works site. If a macropod is struck during clearing, it is to be inspected for injury by the supervising fauna ecologist. Dependant on the

size of the individual, the ecologist may relocate the animal to a vet, in which case a large bag will be placed over the animal's head, and it will be driven to the veterinary hospital identified previously. If the individual is too large to be safely transported in available vehicles, WIRES, Sydney Wildlife Rescue or a wildlife veterinarian will be called onsite to attend to the injured fauna.

All injured macropods must be checked for pouch young. If pouch young are present, wildlife carers (Sydney Wildlife Rescue or WIRES) must be contacted immediately to obtain advice on whether pouch young are to be left in-situ or removed from the pouch. Dependant on the level of injury and wildlife carer advice, the young may be left in-situ if the animal is being taken to a vet. If the mother is too large for transport, the joey may to be removed in accordance with wildlife carer advice and wrapped in a towel and contained in a box in a warm area. There is potential that these young could be raised and released successfully by a wildlife carer.

4.3.4.2. Terrestrial Mammals

i. Echidna

Species such as the Short-beaked Echidna are known to occur within the Property and may attempt to burrow when a capture attempt is made. This can be counteracted by a quick capture, thus not allowing the animal to deeply engage with the ground. If the individual is found to have burrowed, moving of soil around the animal followed by lifting from underneath back two feet will be sufficient to extract the individual. Welding gauntlets are to be worn to avoid injury to staff. Tools, such as shovels, should never be used to dig underneath the Echidna as these risk injury to the beak. Catchers must gently work their hands down each side of the Echidna avoiding the spines and get their hands under the animals back legs where the fur is soft, then link fingers and apply firm constant pressure in an upward direction to enable the echidna to be lifted free of the ground. Special care must be taken not to injure the beak. As echidnas are more prone to heat stress than cold stress (DPIE 2021), any echidna captured must be kept in cool ventilated conditions and released at or after dusk. If injured, the echidna must be taken to an appropriately qualified veterinarian or wildlife carer immediately. Echidnas should be transported in a ventilated plastic container.

Echidnas encountered between July and October may have pouch young (puggles) (DPIE 2021). Puggles may also be left in burrows by parents during foraging between December and March. If any Echidna puggles, not with parents, are encountered, Sydney Wildlife rescue or WIRES are to be notified immediately and the puggles taken to a vet for examination. The surroundings of any injured adults should also be checked for presence of puggles that may have been dislodged during trauma.

ii. Small mammals

Small terrestrial mammals which have potential to occur within the Approved Works area include a range of species and groups including small gliders, mice, rats, Antechinus, rabbits and hares. Each group is likely to react differently to disturbance caused by clearing, with species such as hares likely to flee prior to clearing, but groups such as rodents and dasyurids seeking shelter.

Small terrestrial mammals are to be caught whenever possible, as they are fast moving and can quickly hide in small and hard to reach spaces once they have been initially disturbed. Small terrestrial mammals will typically be detected during clearing of suitable habitat such as hollow logs, log piles and rocky debris.

Small mammals are to be captured using a small soft net or using a towel thrown over the animal, then quickly moving the animal into a container or calico bag. Animals can be secured through the net or towel by using the index and middle fingers around the back of the neck, and the remainder of the hand controlling the body. Animals will be inspected for injury, and individually placed inside a calico bag or cardboard box appropriate for their size. The animal is to then be removed from the clearing area and placed in the designated fauna care area until the appropriate release time by the supervising fauna ecologist.

If injured animals are detected, the ecologist must be notified, and will assess the animals' condition and transport to a vet. Injured animals are to be placed in suitably sized boxes with towels/catch bags for padding and for transport to the vet.

Rabbits and hares are pest species in NSW and are to be contained and taken to the closest vet for humane euthanasia.

iii. Large Mammals

Large mammals which are known to occur within the Approved Works area to date is limited to foxes.

Feral animals such as foxes and dogs are not to be captured unless injured. All will attack violently if threatened, thus it may be safer for these individuals to be avoided. If safe to do so, these animals are to be restrained in a large hessian sack and transported securely to a vet.

4.3.4.3. Arboreal Mammals

Arboreal mammals are likely to be encountered during clearing operations. Mammals such as Sugar Gliders, Ring-tail Possums and Brush-tailed Possums are known to occur on the Site. As a result, it is vital that all hollows/habitat features be thoroughly checked prior to felling and once felling has occurred.

Possums and gliders are relatively adept at moving on the ground, thus present a challenge for spotter catchers. Capture is best undertaken when animals are in a confined space, such as in a tree hollow. The first option should be to avoid capture of the animal and allow the individual to self-relocate. If feasible, relocate the entire log/hollow to a suitable nearby release area and allow the animal to self-relocate. If capture is required, a bag is to be placed over the tree hollow and the animal encouraged from the opposite end. Where this is not possible and the animal is moving on the ground, a team of two ecologists are to attempt the capture with approaching the animal from two different angles and guide it away from other trees that it could run and climb up before being checked for injuries. Each person will have a towel, large catch bag and/or pillowcase and wear thick gloves. The towel can be used to throw over and slow down the possum or glider while using the sides of the towel to wrap the animal up. The animal is to be then taken to the designated fauna care areas for further examination. The supervising fauna ecologist is to hold the possum with towel covering and holding the base of the head gently with one hand and around the hips of the back two legs with the other hand while the towel is moved to inspect the different parts of the possum's body for obvious signs or injuries such as puncture wounds by the second person. The animal can then be placed inside a small carboard box or catch cage with the towel for subsequent release (if uninjured) at dusk by the supervising fauna ecologist or transported to the vet (if injured).

Arboreal mammals are to be checked for obvious physical injury before release, and it is to be determined by the supervising fauna ecologist whether normal locomotion and response is occurring. All injured animals must be taken to the vet immediately for assessment and possible rehabilitation. Any possums or gliders captured, once checked for injuries by an experienced carer or vet, shall only be released after dusk and prior to dawn by an experienced catcher/rescuer. While releasing into a possum or glider box within the designated release area is preferable, this will be dependent on accessibility and safety requirements. If boxes are not accessible at the time of release, fauna should be released as close as feasible to a nest box. Nominated release sites will be in accordance with **Figure 4**.

When disturbed, adult possums and gliders may abandon vulnerable young in order to escape danger and are unlikely to return for them. While efforts will be made to release in family groups, any young juveniles separated from parents must be kept warm, quiet and dark with a towel in a box and Sydney Wildlife Rescue or WIRES is to be contacted for further care of juveniles.

4.3.5. Bats

Bats include both megachiropteran bats (Flying-foxes) and microchiropteran bats (microbats).

In order to facilitate detection of microbats, hollows are to be extensively checked and cracked open. Secondary detection such as the use of auditory cues (such as high pitched clicking and chattering) as well as checks for guano (bat faeces) around the base of trees during pre-clearance surveys can also be used to detect this group.

If microbats are detected during clearing, only appropriately vaccinated ecologists are to handle them. There is potential that bats carry the Australian bat lyssavirus, a virus similar to rabies, which is fatal if contracted. To this end, supervisors are to be notified when microbats are detected. Microbats are to only be handled by experienced/trained and vaccinated ecologists using gloves and are to be stored in hung calico bags in a cool dark place. Similar species are to be kept together, as mixtures of microbat species can lead to predation. No more than 5 individuals are to be kept in a single large calico bag. Microbats should only be released at dusk when other microbat activity is observed, or a bat soft release box can be installed in the relocation area and bats placed inside, allowing them to leave on their own. These bat soft release boxes should be checked in the morning to ensure all bats have self-relocated.

Handling microbats requires a greater level of feel of the bat and so lighter and thinner gloves are required. Puncture resistant/tear resistant nitrile gloves with thin gloves must be used when handling microbats. In the event of a scratch or bite, the gloves must be checked for any breach to allow the handler to know that no exposure has occurred. A pen must be used to mark the glove where bite occurred, then remove and hold up to the light to see if glove was penetrated. In the event of penetration through gloves, the relevant person must immediately seek medical attention and obtain additional vaccination booster shots as required.

Microbats are to be identified to species level by an experienced fauna ecologist, following inspection for injury. If normal locomotion cannot be achieved, the animal is to be taken to a vet that accepts microbats for further treatment/assessment.

Megachiropteran bats are unlikely to be encountered during clearing works as no roosting camps are present onsite and forging occurs at night, outside of allowed construction hours. Nonetheless, in the unlikely event of

an encounter, similar handling procedures to those for microbats should be implemented. However, due to size difference and higher risk of bite penetration, the vaccinated ecologists should utilise thicker gloves, such as welding gloves when handing Flying foxes. No more than one individual should be placed in a large calico bag and they should be released after dark. Soft release boxes are not to be utilised for Flying-foxes.

4.3.6. Invertebrates

If any individuals of the Dural Land Snail are found, they must be kept dry and cool. This is simply achieved by placing them in a small jar, box or container with a few leaves or bark to shelter underneath. If more than two or three snails are found, then the additional snails are to be put into another container. They generally can survive for several days, especially if kept cool and dry if they need to be held for longer periods then this needs to be dealt on a case-by-case basis by a suitably qualified person.

4.4. Post Clearing Fauna Encounter Protocols

As required by the consent conditions, this section provides protocols for dealing with fauna (e.g. macropods) encountered within construction zones after vegetation clearing has taken place.

Although it is unlikely that fauna will be encountered in the construction zones after vegetation clearance has taken place, there is the potential for large, mobile species such as macropods (kangaroos and wallabies) to occur, most likely in transit between areas of habitat outside the clearing area.

If fauna are encountered, works should stop until the animal has left the construction zone. In the first instance, they should be encouraged to leave of their own accord by slowly approaching them. This should be undertaken very slowly, ensuring that the animal does not feel trapped by being pushed into an area from which there is no escape and that there is a large open area that the animal can retreat to. The animal should not be approached closer than 5 m in the first instance to avoid stressing the animal or incurring injuries if the animal becomes aggressive. No attempt should be made to capture the animal under any circumstances and they are not to be handled by any person other than the supervising fauna ecologist. If the animal does not relocate voluntarily, or appears to be injured or sick, the supervising fauna ecologist must be called to advise on further procedures. These will be as outlined in previous sections during clearing.

5. Reporting Requirements

The Project Ecologist or relevant fauna specialist is to provide the following reports to Council's Manager - Environment & Health and the clearing contractor prior to the commencement of the relevant activity:

- A pre-clearance letter itemising habitat features before works commence; and
- A clearance supervision report itemising the extent of habitat cleared as well as a full list of species encountered/relocated.

In addition, a Certification Report will be prepared for submission to Council two weeks prior to the commencement of works to certify that the primary pre-clearance surveys have been undertaken in accordance with requirements of this FMP. Further details of the reporting requirements are presented below.

5.1. Pre-clearing Survey Report

Weekly pre-clearing survey reports will be provided to Council following commencement of the project. These will identify and itemise the habitat features recorded from the Approved Works area as well as the type and number of species recorded and relocated.

It will be provided to Council's Manager - Environment & Health and the clearing contractor prior to clearing to ensure that the habitat features are known and to prevent any inadvertent impacts to these features during clearing. Each pre-clearing survey report will provide the following information as a minimum:

- Types of habitat features present (tree hollows, nest/drey, logs, roosting cavity etc);
- Location of habitat features;
- Number of potential salvage features;
- Any fauna encountered/observed; and
- Recommendations of additional mitigation measures (if required).

5.2. Clearing Supervision Report

As outlined previously, all vegetation clearing will be supervised by an ecologist in order to minimise impacts to native fauna species. Following the clearing and attendant supervision, a clearance supervision report will be prepared itemising the extent of habitat cleared as well as a full list of species encountered/relocated. Each clearing supervision report will provide the following information as a minimum:

- Name of species captured and date of capture
- Health of species captured;
- Date of relocation, transport to vet or handover to wildlife carer, as relevant
- Location of release point within the fauna release area;
- Details of relocation protocols employed, including personnel carrying out relocation;

- Locations of any relocated habitat features;
- Total number of individuals relocated;
- Details of any fauna were injured and required further care including reference/call sheet number for licenced wildlife carer organisation; and
- Details of any fauna deaths.

Note – as per Consent Condition 44n) any fauna injuries or deaths are to be reported to Council within 24 hours of the incident.

5.3. Powerful Owl Survey Reports

As required by the Conditions of Consent, monitoring reports are to be submitted to Council monthly following each targeted Powerful Owl survey and a map showing the location of roosting/nesting owls in relation to clearing/demolition works is to be included. Relevant data will also be provided to other relevant stakeholders, such as Birdlife Australia as required.

5.4. Certification Reports

As required by Condition 44 of Consent, certification by the Project Ecologist that all the works required to be undertaken prior to clearing have been undertaken in accordance with the measures specified in this FMP shall be submitted to Council's Manager – Environment & Health for endorsement two weeks prior to any works commencing. This report will certify that the pre-clearance survey, fauna relocation and installation of nest boxes have been undertaken strictly in accordance with this FMP and implemented in accordance with the approved timelines.

As required by Condition 100 of Consent and prior to issue of an occupation and/or subdivision certificate, a certification report will be submitted to Council's Manager – Environment & Health. This report will certify that the following measures have been undertaken in accordance with this FMP:

- Fauna Nest Boxes – Location plan and photographs of installed nest boxes; and
- Tree Removal & Fauna Protection – Details prepared by the Project Ecologist demonstrating compliance with Conditions 44 and 81 of Consent.

A copy of all preclearance reports issued to Council will also be issued to contractors.

6. References

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APPENDIX A :

Fauna Induction Fact Sheet

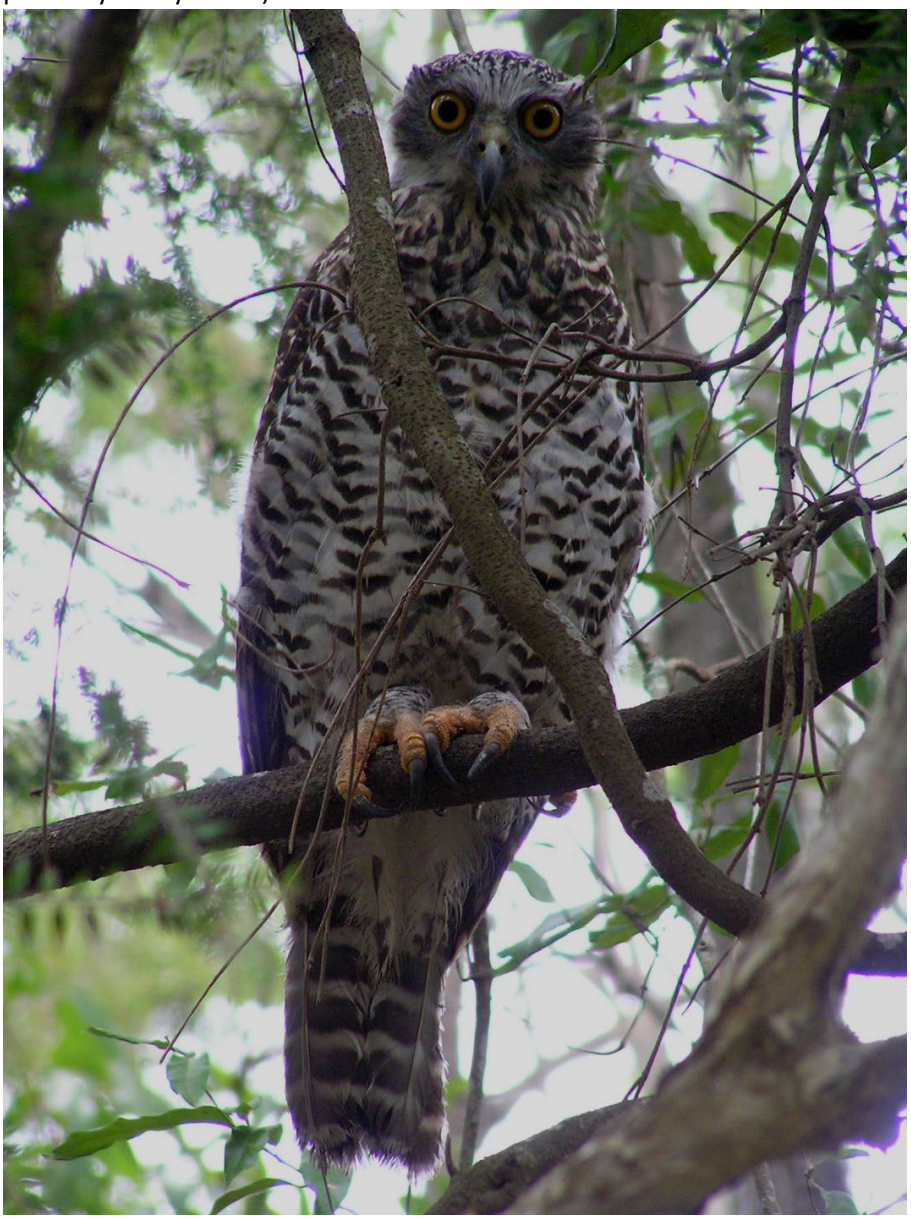
55 Coonara Avenue, West Pennant Hills (the Property): Induction Fact Sheet – Ecology

Environmental Values

The Property contains significant areas of high biodiversity values within and adjacent to the Demolition Footprint including, but not limited to the following:

- Threatened Ecological Communities: Blue Gum High Forest (BGHF) and Sydney Turpentine Ironbark Forest (STIF).
- A known population of the endangered Dural Land Snail (Photo by Stephanie Clark)

- Roosting/Breeding habitat for an established breeding pair of Powerful Owls (Powerful Owl photo by Corey Mead)



- Roosting/Sheltering/Foraging habitat for a variety of native fauna, including (but not limited to) frogs, lizards, snakes, cockatoos, brush turkeys, possums, echidnas and microbats
- Habitat within the approved works area is a mix of natural (trees, groundcover vegetation, bush rock) and artificial (landscaped car parks)
- Exotic/Pest species such as Foxes and Black rats are also present within the Property and may occur within the approved works area.
- The property potentially supports various snake species, including venomous snakes such as the Red-bellied Black Snake or the Eastern Brown Snake
- Other species found on the site that may be problematic to contractors include, ticks, bull-ants, bees, wasps and spiders.

General Environmental Requirements

- All works are to be fully contained within demarcated/delineated work zones/work sites.
- The site is a smoke free environment. There is no smoking within the approved works areas.
- All rubbish to be placed in bins onsite.
- All machinery and equipment entering the site is to be clean of dirt and foreign material.
- Wash down areas should be set up to clean footwear prior to entering/leaving site
- Tree Protection Fencing requirements are to be strictly adhered to. Tree Protection Fencing must be installed and maintained in accordance with approved plans at all times
- Work zones can only be accessed once approval and a clearance report is received from Project Ecologist and/or Project Arborist.
- Any excavation within a tree protection zone for trees that are to be retained is to be completed under the supervision of the project Arborist.
- Only areas within the approved works area are to be accessed by personnel and equipment. Unauthorised personnel and equipment are not permitted to enter retained vegetation areas outside the approved works area;
- Machinery, tools & equipment that generate sparks or flames should not be used within 20m of barrier fencing to minimise the risk of bush fire ignition within the adjacent vegetation areas being retained.
- Any damage to barrier fencing is to be immediately reported and steps actioned to repair barrier fencing.
- All important fauna habitat within the works area will be identified during pre-clearing surveys and will be marked with flagging tape and/or spray paint of a specified colour. These features are not to be disturbed/removed without supervision by the ecologist.
- Fauna survey equipment (traps and surveillance cameras) will be deployed across the approved works areas. These are not to be disturbed/removed without supervision by fauna ecologist. If captures are incidentally observed within traps, the supervising ecologist is to be notified.
- Fauna are not to be disturbed and their occurrence is to reported to the supervising ecologist
- Only authorised/trained ecologists are to handle fauna. In the event of any unexpected fauna encounters, the supervising ecologist is to be notified immediately. All other personnel are to maintain a safe distance from fauna and allow it a clear path to self-relocate if it is attempting to do so.
- All personnel should be aware of locations of first aid kits/first aid stations. All first aid kits/stations should contain snake bandages in the event of a snake encounters.

Stop Work Procedures

The following stop work procedures must be followed when animals are encountered by clearing or demolition contractors, or spotted by the ecologist:

- Where an animal is encountered by a contractor:
    - If not in the vicinity of machinery or in close proximity to other works (e.g repair of fences) the supervising ecologist and Mirvac representative are to be notified but work not stopped. This is particularly relevant for sightings of bats, owls, frogs, echidnas, possums, snakes and larger lizards such as goannas;
    - If in the vicinity of a piece of machinery the supervising ecologist and Mirvac representative are to be notified, work stopped and bucket/other equipment lowered. Works are to cease until the fauna is captured by the supervising ecologist or ecologist gives the all clear in the event of fauna self-relocation;
    - If a snake is detected, stop works, notify the supervising ecologist and maintain safe distance (at least 7-10m);
- Where a contractor is bitten or scratched by an animal
    - Work in the vicinity is to be stopped;
    - Animal should be identified as accurately as possible in order to inform treatment;
    - Medical attention must be sought immediately. Some microbats carry Australian Bat Lyssavirus (ABLV) which is a virus similar to rabies that can be transmitted from bats to humans, causing serious illness;
- If the animal is spotted by ecologist:
    - The ecologist has the authority to advise machinery operating in close proximity to the animal to stop work and lower bucket. The contractor is to follow the direction of the supervising ecologist until the animal is captured and removed or has self-relocated.
    - Once captured, removed or has self relocated the supervising ecologist is the only person authorised to advise that work can recommence by that piece of machinery. All personnel must be well clear of the machinery prior to work recommencing and the contractor must always follow their safety management plan and Safe Work practices.

FIGURES

Legend

- The Property
- Concept Masterplan – Approved Works
- Demolition DA footprint – subject to separate FMP
- Asset Protection Zone
- Areas to be managed under a VMP (to be approved by Council)

Coordinate System: MGA Zone 56 (GDA 94)

Image Source:
Image © Nearmap (2023)
Dated: 18/01/2023

Data Source:
Sixmaps Clip and Ship (2022)
Spatial Services
NSW Department of
Finance and Services

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I:\...\21108\Figures\RP7\20230209\Figure 1. Location

Figure 1. Location of the Property and Concept Masterplan DA areas

0 50 100 150 m

Legend

- The Property
- Concept Masterplan – Approved Works
- Demolition DA footprint – subject to separate FMP
- Areas to be managed under a VMP (to be approved by Council)
- Dural Land Snail Locations

Coordinate System: MGA Zone 56 (GDA 94)

Image Source:
Image © Nearmap (2023)
Dated: 18/01/2023

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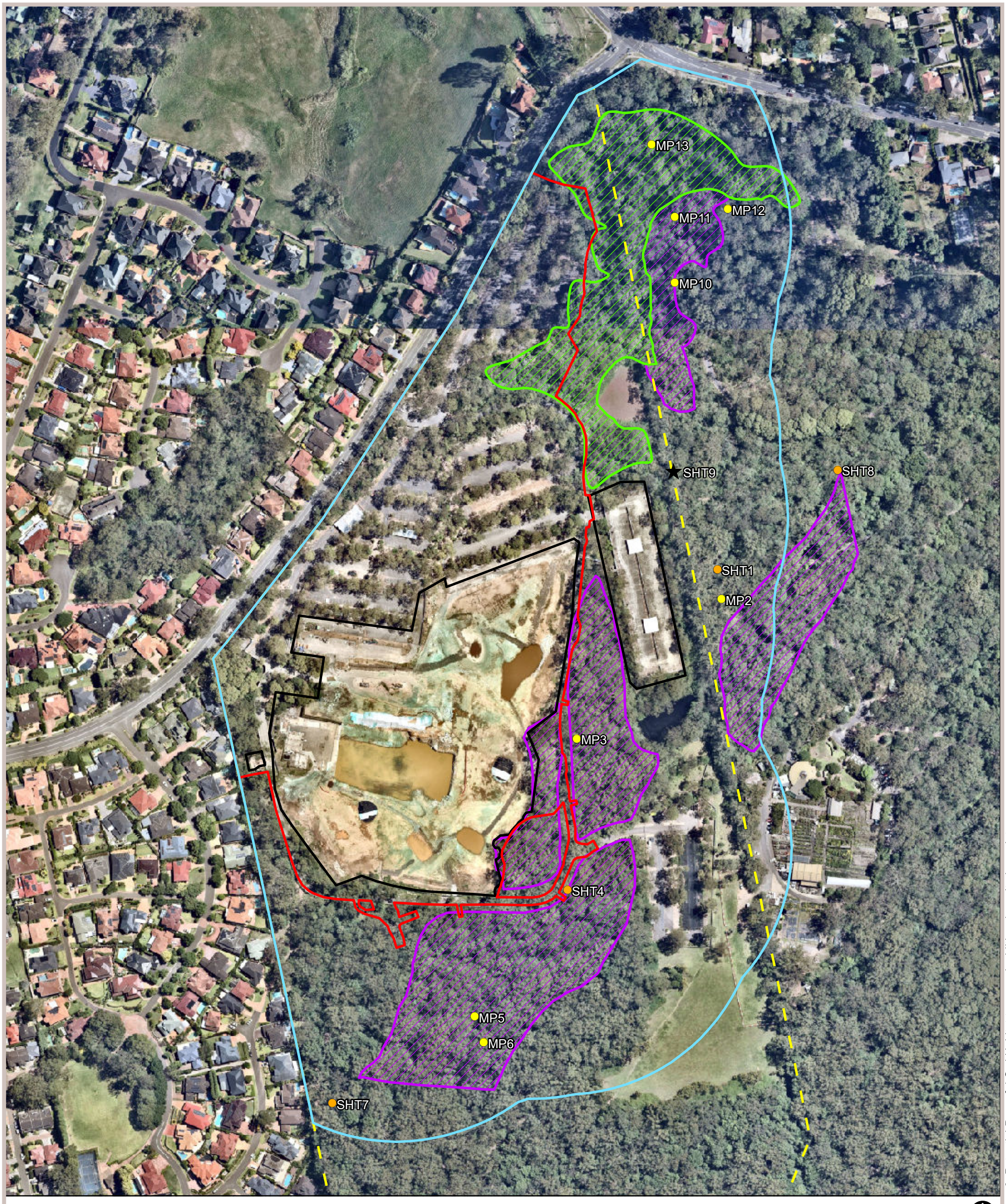
0 50 100 m

I:\...\21108\Figures\RP7\20230209\Figure 2. Location of Dural Land Snail recordings

Figure 2. Location of Dural Land Snail recordings within the Property and adjacent Cumberland State Forest



Legend

- The Property
- Concept Masterplan – Approved Works
- Demolition DA footprint – subject to separate FMP
- Concept Masterplan 150 m Buffer
- Suitable Roosting Habitat Areas –native understorey
- Roosting (sub-optimal) Habitat areas – Lantana/Privet understorey
- Monitoring Point (MP)
- Significant Habitat Tree (SHT)
- Previously used nest tree – no longer present at this location as per 2022/2023 surveys

Coordinate System: MGA Zone 56 (GDA 94)

Image Source:
Image © Nearmap (2023)
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I:\...\21108\Figures\RP7\20230418\Figure 3. Potential Powerful Owl Habitat trees and additional monitoring points

Figure 3. Potential Powerful Owl Habitat trees and additional monitoring points out to 150m from the Concept Masterplan DA Footprint

0 50 100 m

Legend

- The Property
- Concept Masterplan – Approved Works
- Demolition DA footprint – subject to separate FMP
- Areas to be managed under a VMP (to be approved by Council)
- Release area for captured vertebrate fauna
- Relocation area for the Dural Land Snail
- Release area for Turtles

Coordinate System: MGA Zone 56 (GDA 94)

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Dated: 18/01/2023

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Spatial Services
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I:\...\21108\Figures\RP7\20230209\Figure 4. Relevant Locations for Fauna Relocation

Figure 4. Relevant Locations for Fauna Relocation

0 50 100 m