Flora and Fauna Assessment

Clearing for a Proposed Dwelling and Asset Protection Zone

Lot 104 DP 1049845
Bundabah Road, Bundabah

orogen

Prepared For

Tea Gardens Farm Pty Ltd

28 November 2007

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Introduction

1.1 Introduction

Orogen Pty Ltd has been commissioned by Tea Gardens Farm Pty Ltd (the client) to prepare a Flora and Fauna Assessment report, incorporating a Section 5A Assessment to evaluate the potential impacts of clearing for a proposed dwelling and associated Asset Protection Zone (APZ) on Lot 104 DP 1049845, Bundabah Road, Bundabah (**Figure 1.1**).

A Development Application (DA 423/07) for a dwelling within Lot 104 has been submitted to Great Lakes Council (GLC). The building envelope and APZ area demonstrated within original DA has been augmented and the new location for the dwelling and extent of the APZ is the subject of this report. This Flora and Fauna Assessment report has therefore been prepared as an addendum to the documentation for DA submitted previously to GLC.

Lot 104 DP 1049845 is approximately 100.7 ha in area and is hereafter referred to as the 'subject land'. The dwelling is proposed to be located at the crest of a hill that is situated within the approximate centre of the subject land (**Figure 1.1**). The proposed clearing area comprises the building footprint and the area required for the establishment of the APZ (hereafter referred to as the 'site'). The extent of the APZ has been determined for Level 2 construction (Orogen, 2007).

The majority of the site has been subject to previous clearing and has also been recently heavily grazed by goats. Despite this, the proposed development will result with the removal of some native vegetation. The extent of the building footprint and APZ is comprises approximately 2.1 ha. Approximately 0.3 ha of this is required for the building footprint (**Appendix A**). Given the majority of the site is comprised of a highly modified ecotype represented by scattered Eucalypts with limited or no ground cover, the amount of vegetation proposed to removed is minimal. In addition, as the majority of the clearing area is comprised of the APZ, vegetation removal will involve only selective clearing of vegetation within the APZ areas, thereby allowing for retention of some vegetation.

1.2 Objectives of the Study

The objectives of the study were to:

- Determine the Threatened flora and fauna species and Endangered Ecological Communities (EEC's) known or likely to occur within the proposed clearing area. This determination is based on the results of a desktop review, habitat assessment on site and application of the Precautionary Principle; and

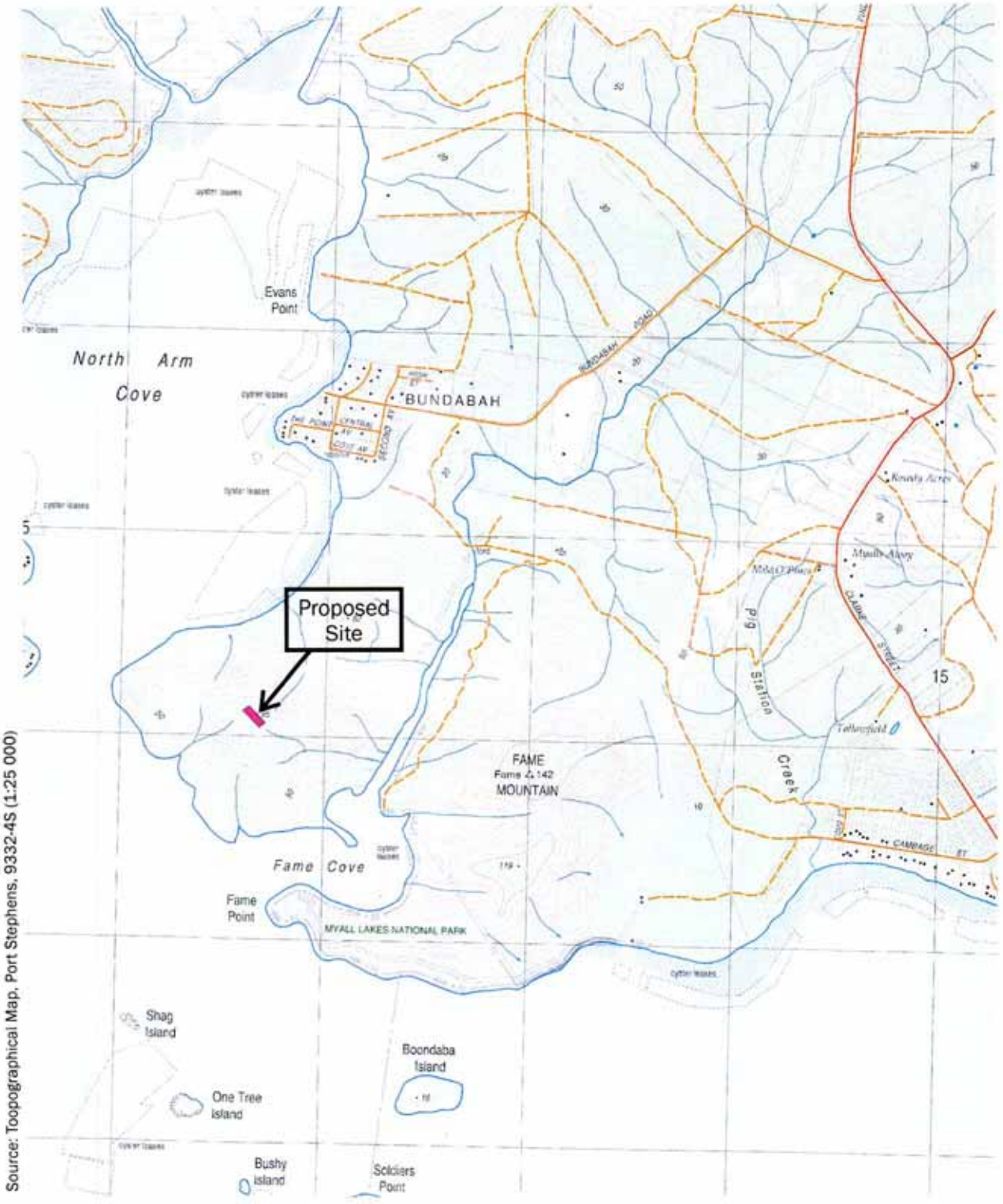

Figure 1.1 - Locality Plan

- Formulate and document mitigation measures that are required to alleviate potential impacts of the clearing on the flora and fauna species and EEC's known or likely to occur within the proposed clearing area.

1.3 Purpose of the Report

This Flora and Fauna Assessment investigates the potential ecological issues associated with the proposed clearing, particularly with regard to Threatened species, populations and Endangered Ecological Communities and is intended to assist Great Lakes Council in the decision making process.

1.4 Outline of the Report

The report has been structured to provide information consistent with requirements of the *Environmental Planning and Assessment Act 1979* and the *Threatened Species Conservation Act 1995*. The report is structured as follows:

Section 2 – Describes the flora and fauna survey methodology and assessments employed for the study;

Section 3 – Describes the results of the flora surveys and fauna surveys and assessments;

Section 4 –Contains a Section 5A Assessment including a description of the assessment process, and the determination of Subject Species;

Section 5 – Provides an assessment in accordance with the *Environmental Protection and Biodiversity Conservation Act 1999* (*EPBC Act*);

Section 6 – Discusses the potential impacts of the proposed clearing and provides recommendations in to reduce the potential impacts of this clearing upon flora and fauna; and

Section 7 –Provides a conclusion for the proposed clearing in relation to potential ecological impacts.

Methodology

2.1 Desktop Review

A desktop review was undertaken to determine the fauna and flora species and vegetation communities of conservation significance previously recorded in the locality (approximately 10 km radius) in order to assist with consideration of species to be targeted during field investigations. The review involved the following:

- A search of the records of threatened species and endangered populations held on the Department of Environment and Conservation (DECC), Atlas of NSW Wildlife database (2007);
- Key habitats and corridors in North East NSW, NSW NPWS, (2007);
- Statement of Effect on Threatened Flora and Fauna Report Over Land Proposed for Rezoning and Subdivision at Area C Lots 22-25 DP 69143. North Arm Cove (Wildthing Environmental Consultants, 2000);
- Updated Statement of Effect on Threatened Flora and Fauna Report. Part Lot 24 DP 69143 & Part Lot 101 Bundabah NSW, (Wildthing Environmental Consultants, 2002); and
- Eight Part Test for the Proposed Development of Lots 101-104 DP 1048945 Bundabah, NSW (Wildthing Environmental Consultants, 2004).

2.2 Field Surveys

2.2.1 Habitat Assessment

The habitat assessment was undertaken during site inspections on 31 October and 21 November 2007. The Threatened flora and fauna species known or potentially occurring within the locality and the occurrence of specific habitat features appropriate for these species were evaluated during this habitat assessment.

The fauna habitat assessment was undertaken in all habitat types occurring within the site. The habitats were assessed for habitat features for Threatened species such as hollow-bearing trees, nest sites, rocky outcrops, water courses, wetland habitats, leaf litter and caves/drains or other structures suitable for roosting or denning purposes.

The habitat assessment was then used to determine the Subject Species, or Populations and Ecological Communities for the Section 5A Assessment.

2.2.2 Flora surveys

A rapid botanical assessment was undertaken during the field investigations on 31 October and 21 November 2007 to identify the occurrence of Threatened flora species and Endangered Ecological Communities within the site. The assessments included random meander transects to target Threatened flora species listed by the *EPBC act* and *TSC Act* known or considered to potentially occur within in the locality. Species targeted included: *Chamaesyce psammogeton, Melaleuca groveana, Callistemon linearifolius, Prostanthera densa, Eucalyptus parramattensis* subsp. *Decadens, Cryptostylis hunteriana, Lindernia alsinoides,* and *Tetratheca juncea.*

Vegetation Community Surveys

A rapid botanical assessment was undertaken using the Random Meander technique (Cropper, 1993) to identify vegetation communities, inventory the dominant floristics and search for TSC listed flora taxa potentially occurring in the locality. The structural classification used for the community description follows Walker and Hopkins (1990).

2.2.3 Fauna Traverse Surveys

A fauna traverse was undertaken throughout all habitats within the proposed clearing area and adjoining vegetation on 31 October and 21 November 2007. During the traverse, specific attention was given to searching for raptor nests, feeding signs of Glossy Black Cockatoo, latrine sites for Spotted Quoll, worn glider runs in trees and nest/roost sites for Threatened owls.

2.2.4 Tree Marking Program

A tree marking program was undertaken within the site and aimed to identify and quantify the availability of particular habitat features such as hollow resources, Koala feed tree species, and Glossy Black Cockatoo feed tree species. The tree marking was undertaken throughout the majority of the site, however, this exercise did not extend into the relatively intact Forest occurring within some locations at the outer area of the APZ.

The following methods were undertaken in the field:

Hollow Bearing Trees

The existing cleared area was traversed on foot and any trees observed with visible cavities, or those considered to potentially contain hollows, were documented on pro-forma data sheets. Information recorded included: tree species; approximate height; and diameter at breast height (DBH), hollow types (small-large/trunk or limb) and species' suitability. Each tree was assigned a number and subsequently marked with white paint and orange flagging tape.

Koala Feed Trees

The *Eucalyptus* or *Corymbia* species with a Diameter at Breast Height (DBH) greater than 30 cm were identified. The Koala feed trees listed under Schedule 2 of SEPP 44 occurring within the site namely: Tallowwood (*Eucalyptus microcorys*) and Grey Gum (*Eucalyptus punctata*) were differentiated with a symbol marked on-site with white paint. The number of Tallowwood and Grey Gum marked in the field were later tallied from the survey plan produced.

Glossy Black-Cockatoo Feed Trees

All fruit bearing (female) Allocasuarinas trees observed were marked in the field with white paint and later tallied from the survey plan produced.

Tree survey plan

Each tree marked in the field was surveyed on-site by Great Lakes Surveys and an overlay of the site showing the proposed building envelope, extent of the APZ, and location of the trees was subsequently produced (**Appendix A**).

2.3 SEPP 44 – Koala Habitat Protection

The objective of State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) is to encourage the conservation and management of habitat areas for Koalas to ensure their current distribution is maintained. In accordance with SEPP 44, an assessment was undertaken to determine the occurrence of Koala habitat within the site.

A SEPP 44 assessment involves:

- Determination of whether the study area occurs within the Local Government Areas (LGA's) listed on Schedule 1 of SEPP 44;
- Determination of *potential Koala habitat* within the Study area;
- Determination of *core Koala Habitat*; and
- Consideration of the need for a Koala Plan of Management.

2.3.1 SEPP 44 definitions

Potential Koala Habitat

Potential Koala habitat is defined under SEPP 44 as "areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component."

Core Koala Habitat

Core Koala Habitat is defined by SEPP 44 as "an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historic records of a population.

Koala Scat Searches

Specific Koala scat searches were undertaken within the site to evaluate the level of Koala activity. The scat searches were undertaken in general accordance with the Spot Assessment Technique as ascribed in Phillips, S. and Callaghan, J., (1995). The methodology involved searching the basal circumference of least 20 trees for Koala scats and scratches that are known to, or likely to be utilised by Koalas. Each tree was searched for two (2) to three (3) minutes, or until a Koala scat was found, whichever came first. A total of two (2) sample site (40 trees) using this method were surveyed within the site and adjoining habitats. In addition, a number of suitable Koala feed trees within and adjoining the site were randomly searched for signs of Koala usage during the fauna transect searches.

2.4 Survey Limitations

The surveys undertaken may not provide a true indication of seasonal habitat utilisation by fauna species within the site and some cryptic flora species may only be detected during particular flowering periods. Detailed flora and fauna surveys were not undertaken and as such a precautionary approach was applied in determining the species potentially utilising the habitats within the site and environs. In effect, where there is some doubt as to whether a Threatened species may potentially utilise a habitat, it was assumed that the habitat is utilised by the species.

Results

3.1 Desktop Review

Review of the Atlas of NSW Wildlife database revealed 10 Threatened flora species, 35 Threatened fauna species and two (2) Endangered Populations as occurring within the locality (DEC, 2007). Details of the conservation status, ecology and local occurrence, as well as a consideration of each species *'likelihood of occurrence'* on the site based on the habitats present are provided in (**Appendix B**). The determination of *'likelihood of occurrence'* within the site is ranked from low to high likelihood in the following categories: Highly Unlikely, Unlikely, Potential, Likely, Highly Likely, and Known.

The desktop review also identified that the following Threatened species have been previously recorded within the subject land (Wildthing Environmental Consultants, 2004):

- Grove's Paperbark (Melaleuca groveana);
- Black-eyed Susan (*Tetratheca juncea*);
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*);
- Osprey (*Pandion haliaetus*);
- Koala (*Phascolarctos cinereus*);and
- Little Bentwing-bat (*Miniopterus australis*).

3.2 Flora

3.2.1 Vegetation Communities

A single vegetation community was identified within the site and a summary description of this community is provided below.

Mixed Eucalypt Dry Open Sclerophyll Forest.

This vegetation community was recorded within and adjoining the site. The community comprises a mixed aged stand including older remnant trees.

Upper (Tree) Stratum (height 10-20 m; projected foliage cover 20-50%)

Eucalyptus punctata, Corymbia maculata, E. microcorys, E. acmenoides, E. paniculata. Co-dominants *Corymbia gummifera and Angophora costata* minor canopy associates (5%).

Mid Stratum (height up to 7 m; projected foliage cover 1-5 %)

Relatively sparse at most locations dominated by *Dodonea spp, Acacia melanoxylon. Occasional Allocasuarina torulosa* scattered throughout.

The mid stratum within the north east of the site was found to contain minor assemblages of wet sclerophyll/rainforest species such as *Backhousia myrtifolia, Cupaniopsis* spp., and *Ficus* spp.

Lower Stratum (height to 2 m; projected foliage cover 30-50%)

Dominated by *Dodonea triquetra*. Some climbers and scramblers noted such as *Smilax australis, Cayratia clematidea, and Eustrephus latifolius.*

Ground cover sparse and primarily limited to graminoids such as *Lomandra ssp and Dianella spp.*

Extent of Disturbance

The majority of the site has been subject to previous clearing and has also been recently heavily grazed by goats (**Figure 3.1**). Subsequently the majority of the site is comprised of a highly modified ecotype represented by scattered Eucalypts with limited or no ground cover (**Figure 3.2**). Prior to disturbance, this vegetation would have most likely resembled the Dry Forest surrounding the current extent of clearing. Only a relatively small portion of intact Forest community occurs within the outer edges of the APZ area (**Figure 3.3, Appendix A**).

The proposed clearing area comprises only a small proportion of vegetation, relative to the extent and quality of the Forest community adjoining the site and also occurring throughout the subject land. The community identified within the site is also well represented within the locality.

3.2.2 Threatened Flora Species

There were no Threatened flora species identified within the site during the surveys. Based on the vegetation/habitats present and previous records in the locality, the site is considered to contain potential habitat for *Melaleuca groveana, Callistemon linearifolius,* and *Tetratheca juncea*. Given the extent of disturbance, however, habitat for Threatened flora species within the site is considered to be generally associated with the relatively intact areas of Forest occurring within outer edges of the APZ.

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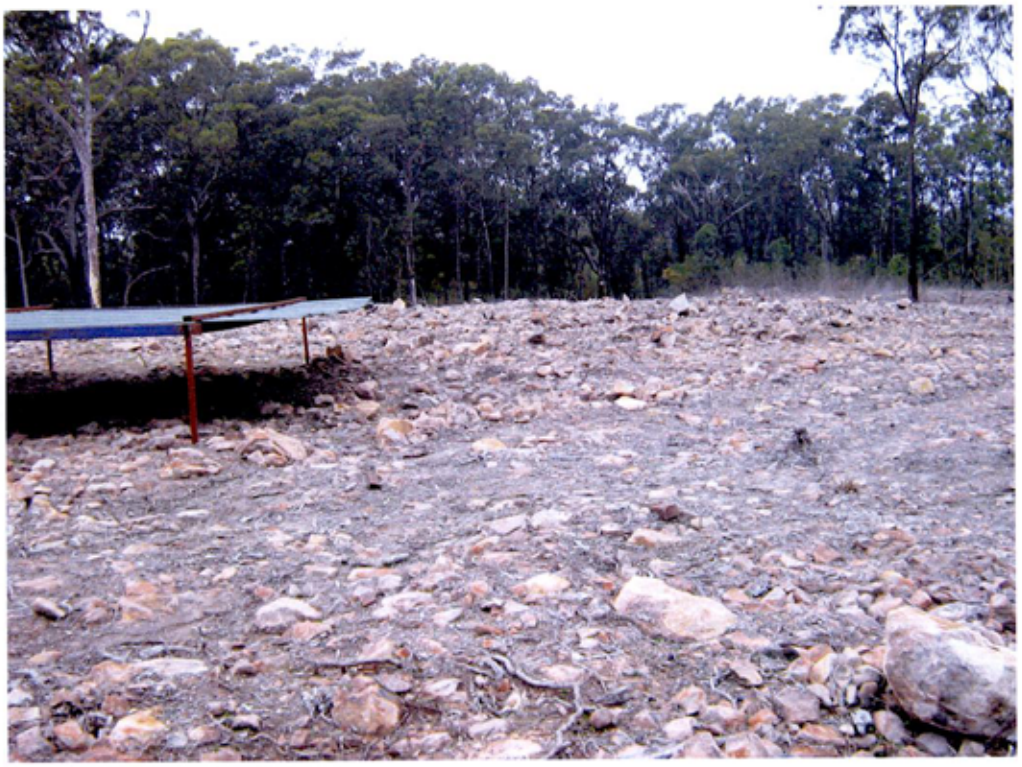

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Figure 3.1 - Existing Cleared Area

Figure 3.2 - Modified Forest Ecotype (remnant trees)

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South East Section

North East Section

Figure 3.3 - Forest within the APZ Area

Although not detected, *Tetratheca juncea* is a relatively cryptic species and given the occurrence of occurrence of potential habitat and the known records (within 250 m), this species has been considered in the Section 5A Assessment (**Appendix C**).

3.2.3 Endangered Ecological Communities

A small patch of Dry Rainforest dominated by *Backhousia myrtifolia* was found to occur to the north east of the site. This patch of vegetation is considered to be analogous to the Endangered Ecological Community (EEC) - *Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions.*

This patch is located on a relatively sheltered north east facing slope and comprises an area of approximately 0.1 ha (**Figure 3.4, Appendix A**). Being located outside of the APZ area, no clearing of this community will be required. The majority of this community is bounded by the extent of the existing clearing, and therefore this community is exposed to a significant degree of edge effects.

3.3 Fauna

3.3.1 Habitat Assessment

The majority of the vegetation within the site has been subject to previous clearing (**Figure 3.1**). The majority of the vegetation that does occur within the site is located within the proposed APZ area and is comprised of a highly modified Forest ecotype. This vegetation is represented by remnant trees with no understorey or ground cover (**Figure 3.2**). Relatively intact vegetation occurs within some locations at the outer edges of the APZ (**Figure 3.3, Appendix A**).

Being predominantly cleared, the site was found to contain limited habitat resources for both Protected and Threatened fauna species. The habitat value of the vegetation within the site is discussed below.

Where present, the ground cover, understorey and tree component within the site provides a variety of foraging habitat for insectivorous, nectivorous and herbivorous species including microchiropteran bats, megachiropteran bats and arboreal, scansorial and ground mammals such as gliders, rodents, and Dasyurids. The vegetation within and adjoining the site represents potential hunting habitat for the Threatened Forest Owls (eg. Powerful Owl, Masked Owl) and also raptors such as the Square-tailed Kite (*Lophoictinia isura*).

At some locations, the mid stratum of the Forest community at the outer edges of the APZ contains some wet sclerophyll forest elements. In particular a number of Tuckeroo and *Ficus* were observed within and adjoining the site. The fruits produced by these tree species would provide potential foraging resources for fruit doves such as the Wompoo Fruit Dove (*Ptilinopus magnificus*) and Superb Fruit Dove (*Ptilinopus supurbus*).

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Figure 3.4 - Dry Rainforest Adjoining the Site

The leaf litter throughout the site provides appropriate habitat for reptiles, and also foraging habitat for a variety of insectivorous mammals and birds. In addition, the site contains fallen logs and scattered timber which provide suitable denning and foraging habitat for a variety of fauna including reptiles, rodents and smaller sized Dasyurids.

The site contains hollow bearing trees, however, given the size of the cavities observed, these trees would only provide potential denning or roosting habitat for smaller sized fauna such as arboreal mammals and microchiropteran bats. The site does not contain any caves and therefore lacks roosting habitat for cave-obligate microchiropteran bats.

The substrate of the site and much of the subject land is characterised by exposed and weathered igneous rock. This rocky terrain provides basking and shelter habitat for reptiles and also shelter resources for and small mammals (eg. rodents).

The site contains scattered *Allocasuarina torulosa* trees and chewed fruit cones were identified during the surveys. This evidence is indicative of feeding activity by Glossy Black Cockatoo. The chewed cones were found beneath four (4) trees occurring within the outer edge of the APZ area, to the north of the proposed building footprint (**Appendix A**).

The vegetation communities also contain suitable Koala feed trees and the habitat value for this species is discussed further in **Section 3.3.3.**

The site does not contain permanent aquatic habitat and being located on the crest of a hill, does not contain any significant ephemeral drain lines or depressions. The site is therefore unlikely to provide potential breeding habitat for any Threatened amphibians and similarly, the site does not contain potential habitat for any Threatened aquatic species.

3.3.2 Fauna Traverse Searches

Evidence of habitat utilisation by two (2) Threatened species was identified within the site during the surveys.

The Koala was identified from scats found during the specific Koala scat searches and was tentatively identified from scratches observed on the trunks of a number of trees within the site.

Chewed Allocasuarina fruit cones, indicative of feeding activity by the Glossy Black-Cockatoo, was observed within the outer edge of the APZ area during the surveys.

Evidence of feeding activity by the Glossy Black-Cockatoo was observed opportunistically near the western boundary of the subject land during a reconnaissance of the subject land by Orogen in November 2007. During this reconnaissance, the Koala was also tentatively identified from scratches observed on the trunks of a number of trees at various locations within the subject land.

3.3.3 Koala Habitat Assessment

The site is situated within the Great Lakes Council LGA, which is listed on Schedule 1 of SEPP 44.

Tallowwood (*E. microcorys*) and Grey Gum (*E. punctata*) together constitute at least 15 % of the tree component within the site. The site therefore contains *potential Koala habitat* pursuant to SEPP 44.

The site and adjoining habitats also contains browse species such as *Corymbia maculata, E. paniculata, E. acmenoides*, and *E. gummifera.*

Koala Scat Searches.

Of the 40 trees searched during the specific Koala scat searches, Koala scats were identified beneath a total of five (5) trees (**Appendix A**). During these searches, the trunks of a number of trees were observed with scratches indicative of the Koala. Although the surveys identified habitat usage within the site by the Koala, the low activity levels indicate Koalas only occasionally browse amongst the trees within the site. The site is therefore unlikely to contain *core Koala habitat* pursuant to SEPP 44.

3.3.4 Tree Survey

Hollow Bearing Trees

A total of 12 hollow bearing trees were marked the during the tree survey. A plan showing the location of the hollow bearing trees and the overlay of the proposed building footprint and APZ is provided in **Appendix A.** This plan demonstrates that only one (1) hollow bearing tree occurs within the proposed building footprint. This hollow bearing tree provides a small branch hollow that represents roosting habitat for only small number of microchiropteran bats.

All other hollow bearing trees occurring within the site are located within the APZ area and can therefore be retained given permissible vegetation densities within the APZ.

Koala Feed Trees

A total of 27 feed trees listed under Schedule 2 of SEPP 44 were marked during the tree survey, and comprised 17 Grey Gum and 10 Tallowwood.

A total of five trees (5) require removal for the proposed building footprint. These trees comprise three (3) Spotted Gum, one (1) Iron Bark and two (2) Grey Gum. These tree species represent suitable Koala feed tree species, however, only Grey Gum is listed under Schedule 2 of SEPP 44.

The majority of the SEPP 44 feed trees occurring within the APZ can be retained through selective vegetation removal during the establishment of the APZ.

Glossy Black-Cockatoo Feed Trees

A total of seven (7) *Allocasuarina torulosa* were marked during the tree survey, and of these, a total of three (3) trees were female. There was no evidence of feeding activity by the Glossy Black-Cockatoo identified beneath these trees during the surveys. As discussed, feeding activity by this species was identified within the relatively intact forest within the outer edge of the APZ to the north of the proposed building footprint (**Appendix A**).

No Allocasuarinas require removal for the proposed building footprint as the few scattered Allocasuarinas occurring within the APZ may be retained.

3.3.5 Fauna Corridors and Key Habitats

The subject land is located within 1 km to the Fame Cove – Nerong Regional corridor modelled by NPWS. The majority of the subject land is heavily vegetated and is therefore connected to these corridors and subsequently linked to vast areas of habitats occurring in the locality, including Myall Lakes National Park.

In the context of the vegetated areas throughout the subject land, the habitats at the site are not considered to comprise an important component of connective habitats in the subject land, or locality. Development of this site will not cause fragmentation of habitats in the locality and existing connectivity of the habitats throughout the remainder of the subject land will remain unchanged. In addition, vegetation within the APZ will continue to facilitate movement through the site itself.

Section 5A Assessment Process

4.1 Background

This section of the report provides a background to the Section 5A Assessment including a definition of terms used in the assessment process and the determination of Subject Species. The potential for significant impact as a result of the proposed clearing upon the Subject Species is provided in **Appendix C.**

The *Threatened Species Conservation Amendment Act (2002)* amended the *EP&A Act 1979*, by the identification of seven (7) factors that must be considered when assessing the impacts of a particular proposal. The objective of the Section 5A Assessment is to determine if a proposal is likely to have a *significant effect* on Threatened species, populations or ecological communities, or their habitats.

4.2 Definitions

4.2.1 Local Population

The *TSC Act* defines a "local population" as "a population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary of the study area can be demonstrated" (NPWS, 1996).

The local population of a species in the area of the proposal would be limited to the habitats in the local area, rather than the population residing within the study area. Although some individuals may reside within the study area, populations are generally linked to more extensive tracts of vegetation. For the purposes of this assessment the local population is considered as the population which resides within the proposed clearing area and habitats in the local area.

4.2.2 Viability of the Local Population

The Section 5A Assessment requires that a determination be made as to whether the viability of a local population will be compromised by the proposal in question. A viable local population is defined by the NPWS (1996) as *"a population that has the capacity to live, develop and reproduce under normal conditions"*. In respect of the proposed clearing, to determine that the local population would not be detrimentally affected, it would be necessary to prove that partial removal of the habitat within the study area would not affect the movement of Subject Species to the extent that local populations may become extinct.

4.2.3 Regional Population

The term region is defined by the *TSC Act* as "a bioregion defined in a national system of bioregionalisation that is determined by the Director-General....., to be appropriate for those purposes". The study area is situated within the New South Wales North Coast biogeographic region, which extends from the QLD/NSW Border south to about Port Stephens, and west to the Great Dividing Range (Thackway & Cresswell, 1995).

4.3 Subject Species

A total of 10 Threatened flora species, 35 Threatened fauna species and two (2) Endangered Populations have been previously recorded within the locality. A number of these species, however, are not considered likely to occur based on the habitat requirements of the species and the lack of these features within the site. These species are not considered as Subject Species for the Section 5A Assessment.

All the Threatened species recorded within the locality are listed in **Tables B.1 – B.2** in **Appendix B**, which also provides an assessment of likely occurrence and based on this, the determination of Subject Species. In addition, although not recorded in the locality, a number of other Threatened species were considered as Subject Species given the habitats available within the site, and the known distribution and the habitat requirements of these species (refer **Tables B.1 – B.2** in **Appendix B**).

In total, 21 Threatened species, comprising one (1) flora species and 20 fauna species were considered as Subject Species for the proposed clearing and the assessment of significant impact (Section 5A). In addition one (1) Endangered Population was considered for the Section 5A Assessment

Endangered Ecological Community

As discussed in a previous section of this report, a small patch of Dry Rainforest adjoins the site. This community is considered to be analogous to the *Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions.*

Being located outside of the site, no clearing will be required within this community. Given the proximity to the site, however, a Section 5A assessment has been undertaken to assess the potential impact of the proposal upon this community under the precautionary principle.

4.4 Section 5A Conclusion

The Section 5A assessment (**Appendix C**) determined that the proposed clearing is unlikely to cause a significant effect on any *'Threatened species, populations or ecological communities or their habitats within the locality'.*

Commonwealth Environmental Protection and Biodiversity Conservation Act 1999

5.1 Commonwealth EPBC Act Assessment Process

The *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) requires that assessment must be made to determine if an action is likely to impact upon seven identified matters of National Environmental Significance (NES). Activities considered likely to cause a significant impact to matters of NES require Commonwealth approval under the provisions of the *EPBC Act.*

There seven matters of NES listed under the *EPBC Act* are:

- World Heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

5.1.1 Assessment

The relevance of each matter of NES when considering the proposed clearing is discussed in **Table 5.1.** This assessment was undertaken with reference to an Environment Protection and Biodiversity Conservation Act Online Database search (23 November, 2007), with a buffer area of 10 km.

Table 5.1 - Consideration of EPBC Act Matters of NES

Consideration	Assessment
World Heritage Areas	The proposed clearing will not impact upon any World Heritage Area.
National Heritage Places	There are no National Heritage places that will be affected by the proposed clearing.

Table 5.1 - Consideration of EPBC Act Matters of NES

Consideration	Assessment
Ramsar Wetlands of International Significance	The proposed clearing will not impact upon any listed Ramsar sites.
Listed Threatened Species	The habitat resources proposed to be removed from the site are unlikely to represent a significant area of habitat for Threatened fauna or flora species in a local or regional context. The proposed clearing will not cause isolation of habitats in the locality. The proposed clearing is therefore considered unlikely to cause a significant impact to any Threatened species listed under the *EPBC Act*.
Listed Ecological Communities	No *EPBC Act* listed ecological communities occur within or adjoin the site The proposed clearing will therefore not cause a significant impact to any *EPBC Act* listed Ecological Communities.
Listed Migratory Species	The site does not contain *an important area of habitat* for migratory species. The proposed clearing is therefore unlikely to cause a significant impact any the listed migratory species, including those on JAMBA/CAMBA.
Commonwealth Marine areas	The proposed clearing will not impact upon any Commonwealth marine areas.
Nuclear actions	The proposed clearing does not constitute a nuclear action

5.1.2 Other Matters Protected by the *EPBC Act*

In addition to the Matters of NES listed in **Section 5.1.1**, other matters protected by the *EPBC Act* include the following:

- Commonwealth Lands;
- Commonwealth Heritage Places;
- Places on the Register of the National Estate (RNE);
- Listed Marine Species;

- Whales and Other Cetaceans;
- Critical Habitats; and
- Commonwealth Reserves.

The relevance of each matter protected by the *EPBC Act* when considering the site and environs is discussed below and summarised in **Table 5.2**. This assessment was undertaken with reference to an *EPBC Act* online database search, with a buffer area of 10 km.

Table 5.2 - Consideration of Other Matters under EPBC Act

Consideration	Assessment
Commonwealth Lands	The proposed clearing will not impact upon any Commonwealth Lands.
Commonwealth Heritage Places	The proposed clearing will not impact upon any listed Commonwealth Heritage Place.
Places listed on the Register of the National Estate (RNE)	The closest place listed on the RNE is Port Stephens Estuary which adjoins the subject land. Given the location of the proposed site, the proposed clearing will not impact upon this or any other place listed on the RNE.
Listed Marine Species	No marine habitats occur within the site and the habitat proposed to be removed is unlikely to represent an area of important habitat for listed terrestrial marine species such as the White-throated Needletail (*Hirunapus caudactus*), and Rainbow Bee-eater (*Merops ornatus*) etc. The proposed clearing is therefore unlikely to cause a significant impact on listed marine species.
Whales and Other Cetaceans	The site does not contain any habitat for whales and cetaceans. The proposed clearing will therefore not cause a significant impact to whales and other cetaceans listed under the EPBC Act.
Critical Habitats	No critical habitats listed under the *EPBC Act* have been identified within the locality.

Table 5.2 - Consideration of Other Matters under EPBC Act

Consideration	Assessment
Commonwealth Reserves.	No Commonwealth Reserves occur have been identified within the locality by the online search.

5.1.3 Key Threatening Processes

There are currently 17 Key Threatening Processes (KTP) listed under the *EPBC Act*. Of these, two (2) of these are considered relevant to the proposal, namely, *loss of climatic habitat caused by anthropogenic emissions of greenhouse gases'* and *'Land Clearance'*.

- Land Clearance; and
- Loss of climatic habitat caused by emissions of greenhouse gases.

The contribution of greenhouse gases as a result of the construction activity is, however, negligible in the context of other greenhouse emitting activities occurring in the region. In addition, the small amount of native vegetation proposed to be removed for the proposal is considered negligible compared to the area of native vegetation occurring within the subject land and wider locality.

5.1.4 Potential for Significant Effect on Matters of NES

It is submitted that the proposed clearing will not result in the potential for a significant effect on Threatened Species and Threatened Ecological Communities listed under the *EPBC Act*.

There are no Wetlands of International Significance, Migratory Species, EPBC listed Threatened species or any other matters protected by the *EPBC Act* that will be significantly affected by the proposed clearing. It is therefore considered that the proposed clearing would not require Commonwealth approval under the provisions of the *EPBC Act*.

Discussion of Potential Impacts

6.1 Vegetation Removal

The removal of vegetation for the proposal will reduce the area of potential habitat available for both protected species and Threatened species known or potentially occurring in the locality.

Being primarily comprised of cleared land with scattered trees, the site represents relatively low quality habitat for fauna species. The site does not contain any caves and therefore lacks roosting habitat for cave-obligate microchiropteran bats. The one (1) hollow bearing tree requiring removal for the building footprint provides potential roosting habitat for species of microchiropteran bats that are known to utilise hollows, however, the small branch hollow provided by this tree is unlikely to support a maternal roosting colony of microchiropteran bats.

The proposal will result with the removal of suitable Koala feed trees, including tree species listed under Schedule 2 of SEPP 44. Notwithstanding, only two (2) trees requiring removal for the building footprint are listed under SEPP 44 and the majority of the SEPP 44 feed trees occurring within the APZ can be retained through selective vegetation removal during the establishment of the APZ. The feed trees required to be removed will therefore primarily comprise potential browse species such as Iron Bark and Spotted Gum. The number of potential feed trees proposed to be removed for the proposal is therefore considered negligible to the amount of feed trees (including preferred feed trees) that can be retained within the APZ, and also to those occurring within the adjoining Forest community.

Although feeding activity by the Glossy Black-Cockatoo was identified during the surveys, the number of feed trees occurring within the site represents a very small amount of foraging resources in the context of both known and potential feed trees adjoining the site and larger locality. There were no potential feed trees identified within the proposed building envelope, and both potential and/or known feed trees occurring within the APZ can be retained. In addition, the site does not contain potential nest trees for this species and therefore the proposal will not result with the removal of known and/or potential habitat for the Glossy Black-Cockatoo.

Although not detected, some areas within the site are considered to contain potential habitat for the Threatened flora species, *Tetratheca juncea*. Given the extent of the existing cleared area, this habitat is generally associated with the relatively intact areas of Forest occurring within outer edges of the APZ and this area of habitat represents a small area of potential habitat for the species in the context of suitable habitat adjoining the site. In addition, *Tetratheca juncea* represents a low potential bushfire hazard and therefore any plants, should they be found during pre-clearing surveys (**Section 6.2**), can be retained within the APZ.

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area and the proposed clearing will therefore not cause isolation or fragmentation of habitat within the locality.

Based on the above discussion, it is therefore unlikely that a breeding population of any Threatened species is dependant upon the vegetation/habitat resources occurring within the site alone and the proposed clearing of this habitat is considered negligible to the context of the relatively unmodified Forest adjoining the site. The habitat resources proposed to be removed are also considered negligible in the context of the large areas of appropriate habitat occurring in the locality, including habitats conserved Tomaree NP and Myall Lakes NP.

The small patch of Lowland Rainforest EEC adjoining site is located outside of the APZ area and will therefore not be impacted directly through clearing. Given the current level of edge effects associated with the existing cleared area and current land use, the potential for indirect impact upon this community as result of the proposal is considered to be low.

6.1.1 Weed Invasion

Although a number of weeds occur within the proposed clearing area, the clearing operations will provide an opportunity for weed species to re-colonise the areas of disturbance prior to commencement of construction. Given the current edge effects, however, the proposed clearing will not increase the opportunity for weeds species to infiltrate the adjoining areas.

6.1.2 Clearing Activity

There is the potential for injury to fauna as a result of the clearing operations. Of particular concern would be Koalas that may be utilising trees within and adjoining the proposed clearing areas during the clearing activity. In addition, there is potential for injury to a small number of microchiropteran bats that be utilising the one (1) hollow bearing tree requiring removal for the building footprint. A number of mitigation measures are therefore recommended to reduce the potential impact upon fauna during the clearing activity (**Section 6.2**). In addition, a number of mitigation measures are recommend to minimise the amount of habitat resources proposed to be removed (*eg.* selective tree species removal in the APZ).

6.1.3 Cumulative Effect

The proposed clearing will contribute towards the cumulative effect of vegetation removal/habitat loss occurring in the locality. In the context of development occurring throughout the locality, and due to the relatively small area of potential habitat for Threatened species and protected species that will be removed as a result of the proposed clearing, the cumulative impact could not be regarded as considerable or significant.

6.1.4 Removal of Hollow Bearing Trees

The proposed removal of one (1) hollow bearing tree with a small branch hollow will not significantly reduce the availability of hollow resources within the locality. In addition, the branch hollow can be harvested and relocated into adjoining habitats.

6.2 Mitigation Measures

While the proposed clearing is not likely to cause a significant impact upon any Threatened species, population or endangered ecological community, a number of mitigation measures are recommended in order to further reduce the potential for impacts associated with the proposed clearing. These are discussed in the following sections of the report.

6.2.1 Pre-Clearing Preparations

Pre-Clearing Preparations

Prior to the commencement of any pre-clearing surveys, the exact location of the building footprint and extent of the APZ boundary should be accurately surveyed and marked on site by a registered surveyor.

The APZ boundary should be marked with pegs set at regularly intervals. The boundary between the Inner Protect Area, and Outer Protection Area should also be distinguished.

With the assistance of a qualified ecologist, the boundary of the adjoining patch of rainforest should also be surveyed and marked onsite to ensure this community is located outside of the APZ. If any part of this Rainforest is found to occur within the APZ, additional investigation will be required to determine the impact of the proposed clearing upon this community. Preferably, alternatives for relocating the building envelope so that the APZ falls outside of this community should be considered.

Targeted Surveys for *Tetratheca juncea*

Prior to the commencement of any clearing, targeted surveys for *Tetratheca juncea* should be undertaken throughout the site during the flowering period for this species. While this species generally flowers between July - December, it is recommended to undertake the targeted surveys between August – October.

Any plants identified within the APZ should be marked for retention. In addition, small patches of ground cover vegetation around each plant should also be retained to provide some cover/habitat for the retained plants. Each of these patches should be clearly marked with pegs on site.

Although considered unlikely, any plants identified within the building footprint should be clearly marked and translocated by personnel experienced with such a procedure. Appropriate licenses or permits (eg. from NPWS) for the translocation of Threatened flora species would be sought at the time.

Selective Tree Removal Process

Following the marking of the building footprint and APZ boundaries, a tree marking exercise will need to be undertaken within the APZ by a qualified ecologist so that the retention of particular habitat resources/tree species can be prioritised. In particularly, the retention of the items listed below will need to be prioritised in the following order:

1. *Tetratheca juncea* (if identified by the pre-clearing surveys);
2. Hollow bearing trees;
3. Koala feed trees identified with Koala scats at the base during the surveys for this assessment;
4. Koala Feed Trees listed under Schedule 2 of SEPP 44 (*E. punctata* and *E. microcorys*) identified within the site);
5. Female Allocasuarina species known to be utilised by the Glossy Black Cockatoo;
6. Any other Female Allocasuarinas;
7. Any potential browse tree species of the Koala;
8. Mature trees;
9. Young trees; and
10. Short lived trees and shrubs (eg. *Acacia* spp.).

The ecologist should clearly mark on site with white paint those items for retention with an 'H' and those for removal with an 'X'. The vegetation occurring within the APZ can therefore be selectively thinned to permissible densities following this procedure, while ensuring vegetation removal is to the minimum extent required. The persons undertaking the tree marking will need to be familiar with the requirements of APZ's.

Pre-clearing surveys for hollow bearing trees

If the removal of hollow bearing trees within the APZ is found to be unavoidable during the tree marking process, any such trees will need to be subject to pre-clearing survey including stag watching at dusk to help determine the presence of inhabiting fauna.

The pre-clearing surveys should include the use of an Anabat system on at least two (2) nights to detect microchiropteran bats that may occur within any hollow-bearing trees at the time of clearing. If a maternal colony of microchiropteran bats is detected, then it is recommended that the felling of the hollow bearing tree be postponed until the colony has vacated the hollow.

Ecological Clearing Supervision

The one (1) hollow bearing tree requiring removal for the building footprint will need to be felled in the presence of a qualified ecologist to minimise the potential impact on fauna. Any injured fauna should be captured where possible and taken to the local wildlife carer.

Any additional hollows required to be removed will also need to be subject to ecological clearing supervision.

Checking trees for Koalas

Machine operators will be required to check the canopy of each tree for Koalas immediately prior to felling. In addition, any trees within proximity to the trees being felled should also be checked for residing Koalas. All clearing activity with 50 m of a tree found to contain a Koala is to cease and can only re-commence once the Koala has moved by its own free will.

Clearing Contractor Induction

Prior to the commencement of any clearing activity, by means of a site induction, personnel undertaking the clearing will need to be made fully aware of their obligations including:

- restricting clearing the marked boundaries;
- retaining marked;
- checking trees for inhabiting Koalas; and
- utilising felling methods that avoids causing damage to retained items or adjoining vegetation.

The initial induction should be undertaken on site between the clearing personnel or supervisor and the person/s that were involved with the tree marking.

Harvesting Hollow Resources

Any hollow resources remove from the site should be harvested and relocated into the adjoining habitats.

6.2.2 Erosion and Sedimentation

Sedimentation and erosion controls should be implemented during the clearing activity to mitigate impacts on the adjoining vegetation. These should include controls such as silt fences and hay bales along contours and would aim to reduce the potential for sediment transport during the clearing.

6.2.3 Weed management

Weed management should be undertaken following the initial clearing activity to reduce the likelihood of weed species re-colonising these areas. All weed material removed from the proposed clearing area should be taken to an appropriate local waste management depot.

Conclusion

7.1 Conclusion

This ecological assessment has been prepared as an addendum to the documentation submitted with the original DA for the proposed dwelling. This report has been prepared to assess to the potential impacts associated with a proposed dwelling upon the Threatened species known to or considered likely to occur in the locality, and those considered likely to utilise the habitats within and adjoining the site.

The site was found to contain habitat resources for a number of Threatened species, however, being primarily comprised of cleared land with scattered trees, the site represents relatively low quality habitat for most fauna species.

From the desktop review and habitat assessment a total of 3 Threatened flora species and 20 Threatened fauna species listed under the *TSC Act 1995* could potentially utilise the habitats within the site. In addition, evidence of habitat utilisation by the Koala and Glossy Black-Cockatoo was identified during field surveys for this assessment.

It is unlikely, however, that a breeding population of any species would be dependant upon the habitats at the site and the proposed clearing will not cause isolation of habitats in the locality. The habitat resources proposed to be removed are considered negligible to the area of habitat adjoining the site.

The Section 5A Assessment (**Appendix C**) concluded that the proposal is unlikely to have a significant effect on *'Threatened species, populations or ecological communities or their habitats within the locality'*.

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Appendix A

PROPOSED BUILDING FOOTPRINT AND APZ LAYOUT

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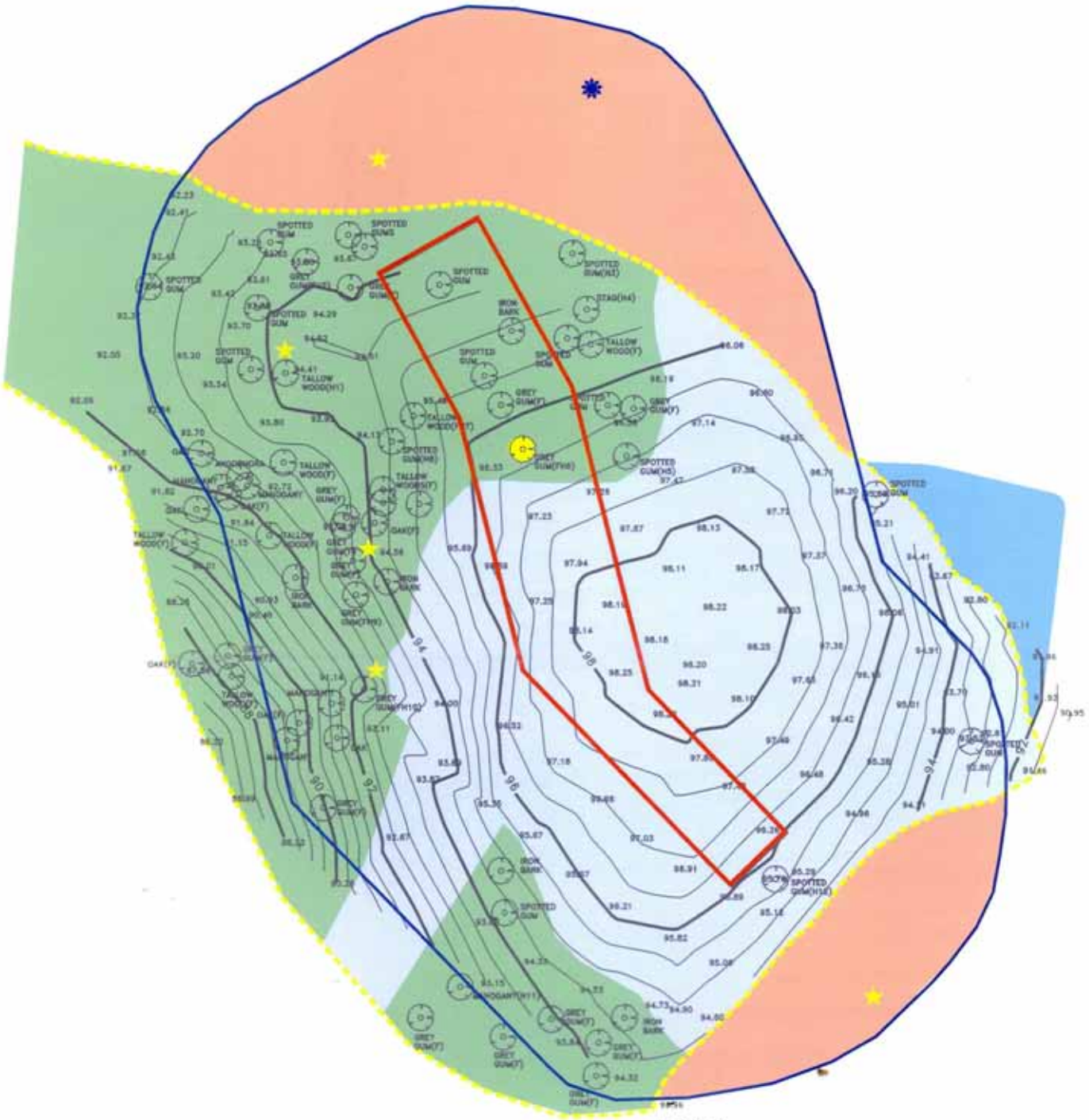

Appendix A - Proposed Building Footprint & APZ

Appendix B

THREATENED SPECIES TABLES

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Table B.1 - Threatened Flora Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Tetratheca juncea Black-eyed Susan	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 3VCa	Grows in sandy, occasionally swampy heath and dry eucalypt forest and woodland.	Recorded within 250 m to the north east of the site (Wildthing, 2004*) Not detected during the surveys. The site and adjoining vegetation communities are, however, considered to contain potential habitat for this cryptic species. Potentially occurring.	*Tetratheca juncea* is considered a **Subject Species for the proposal** given the nearest records and the cryptic nature of the species.
Chamaesyce psammogeton Sand Spurge	TSC Act: Endangered EPBC Act: Not listed ROTAP: Not listed	A mat-forming herb that flowers in summer, with plant growth mainly occurring in spring and summer. It grows on exposed headlands and foredunes in Spinifex sericeus tussock grassland. Recorded north From Jervis Bay area (Currarong, Culburra and Seven Mile Beach National Park) to Queensland. Also on Lord Howe Island. Populations within Wamberal Lagoon NR, Myall Lakes NP, Bundjalung NP. Recorded in locality near Tiona, at Seven Mile Beach and near Submarine beach in Myall Lakes NP.	Recorded within 10 km of the site. Not detected within the site during the surveys. The site does not contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.
Prostanthera densa Villous Mint-bush	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 3VC-	Recorded from the Currarong area in Jervis Bay, Royal National Park, Cronulla and Port Stephens where it is generally found on sandstone in sclerophyll forest and shrubland on coastal headlands (DEC, 2007).	Recorded within 8 km to the south east of the site. Not detected within the site during the surveys. The site does not contain	Not considered a Subject Species for the proposal.

Table B.1 - Threatened Flora Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
			potential habitat for this species. Unlikely to occur.	
Callistemon linearifolius Nettled Bottle Brush	TSC Act: Vulnerable EPBC Act: Not Listed ROTAP: 2RCi-	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Grows in dry sclerophyll forest on the coast and adjacent ranges (DEC, 2007).	Recorded within 4 km to the south east of the site in Salamander Bay. Not detected within the site during the surveys. The site and adjoining vegetation communities are, however, considered to contain potential habitat for this species. Potentially occurring.	Not considered a Subject Species for the proposal.
Eucalyptus parramattensis subsp. *decadens*	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 2VCi	Generally occurs on deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. Tends to occur in dry sclerophyll woodland with dry heath understorey. Also occurs as an emergent in dry or wet heathland. Often a community dominant where this species occurs (DEC, 2007).	Recorded within 5 km to the south of the site in Salamander Bay. Not detected within the site during the surveys. The site does not contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.
Melaleuca groveana Grove's Paperbark	TSC Act: Vulnerable EPBC Act: Not Listed ROTAP: 3RC-	Heath and shrubland, often in exposed sites, at high elevations, on rocky outcrops and cliffs. Also occurs in dry woodlands.	Recorded within 250 m to the north east of the site (Wildthing, 2004*) Not detected within the site during the surveys. The site and adjoining	Not considered a Subject Species for the proposal.

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Table B.1 - Threatened Flora Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
			vegetation communities are, however, considered to contain potential habitat for this species. Potentially occurring.	
Cryptostylis hunteriana Leafless Tongue Orchid	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 3VC-	Swamp-heath and woodland. Larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); where it appears to prefer open areas in the understorey.	Recorded within 10 km to the south east of the site. Not detected within the site during the surveys. The site and adjoining vegetation communities are not contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.
Diuris arenaria Sand Doubletail	TSC Act: Endangered EPBC Act: Not Listed ROTAP: Recommended 2VC	Coastal heath and dry grassy eucalypt forest on sandy flats.	Recorded within 5 km to the south east of the site. Not detected within the site during the surveys. The site does not contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.

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Table B.1 - Threatened Flora Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Diuris praecox Rough Double Tail	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 2VC-	Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey.	Recorded within 10 km to the south east of the site. Not detected within the site during the surveys. The site does not contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.
Asperula asthenes Trailing Woodruff	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 3VC-	A low, trailing, perennial herb. Found in damp sites, often along riverbanks. Species has been recorded from Bulahdelah to near Kempsey. A number of scattered records are located within the Forster -Tuncurry area in swamp forest habitats in riparian zones generally situated over the western side of Wallis Lake (I. Mamott pers. obs.).	Recorded within 10 km to the west of the site. Not detected within the site during the surveys. The site does not contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.

* - Eight Part Test for the Proposed Development of Lots 101-104 DP 1048945 Bundabah, NSW (Wildthing Environmental Consultants, 2004).

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
AMPHIBIANS				
Crinia tinnula Wallum Froglet	TSC Act: Vulnerable EPBC Act: Not Listed	The Wallum Froglet is restricted to coastal areas of south eastern Queensland and northern NSW where it occurs in fringing vegetation associated with wetlands with highly acidic, tannin stained waters that are usually dominated by paperbarks and tea trees (NPWS, 2005; Cogger, 2000).	Recorded within 5 km of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
BIRDS				
Pandion haliaetus *Osprey*	TSC Act: Vulnerable EPBC Act: Not Listed	The Osprey is thinly distributed around to coast of Australia where they forage for fish in fresh, brackish, or saline waters of rivers, lakes, estuaries and inshore coastal waters (Schodde and Tidemann, 1993; NPWS, 2000). Nests are usually located near a suitable area of foraging habitat and are a bulky structure made from piled sticks, often positioned in a tall dead tree or artificial structures such as telecommunication towers or poles (Schodde and Tidemann, 1993; NPWS, 2000). Breeding pairs defend breeding territory against other Ospreys, and active nests are usually more than 1 km apart (NPWS, 2005).	This species has been recorded within approximately 350 m of the site (Wildthing, 2004*). This species may traverse the site on occasion, however, the site does not contain potential foraging habitat for this species and no nests were observed during the survey. Potentially occurring.	As no areas of foraging habitat or known nest sites will be affected, the Osprey is not considered as a Subject Species.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Burhinus grallarius Bush Stone-curlew	TSC Act: Endangered EPBC Act: Not Listed	The Bush Stone-curlew is widespread in northern and north eastern Australia (NPWS, 2000). In NSW, this species is rare east of the Great Dividing Range, with the exception of isolated populations along the north coast (NPWS, 2000). Bush Stone-curlews occur in sparsely grassed, lightly timbered open forest or woodland. Preferred habitat is often associated with water courses and woodlands of casuarinas, eucalyptus, and acacia, however dry open grassland and cropland adjacent to woodland is also known to be utilised (NPWS, 2000; NPWS, 1999; Schodde & Tidemann, 1993; Garnett and Crowley, 2000). The Bush Stone-curlew nests on the ground and feed on a range of invertebrates and small vertebrates, and also seeds and shoots (NPWS, 1999; Garnett and Crowley, 2000).	Recorded within 10 km to the west of the site. The site does contain potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.
Calyptorhynchus lathami Glossy Black-Cockatoo	TSC Act: Vulnerable EPBC Act: Not Listed	Occurs in a variety of Sclerophyll forest types where suitable feed trees (*Allocasuarina* spp) occur (NPWS, 1999).	Numerous records within the locality. Evidence of feeding activity by this species was identified within the site during the surveys. Known to occur.	**Considered a Subject Species for the proposal.**

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Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Charadrius mongolus Lesser Sand-plover	TSC Act: Vulnerable EPBC Act: Migratory	The Lesser Sand Plover is a migratory species. Whilst in Australia the species is found on mudflats, white sandy beaches, estuaries and tidal areas in mangroves (NPWS, 2000). The Lesser Sand Plover primarily feeds upon crustaceans, molluscs, insects, and marine worms (NPWS, 1999xx). It roosts during high tide on sandy beaches, spits and rocky shores (DEC, 2006). The species breeds in eastern Siberia, southern Mongolia, western China and the Himalayas, migrating to the coasts of eastern and southern Africa, the Middle East, India, South-east Asia and Australia. The species migrates to the Australian coast between September and March where it occurs around the Australian coastline but is most abundant in the Gulf of Carpentaria and along the east coast of Queensland and northern NSW (Species Profile, DEC, 1999)	Recorded within 10 km of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Ephippiorhynchus asiaticus Black-necked Stork	TSC Act: Endangered EPBC Act: Not listed	This species forages in wetlands, mangroves, swamps, mudflats, dry floodplains, irrigated land and occasionally open grassy woodland (NPWS, 2000; NPWS, 2005). The nest is a large flat pile of sticks, grass, and rushes place in a tree, usually near water (NPWS, 2000).	Recorded within 10 km of the site. The site does not contain potential foraging habitat for this species and no nest sites were observed during the surveys. Unlikely to occur.	Not considered a Subject Species for the proposal.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Ptilinopus magnificus Wompoo Fruit-Dove	TSC Act: Vulnerable EPBC Act: Not listed	Distributed along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula however are considered rare south of Coffs Harbour. Occurs in or near rainforest, low elevation moist eucalypt forest and brush box forests. More often found in mature forests, however also found in remnant and regenerating rainforest (DEC, 2007, Schodde and Tidemann, 1993). They feed upon a range of tree and vine fruits and are locally nomadic, following food availability. Nests are located between three to ten metres above the ground in the understorey trees and palms (NPWS, 2000).	Recorded within 5 km of the site. A small number of Tuckeroo and *Ficus* spp were observed within and adjoining the site. The fruits produced by these tree species would provide foraging resources for the Woompoo Fruit Dove. Potentially occurring.	**Considered a Subject Species for the proposal.**
Ptilinopus supurbus Superb Fruit-Dove	TSC Act: Vulnerable EPBC Act: Not Listed	Occurs mainly in rainforest and closed forest. The species forages high in the canopy on fruits such as figs and palms. It may forage in Eucalypt or acacia woodland providing that fruit bearing trees occur (DEC, 2007).	Recorded within 5 km of the site. A small number of Tuckeroo and *Ficus* spp were observed within and adjoining the site. The fruits produced by these tree species would provide foraging resources for the Superb Fruit Dove. Potentially occurring.	**Considered a Subject Species for the proposal.**
Ptilinopus regina Rose-crowned Fruit-Dove	TSC Act: Vulnerable EPBC Act: Not listed	Found on the coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Primarily occur in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful (DEC, 2007).	Not recorded within the locality, however, site contains Tuckeroo and *Ficus* spp which would provide foraging resources for this species.	**Considered a Subject Species for the proposal.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
			Potentially occurring.	
Haematopus fuliginosus Sooty Oystercatcher	TSC Act: Vulnerable EPBC Act: Not listed	The Sooty Oystercatcher is distributed around the entire coastline and islands around Australia. Throughout its range, the Sooty Oystercatcher primarily occurs on rocky beaches, rocky shores, rocky headlands, rocky shelves and beaches, and offshore islands, and very rarely on sandy beaches and estuarine tidal flats (NPWS, 2000; Scodde & Tidemann, 1993). This species forages on exposed rock and coral at low tide for limpets, mussels, and crustaceans (NPWS, 2000). Nests are a shallow depression in sand above the high tide mark, or a cleft in rocks that may be built up with pebbles (NPWS, 2000; Scodde & Tidemann, 1993).	Recorded within 10 km to the east of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Haematopus longirostris Pied Oystercatcher	TSC Act: Vulnerable EPBC Act: Not listed	The Pied Oystercatcher occurs around the entire coastline of Australia. Throughout its range, the Pied Oystercatcher favours beaches, intertidal flats and sand banks and occasionally rocky headlands (NPWS, 2000). Molluscs have been noted to be a staple food source, however, worms, crabs and small fish may be taken (NPWS, 2000; Scodde & Tidemann, 1993). Pied Oystercatchers primarily nests on coastal or estuarine beaches and may occasionally use salt marsh or grassy areas (NPWS, 2000).	Recorded within 5 km to the south of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.

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Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Sterna albifrons Little tern	TSC Act: Endangered EPBC Act: Migratory	The Little Tern occurs around the coast to Australia from mid WA, around northern and eastern Australia to the east coast of Tasmania (NPWS, 1999). Throughout its range, Little Terns prefer sheltered environments and are predominantly found in coastal waters, bays, shallow inlets, and salt or brackish lakes (NPWS, 1999, NPWS; 2000).	Recorded within 10 km to the east of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Pomatostomus temporalis temporalis Grey-crowned Babbler	TSC Act: Vulnerable EPBC Act: Not Listed	Grey-crowned Babblers generally occur in a variety of open Eucalypt forests and woodlands (DEC, 2001). Territories range from one to fifty hectares and are defended all year. Nests are usually located in shrubs or sapling eucalypts (DEC, 2001). Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses.	Recorded within 10 to the north west of the site. The site is does not contain appropriate habitat for this species. Not detected during the surveys. Unlikely to occur.	Not considered a Subject Species for the proposal.
Macronectes giganteus Southern Giant Petrel	TSC Act: Endangered EPBC Act: Endangered and Migratory (Bonn).	Oceanic species occurring from Antarctica to approximately 20° S and is often recorded off the coast of NSW. This species nests in small colonies during summer amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory (DEC, 2007).	Recorded within 10 km to the east of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Pterodroma leucoptera leucoptera Gould's Petrel	TSC Act: Endangered EPBC Act: Endangered Listed migratory (JAMBA).	The Gould's Petrel is pelagic, and while their non-breeding range is unknown, this species has been recorded to predominantly forage within the Tasman Sea, feeding upon surface fish, squid and krill. This species has been observed to primarily breed on Cabbage tree Island which is located offshore from the entrance to Port Stephens (NPWS, 2000).	Recorded within 10 km to the east of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Lathamus discolour Swift Parrot	TSC Act: Endangered EPBC Act: Endangered	The Swift Parrot breeds in Tasmania between spring and summer and migrate to the mainland during winter where they disperse widely across south eastern Australia (NPWS, 2000; Scodde & Tidemann, 1993). Swift Parrots nest in tree hollows from a variety of Eucalypt species, and usually in old growth trees with a DBH of over 0.8 m. Swift Parrots forage in woodlands, riparian vegetation, and also remnant patches of mature eucalypts in agricultural areas where they feed on nectar, lerps and other insects from eucalypt foliage (NPWS, 2000; Swift Parrot Recovery Team, 2001,Schodde and Tidemann, 1993).	Recorded within 2 km of the site. The site does not contain winter flowering eucalypts and therefore contains limited foraging resources for this species. The hollow bearing trees within the site would not be utilised by this species as breeding occurs in Tasmania. Unlikely to occur.	Not considered a Subject Species for the proposal.
Ninox connivens Barking Owl	TSC Act: Vulnerable EPBC Act: Not listed	The Barking Owl occurs in a variety of habitats including eucalypt woodland, open forest, swamp woodlands and timber along water courses, however; the ideal habitat for the Barking Owl is open country with a good choice of large hollow	Recorded within 5 km to the south of the site. The site and adjoining vegetation communities are not considered to represent typical habitat for this species. Notwithstanding, the	**Considered a Subject Species for the proposal.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
		trees for nesting. This species also has a distinct preference to be close water (Hollands, 1991; NPWS, 2000). Home ranges for this species may be between 30 and 200 hectares (NPWS, 2000; Schodde & Tidemann, 1993).	site is considered to contain potential foraging habitat for owls. Potentially occurring.	
Ninox strenua Powerful Owl	TSC Act: Vulnerable EPBC Act: Not listed	This species occurs in a range of habitats including open woodland, open forest, tall moist forest and rainforest (NPWS, 2000). The Powerful owl has a very large home range of 800 to 1000 ha per breeding pair (NPWS, 2005). The Powerful Owl requires trees with large hollows that are at least 50 cm deep and 12 - 40 m above the ground (NPWS, 2000; Scodde & Tidemann, 1993).	Recorded within 500 m of the site. The site contains potential foraging habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**
Tyto novaehollandiae Masked Owl	TSC Act: Vulnerable EPBC Act: Not listed	Masked Owls utilise a broad range of habitats, including open forest and woodland with a sparse understorey and adjacent open areas (Hollands, 1991; Debus & Rose, 1994). Essential habitat features include the presence of suitable roosting and nesting hollows and an abundant supply of ground-dwelling mammals (Higgins 1999; Kavanagh, 1996).	Recorded within 2 km of the site. The site and contains potential foraging habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**

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Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
MAMMALS				
Eubalaena australis Southern Right Whale	TSC Act: Vulnerable EPBC Act: Endangered & Migratory (Bonn)	Oceanic, occurring in temperate and subpolar waters of the southern hemisphere. Migrate between summer feeding grounds in Antarctica and winter breeding grounds around the coasts of southern Australia, New Zealand, South Africa and South America (DEC, 2006).	Recorded within 5 km to the south east of the site. The site does not contain appropriate habitat for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Dasyurus maculatus maculatus Spotted-tailed Quoll	TSC Act: Vulnerable EPBC Act: Endangered (SE mainland population)	The Spotted-tailed Quoll occurs along the east coast of Australia from south east Queensland to South Australia and Tasmania. The Spotted-tailed Quoll has been recorded in a wide range of habitat types including dry and moist sclerophyll forests and woodlands, rainforest, coastal heathland, and riparian forest. This species been occasionally sighted in treeless areas, rocky outcrops and grazing lands (NPWS, 1999; NPWS, 2000; Strahan, 1998). The Spotted-tailed Quoll shelters and dens in small caves, fallen logs with large hollows and tree hollows and may utilise numerous dens within its home range which has been estimated to be between 800 ha to 20 km^2 (NPWS, 2000; NPWS in prep in NPWS, 1999).	Recorded within 2 km of the site. The site and adjoining habitats contain potential foraging and denning habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Phascogale tapoatafa Brush-tailed Phascogale	TSC Act: Vulnerable EPBC Act: Not listed	The Brush-tailed Phascogale has a patchy distribution around the coast of mainland Australia (NPWS, 1999). The Brush-tailed Phascogale is a largely arboreal species that primarily occurs in dry forests and woodlands with an open or sparse ground cover of herbs, grasses shrubs and leaf litter and a moderate density of trees and shrubs in the midstratum (NPWS, 2000; NPWS, 1999; Soderquist 1995). Males have a home range of up to 100 ha, while females occupy a home range of 20 to 60 ha (NPWS, 1999).	Recorded within 500 m of the site. The site contains potential foraging and denning habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**
Petaurus australis Yellow-bellied Glider	TSC Act: Vulnerable EPBC Act: Not listed	The Yellow-bellied Glider is found in tall mature Eucalypt Forest and they feed on a range of sources including winter-flowering Eucalypts which provide nectar and pollen (NPWS, 2000; Readers Digest 1997). They also feed upon the sap of Eucalypts in which they chew V-shaped incisions to collect the sap. Yellow-bellied Gliders den in large tree hollows (NPWS, 2000).	Recorded within 10 km to the northwest of the site. The vegetation communities within and adjoining the site do not represent typical habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.
Petaurus norfolcensis Squirrel Glider	TSC Act: Vulnerable EPBC Act: Not listed	The Squirrel Glider is distributed in eastern Australia from northern Queensland, through eastern NSW to Victoria (NPWS, 2000). The Squirrel Glider occurs in dry sclerophyll forest and woodland (Strahan, 1998). This species feeds upon nectar, pollen, flowers, insects, and sap of particular eucalypts (Strahan, 1998; NPWS,	Recorded within 500 m of the site. The site contains potential foraging and denning habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
		1999). The Squirrel Glider dens in hollow bearing trees, and often dens in family groups (Strahan, 1998; NPWS, 2000). Home ranges have been estimated as between 0.65 to 8.55 ha, with movements tending to be greater for males (NPWS, 1999).		
Dugong dugon Dugong	TSC Act: Endangered EPBC Act: Migratory	Distribution south from warmer coastal and island waters of the Indo-West Pacific to northern NSW. Generally occurs in wide shallow protected bays, wide shallow mangrove channels and in the lee of large inshore islands. Requires extensive seagrass beds on which they feed (DEC, 2007).	Recorded within 5 km to the south east of the site. The site does not contain estuarine habitats for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Phascolarctos cinereus Koala	TSC Act: Vulnerable EPBC Act: Not listed	The Koala occurs in eucalypt woodlands and forests throughout eastern Australia (NPWS, 2000). The Koala feeds almost exclusively on the foliage of particular eucalypts, and may prefer certain species within any local or regional area (Strahan, 1998; Callaghan et al, 2002).	Numerous records within the locality. Evidence of habitat utilisation by this species was identified within the site during the surveys. Known to occur.	**Considered a Subject Species for the proposal.**
Potorous tridactylus tridactylus Long-nosed Potoroo	TSC Act: Vulnerable EPBC Act: Vulnerable	The Long-nosed Potoroo is known to occur in a wide variety of habitats including moist and dry forests, wet heathland and cool temperate rainforests with dense layers of grasses, ferns, vines or shrubs (NPWS, 2000).	Few records within the LGA, and only two records within the locality. The site is considered to contain limited potential habitat for this species. Unlikely to occur.	Not considered a Subject Species for the proposal.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
Pteropus poliocephalus Grey-Headed Flying-Fox	TSC Act: Vulnerable EPBC Act: Vulnerable	The Grey-headed Flying-fox occurs in a range of habitats including subtropical and temperate rainforests, dry and wet sclerophyll forests, Banksia woodland, heaths and Melaleuca swamps (Duncan et al, 1999; NPWS, 2001).	Numerous records in the locality. The site contains potential foraging habitat for this species. The habitats within and adjoining the site are unlikely to be utilised as a camp site. Likely to occur.	**Considered a Subject Species for the proposal.**
Mormopterus norfolkensis Eastern Freetail-bat	TSC Act: Vulnerable EPBC Act: Not listed	This species has been recorded from a variety of habitats including Woodland, Dry and Wet sclerophyll forests and has been recorded foraging along a river within Rainforest (Strahan, 1998; Churchill, 1998). It is believed that the Eastern Freetail-bat is primarily a tree roosting species however; it has been recorded within the roof of a hut (Strahan, 1998).	Recorded within 10 km of the site. The site contains potential foraging and roosting habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**
Falsistrellus tasmaniensis Eastern False Pipistrelle	TSC Act: Vulnerable EPBC Act: Not listed	The Eastern False Pipistrelle inhabits sclerophyll forests and woodlands. The Eastern False Pipistrelle is known to roost in tree hollows although has been recorded roosting in Jenolan caves and in old wooden houses (Churchill 1998; Strahan, 1998).	Recorded within 10 km of the site. The site contains potential foraging and roosting habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**
Miniopterus australis Little Bentwing-bat	TSC Act: Vulnerable EPBC Act: Not listed	The Little Bentwing-bat occurs along the east coast of Australia from north eastern Queensland to the central coast of NSW (NPWS, 2000; NPWS, 2005). This species has been noted to	Recorded within 250 m of the site. The site contains potential foraging habitat for this species. The site does not contain potential roosting habitat for	**Considered a Subject Species for the proposal.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
		predominantly forage between the canopy and the understorey within well timbered habitats including moist and dry sclerophyll forest, woodlands, rainforest, Melaleuca swamps, and dense coastal banksias (Strahan, 1998; NPWS, 2005; NPWS, 2000).	this species. Likely to occur.	
Miniopterus schreibersii oceanensis Eastern Bentwing-bat	TSC Act: Vulnerable EPBC Act: Not listed	The Eastern Bentwing-bat occurs in eastern Australia from north Queensland to far south east SA. In NSW they are found along the coast and western slopes, including high elevations of the Great Dividing Range (NPWS, 2000). This species predominantly forages above the tree canopy in a range of well timbered habitats including rainforest, paperbark swamps, heaths, woodlands and sclerophyll forests (Strahan, 1998; NPWS, 2000).	Recorded within 500 m of the site. The site contains potential foraging habitat for this species. The site does not contain potential roosting habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**
Myotis macropus Southern Myotis	TSC Act: Vulnerable EPBC Act: Not listed	The Southern Myotis is thought to have occurred along the east coast of Australia from south east Queensland to Victoria and South Australia, and also along inland waterways of the Murray and Darling River Systems (Duncan et al., 1999). This species are often found roosting near bodies of still or slowly moving water where they almost exclusively forage, catching aquatic insects and small fish by raking the surface with its specialised and relatively large claws (NPWS, 2000; Strahan,	Recorded within 5 km of the site. The site does not contain specific habitat for this species (water bodies). Given the distance to the nearest water bodies, the hollow resources within the site are unlikely to be utilised for roosting by this species. Unlikely to occur.	Not considered a Subject Species for the proposal.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
		1998; Duncan et al., 1999). This species roosts in colonies that may occur in tree hollows, caves, mines, tunnels, dense vegetation, and disused birds nests, or underneath bridges and buildings (NPWS, 2000; Duncan, 1999).		
Scoteanax rueppellii Greater Broad-nosed Bat	TSC Act: Vulnerable EPBC Act: Not listed	The Greater Broad-nosed Bat occurs in a variety of habitats from woodland, moist and dry eucalypts forest and rainforest (NPWS, 2000; Duncan, 1999). This species feeds upon large flying insects, and is also known to feed upon other species of bats (NPWS, 2000; Strahan, 1998). While little is known about breeding habitat for this species, the Greater Broad-nosed Bat has been found roosting in tree hollows, cracks and fissures in the trunk and boughs of stags, under exfoliating bark, and roof spaces of buildings (Duncan et al., 1999; Strahan, 1998).	Recorded within 2 km of the site. The site contains potential foraging and roosting habitat for this species. Likely to occur.	**Considered a Subject Species for the proposal.**
Mormopterus beccarii Beccari's Freetail-bat	TSC Act: Vulnerable EPBC Act: Not listed	Little is known about the biology of this species. Despite this, the species has been recorded from a variety of habitats including Rainforest, river flood plains, Tall open forests, Savannah Woodlands, arid shrublands and grasslands (Strahan, 1998; Churchill, 1998). It is believed that the Beccari's Freetail-bat is primarily a tree roosting species however, colonies of up to 50	Although the nearest records are over 15 km away, this species is only considered as potentially occurring given its high mobility, known distribution and occurrence of potential foraging and roosting habitat for this species.	**Considered a Subject Species for the proposal.**

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Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
		individuals have been found under roofs in urban areas in Queensland (Strahan, 1998).	Potentially occurring.	
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	TSC Act: Vulnerable EPBC Act: Not Listed	The Yellow-bellied Sheathtail-bat occurs across northern Australia, north of the Tropic of Capricorn, extending south through eastern NSW to Victoria and SA. There are only a few scattered records of this species in NSW (NPWS, 2000). The Yellow-bellied Sheathtail-bat occurs in a wide range of habitats, and primarily roost in tree hollows, however is known to roost in abandoned Sugar Glider nests and have also been observed roosting on the walls of buildings in broad daylight (Churchill, 1998; Strahan, 1998).	Although the nearest records are over 15 km away, this species is considered as potentially occurring given its high mobility, known distribution and occurrence of potential foraging and roosting habitat for this species. Potentially occurring.	**Considered a Subject Species for the proposal.**
REPTILES				
Caretta caretta Loggerhead Turtle	TSC Act: Endangered EPBC Act: Endangered and migratory (Bonn)	Occurs in tropical and warm temperate waters off the Australian coast. This species forages in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months (DECC, 2007).	Records within 1 km to the south in Nelsons Bay. The site does not contain estuarine habitats for this species. Highly unlikely to occur.	Not considered a Subject Species for the proposal.
Chelonia mydas Green Turtle	TSC Act: Vulnerable EPBC Act: Vulnerable and migratory (Bonn)	The Green Turtle has been recorded in coastal waters of all Australian states; however, this species predominantly occurs in tropical and subtropical waters, with some individuals straying	Records within 1 km to the south in Nelsons Bay. The site does not contain estuarine habitats for this species.	Not considered a Subject Species for the proposal.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
		into temperate waters, including coastal waters of NSW north coast (Cogger et al., 1993; NPWS, 2000). This species migrates great distances between foraging grounds and nesting beaches, where they lay eggs in holes dug in beaches throughout their range. In Australia, major nest sites are known in the Great Barrier Reef and the Gulf of Carpentaria and WA (DEH, 2005, Cogger et al, 1993). The Green Turtle has been noted to be carnivorous when young; however, as adults, this species primarily feeds upon seagrass and algae, and may also consume fish egg cases, jellyfish and sponges (DEH, 2005, NPWS, 2000).	Highly unlikely to occur.	
Hoplocephalus stephensii Stephen's Banded Snake	TSC Act: Vulnerable EPBC Act: Not listed	Stephen's Banded Snake occurs on the coast and ranges of eastern Australia from the central coast of NSW to south eastern Queensland (NPWS, 2000; Cogger, 2000). This species occurs in a variety of habitats including rainforest, wet and moist sclerophyll forest, and dry sclerophyll forest. The species dens among vines, or in rock crevices, and hollow trees and logs (NPWS, 2000; NPWS, 2005; Cogger et al. 2000). It is a partly arboreal species and feeds upon lizards, frogs, birds and small mammals. The species dens among vines, or in rock crevices, and hollow trees and logs (NPWS, 2000; NPWS, 2005; Cogger et al. 2000).	Recorded within 5 km of the site. The site contains potential habitat for this species. The hollow bearing trees within the site also represent potential denning habitat for the Stephen's Banded Snake. Likely to occur.	**Considered a Subject Species for the proposal.**

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Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats Within the Site	Identification of Subject Species
ENDANGERED POPULATIONS				
Dromaius novaehollandiae Emu	TSC Act: Endangered Population (North Coast Bioregion and Port Stephens LGA) EPBC Act: Not listed	The Emu is a large flightless bird that occurs throughout mainland Australia; however the population of Emus in the NSW North Coast Bioregion and Port Stephens LGA is isolated from other populations in the Sydney Basin and New England Tableland Bioregion (NPWS, 2005). Emus occur in a range of habitats from forest and woodland, through to open grassland, however these birds are rarely found in rainforest of very arid areas (Garnett and Crowley, 2000; Australian Museum 2005).	The Endangered Population has been recorded within 10 km to the south of site, around Nelson Bay. The Emu is considered to potentially occur within the site and environs.	**Considered a Subject Population for the proposal.**
Phascolarctos cinereus Koala	TSC Act: Endangered Population (Hawks Nest and Tea Gardens Population. EPBC Act: Not listed	The Hawks Nest and Tea Gardens Endangered Koala Population is known from, and within the immediate vicinity of, the towns of Hawks Nest and Tea Gardens in the Great Lakes Local Government Area. The DECC have noted that Swamp Mahogany and Tallowwood of primary importance to this Koala population (DECC, 2007).	The Endangered Population has been recorded within 10 km to the east of the site. The site is, however, located outside the range of the Hawks Nest and Tea Gardens Endangered Population.	Not recognised as a Subject population for the proposal.

Appendix C

SECTION 5A ASSESSMENT

Section 5A Assessment

Clearing for a Proposed Dwelling and Asset Protection Zone

Lot 104 DP 1049845

Bundabah Road, Bundabah

Prepared For:

Tea Gardens Farms Pty Ltd

28 November 2007

407110_REO_005_AC.doc

Environmental Planning, Assessment and Management

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Report Title:	***Section 5A Assessment***
Project:	Clearing for a proposed dwelling and asset protection zone. Lot 104 DP 1049845, Bundabah Road, Bundabah.
Client:	*Tea Gardens Farms Pty Ltd*
Report No.:	*407110_REO_005_AC.doc*
Draft/Final:	Final

Orogen Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All maps, plan and cadastral information contained within this report are prepared for the exclusive use of Buildev Tinonee Pty Ltd to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Orogen Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

Reviewed By:	*Tony Fish*
Position:	*Project Director*
Signed:	
Date:	28 November 2007

Prepared By:	*Eden Wyatt*
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Introduction

Section 5A Assessment Of Significant Effect On Threatened Species, Populations Or Ecological Communities, Or Their Habitats

The following Section 5A Assessment should be read with reference to the main Flora and Fauna report prepared by Orogen for the proposal.

1.1 Black-eyed Susan (*Tetratheca juncea*)

Tetratheca juncea is a low prostrate shrub that is usually found in low open forests and woodlands with a mixed shrub understorey and grassy ground cover, however, this species has been occasionally recorded in swamp heath and moist forest (PlantNet, 2007, DECC, 2007).

Tetratheca juncea generally prefers well drained sites often on ridges, however, it has been recorded on upper slopes, mid slopes and occasionally in gullies (DECC, 2007). The majority of the known populations occur on low nutrient soils associated with the Awaba Soil Landscape. This species is chiefly recorded in coastal districts from Bulahdelah to Lake Macquarie and is known to occur in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. This species has also been recorded also recorded within the northern portion of the Sydney Basin bioregion, including from Port Jackson to Botany Bay from which it is possibly extinct (PlantNet, 2007; DECC, 2007).

Plants are usually sprawling and can be difficult to detect amongst other vegetation when not flowering, however, *Tetratheca juncea* can be distinguished from other Tetratheca species by its distinct winged stem and reduced leaves (DECC, 2007). This species mostly flowers between July to December (PlantNet, 2007)

Tetratheca juncea was not detected during the targeted surveys. Notwithstanding, given the nearest records of the species (<250m), the cryptic nature of the species, and the occurrence of potential habitat within and adjoining the site, *Tetratheca juncea* has been considered a Subject Species for the proposal. Potential habitat for this species within the site is, however, limited to the edges of the APZ area where ground cover is present.

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

The proposed clearing will result in the removal of potential habitat for *Tetratheca juncea*, however, this habitat represents a small area of potential habitat in the context of suitable habitat adjoining the site.

Targeted surveys during the flowering period would identify the occurrence of this species within the site. *Tetratheca juncea* is a low shrub and therefore represents a low potential bushfire hazard. Any individuals identified during the targeted searches can therefore be retained within the APZ given permissible vegetation densities within such zones.

It is unlikely that potential habitat for this species occurs within the proposed building footprint given the highly modified landscape at this location (refer **Figure 3.1** main report), however, any plants identified within the building footprint can be translocated to the adjoining habitats.

Given the above discussion, the proposal is therefore unlikely to have an adverse effect on the life cycle of the *Tetratheca juncea* such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

Given the extent of the existing cleared area, potential habitat for this species is associated with outer edges of the APZ. The vegetation within these areas will require selective thinning to establish the formal APZ area, however, this clearing will result with minimal removal of potential habitat for this species.

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

Existing linkages within the subject land will be maintained.

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

The potential habitat proposed to be removed represents a small area of potential habitat in the context of suitable habitat adjoining the site and known habitat for this species has been recorded within 250 m of the site.

The potential habitat proposed to be removed could therefore not be considered important to the long term survival of the species.

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

There is currently no critical habitat identified for any populations of *Tetratheca juncea* under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the *Tetratheca juncea* and no threat abatement plans are applicable to this species.

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

As assessment of the Key Threatened Processes (KTP's) listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1**

1.1 Glossy-Black Cockatoo (*Calyptorhynchus lathami*)

The primary habitat requirements for Glossy Black Cockatoos include a good supply of food in the form of *Allocasuarina* fruit, particularly *Allocasuarina torulosa* and *A. littoralis*, and large hollows for nesting (Higgins, 1999; Pepper *et al.*, 2000). Nest hollows range in size, although Garnett *et al.* (1999) recorded an average nest hollow height of 30 cm, and an average width of 19 cm. Preferred habitat is often on fertile soils in dry open forest and woodland. Glossy Black Cockatoos generally choose to roost and nest in close proximity to preferred feeding sites.

Evidence of feeding activity by this species was identified within the APZ during the fauna transect surveys. In addition, feeding activity by this species has been recorded at a number of other locations within the subject land.

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

Although feeding activity by the Glossy Black-Cockatoo was identified during the surveys, the feed trees occurring within the site represent a very small amount of foraging resources in the context of both known and potential feed trees occurring within the subject land and also locality. There were no potential feed trees identified within the proposed building envelope, and both potential and/or known feed trees occurring within the APZ can be retained. In addition, the site does not contain potential nest trees for this species and therefore the proposal will not result with the removal of known and/or potential habitat for the Glossy Black-Cockatoo.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Glossy Black-Cockatoo such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

As discussed in part (a) the proposal will not result with the removal of known and/or potential habitat for the Glossy Black-Cockatoo.

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

The Glossy Black-Cockatoo is a highly mobile species, and utilises fragmented areas of habitat within its very large home range on a daily basis. In addition, the site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. The proposed clearing will therefore not cause isolation or fragmentation of habitat.

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

As discussed in part (a) the proposal will not result with the removal of known and/or potential habitat for the Glossy Black-Cockatoo. The scattered feed trees within in the site (which can be retained) represent very small amount of foraging resources in the context of both known and potential feed trees occurring within the subject land and could not be considered important to the long term survival of the species.

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

There is currently no critical habitat identified for any populations of the Glossy Black-Cockatoo under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the Glossy Black-Cockatoo and no threat abatement plans are applicable to this species.

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

As assessment of the Key Threatened Processes (KTP's) listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1.**

1.2 Threatened Fruit Doves

1.2.1 Wompoo Fruit-Dove (*Ptilinopus magnificus*)

Distributed along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula however are considered rare south of Coffs Harbour. Occurs in or near rainforest, low elevation moist eucalypt forest and brush box forests. More often found in mature forests, however, also found in remnant and regenerating rainforest (DECC, 2007, Schodde and Tidemann, 1993). Wompoo Fruit-Doves feed upon a range of tree and vine fruits and are locally nomadic, following food availability. Nests are located between three to ten metres above the ground in the understorey trees and palms (NPWS, 2000).

1.2.2 Superb Fruit-Dove (*Ptilinopus superbus*)

The Superb Fruit-Dove is primarily distributed from north-eastern in Queensland to north-eastern NSW and much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya (DECC, 2007). This species mainly occurs within rainforest and similar closed forests where it forages for fruits of many tree species such as figs and palms. The Superb Fruit-Dove is alo known to forage in eucalypt or acacia woodland where there are fruit-bearing trees (DECC, 2007).

1.2.3 Rose-crowned Fruit-Dove (*Ptilinopus regina*)

Distributed on the coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Primarily occur in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful (DEC, 2007). This species feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits and some populations are migratory in response to food availability (DEC, 2007).

Assessment

A small number of Tuckeroo and *Ficus* were observed within the site and the fruits produced by these tree species provide potential foraging resources for the Threatened Fruit Doves. In addition, suitable habitat for Fruit Doves was observed at other locations within the subject land.

There were no Fruit Doves detected during the surveys, however, these species' were considered to potentially occur within the site given the occurrence of potential foraging resources within and adjoining the site.

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

The potential habitat proposed to be removed for the proposal provides a very small amount of potential foraging resources for Fruit Doves in the context of the suitable habitat adjoining the site. The removal of a small number of Tuckeroo and/or *Ficus* from the site is considered negligible to the amount of suitable vegetation occurring within the subject land, including areas of rainforest which response more typical habitat for Threatened Fruit Doves. The amount of potential foraging resources proposed to be removed from the site is also considered negligible to the amount of potential foraging resources occurring in the locality.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Threatened Fruit Doves such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

A selection of Tuckeroo and *Ficus* sp occurring will require removal for the establishment of the APZ. The fruits of these trees provide potential foraging resources for the Threatened Fruit Doves.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. The proposed clearing will therefore not cause isolation or fragmentation of habitat for the Threatened Fruit Doves.

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

The habitat proposed to be removed from the subject site represents a very small area of potential habitat for the Threatened Fruit Doves. The area of habitat proposed to be removed is considered negligible to the area of more suitable habitat that occurs within the subject land, and also to the large areas of relatively high quality habitats occurring in the locality, including within Tomaree NP and Myall Lakes NP.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Threatened Fruit Doves, and this habitat is not considered important for the long term survival of the local population of any Threatened Fruit Doves.

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

There is currently no critical habitat identified for any populations of any Threatened Fruit Doves under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the Threatened Fruit Doves and no threat abatement plans are applicable to this species.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1.**

1.3 Forest Owls

Powerful Owl (*Ninox strenua*)

Powerful Owls are known to occur in a variety of forest types along the coast and ranges, with records up to 1500 m ASL (Debus & Chafer, 1994; Higgins, 1999). Powerful Owls often roost during the day in the canopy of trees, although large hollows are used during the breeding season (Higgins, 1999). This species is known to have an extensive home range that may be as large as 1000 ha. The Powerful Owl preys most commonly on arboreal mammals.

Masked Owl (Tyto novaehollandiae)

Masked Owls are known to utilise a broad range of habitats, including open forest and woodland with a sparse understorey and adjacent open areas (Hollands, 1991; Debus & Rose, 1994). Essential habitat features include the presence of suitable roosting and nesting hollows and an abundant supply of ground-dwelling or scansorial mammals (Higgins 1999; Kavanagh, 1996). Masked Owls are known to forage and roost within previously disturbed habitats and on the fringes of urban development (Hollands, 1991; Kavanagh, 1996). Most foraging occurs within open forest or along roads and tracks.

Barking Owl (*Tyto connivens*).

Barking Owls occur in a variety of forest and woodlands types along the coast and ranges however are most common in savannah woodland. Barking Owls generally roost during the day in the canopy of trees, although hollows are used during the breeding season. The home range of the Barking Owl varies between 30 and 200 ha depending upon the habitat type. The Barking Owl preys on a variety of mammals, birds and insects (Schodde and Tidemann, 1993; NPWS, 2000).

Assessment

The site contains appropriate foraging the Powerful Owl, Masked Owl and Barking Owl, however, the subject site does not contain potential nesting habitat for these owls.

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

The proposal will result in the removal of potential foraging habitat for the Subject Forest Owls. Being primarily comprised of cleared land with scattered trees, the site, however, represents relatively low quality foraging habitat for the Subject Forest Owls. The proposal will not result with removal of potential nesting habitat for the Subject Forest Owls.

The habitat proposed to be removed from the site is therefore considered negligible to the area of more suitable habitat available within the subject land and also within the locality, including within Tomaree NP and Myall Lakes NP. The area of potential habitat proposed to be removed is also considered insignificant in the context of the Subject Forest Owls large home range. In addition, these owls are likely to continue foraging among the vegetation retained within APZ area.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Subject Forest Owls such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

A total of five (5) trees will require removal for the building footprint and a selection of trees occurring within the APZ will require removal for the formal establishment of the APZ. In addition, a small amount of understorey and ground cover vegetation occurring within the outer edges of the APZ will require removal.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Subject Forest Owls and prey species will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal. In addition, the Powerful Owl, Masked Owl and Barking Owl are highly mobile species, and utilise fragmented areas of habitat within their very large home range on a regular basis.

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

The site represents a very small area of potential habitat in relation to these species' high mobility and very large home ranges. In addition, the majority of the habitat proposed to be removed is also highly modified as a result of the previous and existing land use of the site.

The area of habitat proposed to be removed is considered negligible to the area of relatively higher quality habitat adjoining the site and also occurring within the conservation reserves in locality, including Tomaree NP and Myall Lakes NP.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Subject Forest Owls, and this habitat is not considered important for the long term survival of the local population of the Subject Forest Owls.

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

There is currently no critical habitat identified for any populations of the Powerful Owl, Barking Owl or Masked Owl under Section 3 of the *Threatened Species Conservation Act 1995*.

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

An approved recovery plan has been prepared for the three Large Forest Owls - Powerful Owl, Sooty Owl and Masked Owl. A draft recovery plan has been prepared for the Barking Owl and considerations of these recovery plans are outlined below. No threat abatement plans are applicable to the proposal for these owl species

LARGE FOREST OWLS

The habitat proposed to be removed is not considered a significant area (in terms of size, quality and importance) of habitat for the Powerful or Masked Owl and no known or potential nesting habitat will be removed. The proposal is therefore not inconsistent with the recovery plan for these species. Further, the objectives of the recovery plan prepared for the Large Forest Owls are not considered to be relevant to the proposal and more specifically relate to government agencies.

BARKING OWL

The removal of any potential habitat for the Barking Owl is not consistent with objective 3 of the Draft Recovery Plan prepared for the Barking Owl. Notwithstanding, the habitat proposed to be removed is not considered a significant area (in terms of size, quality and importance) of habitat for the Barking Owl and no known or potential nesting habitat will be removed.

The remaining objectives of the recovery plan prepared for the Barking Owl are not considered to be relevant to the proposal and more specifically relate to government agencies.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1.**

1.4 Spotted-tailed Quoll (*Dasyurus maculatus*)

The Spotted-tailed Quoll is the largest marsupial carnivore on the Australian mainland (Strahan 1995). Spotted-tailed Quolls are found in a variety of forest types including dry and moist eucalypt forests and rainforest (NPWS 2004). They are mostly nocturnal, but are known to hunt during daylight hours (Strahan 1998). The species often feeds upon the ground, hunting a range of prey including insects, small wallabies, rodents, birds and lizards (NPWS 2000). Spotted-tailed Quolls often den in fallen logs, caves, rocky outcrops and may utilise many den sites within its home range which is estimated to be between 800 ha and 20 km^2 (NPWS 2000, NPWS 1999).

There are two subspecies of the Spotted-tailed Quoll: *Dasyurus maculatus gracilis* and *Dasyrus. m. maculatus*. The latter occurs along the east coast of Australia from southeast Queensland to Tasmania. In NSW the Spotted-tailed Quoll occurs on both sides of the Great Dividing Range (NPWS, 1999).

Potential foraging and denning habitat for the Spotted-tailed Quoll occurs within and adjoining the site and this species has been recorded within 2 km of the site. Given the species very large home range, and also the occurrence of appropriate habitat, the Spotted-tailed Quoll is considered to potentially utilise the habitats within the site.

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

The proposal will result in the removal of potential foraging habitat for the Spotted-tailed Quoll. Being primarily comprised of cleared land with scattered trees, the site, however, represents relatively low quality habitat for the Spotted-tailed Quoll. The proposal will not result with removal of potential denning habitat for the Spotted-tailed Quoll.

The habitat proposed to be removed from the site is therefore considered negligible to the area of more suitable habitat available within the subject land and also within the locality, including within Tomaree NP and Myall Lakes NP. The area of potential habitat proposed to be removed is also considered insignificant in the context of the Spotted-tailed Quolls large home range. In addition, the Spotted-tailed Quoll is likely to continue foraging among the vegetation retained within APZ area.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Spotted-Tailed Quoll such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

A total of five (5) trees will require removal for the building footprint and a selection of trees occurring within the APZ will require removal for the formal establishment of the APZ. The proposal will also result with the modification of the rocky surface within the proposed building envelope which provides shelter resources for prey species such as small lizards and rodents. In addition, a small amount of understorey and ground cover vegetation occurring within the outer edges of the APZ will require removal.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Spotted-tailed Quoll will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal.

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

The Spotted-tailed Quoll has a large home range which is estimated between 800 ha and 20 km^2. The site therefore represents a very small area of potential habitat for the Spotted-tailed Quoll and the majority of this habitat is degraded as a result of the previous and existing land use. The area of habitat proposed to be removed is considered negligible to the area of relatively higher quality habitat adjoining the site and also to the large areas habitat occurring in the locality, including within Tomaree NP and Myall Lakes NP.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Spotted-tailed Quoll, and this habitat is not considered important for the long term survival of the local population of the species.

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

There is currently no critical habitat identified for any populations of the Spotted-tailed Quoll under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the Spotted-tailed Quoll and no threat abatement plans are applicable to the proposal for this species.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1.**

1.5 Small Arboreal Mammals

1.5.1 Brush-tailed Phascogale (*Phascogale tapoatafa*)

The Brush-tailed Phascogale is a largely arboreal species that generally prefers Dry Open Sclerophyll Forests and Woodlands with an open ground layer and a moderate density of trees and shrubs in the midstratum (NPWS, 1999; Soderquist 1995). The species is dependent on tree hollows for breeding and shelter, generally preferring hollows that are 25-40 mm wide (Ayers et al.,1996).

Old growth forest is usually required within an individual's home range, which has been recorded to be up to 100 ha for males and 20-60 ha for females however recent studies in high quality habitat have demonstrated that animals can have home ranges as small as 2.3 -8.0 ha for females (SFNSW; 1995; NPWS; 1999; van der Ree et. al. 2001).

1.5.2 Squirrel Glider (Petaurus norfolcensis)

The Squirrel Glider is distributed in eastern Australia from northern Queensland, through eastern NSW to Victoria (NPWS, 2000). In Northern NSW Squirrel Gliders tend to occur most commonly in dry open forests with an abundant and varied supply of nectar and arthropods (Sharpe & Goldingay 1998). This species feeds upon nectar, pollen, flowers, insects, and sap of particular eucalypts (Strahan, 1998; NPWS, 1999). The Squirrel Glider dens in hollow bearing trees, and often dens in family groups (Strahan, 1998; NPWS, 2000). Squirrel Gliders have also been recorded roosting in isolated trees in paddocks, so they are capable of traversing partially cleared land (Law *et al* 2000). Home ranges have been estimated as between 0.65 to 8.55 ha, with movements tending to be greater for males (NPWS, 1999).

Assessment

The site contains potential foraging and denning habitat for the Brush-tailed Phascogale and Squirrel Glider, and both these species have been recorded within 500 m of the site. Given these species very large home range, and also the occurrence of appropriate habitat, the Brush-tailed Phascogale and Squirrel Glider are considered to potentially utilise the habitats within the site.

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

The proposal will result in the removal of potential habitat for the Brush-tailed Phascogale and Squirrel Glider. Being primarily comprised of cleared land with scattered trees, the site, however, represents relatively low quality habitat for these species. The one (1) hollow bearing tree requiring removal for the building footprint does not provide potential denning habitat for the Brush-tailed Phascogale and Squirrel Glider (refer **Section 3.3.4** main report). The proposal will therefore not result with removal of potential denning habitat for the Brush-tailed Phascogale and Squirrel Glider.

The habitat proposed to be removed from the site is therefore considered negligible to the area of more suitable habitat available within the subject land and also within the locality, including within Tomaree NP and Myall Lakes NP. In addition, the Brush-tailed Phascogale and Squirrel Glider are likely to continue foraging among the vegetation retained within APZ area.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Brush-tailed Phascogale or Squirrel Glider such that a viable local population of either species is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

A total of five (5) trees will require removal for the building footprint and a selection of trees occurring within the APZ will require removal for the formal establishment of the APZ. In addition, a small amount of understorey and ground cover vegetation occurring within the outer edges of the APZ will require removal.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Brush-tailed Phascogale or Squirrel Glider will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal.

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

The site represents a very small area of potential habitat for the Brush-tailed Phascogale and Squirrel Glider in the context of these species home range and the majority of the habitat proposed to be removed is highly degraded as a result of the previous and existing land use. The area of habitat proposed to be removed is considered negligible to the area of relatively higher quality habitat adjoining the site and also to the large areas habitat occurring in the locality, including within Tomaree NP and Myall Lakes NP.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Brush-tailed Phascogale and Squirrel Glider and this habitat is not considered important for the long term survival of the local population of either species.

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

There is currently no critical habitat identified for any populations of the Brush-tailed Phascogale or Squirrel Glider under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the Brush-tailed Phascogale or Squirrel Glider and no threat abatement plans are applicable to the proposal for these species.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1**.

1.6 Koala (*Phascolarctos cinereus*)

The Koala feeds almost entirely on the foliage of specific Eucalypts; however, within the species' range differences in preferred feed tree species occur. While State Environmental Planning Policy 44 – Koala Habitat protection (SEPP 44) lists 10 feed tree species, studies have identified that a variety of Eucalypt species occurring within any locality may be utilised and Koalas have been recorded feeding on over 69 Eucalypt species (NPWS, 2000). Males may have a home range of up to 40 ha which usually overlap the home range of a number of females (Phillips, 1994).

There are numerous records of the Koala within the locality, and some of these records are within 1 km of the subject site (DECC, 2007). Evidence of habitat utilisation by the Koala was identified within the site during the surveys and site contains a variety of suitable feed trees for the Koala.

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

The proposal will result in the removal of five (5) suitable feed trees that occur within the proposed building footprint. In addition, a number of potential feed trees will require removal for the formal establishment of the APZ.

There was no evidence of habitat usage by the Koala identified beneath the trees requiring removal for the building footprint. Only two (2) trees requiring removal for the building footprint are listed by Schedule 2 of SEPP 44. In addition, the majority of locality preferred feed trees and/or SEPP 44 feed trees occurring within APZ can be retained through a selective removal process when formally establishing APZ. Further, any trees identified with Koala scats around the base during the surveys can be retained.

The feed trees required to be removed will therefore primarily comprise potential browse species such as Iron Bark and Spotted Gum. The number of potential feed trees proposed to be removed for the proposal is therefore considered negligible to the amount of feed trees (including preferred feed trees) that can be retained within the APZ, and also to those occurring within the adjoining Forest community. In addition, the number of potential feed trees proposed to be removed is considered negligible to the large areas of appropriate habitat within Myall Lakes NP.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Koala such that a viable local population is likely to be placed at risk of extinction.

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

The site is located outside the range of the Endangered Population of Koalas occurs within Tea Gardens.

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

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

Not Applicable.

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

Not Applicable.

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

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

The proposal will result in the removal of five (5) suitable feed trees that occur within the proposed building footprint. In addition, a number of potential feed trees will require removal for the formal establishment of the APZ. The majority of the trees requiring removal comprise potential browse species and only two (2) preferred feed trees/SEPP 44 feed trees (*Eucalyptus punctata)* require removal for the building footprint.

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

Koalas are capable of traversing partially of cleared land, including APZ areas. In addition, the site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Koala will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal.

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

The habitat proposed to be removed from the site is highly degraded as a result of the previous and existing land use of the site. Although the surveys identified habitat usage within the site by the Koala, the low activity levels indicate Koalas only occasionally browse amongst the trees within the site. No Koala scats were found beneath the trees proposed to be removed for the building footprint, and any trees within the APZ found with Koala scats around the base can be retained.

The number of Koala feed trees proposed to be removed for the proposal, including (2) SEPP 44 feed trees is considered negligible to the suitable feed trees that can be retained within the APZ, and also to the number of feed trees occurring within the adjoining Forest community.

Therefore, given the considerations discussed above, the habitat proposed to be removed could not be considered an important area of habitat for the Koala, or considered important for the long term survival of the local population of the Koala.

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

There is currently no critical habitat identified for any populations of the Koala under Section 3 of the *Threatened Species Conservation Act 1995*.

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

A draft recovery plan has been prepared for the Koala and considerations of this recovery plan are outlined below. There are no threat abatement plans applicable to the proposal for the subject species.

KOALA

The removal of any potential or known habitat for the Koala is not consistent with Objective 1 of the Draft Recovery Plan prepared for the Koala. Despite this, as discussed above, the number of feed trees proposed to be removed could not be considered a significant area of habitat (in terms of size, quality and importance) for the Koala.

The remaining objectives of the recovery plan for the Koala are not relevant to the proposal and more specifically relate to government agencies.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1.**

1.7 Grey-headed Flying -fox (*Pteropus poliocephalus*)

The Grey-headed Flying–fox is known to feed on a variety of native and introduced fruits and blossoms from a wide variety of habitats including Rainforests, Sclerophyll forests, Woodland, heaths and disturbed environments including orchards and suburban gardens.

The Grey-headed Flying-fox, like other Pteropidids, roost communally in colonies where numbers may reach hundreds of thousands. These colonies are usually found in Rainforest, mangroves and Sclerophyll forests but are also known to occur in urban parks and gardens (B. Campbell *pers. obs*, G. Richards *pers comm.*). The Grey-headed Flying–fox is also known to travel extremely large distances in a year migrating along the coastal areas of NSW according to the availability of food resources.

The site contains suitable foraging resources for the Grey-headed Flying-fox, and there are numerous records within the locality. The habitats at the site are unlikely to be utilised as a camp site.

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

The proposal will result in the removal of potential habitat for the Grey-headed Flying-fox. Being primarily comprised of cleared land with scattered trees, the site, however, contains relatively low quality foraging resources for Grey-headed Flying-fox. The potential foraging resources proposed to be removed from the site is considered negligible to the area of more suitable habitat available within the subject land and also within the locality, including within Tomaree NP and Myall Lakes NP. In addition, the Grey-headed Flying-fox is likely to continue foraging among the vegetation retained within APZ area.

The proposal will not impact upon any known camp sites in the locality.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Grey-headed Flying-fox such that a viable local population of the species is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

A total of five (5) trees will require removal for the building footprint and a selection of trees occurring within the APZ will require removal for the formal establishment of the APZ. In addition, a small amount of understorey and ground cover vegetation occurring within the outer edges of the APZ will require removal.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Grey-headed Flying-fox will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal. In addition, the Grey-headed Flying-fox is a highly mobile species that regularly utilises fragmented areas of habitat within its very large home range on a daily basis.

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

The site represents a very small area of potential habitat for the Grey-headed Flying-fox in the context of this species' home range and the majority of the habitat proposed to be removed is highly degraded as a result of the previous and existing land use. The area of habitat proposed to be removed is considered negligible to the area of relatively higher quality habitat adjoining the site and also to the large areas habitat occurring in the locality, including within Tomaree NP and Myall Lakes NP.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Grey-headed Flying-fox and this habitat is not considered important for the long term survival of the local population of the species.

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

There is currently no critical habitat identified for any populations of the Grey-headed Flying-fox under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the Grey-headed Flying-fox and no threat abatement plans are applicable to this species.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1**.

1.8 Threatened Microchiropteran Bats

Eastern Freetail-bat (*Mormopterus norfolkensis*)

As the taxonomic revision of the *Mormopterus* genus has not been finalised, there is some uncertainty regarding the habitat and distribution of *Mormopterus norfolkensis*. Similarly, little is known about the biology of this species. Despite this, the species has been recorded from a variety of habitats including Woodland, Dry and Wet Sclerophyll forests and has been recorded foraging along a river within Rainforest (DECC, 2007; Strahan, 1998; Churchill, 1998, NPWS, 2005). It is believed that the Eastern

Freetail-bat is primarily a tree roosting species however; it has also been recorded within the roof of a hut (Strahan, 1998).

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

The Eastern False Pipistrelle inhabits Sclerophyll Forests and Woodlands and is known to forage over open water. This species generally prefers tall forests and forages above the canopy. This species has a wing morphology which indicates that it is highly mobile with a comparatively large foraging range.

The Eastern False Pipistrelle is known to roost in tree hollows though has been recorded roosting in Jenolan caves and in old wooden houses (Churchill 1998; Strahan, 1998).

Little Bentwing-bat (*Miniopterus australis*)

The Little Bentwing-bat occurs along the east coast of Australia from north eastern Queensland to the central coast of NSW (NPWS, 2000; NPWS, 2005). This species has been noted to predominantly forage between the canopy and the understorey within well timbered habitats including moist and dry sclerophyll forest, woodlands, rainforest, *Melaleuca* swamps, and dense coastal banksias (Strahan, 1998; NPWS, 2005; NPWS, 2000).

The Little Bentwing-bat is considered as a cave obligate species which roosts by day in caves, tunnels, and mines. This species forms maternity colonies in summer in roost sites which have an extremely high humidity, and these roosts are often shared with the Eastern Bentwing-bat (NPWS, 2005; NPWS, 2000; Strahan, 1998).

Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)

The Eastern Bentwing-bat occurs in eastern Australia from north Queensland to far south east SA. In NSW they are found along the coast and western slopes, including high elevations of the Great Dividing Range (NPWS, 2000). This species predominantly forages above the tree canopy in a range of well timbered habitats including rainforest, paperbark swamps, heaths, woodlands and sclerophyll forests (Strahan, 1998; NPWS, 2000).

Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)

The Yellow-bellied Sheathtail-bat occurs across northern Australia, north of the Tropic of Capricorn, extending south through eastern NSW to Victoria and SA. There are only a few scattered records of this species in NSW (NPWS, 2000). The Yellow-bellied Sheathtail-bat occurs in a wide range of habitats, and primarily roost in tree hollows, however is known to roost in abandoned Sugar Glider nests and have also been observed roosting on the walls of buildings in broad daylight (Churchill, 1998; Strahan, 1998).

Like the Little Bentwing-bat, the Eastern Bentwing-bat is also considered as a cave obligate species, only known to roost in caves, tunnels, mines and closed stormwater drains (NPWS, 2005; NPWS, 2000; Strahan, 1998). The Eastern Bentwing-bat has specific requirements for roost caves throughout the year including roosts for over wintering, acclimatisation caves, and maternity caves. Maternity caves generally have domed rooves in which the young are left. These sites reach high temperatures and high levels of humidity and act as a 'humidicrib'. These maternity colonies are often shared with the Little Bentwing-bat.

Greater Broad-nosed Bat (*Scoteanax rueppellii*)

The Greater Broad-nosed Bat is known to occur in a wide variety of habitat types including grazing land, Heathland, Melaleuca Swamps, Woodlands, Rainforest and Wet and Dry Sclerophyll Forests. Roost sites of the Greater Broad-nosed Bat have been located in hollow tree trunks and branches, as well as the roofs of old buildings (Duncan et al, 1999b). It generally prefers roosts with entrance diameters which are slightly larger than the size of the animals' body. These roosts have been located in mature remnant trees in grazing land, Melaleucas in Swamp forests and in Dry Sclerophyll forest (B. Campbell pers obs, Churchill, S., 1998).

Beccari's Freetail Bat (*Mormopterus beccarii*)

As the taxonomic revision of the *Mormopterus* genus has not been finalised, there is some uncertainty regarding the habitat and distribution of *Mormopterus beccarii*. Similarly, little is known about the biology of this species. Despite this, the species has been recorded from a variety of habitats including Rainforest, river flood plains, Tall Open Forests, Savannah Woodlands, arid Shrublands and Grasslands (Strahan 1995, Churchill 1998). It is believed that the Beccari's Freetail Bat is primarily a tree roosting species however, colonies of to 50 individuals have been found under roofs in urban areas in Queensland (Strahan, 1998).

Assessment

The vegetation at the site represents suitable foraging habitat for the subject insectivorous bats and the site contains suitable hollow resources for species that are known to utilise tree hollows. The site does not contain caves or similar structures and therefore does not contain suitable roosting habitat for cave obligate species such as the Little and Eastern Bentwing-bats.

The Eastern Freetail-bat, Eastern False Pipistrelle, Little Bentwing-bat, Eastern Bentwing-bat and Greater Broad-nosed Bat have been recorded within the locality. While the Yellow-bellied Sheathtail-bat and Beccari's Freetail Bat have not been recorded in locality, however these species are considered likely to occur within the site given their known distributions and the occurrence of potential habitat within and adjoining the site.

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

The proposal will result in the removal of potential habitat for the Subject Microchiropteran Bats. Being primarily comprised of cleared land with scattered trees, the site, however, represents relatively low quality habitat for these species. The one (1) hollow bearing tree requiring removal for the building footprint provides potential roosting habitat for species that are known to utilise hollows. The small branch hollow provided by this tree is, however, unlikely to support a maternal roosting colony of microchiropteran bats.

The habitat proposed to be removed from the site is therefore considered negligible to the area of more suitable habitat available within the subject land and also within the locality, including within Tomaree NP and Myall Lakes NP. In addition, the Subject Microchiropteran Bats are likely to continue foraging among the vegetation retained within APZ area.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Subject Microchiropteran Bats such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

No roosting habitat for cave obligate species will be impacted by the proposal.

A total of five (5) trees will require removal for the building footprint, including one (1) potential roost tree (small hollows only), and a selection of trees occurring within the APZ will require removal for the formal establishment of the APZ. In addition, a small amount of understorey and ground cover vegetation occurring within the outer edges of the APZ will require removal.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Subject Insectivorous Bats will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal. In addition, the Subject Insectivorous Bats are all highly mobile species, and utilise fragmented areas of habitat on a nightly basis.

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

The site represents a very small area of potential habitat for the Subject Insectivorous Bats in the context of these species' home range and the majority of the habitat proposed to be removed is highly degraded as a result of the previous and existing land use.

The area of potential habitat proposed to be removed, including one potential roost tree (for hollow dependant species) is considered negligible to the area of more suitable habitat adjoining the site (including potential roost trees) and also to the large areas habitat occurring in the locality, including within Tomaree NP and Myall Lakes NP. As discussed, the hollow bearing tree proposed to be removed is unlikely to support a maternal colony.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Subject Microchiropteran Bats and this habitat is not considered important for the long term survival of the local population any Subject Microchiropteran Bats.

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

There is currently no critical habitat identified for any populations of the Subject Microchiropteran Bats under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for any of the Subject Microchiropteran Bats under the *TSC Act* and no threat abatement plans are applicable to the proposal for these species.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1.**

1.9 Stephens' Banded Snake (*Hoplocephalus stephensii*)

Stephen's Banded Snake occurs on the coast and ranges of eastern Australia from the central coast of NSW to south eastern Queensland (NPWS, 2000; Cogger, 2000).

This species occurs in a variety of habitats including rainforest, wet and moist sclerophyll forest, and dry sclerophyll forest, however, it is more commonly found in wetter habitats such as rainforest and wet sclerophyll forest, particular with rocky outcrops, cliffs or ridges (NPWS, 2005; Cogger, 2000). It is a partly arboreal species and feeds upon lizards, frogs, birds and small mammals. The species dens among vines, or in rock crevices, and hollow trees and logs (NPWS, 2000; NPWS, 2005; Cogger *et al.* 2000).

Potential foraging and denning habitat for the Stephen's Banded Snake occurs within and adjoining the site and this species has been recorded within 5 km of the site. Given the nearest records and occurrence of appropriate habitat, the Stephen's Banded Snake is considered to potentially utilise the habitats within the site.

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

The proposal will result in the removal of potential foraging habitat for the Stephen's Banded Snake. Being primarily comprised of cleared land with scattered trees, the site, however, represents relatively low quality habitat for the Stephen's Banded Snake. The proposal will not result in the removal of potential denning trees for the Stephen's Banded Snake.

The habitat proposed to be removed from the site is therefore considered negligible to the area of more suitable habitat available within the subject land and also within the locality, including within Tomaree NP and Myall Lakes NP. In addition, the Stephen's Banded Snake is likely to continue foraging among the vegetation retained within APZ area.

Based on the above discussion, the proposal is therefore considered unlikely to have an adverse effect on the life cycle of the Stephen's Banded Snake such that a viable local population is likely to be placed at risk of extinction.

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

Not Applicable.

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

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

Not Applicable.

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

Not Applicable.

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

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

A total of five (5) trees will require removal for the building footprint and a selection of trees occurring within the APZ will require removal for the formal establishment of the APZ. The proposal will also result with the modification of the rocky surface within the proposed building envelope and this terrain likely to provide shelter and basking habitat for the Stephen's Banded Snake and also for prey species such as small lizards and rodents. This surface is, however, unlikely to provide denning structures for the Stephen's Banded Snake.

In addition, a small amount of understorey and ground cover vegetation occurring within the outer edges of the APZ will require removal.

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

The site is adjoined by extensive areas of relatively unmodified habitats which provide suitable linkage through the area. Habitat for the Stephen's Banded Snake will therefore not become isolated or fragmented from other areas of habitat as a result of the proposal.

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

The site represents a small area of potential habitat for the Stehphens' Banded Snake and the majority of this habitat is degraded as a result of the previous and existing land use. The area of habitat proposed to be removed is considered negligible to the area of relatively higher quality habitat adjoining the site and also to the large areas habitat occurring in the locality, including within Tomaree NP and Myall Lakes NP.

Therefore, the small amount of potential habitat proposed to be removed could not be considered an important area of habitat for the Stehphens' Banded Snake and this habitat is not considered important for the long term survival of the local population of the species.

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

There is currently no critical habitat identified for any populations of the Stehphens' Banded Snake under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No draft recovery plans or final recovery plans have been prepared for the Stehphens' Banded Snake and no threat abatement plans are applicable to the proposal for this species.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1**.

1.10 Lowland Rainforest Endangered Ecological Community

The Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions EEC is the name given to the ecological community of subtropical rainforest and some related forms of dry rainforest, but excludes Littoral Rainforest and Lowland Rainforest on Floodplain (NPWS, 2007). Lowland rainforest is often is associated with a range of high nutrient geological substrates, particularly basalts and fine grained sedimentary rocks on coastal plains and plateaux, foot slopes and foothills (NPWS, 2007).

In the Sydney Basin bioregion, Lowland Rainforest is limited to elevations below 350 m, however, it is found up to 600 m above sea level in the north of its range.

The trees within the EEC form three major strata comprising emergent, canopy and sub canopy (NPWS, 2007). The trees are taxonomically diverse at the genus and family levels, and scattered eucalypt emergents may occasionally be present. Lowland Rainforest can also contain a range of plant growth forms including palms, vines and vascular epiphytes (NPWS, 2007).

A small patch of Dry Rainforest occurs to the north east of the site and is analogous to the Lowland Rainforest EEC. This patch is located on a relatively sheltered north east facing slope and comprises an area of approximately 0.1 ha (refer **Appendix A** of main report). Being located outside of the APZ area, no clearing will be required within this community.

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

Not Applicable.

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

Not Applicable.

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

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

The proposal will not result in the direct removal or loss of the Lowland Rainforest as this community occurs outside of the APZ area.

This patch of Rainforest is currently adjoined by the existing cleared area and is therefore subject to a significant degree of edge effects (refer **Figure 3.4** and **Appendix A** main report). The establishment of the APZ will not increase the exposure to these edge effects. The proposed clearing is therefore unlikely to cause significant indirect impacts to this EEC.

Based on the above discussion, the proposal is considered unlikely to have an adverse affect on the extent of the Lowland Rainforest such that its local occurrence is likely to be placed at risk of extinction.

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

As discussed, the small patch of Lowland Rainforest is currently subject to significant edge effects associated with the existing clearing, and the proposed clearing associated with the proposal will not increase the exposure to these edge effects. The proposal is therefore unlikely to substantially and adversely modify the composition of the Rainforest such that its local occurrence is likely to be placed at risk of extinction.

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

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

The proposal will not result in the direct removal or loss of the Lowland Rainforest EEC as this community occurs outside of the APZ area.

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

The proposal will not result in any fragmentation or isolation of suitable habitats for the Lowland Rainforest EEC on the subject land.

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

The Lowland Rainforest EEC adjoining the site occurs as a relatively small and isolated patch. Any habitat within this patch could be considered an important area of habitat to this particular stand. This area of habitat, however, could not be considered important to the extant of Lowland Rainforest occurring within the subject site and broader locality.

In addition, as discussed, the proposal will not result in the direct removal or indirect modification of this EEC.

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

There is currently no critical habitat identified for the Lowland Rainforest EEC under Section 3 of the *Threatened Species Conservation Act 1995*.

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

No recovery or threat abatement plans have been prepared for the Lowland Rainforest EEC.

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

As assessment of the KTP's listed under Schedule 3 of the *TSC Act* considered relevant to the proposal is provided in **Table C.1**.

1.11 Key Threatening Process

The following table assesses the Key Threatening Processes listed under Schedule 3 of the *TSC Act*.

Table C.1 - Key Threatening Processes relevant to the proposal.

Criteria	Assessment
Anthropogenic climate change	The use of machinery during construction and clearing of some vegetation will make a contribution to anthropogenic climate change through release of stored carbon from vegetation and greenhouse gas emissions associated with use of fossil fuels. The clearing of vegetation will also reduce the vegetation available for Carbon dioxide cycling. The impact of the proposal on anthropogenic climate change however is negligible in the context of other activities in the region.
Clearing of native vegetation	The proposal will result with the clearing of native vegetation for the building footprint and establishment of the APZ. The vegetation occurring within the site, however, is highly degraded as a result of the previous and existing land use and consequently, the majority of the clearing area is comprised of cleared land with scattered trees. The amount of native vegetation proposed to be removed is therefore considered negligible to the area of relatively unmodified vegetation/habitat adjoining the site, and also to the large areas of heavily vegetated land occurring in the locality. The proposal will therefore not significantly contribute to the operation of this Key Threatening Process (KTP).
Invasion and establishment of exotic vines and scramblers.	The vegetation within the site is highly modified from previous and existing land use. Consequently, this vegetation is currently exposed to significant edge effects and therefore the proposal is unlikely to increase opportunities for the invasion and establishment by exotic vines and scramblers. The proposal will therefore not significantly contribute to the operation of this Key Threatening Process (KTP).
Invasion, establishment and spread of *Lantana camara.*	The vegetation within the site is highly modified from previous and existing land use. Consequently, this vegetation is currently exposed to significant edge effects and therefore the proposal is unlikely to increase opportunities for the invasion, establishment or spread of Lantana within or adjoining the site. The proposal will therefore not significantly contribute to the operation of this Key Threatening Process (KTP).
Invasion of native plant communities by exotic perennial grasses.	The vegetation within the site is highly modified from previous and existing land use. Consequently, this vegetation is currently exposed to significant edge effects and therefore the proposal is unlikely to increase opportunities for the invasion of exotic perennial grass within or adjoining the site. The proposal will therefore not significantly contribute to the operation of this Key Threatening Process (KTP).

Table C.1 - Key Threatening Processes relevant to the proposal.

Criteria	Assessment
Loss of hollow bearing trees.	The proposal will result with the clearing of one (1) hollow bearing tree for the building footprint. This hollow bearing tree provides a small branch hollow that represents roosting habitat for only small number of microchiropteran bats. Over 11 hollow bearing trees occur within the APZ area and these can be retained. In addition, numerous hollow bearing trees, including potential nest trees for large species such as Owls occur throughout the adjoining habitats. In the context the hollow trees to be retained within the site, and also to those occurring within the adjoining habitats, the proposed removal of one (1) hollow bearing tree with a small branch hollow will not significantly reduce the availability of hollow resources within the locality. In addition, the branch hollow can be harvested and relocated into adjoining habitats. Based on the above discussion, the proposal is therefore unlikely to significantly contribute to this KTP.
Removal of dead wood and dead trees.	The proposal will result with the removal fallen timber that occurs within the site. The proposed removal of this timber is, however, considered negligible to the amount of fallen timber occurring within the adjoining habitats. It is unlikely that the removal of a small amount of timber from the site will result with a significant impact to any of the Subject Species.
Bushrock removal	The proposed earthworks will result with the removal of bush rock that occurs throughout the surface of the site. Any bushrock that is removed can be re-sited into the APZ and/or adjoining habitats and therefore there will be no net lees of bushrock from the area. No caves or similar structures will be modified and it is unlikely that the removal/disturbance of bushrock from the site will result with a significant impact to any of the Subject Species.
It is considered that remaining KTP's listed on Schedule 3 of the *Threatened Species Conservation Act (1995)* are not relevant to the proposal.	

Conclusion

2.1 Conclusion

It is concluded that the proposal is unlikely to cause a significant affect on any *'Threatened species, populations or ecological communities or their habitats within the locality'*. A Species Impact Statement is therefore not required for the proposal.

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