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FLORA AND FAUNA ASSESSMENT REPORT

307-321 CRANEBROOK ROAD

CRANEBROOK

PREPARED FOR: Maryann Bastac

OUR REFERENCE: 164614

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	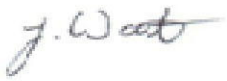	
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Executive Summary

This flora and fauna report was prepared by Envirotech Pty Ltd for Maryann Bastac.

The proposed development consists of a single dwelling and a garage on land at 307-321 Cranebrook Road, Cranebrook. The land is currently zoned as primary production but has not been used for such at this point.

Flora and fauna surveys were conducted at 9:30 am on the 3rd of December 2014 for approximately three hours by botanist Laurel Fowler and fauna ecologists' Jessica Wait & Evan Webb. A nocturnal fauna survey was conducted by Jessica Wait and Evan Webb on the Thursday 11th December at 7 pm till 9 pm.

The preliminary desktop research resulted in a moderate to high likelihood of eight threatened flora species having suitable habitat represented on site and the probable presence of one critically endangered ecological community. Desktop research resulted in a moderate to high likelihood of 22 threatened fauna species having suitable habitat represented on site.

The site is 2.11 hectares and reasonably well vegetated. However, the central part of the site only has a sparse mid-storey and the site has many weeds such as *Ochna serrulata*. The surrounding properties either have residential developments or have not yet been developed on.

Results

No threatened flora species were found on site during the vegetation survey. No threatened fauna were recorded during the diurnal or nocturnal surveys.

A population of *Grevillea juniperina* subsp. *juniperina* was found just outside of the western boundary of the site. This species is listed as Vulnerable under that TSC Act. It is probable that this species exists in the soil seed bank on site.

Although somewhat degraded, the critically endangered ecological community Cumberland Plain Shale Woodlands and Shale-Gravel Transition was detected both on site and on the surrounding sites.

Seven part tests indicated that the eight flora species with suitable habitat represented on site would not be put at risk of local extinction as a result of the development, as such no significant

impact is expected. The seven part tests also indicated that the critically endangered ecological community present on site would be able to continue both on and off site despite the development, largely due to the size and the positioning of the development and as such no significant impact is expected. The seven part tests indicated that the 22 fauna species with habitat represented on site will not be placed at risk of local extinction as a result of the proposed development and no significant impact is expected. A species impact statement is not required, nor is a referral to the Minister for the Environment.

Recommendations

It is recommended that the presence of the critically endangered ecological community and the vulnerable *Grevillea juniperina* subsp. *juniperina* result in the owner and those working on the property treat the vegetation that is to be retained with extreme care during and after the development. A species impact statement is not required, nor is a referral to the Minister for the Environment.

The following are steps to aid in the conservation of the environmental assets identified on site:

- Removal of introduced species;
- A vegetation management plan be prepared to assist in preserving the critically endangered ecological community represented on site.

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1. Introduction

This report determines the presence of threatened species, habitats, populations (and their associated habitats) as well as ecological communities within the subject property. It is written in accordance with the requirements of the *Environmental Planning and Assessment Act* (1979), *Threatened Species Conservation Act* (1995) and the *Environment Protection and Biodiversity Conservation Act* (1999).

1.1 Aims

The aim of this report is to produce a flora and fauna assessment to:

- Assess the ecological resources of the study site;
- Fulfil the requirements of the *Environmental Planning and Assessment Act* (1979);
- To assess the impact of the development on matters of conservation significance;
- Assess the potential for threatened flora and fauna species and Endangered Ecological Communities (EECs) to occur within the study site which may be listed under commonwealth and state legislation;
- Suggest measures which may alleviate the disturbance, in alignment with the *Threatened Species Conservation Act,* (1995) and the *Environmental Conservation and Biodiversity Act,* (1999).

The specific objectives of the report are to:

- Conduct a database search of the study site;
- Plan and undertake field surveys, designed in accordance with the *Working Draft Threatened Biodiversity Assessment Guidelines for Developments and activities (2004)*
- Identify habitat for threatened species on the study site that are listed in the schedules of the TSC Act and the EPBC Act that are known or are likely to occur in the study area;
- Undertake an Assessment of Significance in accordance with the TSC Act and significant impact criteria assessments under the EPBC Act for threatened species, communities and populations that can be impacted by the proposal, either directly or indirectly; and,
- Provide recommendations to mitigate the impacts of the proposed action

1.2 Project Context

Table 1: Name and address of client

Client Name	Maryann Bastac
Address	307-321 Cranebrook Rd, Cranebrook
Local government area	Penrith

1.3 Description of Study Area

Table 2: Description of study area

Size of Property	2.11 ha
Current land use	Not in use
Surrounding land use	Residential
Proposed land use	Residential
Map of study site	See appendix 1

1.4 Proposed Development

Table 3: Description of proposed development

Type of development	Single dwelling and garage.

The concept plan for the proposed development is provided in Appendix 1.

2. Legislative Requirements and International Agreements

Environment Protection and Biodiversity Conservation Act (1999; Commonwealth legislation)

The EPBC Act is legislation of the Commonwealth. In accordance with this act, all proposed actions are to be assessed to determine impacts on *Matters of National Environmental Significance*. These matters include: World heritage properties; Natural heritage; Wetlands of national importance (RAMSAR, CAMBA, JAMBA and ROKAMBA wetlands); Threatened species and ecological communities; Migratory species; Marine areas in the Commonwealth; and Nuclear actions.

If the proposed action is likely to affect a *Matter of National Environmental Significance*, it is necessary that this action is assessed via the EPBC Acts 'considerations' assessment. If there is likely to be a significant impact on these matters, referral to the Commonwealth Environment Minister is required for review. Approval for the proposed action may then be granted, so long as accompanied control measures alleviate likely impacts.

Threatened Species Conservation Act, 1995 (New South Wales)

The central aim of the *Threatened Species Conservation Act* is to protect any threatened flora and fauna occurring in NSW, omitting marine plants and fish. The Act provides information for the identification, conservation and recovery of threatened species as well as their associated populations and communities, and any threats that are imposed on those species. If a proposed action is likely to have an effect on a threatened species, population or ecological community, then this is considered in the development approval process. If the impact is considered significant then a Species Impact Statement (SIS) must be prepared and submitted to the Director General and further agreement and approval is needed. In certain circumstances, the Minister for the Environment may additionally be consulted.

Environmental Planning and Assessment Act 1979 (NSW)

The primary objective of the *Environmental Planning and Assessment Act* (1979), is focused on the protection of the environment. This includes the protection of native flora and fauna, threatened species, populations, ecological communities and their associated habitats. The secondary objective of this act is to implement the precautionary principle, outlined in the *Protection of the Environment Administration Act* (1991). Under section 5A of the Act and Section 94 of the *Threatened Species Conservation Act* (1995), seven listed factors collectively termed the '7-part assessment of significance', allows the determination of the likely impact of a proposed action on threatened species, population or endangered ecological communities. If the proposed action is assessed as likely to have an effect on any of these, then a SIS is required.

International migratory animal agreements include:

a. Appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a Range State under the Convention;
b. The recognised agreement between Australia and the People's Republic of China for the Protection of Migratory Birds in Danger of Extinction and their Environment (CAMBA);
c. The recognised agreement between Australia and the Republic of Korea on the Protection of Migratory Birds (ROKAMBA); and,
d. The recognised agreement between Australia and Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA).

3. Methodology

3.1 Literature and Database Search

A database review was conducted prior to undertaking onsite surveys. This was done to give Envirotech ecologists an insight into which threatened or migratory species should be targeted during field surveys. Table 4 provides an overview of the desktop review.

Table 4: Overview of Desktop Search

Search Tool	Description	Search Parameters
The NSW Bionet *Atlas of New South Wales Wildlife*	Used to generate a list of species listed under the TSC Act.	Parameters set to a 10km radius of the study site.
Commonwealth *Protected Matters Search Tool*	Used to generate a list of species protected under the EPBC Act	Parameters set to a 10km radius of the study site.
Vegetation Information System (OEH)	Used to generate a map of the vegetation community onsite	Cumberland_V2_2008_VISmap_3785
Species Profile and Threats database search	Used to assess threatened and migratory species distribution, ecology and Key Threatening Processes	N/A

3.2 Terrestrial Flora Survey

The flora survey was conducted by botanist Laurel Fowler on Wednesday 3rd December 2014 at 9:30 am for three hours. It was a hot and humid summer's day.

The methodology employed was designed in accordance with the *Working Draft Threatened Biodiversity Assessment Guidelines for Developments and activities (2004)*. Table 5 refers to specific techniques employed.

Table 5: Survey techniques employed to target threatened flora

Survey Type	Description	Is this in accordance with Guidelines?
Random Meander	The entire site and the surrounding area were traversed and all flora species were recorded.	Yes

3.2.1 Habitat Assessment

The degree to which the vegetation on the site resembled natural, undisturbed vegetation was used to determine the habitat potential of the site. This included the following criteria:

- The composition of the species (diversity, degree of weed invasion); and
- Structure of the vegetation (how many original layers of vegetation existed).

Criteria used to evaluate the habitat values of the area in general terms, were *good, moderate, poor* and *cleared/disturbed*. These are detailed in table 6.

Table 6: Criteria used to assess habitat quality for threatened flora

Score	Criteria
Good	There is a high diversity of species, no weeds are extant or those weeds that are present only occur on the edges of the study site, the vegetation represents many layers (i.e. ground, shrub, canopy layers) and these are readily identifiable
Moderate	There are a high number of native species, some weed invasion but these only occur in small patches, one or more of the vegetation layers are disturbed but these are relatively intact;
Poor	There is a low number of native species, many of the plants that are on the site consist of exotic species that occur in dense patches, more than one of the vegetation layers has been disturbed or removed;
Cleared and disturbed	This represents a significantly modified landscape that has less than three native species, invasive species are mostly dominant, there is little representation of vegetation layers, the soil profile is disturbed and there is the likelihood that the area will regenerate to its natural condition and that revegetation techniques would need to be implemented in order to achieve this.

3.3 Terrestrial Fauna Survey

Fauna assessments were undertaken by Jessica Wait and Evan Webb, on Wednesday the 3rd and Thursday the 11th of December 2014. Both diurnal and nocturnal species were considered.

Methodology employed was in accordance with the *Working Draft Threatened Biodiversity Assessment Guidelines for Developments and activities (2004)* and consisted of the following (Table 7):

Table 7: Survey techniques employed to target threatened fauna

Survey Type	**Description**	**Does this match guidelines?**
Bird Point Count Survey	1 hour spent listening and visually recording and species within the immediate area.	Recommended survey technique, however survey effort does not meet the criteria. Precautionary principle applied and 7-part Tests of Significance are therefore relied upon.
Herpetology search	1 hour spent walking the creekline and areas surrounding the dams, identifying species of frogs based on calls. Actively searching under logs, ground debris and loose bark for replies.	Recommended survey technique, however survey effort does not meet the criteria. Precautionary principle applied and 7-part Tests of Significance are therefore relied upon.
Spotlighting	1 hour spent spotlighting for nocturnal fauna within the site and immediate surrounding properties.	Recommended survey technique, however survey effort does not meet the criteria. Precautionary principle applied and 7-part Tests of Significance are therefore relied upon.
Stag Watch	1 habitat tree was watched during and up to 30 minutes	Yes

	following dusk to identify occupancy of native fauna.	
Anabat	An Anabat Express was deployed onsite, set to record microbat activity over 4 consecutive nights, from the 11th -15th of December. Analysis was done by Jessica Wait.	Yes. Survey time and effort meets the minimum survey requirements for threatened microbat species.

3.3.1 Habitat Assessment

A number of habitat values were recorded during the site inspection (Table 8).

The potential for the site to provide habitat for threatened fauna species was based upon habitat values provided in Table 8, and the specific habitat requirements of threatened species. Criteria used to evaluate the overall quality of the habitat, were good, moderate, and poor. This criteria is detailed in Table 9.

Table 8: Methodology for recording fauna habitat values

Habitat Value	Description
Hollow Bearing Trees	All hollow bearing trees had their position recorded on a Garmin Etrex 20 GPS. The hollows were recorded as small (<20cm), medium (20 – 50cms), and large (>50cm). This data was then uploaded onto a map of the site, using ArcGIS.
Stags	Due to their potential habitat value, the number and positioning of stags (dead trees, some with hollows or the potential to hollow out), were also recorded on a Garmin GPS. This data was then uploaded onto a map of the site, using ArcGIS.
Connectivity	The connectivity of the site was assessed by reviewing current aerial photographs and by an examination of the condition of vegetation onsite.
Water	The site and immediate surrounding areas were examined for surface water. Drainage channels of depressions in the soil were also noted. There were all recorded in the Garmin GPS and uploaded onto maps using ArcGIS.
Rocky Outcrops	Any areas of significant bushrock were recorded using a Garmin GPS. These were then uploaded onto maps using ArcGIS.
Leaf Litter	Areas of dense leaf litter were noted.

Table 9: Criteria used to assess habitat quality for threatened fauna

Score	Criteria
Good	The presence of the ground flora consists of a diverse range of native species, the assemblages of species of the vegetation, leaf litter, significant number of refuge, feeding and breeding sites and the presence of a diverse range of native fauna species
Moderate	The ground flora contains a relatively high number of native species, the assemblages of species is relatively undisturbed, leaf litter, the presence of some refuge, feeding and breeding sites and diverse presence of native fauna
Poor	There was a low diversity of ground flora and very little presence of native flora, the assemblages of species of vegetation is low, poor presence of leaf litter, little or no refuge, feeding and breeding sites and a low diversity of fauna species.

3.4 Key Threatening Processes

A list of Key Threatening Processes listed under the *Environmental Protection and Biodiversity Conservation Act* (1999) and *Threatened Species Act* (1995) was generated by conducting a desktop search of the *Species Profile and Threats* database. During the site inspection, the presence or absence of these processes occurring on the site were documented, with additional threats not otherwise being listed, considered.

3.5 Limitations of the Report

The methodological design employed for the purposes of this report was habitat based, and in accordance with Section 5A of the *Environment Planning and Assessment Act* (1979). No trapping, spotlighting, call playback techniques were utilised.

In respect to the timing of the survey and the survey effort employed, a considerable continuum of fauna and flora species and assessments of the ecological processes that are likely to be imposed on the study site, have been derived through desktop searches, and background and literature searches. Therefore, a full inventory of flora and fauna and the ecological processes likely to occur on the study site and surroundings cannot be fully provided in this report.

It is also acknowledged that the presence and detection of threatened and migratory species can alter in respect to time, which includes seasonal weather and climatic cycles. These limitations have been mitigated by identifying any potential habitat for flora and fauna species and by assessing the likelihood of occurrence of these species, with respect to previous records, the habitat present, the land use on the study site and the landscape context of the wider area.

The report has collected data from publically available data sources and is bound by the limitations of the collection, processing and management of those databases used.

4. Results

4.1 Vegetation Communities

Results of the desktop research is provided in Table 11, with vegetation community maps provided in Figure 3 of Appendix 1.

The field investigation identified the threatened ecological community *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest* onsite and within the immediate surrounding area.

Table 10: Results of Bionet and Protected Matters Search tool, identifying threatened ecological communities recorded onsite

Community name	**NSW Status**	**Commonwealth status**	**Occurrence**
Agnes Banks Woodland in the Sydney Basin Bioregion	Endangered Ecological Community	Critically Endangered	Not detected
Blue Gum High Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community	Critically Endangered	Not detected
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	Endangered Ecological Community	Critically Endangered	Not detected
Blue Mountains Swamps in the Sydney Basin Bioregion	Vulnerable	Endangered	Not detected
Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion	Vulnerable	Not Listed	Not Detected
Castlereagh Swamp Woodland Community	Endangered Ecological Community	Not Listed	Not detected

Community name	NSW Status	Commonwealth status	Occurrence
Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion	Endangered Ecological Community	Not Listed	Not detected
Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest	Critically Endangered Ecological Community	Critically Endangered	Detected on site
Freshwater wetland on coastal floodplains of the New South Wales North Coast, Sydney Basin and South East corner bioregions	Endangered Ecological Community	Not listed	Not detected
Montane peatlands and swamps of the New England Tableland, NSW North Coast, Sydney Basin, South Easter Corner, South Eastern Highlands and Australian Alps bioregions	Endangered Ecological Community	Endangered	Not detected
Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion	Endangered Ecological Community	Endangered	Not detected
River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales, North Coast, Sydney Basin and South East Corner Bioregions	Endangered Ecological Community	Not listed	Not detected
Shale gravel Transition Forest in the Sydney Basin Bioregion	Endangered Ecological Community	Critically Endangered	Not detected

Species	NSW Status	Commonwealth status	Occurrence on the study site
Shale/Sandstone Transition Forest	Endangered Ecological Community	Endangered	Not detected
Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion	Endangered Ecological Community	Not listed	Not detected
Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion	Critically Endangered Ecological Community	Not listed	Not detected
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered Ecological Community	Not listed	Not detected
Western Sydney Dry Rainforest in the Sydney Basin Bioregion	Endangered Ecological Community	Critically Endangered	Not detected
White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community	Critically Endangered	Not detected

4.2 Flora

4.2.1 Desktop Research

Results of the desktop research is provided in Table 12. A total of 9 threatened flora species have been recorded within a 10km radius of the study site. This includes:

- 9 species listed under the TSC Act
- 6 species listed under the EPBC Act

4.2.2 Flora Surveys

Flora surveys revealed the following:

Table 11: Habitat features present onsite for threatened flora

Feature	**Quantity**	**Description**
Species diversity	Moderate	27 native species were recorded on site
Structural integrity	Moderate	The western portion of the site had all vegetation layers present however the central area of the site had a minimal mid-storey.
Habitat quality	High	The site is suitable habitat for several threatened species. *Grevillea juniperina* subsp. *juniperina* is located just off site.
Disturbances	Moderate	The absence of a mid-storey in many parts of the site suggests that at some point in the past the land has been cleared and is now regenerating.

Figure 1: GIS map showing locations of threatened flora species *Grevillea juniperina* subsp. *juniperina*.

4.2.3 Assessment of Occurrence

In collating results from desktop and field surveys, it has been determined that there is:

- A low likelihood of the occurrence of 4 species to be present onsite
- A moderate likelihood of occurrence of 4 species to be present onsite
- A high likelihood of occurrence of 1 species to be present onsite.

Species with a moderate – high likelihood of occurrence are:

- *Acacia bynoeana*
- *Allocasuarina glareicola*
- *Dillwynia tenuifolia*
- *Grevillea juniperina* subsp. *juniperina*
- *Micromyrtus minutiflora*
- *Persoonia nutans*
- *Pimelea spicata*
- *Pultenaea parviflora*

For these species, 7 Part Tests of Significance have been prepared, and are present in Appendix 3.

An assessment of available habitat resources onsite, specific to threatened flora species is provided in Table 13.

Table 12 An analysis of threatened flora species likely to occur onsite

Species	Common name	NSW status	Commonwealth status	Habitat	Likelihood of occurrence on the study site
Acacia bynoeana	Bynoe's Wattle	Endangered	Vulnerable	Occurs in heath or dry sclerophyll forest on sandy soils.	High
Allocasuarina glariecola		Endangered	Endangered	Found in Castlereagh open woodland community on tertiary alluvial gravels with clayey subsoil.	Moderate
Dillwynia tenuifolia		Vulnerable	Not Listed	Occurs in scrubby, dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest.	High
Grevillea juniperina subsp. *juniperina*	Juniper-leaved Grevillea	Vulnerable	Not Listed	Grows on clay to sandy soils derived from shale or alluvium. Recorded in Cumberland Plain Woodland and Castlereagh Ironbark Woodland.	High
Micromyrtus minutiflora		Endangered	Vulnerable	Grows in Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, Open Forest on tertiary alluvium and consolidated river sediments.	Moderate
Persoonia nutans	Nodding Geebung	Endangered	Endangered	Restricted to the Cumberland Plain and generally confined to Aeolian and alluvial sediments and occur in a range of communities including Cooks River/Castlereagh Ironbark Forest.	Moderate
Pimelaea spicata	Spiked Rice-flower	Endangered	Endangered	Found on well- structured clay soils. Associated with grey box communities and moist shale woodland.	Moderate
Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Endangered	Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where *Pterostylis saxicola* occurs are	Low

Species	Common name	NSW status	Commonwealth status	Habitat	Likelihood of occurrence on the study site
				sclerophyll forest or woodland on shale/sandstone transition soils or shale soils	
Pultenaea parviflora		Endangered	Vulnerable	Occurs in scrubby, dry heath areas within Castlereagh Ironbark Forest or Shale Gravel Transition Forest on alluvium soils. Occurs only on the Cumberland Plain.	High

4.3 Terrestrial Fauna

4.3.1 Desktop Research

Results of the desktop research is provided in Table 4. A total of 43 threatened flora species have been recorded within a 10km radius of the study site. This includes:

- 42 species listed under the TSC Act
- 17 species listed under the EPBC Act

4.3.2 Fauna Surveys

A list of the species recorded onsite during the survey period is present in Appendix 2. In total, 15 species were recorded on site.

4.3.3 Habitat Assessment

An overview of the habitat assessment is provided in the Table 13 below. A more detailed description of the habitat onsite is provided in Appendix 3.

Table 13: Habitat features onsite for threatened fauna

Habitat Value	**Quantity**	**Description**
Hollow Bearing Trees	Low-Moderate	Four medium hollows were found on site and two small hollows were found to the west of the site.
Stags	Low	Only three stags were present on site.
Connectivity	Low	There is low connectivity within the site due to the sparsely vegetated area in the centre. The heavily vegetated area to the north of the site is not connected as the property to the north has been cleared.
Water	Moderate	There is a creek running parallel to the edge of the site closest to Cranebrook Road.

Rocky Outcrops	Low	No rocky outcrops were recorded on site.
Leaf Litter	Moderate	Large amounts of leaf litter were presents in the areas that were heavily vegetated (western portion of site) but less was present in the more sparsely vegetated central part of the site.

4.3.4 Assessment of Occurrence:

In collating results from desktop and field surveys, it has been determined that there is:

- A low likelihood of the occurrence of 23 species to be present on the study site;
- A moderate likelihood of occurrence of 17 species to be present on the study site.
- A high likelihood of occurrence for 3 species to be present onsite

Species with a moderate – high likelihood of occurrence are:

- Giant Burrowing Frog *Heleioporus australiacus*
- Little John's Tree Frog *Litoria littlejohni*
- Stuttering Frog *Mixophyes balbus*
- Spotted Harrier *Circus assimilis*
- Square tailed Kite *Lophoictinia isura*
- Gang Gang Cockatoo *Callocephalon fimbriatum*
- Glossy black cockatoo *Calyptorhynchus lathami*
- Little lorikeet *Glossopsitta pusilla*
- Swift Parrot *Lathamus discolor*
- Turquoise Parrot *Neophema pulchella*
- Powerful Owl *Ninox strenua*
- Masked owl *Tyto novaehollandiae*
- Brown Treeceeper (eastern sub species) *Climacteris picumnus*
- Speckled Warbler *Chthonicola sagittata*
- Regent Honeyeater *Anthochaera phrygia*
- Black chinned honeyeater *Melithreptus gularis gularis*
- Varied sitella *Daphoenositta chrysoptera*
- Scarlet robin *Petroica boodang*
- Flame Robin *Petroica phoenicea*
- Koala *Phascolarctos cinereus*
- Grey- headed Flying Fox *Pteropus poliocephalus*
- Southern Myotis *Myotis macropus*

For these species, 7 Part Tests of Significance have been prepared, and are present in Appendix 3.

Table 14: An analysis of threatened flora species likely to occur onsite

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
			Herpetofauna		
Heleioporus australiacus	Giant Burrowing Frog	Vulnerable	Vulnerable	This species occurs in woodland and open dry sclerophyll forest, and commonly burrows below the soil surface. When they breed they will be found in chorus along creek lines, under vegetation and rocks. Breeding habitat consists of pools near second order streams.	Moderate
Litoria aurea	Green and Golden Bell Frog	Endangered	Vulnerable	This species occurs in open forests in wet drainage lines that occur below sandstone ridges. It seeks refuge in leaf litter or dense vegetation.	Low
Litoria littlejohni	Little John's Tree Frog	Vulnerable	Vulnerable	Inhabits heath based forests and woodlands where it shelters under leaf litter and low vegetation. Breeds in the upper reaches of permanent streams and perched swamps.	Low
Mixophyes balbus	Stuttering Frog	Endangered	Vulnerable	Occurs in rainforest and wet, tall open forest in the foothills and escarpment on the Eastern side of the Great Dividing Range.	Low
Hoplocephalus bungaroides	Broad Headed Snake	Endangered	Vulnerable	This species take shelter in rock crevices and is found commonly on exposed cliff edges. It will also shelter in hollow logs embedded in escarpments. Will feed on small reptiles and amphibians.	Low
			Aves		

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Stictonetta naevosa	Freckled Duck	Vulnerable	Not listed	The freckled duck inhabits permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. The species rests in dense cover during the day, usually in deep water. They feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates.	Low
Botarus poiciloptilus	Australasian Bittern	Endangered	Endangered	Prefers permanent, freshwater wetlands with tall, dense vegetation.	Low
Botaurus poiciloptilus	Eastern Bristebird	Endangered	Endangered	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest.	Low
Rostratula australis	Australian Painted Snipe	Endangered	Endangered	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum Muehlenbeckia or canegrass or sometimes tea-tree (Melaleuca).	Low

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Circus assimilis	Spotted Harrier	Vulnerable	Not listed	This species occurs in open woodland which include mallee remnants. It is found predominately in native grassland but can be found foraging over agricultural land and other open habitats such as around wetlands.	Moderate
Lophoictinia isura	Square tailed Kite	Vulnerable	Not listed	This species inhabits a range of timbered habitats such as open forest and dry woodlands. It is found commonly around timbered watercourses.	Moderate
Hieraaetus morphnoides	Little Eagle	Vulnerable	Not listed	Found in eucalypt forests, woods and She oak woodlands and riparian woodlands of the interior of NSW. Will nest in tall living trees.	Low
Falco subniger	Black Falcon	Vulnerable	Not listed	This species occurs mostly in inland regions.	Low
Callocephalon fimbriatum	Gang Gang Cockatoo	Vulnerable	Not listed	Generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.	Moderate
Calyptorhynchus lathami	Glossy black cockatoo	Vulnerable	Not listed	Occurs in open forest and woodland mostly on the coast. It prefers vegetation of Sheoak and Forest Sheoak (*Allocasuarina ssp*.) on which it feeds.	Moderate
Glossopsitta pusilla	Little lorikeet	Vulnerable	Not listed	Found where it will feed on the canopy species in Eucalyptus forest and woodland.	Moderate

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Lathamus discolor	Swift Parrot	Endangered	Endangered	Found where eucalypts are flowering profusely or where lerp infestations are evident. Will return to feed areas where there is foraging resources. Favoured species include Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens* in the winter. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*.	High
Neophema pulchella	Turquoise Parrot	Vulnerable	Not listed	The turquoise parrot lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	High
Ninox strenua	Powerful Owl	Vulnerable	Not listed	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.	Moderate

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Tyto novaehollandiae	Masked owl	Vulnerable	Not listed	Occurs mostly in dry Eucalypt forests and woodland. Has a large home range.	Moderate
Climacteris picumnus	Brown Treeceeper (eastern sub species)	Vulnerable	Not listed	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys.	Moderate
Chthonicola sagittata	Speckled Warbler	Vulnerable	Not listed	Will occur in a range of Eucalyptus dominated communities with a grassy understory. Will often be found around rocky ridges and gullies. Their typical habitat consists of native grasses, a sparse shrub under layer and some eucalypts that still retain an open canopy. This species requires a relatively large habitat area (approx. 10 hectares to breed and a larger area to forage) that is undisturbed for it to persist.	Low - Moderate
Anthochaera phrygia	Regent Honeyeater	Crticially Endangered	Endangered	The Regent Honeyeater inhabits woodlands and if conserved will benefit a range of other species. This species will inhabit dry open forest and woodland, in particular Ironbark woodland and riparian forests of River Sheoak. This species occurs in conjunction with a range of other species and where there are large numbers of mature trees and an abundance of mistletoe. It is a generalist forager and will forage on a range of eucalypts and mistletoes. Key species include: *Eucalyptus microcarpa, E. punctata, E. polyanthemos, E.*	Low - Moderate

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
				moluccana, Corymbia robusta, E. crebra, E. caleyi, C. maculata, E.mckieana, E. macrorhyncha, E. laevopinea, and *Angophora floribunda*. Nectar and fruit from the mistletoes *Amyema miquelii, A. pendula* and *A. cambagei* are also eaten during the breeding season. They will also utilize the understory to hunt for invertebrates.	
Melithreptus gularis gularis	Black chinned honeyeater	Vulnerable	Not listed	Occurs in the canopy of open forests where *E. sideroxylon, E. albens, E. macrocarpa, E. mellidora, E. blakelyi* and *E. tereticornis* are found. Occurs where stringybarks are found.	Moderate
Daphoenositta chrysoptera	Varied sitella	Vulnerable	Not listed	This species occurs in Eucalypt forests particularly where rough barked species are found.	Moderate
Petroica boodang	Scarlet robin	Vulnerable	Not listed	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps.Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	High
Petroica phoenicea	Flame Robin	Vulnerable	Not listed	This species will occur in tall moist eucalypt forests and woodlands where ridges and slopes are present. It will be found where there are clearings on areas with an open understory.	Moderate
Petroica rodinogaster	Pink Robin	Vulnerable	Not listed	Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies.	Low

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Stagonopleura guttata	Diamond Firetail	Vulnerable	Not listed	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities	Low
			Mammalia		
Dasyurus maculatus	Spotted tailed quoll	Vulnerable	Endangered	This species occurs in a range of habitat types which encompass woodland, rainforest, open forest and heath. This species requires fallen logs, caves, rock crevices and rocky cliff faces for refuge.	Low
Phascolarctos cinereus	Koala	Vulnerable	Vulnerable	This species occurs in Eucalypt woodlands and forests. Require a home range of 2 hectares up to several hundred hectares.	Moderate
Petaurus norfolkensis	Squirrel Glider	Vulnerable	Not listed	This species is found where there is old grown Box or Box Ironbark woodland and River Red Gum forest. It will occur in habitats that have a mixed assemblage and will live in family groups of a single male and several females and offspring. They require abundant tree hollows for nesting and refuge.	Low
Pseudomys novaehollandiae	New Holland Mouse	Not listed	Vulnerable	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	Low
Petrogale penicillata	Brush tailed rock wallaby	Endangered	Vulnerable	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	Low

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Petaurus australis	Yellow bellied glider	Vulnerable	Not listed	This species occurs in mature or old growth Ironbark Woodlands as well as River Red Gum Forest. It occurs in places where an *Acacia* midstory is present. They require abundant tree hollows for nesting and refuge.	Low
Mormopterus norfolkensis	Eastern freetail bat	Vulnerable	Not listed	This species occurs in sclerophyll forests, woodlands and mangrove regions. It finds refuge in tree hollows but will also roost under other structures.	Low
Chalinolobus dwyeri	Large eared pied bat	Vulnerable	Vulnerable	This species roosts in caves, cliffs, abandoned mines and in Fairy Martin *Petrochelidon ariel* nests. Found in well vegetated areas where there are gullies.	Low
Scoteanax rueppelli	Greater broad nosed bat	Vulnerable	Not listed	This species occurs in a wide range of habitats. It is mostly found in tall wet forest. Forages along creek and river edges.	Low
Pteropus poliocephalus	Grey- headed Flying Fox	Vulnerable	Vulnerable	Inhabits rainforests, woodlands and swamps. Occasionally found in urban areas.	Moderate
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not listed	Found in moist habitats where there is an abundance of trees taller than 20 metres	Low
Miniopterus schreibersii	Eastern bentwing bat	Vulnerable	Not listed	Caves are the primary roosting habitat, but the species also use derelict mines, storm-water tunnels, buildings and other man-made structures. The eastern bentwing bat forms discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.	Low
Myotis macropus	Southern Myotis	Vulnerable	Not listed	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage	Low - Moderate

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurence
Meridolum corneovirens	Cumerland Plain Land Snail	Endangered	Not listed	Found predominantly in the Cumberland Plain woodland. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest, which are also listed communities.	Low

4.4 Migratory Species

4.4.1 Desktop Research

Results of the desktop research is provided in Table 16. A total of 15 migratory species have been recorded within a 10km radius of the study site.

4.4.2 Fauna Surveys

No migratory species were recorded on site during the fauna surveys.

4.4.3 Assessment of Occurrence

In collating results from desktop and field surveys, it has been determined that there is a:

- low likelihood of the occurrence of 11 migratory species to be present on the study site
- moderate likelihood of occurrence of 4 species to be present on the study site
- high likelihood of occurrence of 0 species to be present on the study site.

Those species with a moderate or high occurrence are:

- White throated Needletail *Hirundapus caudacutus*
- Latham's Snipe *Gallinago hardwickii*
- Rainbow Bee-eater *Merops ornatus*
- Common sandpiper *Actitis hypoleucos*

These species listed are assessed under the *Environmental Protection and Biodiversity Act* (1999) '*Considerations*' (Appendix 2).

Table 15: Results of the Desktop research, showing the occurrence of migratory species within a 10km radius of the site (C=CAMBA; J=JAMBA, K=ROKAMBA)

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurrence on Study Site
Apus pacificus	Fork- tailed Swift	Not listed	C,J,K	This species is almost exclusively aerial, usually occurring over inland plains. They are also seen flying over urban and settled areas. They usually occur over dry, open habitats such as grasslands.	Low
Ardea ibis	Cattle Egret	Not listed	C,J	Found in tropical and temperate grasslands, wooded areas and around terrestrial wetlands that have low emergent vegetation. Congregate in pastures that are low lying and poorly drained and occur commonly with livestock. Their most preferred habitat is wetlands that are shallow, open and fresh with low lying emergent vegetation.	Low
Plegadis falcinellus	Glossy Ibis	Not listed	C	The Glossy Ibis requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains, mangroves and ricefields. The Glossy Ibis is both migratory and nomadic. Its range expands inland after good rains, but its main breeding areas seem to be in the Murray-Darling Basin of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. Glossy Ibis often move north in autumn, then return south to their main breeding areas in spring and summer.	Low
Ardea alba	Great Egret	Not listed	C, J	Occupies a wide range of wetland habitats including swamps and marshes, margins of rivers and lakes, damp or flooded grasslands and salt marshes.	Low

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurrence on Study Site
Haliaeetus leucogaster	White-bellied Sea-Eagle	Not listed	C	Predominantly in coastal habitats but also recorded around terrestrial wetlands in tropical and temperate areas. They require large open areas of water for foraging but will be found flying over terrestrial habitats in which they occasionally forage. They will be found around swamps, lakes and sewage ponds. They occur in coastal dunes, tidal flats, grassland, heathland, woodland, forest and even urban areas.	Low
Hirundapus caudacutus	White-throated Needletail	Not listed	C,J,K	In Australia, White-throated Needletails almost always forage aerially, at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests.	Moderate – aerial foraging
Gallinago hardwickii	Latham's Snipe	Not listed	C,J,K	Occur in a range of habitats from permanent and ephemeral wetlands that have low emergent vegetation, to modified or artificial habitats that are close to human influences. They will occur in a range of water bodies such as waterholes, bogs, lakes, lagoons and creeks and in a range of vegetation types and communities	Moderate
Merops ornatus	Rainbow Bee-eater	Not listed	J	Occurs mainly in open forests and woodlands, shrub lands and in various cleared and semi- cleared areas including farmland.	Moderate
Monarcha melanopsis	Black- faced Monarch	Not listed	Bonn	Occurs in rainforest ecosystems, vine forest and tropical rainforest.	Low

Species	Common Name	NSW Status	Commonwealth Status	Habitat	Occurrence on Study Site
Symposiarchus trivirgatus	Spectacled monarch	Not listed	Bonn	This species occurs in rainforests and wet gullies	Low
Myiagra cyanoleuca	Satin Flycatcher	Not listed	Bonn	Inhabit heavily vegetated gullies in Eucalypt- dominated forests and taller woodlands. On migration occur in coastal forests, woodlands and mangroves.	Low
Rhipidura ruffifrons	Rufous Fantail	Not listed	Bonn	Usually inhabits wet sclerophyll forest, often in gullies with a dense shrubby understorey, often including ferns.	Low
Rhostratula benghalensis	Painted Snipe	Endangered	C, Endangered	Inhabits shallow, terrestrial, freshwater wetlands, including temporary and permanent lakes, swamps and clay pans.	Low
Actitis hypoleucos	Common sandpiper	Not listed	C,J,K	This species is found in a range of wetland habitats that vary in salinity. They are found on rocky shores and muddy margins. It will also occur in lakes pools, billabongs, farm dams and claypans.	Moderate
Tringa glareola	Wood Sandpiper	Not listed	C, J, K	Wood Sandpipers are seen in small flocks or singly on inland shallow freshwater wetlands, often with other waders. They prefer ponds and pools with emergent reeds and grass, surrounded by tall plants or dead trees and fallen timber.	Low

4.5 Key Threatening Processes

Key threatening processes listed under the *Environmental Protection and Biodiversity Conservation Act* (1999) and *Threatened Species Act* (1995) relevant to the site have been listed in Table 16.

Where the proposal is shown to contribute to KTP they are further considered in section 5 and Appendix 3.

Table 16: Key threatening processes relating to the development

Threatening Process	**Act**	**Likely to Occur on site at present**	**Proposal may contribute**
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	TSC	No	Potentially
Bushrock removal	TSC	No	No
Clearing of native vegetation	TSC/EPBC	Potentially	Yes
Competition and grazing by the feral European rabbit	TSC	Potentially	No
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	TSC/EPBC	No	No
Invasion of native plant communities by exotic perennial grasses	TSC	Yes	Yes
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	TSC/EPBC	Yes	Yes
Predation by the European fox	TSC	Yes	No
Removal of dead wood and dead trees	TSC	Yes	Yes

5. Impacts of the Proposed Development

5.1 Potential Impacts on Endangered Ecological Communities (EECs)

The proposal is likely to cause the following impacts on the ecological community *Cumberland Plains Shale Woodlands and Shale-Gravel Transition Forest* present on site:

- Clearing and permanent modification of the groundcover stratum of vegetation for the construction of buildings, driveways and gardens;
- Loss of over story and canopy trees;
- Loss of leaf litter and decorticating bark;
- Trampling of native vegetation during the construction phase; and
- Altered drainage patterns due to the loss of vegetation and the potential increase of impervious surfaces.

An assessment of significance has determined that the development will **NOT** have a significant impact upon the endangered ecological community present onsite (Appendix 3). An assessment of considerations under the *Environmental Protection and Biodiversity Conservation Act* (1999) has also determined that it is unlikely that this development will lead to the local extinction of the community.

5.2 Potential Impacts on Threatened Flora Species

The proposal is likely to cause the following impacts on threatened flora species:

- Removal of habitat
- functional and structural changes within flora populations
- Loss of flora biodiversity in the region.
- Loss of habitat due to the invasion of weeds

Table 17 provides a justification for the conduct of a Seven Part Test, in relation to individual flora species.

This assessment has determined that the development will **NOT** have a significant impact upon the eight threatened flora species with suitable habitat represented on site (Appendix 3). An assessment of considerations under the *Environmental Protection and Biodiversity Conservation Act* (1999) has also determined that it is unlikely that this development will lead to the local extinction of the species.

Table 17: The potential impact on threatened flora species that have habitat represented onsite, and whether a Seven Part Test (TSC Act has been applied)

Scientific Name	TSC Act	EPBC Act	Individual death or injury	Loss or disturbance	Loss or disturbance to reproduction	Impact assessment applied?
Acacia bynoeana	Endangered	Vulnerable	Unlikely	Potentially	Potentially	Yes
Allocasuarina glareicola	Endangered	Endangered	Unlikely	Potentially	Potentially	Yes
Dillwynia tenuifolia	Vulnerable	Not Listed	Unlikely	Potentially	Potentially	Yes
Grevillea juniperina subsp. *juniperina*	Vulnerable	Not Listed	Potentially	Likely	Very Likely	Yes
Micromyrtus minutiflora	Endangered	Vulnerable	Unlikely	Potentially	Potentially	Yes
Persoonia nutans	Endangered	Endangered	Unlikely	Potentially	Potentially	Yes
Pimelea spicata	Endangered	Endangered	Unlikely	Potentially	Potentially	Yes
Pultenaea parviflora	Endangered	Vulnerable	Unlikely	Potentially	Potentially	Yes

5.3 Potential Impacts on Threatened Fauna Species

The proposal has the potential to cause the following impacts on threatened fauna species:

- Death of individuals
- Injury of individuals
- Reduction and loss of breeding resources
- Reduction and loss of foraging resources
- Disturbance to a larger habitat area
- Loss of connectivity within and between habitats

Table 19 outlines the impacts that the proposal may have on these species and determines whether a Seven Part Test (TSC Act) is required.

- Giant burrowing frog – *Heioporus australiacus*
- Stuttering frog – *Mixophyes balbus*
- Square-tailed kite – *Lophoctinia isura*
- Little lorikeet – *Glossopsitta pusilla*
- Glossy black cockatoo – *Calyptorhynchus lathami*
- Gang Gang cockatoo – *Callocephalon fimbriatum*
- Turquoise parrot – *Neophema pulchella*
- Brown treecreeper – *Climacteris picumnus*
- Speckled warbler – *Chthonicola sagittata*
- Regent honeyeater – *Anthocaera Phrygia*
- Black-chinned honeyeater – *Mellthreptus gulgaris*
- Varied sittella – *Daphoenositta chrysopter*
- Scarlet robin – *Petroica boodang*
- Flame robin – *Petroica phoenicea*

This assessment has determined that the development will **NOT** have a significant impact upon threatened fauna species with suitable habitat represented on site (Appendix 3). An assessment of considerations under the *Environmental Protection and Biodiversity Conservation Act* (1999) has also determined that it is unlikely that this development will lead to the local extinction of the threatened fauna species.

5.4 Detailed Description of Habitat Onsite

307-321 Cranebrook Road, Cranebrook is located on a patch of endangered ecological community called Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. Since European occupation the endangered ecological community has been reduced to small patches.

The dominant canopy species were eucalypts, primarily *Eucalyptus eugenioides* and *Eucalyptus parramattensis*.

The site is somewhat degraded with central areas only having a sparse mid-storey. The northern side of the property is dense with *Backhousia myrtifolia* but with some infestation of the weed *Cestrum parqui*. The eastern side of the property has a waterway close to the road that contains *Typha domingensis,* a species of bulrush.

Much of the property is overrun with the weed *Ochna serrulata*. Some *Lantana camara* is present as well as an infestation of *Verbena bonariensis* towards the south of the site.

Just off site to the west is a healthy population of the vulnerable (TSC Act) species *Grevillea juniperina* subsp. *juniperina*.

Figure 7: *Grevillea juniperina* subsp. *juniperina* seen near the property.

Table 11 The potential impact on threatened fauna species, and whether a Seven Part Test (TSC Act has been applied

Common name	Scientific name	TSC Act	EPBC Act	Individual death or injury	Loss or disturbance to limiting of foraging resources	Loss or disturbance of breeding resources	Impact assessment applied?
Giant burrowing frog	*Heleioporus australiacus*	V	V	Yes	Yes	Potentially	Yes
Stuttering Frog	Mixophyes balbus	E	V	Yes	Yes	Potentially	Yes
Spotted Harrier	*Circus assimilis*	Vulnerable	Not listed	Unlikely	Potentially	Unlikely	No
Square Tailed Kite	*Lophoictinia isura*	Vulnerable	Not listed	Unlikely	Yes	Potentially	Yes
Little lorikeet	*Glossopsitta pusilla*	V	Not listed	Potentially	Yes	Potentially	Yes
Glossy black cockatoo	*Calyptorhynchus lathami*	V	Not listed	Potentially	No	Potentially	Yes
Gang Gang Cockatoo	*Callocephalon fimbriatum*	V	Not listed	Potentially	No	Potentially	Yes
Swift Parrot	*Lathamus discolor*	E	E	Unlikely	Potentially	No	No

Turquoise Parrot	*Neophema pulchella*	V	Not listed	Unlikely	Potentially	Potentially	Yes
Powerful Owl	*Ninox strenua*	V	Not listed	Unlikely	Potentially	No	No
Masked owl	*Tyto novaehollandiae*	V	Not listed	Unlikely	Potentially	No	No
Brown Treecreeper	*Climacteris picumnus*	V	Not listed	Unlikely	Potentially	Potentially	Yes
Speckled Warbler	Chthonicola sagittata	V	Not listed	Unlikely	Potentially	Potentially	Yes
Regent honeyeater	*Anthochaera phrygia*	CE	E	Unlikely	Potentially	Potentially	Yes
Black chinned honeyeater	*Mellthreptus gulgaris*	V	Not listed	Unlikely	Potentially	Potentially	Yes
Varied sittella	*Daphoenositta chrysoptera*	V	Not listed	Unlikely	Potentially	Potentially	Yes
Scarlet Robin	Petroica boodang	V	Not listed	Unlikely	Potentially	Potentially	Yes
Flame Robin	*Petroica phoenicea*	V	Not listed	Unlikely	Potentially	Potentially	Yes
Koala	*Phasolarctos cinereus*	V	V	Unlikely	Potentially	Unlikely	No
Grey-headed Flying Fox	*Pteropus poliocephalus*	V	V	No	Potentially	No	No

Southern Myotis	*Myotis macropus*	V	Not listed	Unlikely	Potentially	Unlikely	No
Painted snipe	*Rhostratula benghalensis*	Endangered	Endangered	Unlikely	Potentially	Unlikely	No

6. Recommendations

The following recommendations are suggested in order to mitigate and ameliorate the impacts of the proposal on threatened flora and fauna species and endangered communities:

Vegetation Removal:

- Selective retention of larger canopy trees in order to increase connectivity within the landscape and among habitat patches within the immediate environs of the impact site. This will also ameliorate the amount of sunlight that will penetrate the soil.
- Any construction/earthworks that are to be undertaken in the vicinity of those trees that are to be retained on the site should adhere to the *Protection of Trees on Development Sites, AS4970-2009* (Standards Australia 2009).
- Any trimming of trees (which are to be retained on the site), to accommodate construction should be carried out by a qualified arborist.
- If any fauna is injured during vegetation removal WIRES should be called immediately.
- Vehicles and earthmoving machinery should only be parked in restricted areas in order to protect the off-site habitat surrounding the study site.
- Care should be taken to ensure that, although the vulnerable species *Grevillea juniperina* subsp. *juniperina* is only located off site, no individual plants are harmed during or after the construction phase. This is to be achieved by restricting the presence of any machinery within 40 m of the western property boundary.

Offsetting the Impacts:

- The natural ecosystem should be integrated into landscaping plans of the area.
- It is recommended that some of the cleared vegetation be placed randomly within conserved bushland areas to increase the number of potential fauna breeding and shelter sites. In this way, habitat quality within the remaining undisturbed portion of the site can be enhanced and the disturbance partly offset.
- In regards to the wetland habitat, all littoral vegetation should remain undisturbed and uncleared. This will provide suitable sheltering sites for fauna that use this habitat whilst maintaining the diversity of vegetation on the site.

Maintenance:

- Planting of exotic species should be avoided during landscaping. It is advised that species that naturally occur in this plant community are sourced for gardens.
- Domestic pets should be kept indoors, particularly at night, in order to protect any wildlife that may use the site as habitat.
- Weed species currently present on site, particularly *Ochna serrulata,* need to be managed in order to improve the condition of the critically endangered ecological community present on site.
- We recommend that a Vegetation Management Plan be prepared and implemented in order to protect the critically endangered ecological community present on site and in surrounding areas. Step in order to ensure that the threatened flora species *Grevillea juniperina* subsp. *juniperina* occurring offsite is protected.

7. Conclusion

This report assesses whether any threatened flora and fauna species, endangered populations and endangered ecological communities are likely to be impacted upon by the proposed residential development. It addresses the *Threatened Species Conservation Act* (1995) and the *Environmental Protection and Biodiversity Conservation Act* (1999).

No threatened fauna species were found to be present on the site at the time of inspection. The TSC Act listed vulnerable species *Grevillea juniperina* subsp. *juniperina* was located just to the west of the site and is likely to be present in the soil seed bank on the site. Habitat potential of the site for a number of threatened flora and fauna species is considered high. The critically endangered ecological community Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest occurs on the study site but the community will continue to exist both on site and off site regardless of the development. A species impact statement (TSC Act) and a referral to the Minister (EPBC Act) is deemed **NOT** necessary.

A number of strategies are recommended to alleviate the impacts of this proposal and include:

- The natural ecosystem should be integrated into landscaping plans of the area.
- Weed species currently present on site, particularly *Ochna serrulata,* need to be managed in order to improve the condition of the critically endangered ecological community present on site.
- It is recommended that some of the cleared vegetation be placed randomly within conserved bushland areas to increase the number of potential fauna breeding and shelter sites. In this way, habitat quality within the remaining undisturbed portion of the site can be enhanced and the disturbance partly offset.
- Care should be taken to ensure that, although the vulnerable species *Grevillea juniperina* subsp. *juniperina* is only located off site, no individual plants are harmed during or after the construction phase.

8. References

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Office of Environment and Heritage (undated) Threatened species profile search (online). Available from: http://www.environment.nsw.gov.au/threatenedspeciesapp/ [Accessed 3 December 2014].

Appendix 1: Aerial Imagery and Maps

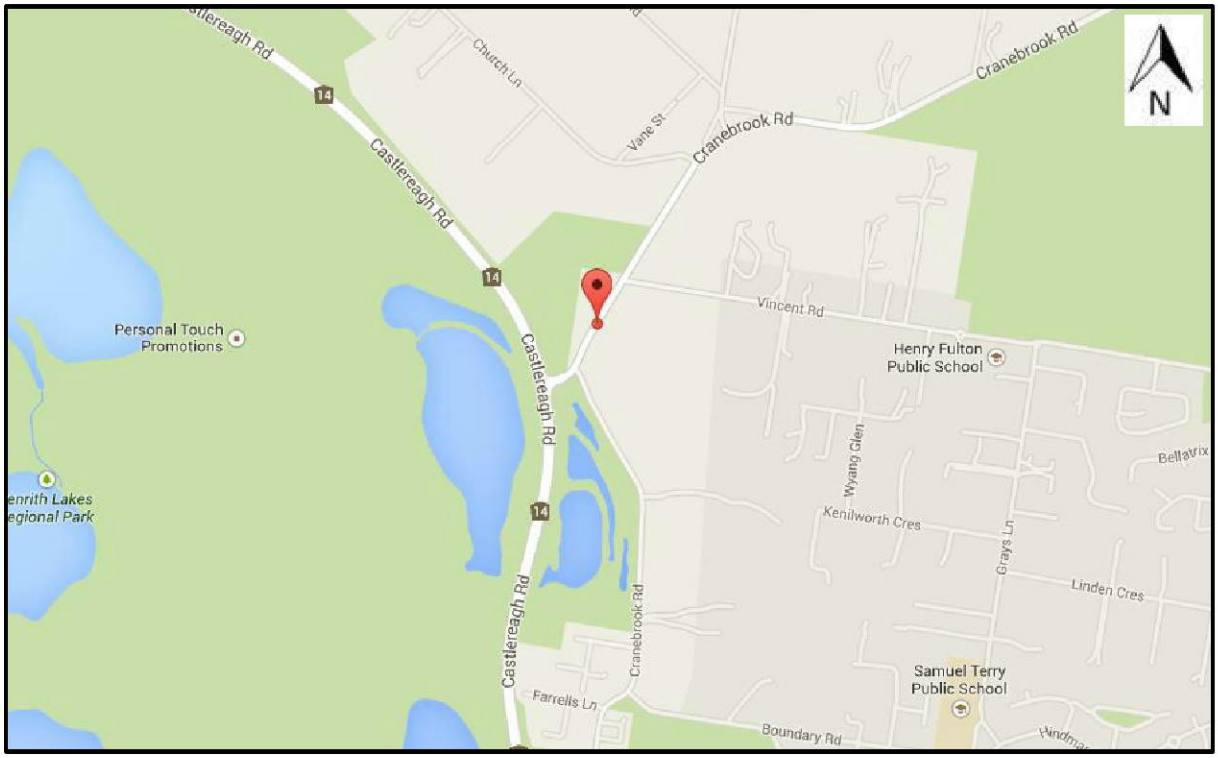

Figure 2: Map of 307-321 Cranebrook Road, Cranebrook

Figure 3: Aerial Map of 307-321 Cranebrook Road, Cranebrook

Figure 4: Aerial map of 307-321 Cranebrook Rd, Cranebrook showing vegetation layers.

Shale Plains Woodland

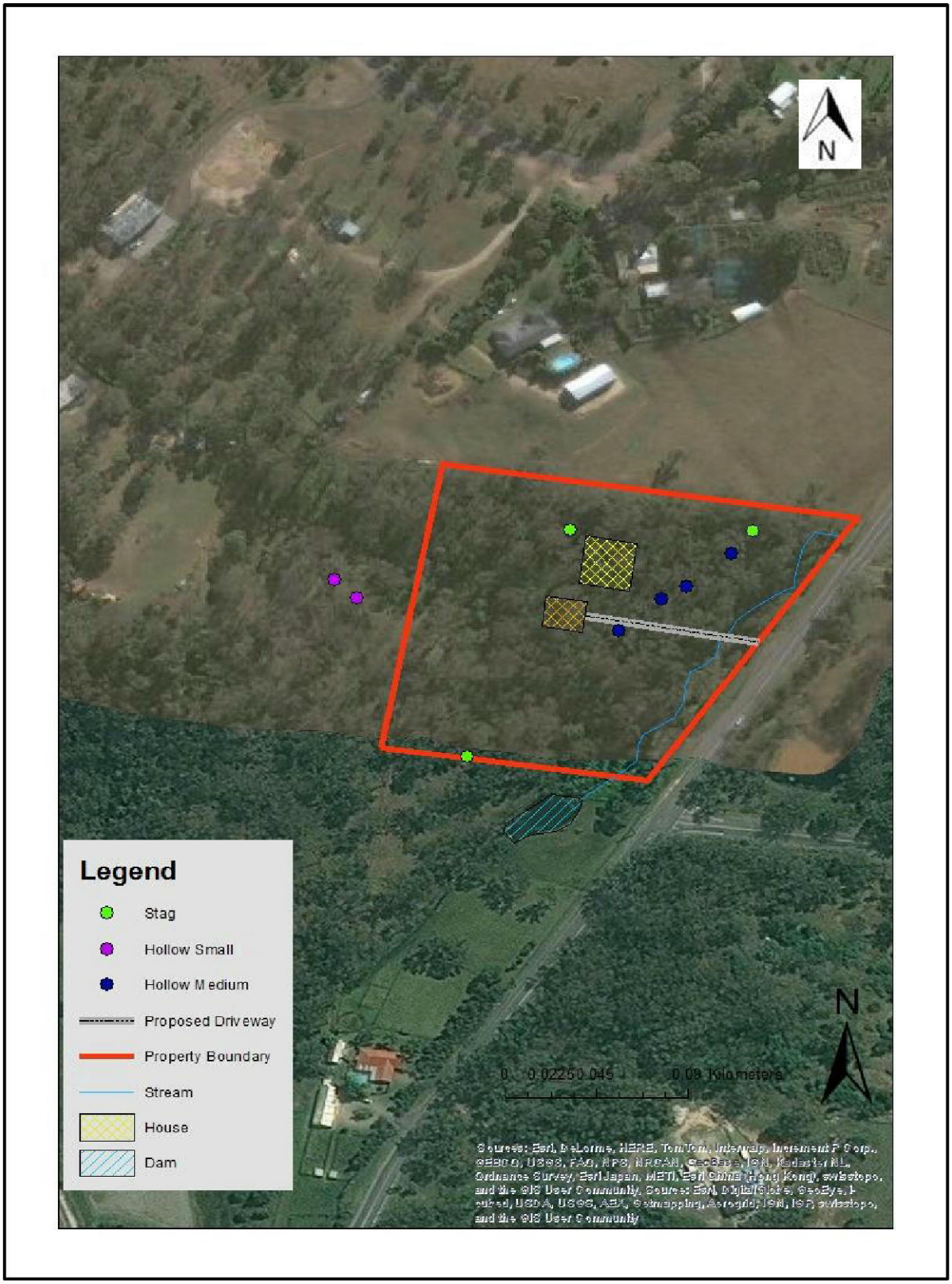

Figure 5: Fauna habitat present on site

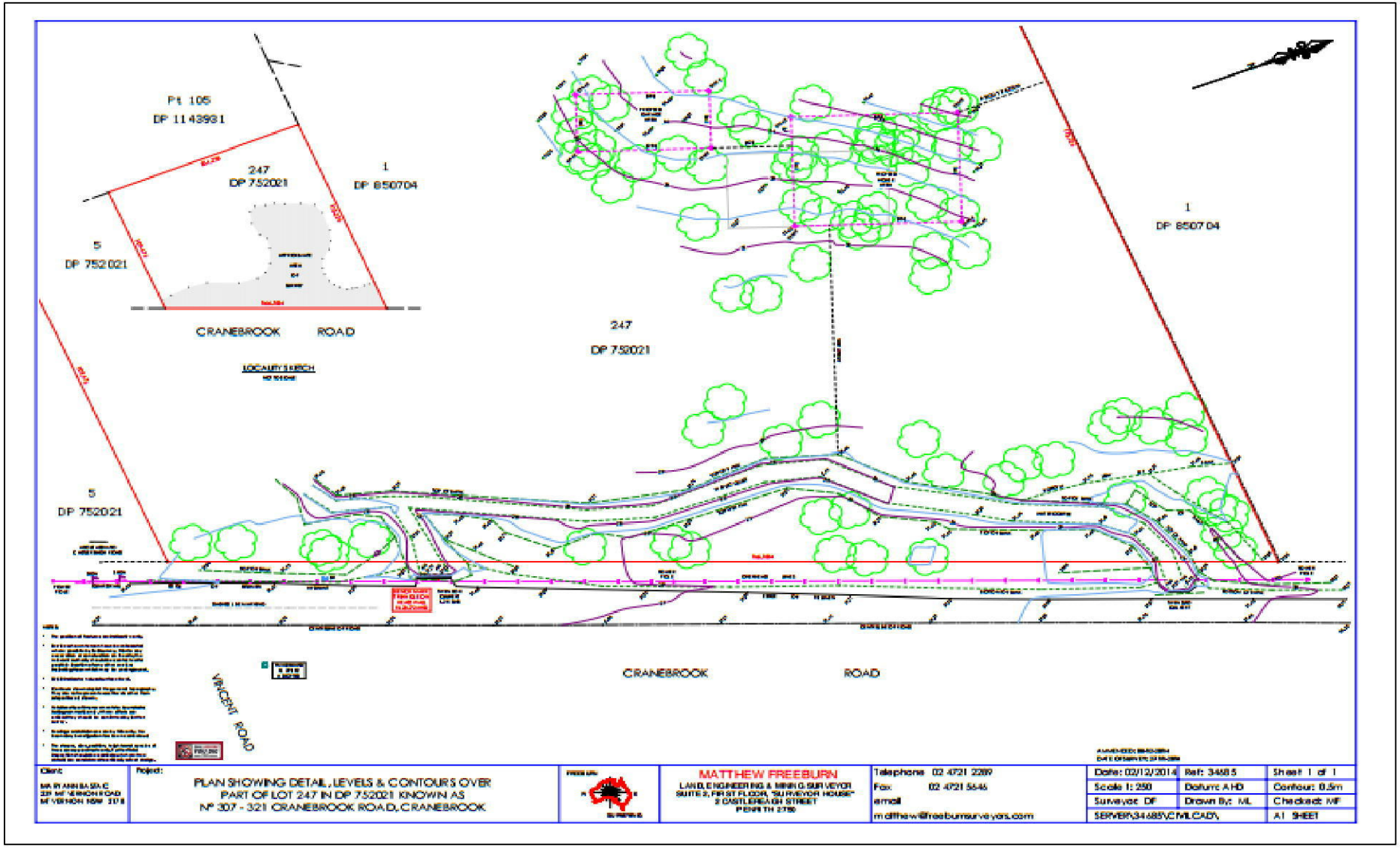

Figure 6: Plan of the proposed development

Appendix 2: Species Recorded Onsite

Flora

Table 19: List of flora recorded on site

Plant Family	Scientific Name	Common Name	Conservation or Weed Status
Amygdalaceae	*Prunus laurocerasus**	Cherry Laurel	-
Apiaceae	*Centella asiatica**	Gotu Cola	-
Asteraceae	*Bidens pilosa**	Cobbler's Pegs	-
Asteraceae	*Circium vulgare**	Spear Thistle	-
Asteraceae	*Hypochaeris radicata**	Cat's Ear	-
Asteraceae	*Ozothamnus diosmifolius*	Rice Flower	-
Asteraceae	*Sonchus oleraceus**	Cow Thistle	-
Berberidaceae	*Nandina domestica**	Nandina	-
Cactaceae	*Opuntia stricta**	Prickly Pear	Weed of National Significance
Campanulaceae	*Pratia purpurascens*	White Root	-
Caprifoliacae	*Lonicera japonica**	Honeysuckle	-
Commelinaceae	*Commelina cyanea*	Scurvy Weed	-
Commelinaceae	*Tradescantia fluminensis**	Wandering Jew	-
Convolvulaceae	*Dichondra repens*	Kidney Weed	-
Cyperaceae	*Ghania sieberiana*	Red-Fruit Saw-Sedge	-
Euphorbiaceae	*Euphorbia peplus**	Milkweed	-
Fabaceae	*Acacia implexa*	Hickory Wattle	-
Fabaceae	*Acacia parramattensis*	Parramatta Wattle	-
Fabaceae	*Senna pendula**	Easter Cassia	-
Juncaceae	*Juncus usitatus*	Common Rush	-
Lauraceae	*Cassytha glabella*	Slender Devil's Twine	-

Lauraceae	*Cinnamomum camphora**	Camphor Laurel	-
Luzuriaceae	*Eustrephus latifolius*	Wombat Berry	-
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne	-
Myrtaceae	*Angophora bakeri*	Narrow-leaved Apple	-
Myrtaceae	*Backhousia myrtifolia*	Grey Myrtle	-
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark	-
Myrtaceae	*Eucalyptus eugenioides*	Thin-leaved Stringybark	-
Myrtaceae	*Eucalyptus fibrosa*	Broad-leaved Ironbark	-
Myrtaceae	*Eucalyptus parramattensis* subsp. *parramattensis*	Parramatta Red Gum	-
Myrtaceae	*Melaleuca nodosa*	Prickly-leaved Paperbark	-
Ochnaceae	*Ochna serrulata**	Micky Mouse Bush	-
Ochnaceae	*Ligustrum lucidum**	Broad-leaved Privet	-
Oxalidaceae	*Oxalis corniculata**	Creeping Woodsorrel	-
Passifloraceae	*Passiflora edulis**	Passionfruit	-
Pittosporaceae	*Bursaria spinosa*	Blackthorn	-
Plantaginaceae	*Plantago lanceolata**	Narrow-leaf Plantain	-
Poaceae	*Cynodon dactylon**	Couch	-
Poaceae	*Entolasia stricta*	Wiry Panic	-
Poaceae	*Paspalum dilatatum**	Paspalum	-
Poaceae	*Themeda australis*	Kangaroo Grass	-
Primulaceae	*Anagallis arvensis**	Scarlet Pimpernel	-

Proteaceae	*Grevillea juniperina* subsp. *juniperina*	Juniper-leaved Grevillea	Vulnerable in NSW (n.b. off site)
Proteaceae	*Persoonia linearis*	Narrow-leaved Geebung	-
Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*	Poison Rock Fern	-
Rosaceae	*Rubus fruticosus**	Blackberry	Class 4 Noxious Weed, Weed of National Significance.
Santalaceae	*Exocarpos cupressiformis*	Cherry Ballart	-
Solanaceae	*Cestrum parqui**	Green Cestrum	-
Solanaceae	*Physalis peruviana**	Ground Cherry	-
Solanaceae	*Solanum mauritianum**	Wild Tobacco	-
Solanaceae	*Solanum nigrum**	Blackberry Nightshade	-
Solanaceae	*Solanum prinophyllum*	Forest Nightshade	-
Typhaceae	*Typha domingensis*	Narrow-leaved Cumbungi	-
Verbenaceae	*Lantana camara**	Lantana	Weed of National Significance
Verbenaceae	*Verbena bonariensis**	Purple Top	-

Fauna

Table 20: List of fauna recorded on site

Scientific Name	Common Name	Status	Observation Type
Mammals			
Oryctolagus cuniculus	European Rabbit	Introduced	Seen
Vulpes vulpes	Red Fox	Introduced	Scat
Birds			
Manorina melanocephala	Noisy Miner	Secure	Seen
Platycercus elegans	Crimson Rosella	Secure	Seen
Trichoglossus haematodus	Rainbow Lorikeet	Secure	Seen
Grallina cyanoleuca	Magpie Lark	Secure	Call
Corvus coronoides	Australian Raven	Secure	Call
Chenonetta jubata	Australian Wood Duck	Secure	Seen
Fulica atra	Eurasian Coot	Secure	Call
Ardea ibis	Cattle Egret	Migratory	Seen
Frogs			
Uperoleia laevigata	Smooth Toadlet	Secure	Call
Litoria fallax	Dwarf Tree Frog	Secure	Call
Litoria peronii	Perons Tree Frog	Secure	Call
Littoria tyleri	Tylers Tree Frog	Secure	Call
Reptiles			
Lampropholis delicata	Delicate Garden Skink	Secure	Seen

Appendix 3 Assessment of significance

Endangered Ecological Communities

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

Under Section 5A of the *Environmental Planning and Assessment Act 1979* (as amended) a Seven Part Test is Required to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" listed on Schedules 1 or 2 of the *Threatened Species Conservation Act 1995*, and consequently, whether a Species Impact Statement is required.

(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:

N/A. This test is for a critically endangered ecological community.

(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 species is likely to be placed at risk of extinction:

N/A. This test is for a critically endangered ecological community

(c) In the case of an endangered ecological community or critically 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:

It is unlikely that the action proposed will have an adverse effect on the community to the extent that it will become locally extinct. The building envelope, including the APZ, is only a small percentage of the site and therefore much of the ecological community will remain both on and off site. The amount of community to be modified will only be 0.54 ha of the 17.88 ha that exists both on and off site, approximately 3 percent of the total pocket of the Endangered Ecological Community. In relation to the site the clearing will be undertaken across approximately 25% of the site.

It is unlikely that a significant impact will occur as a result of the proposed development.

(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:

The composition of the ecological community will not be modified to the extent that the local occurrence will be placed at risk of extinction. Only a small area of the ecological community will be modified as the building envelope represents a small percentage of the local community.

(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:

Only a small area of the ecological community will be removed for the development itself and the APZ. The ecological community will remain both on and off site.

(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;

This site is well connected to Cumberland Plains Shale Woodlands and Shale-Gravel transition forest off site. The proposed development will occur in the north-western corner of the fragment and as such will not create a significant gap. it will not fragment it and the community present on either side of the housing envelope. The retained vegetation will remain connected to other existing areas of the ecological community.

(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:

It is unlikely that the proposed removal of the vegetation associated with the proposed development will affect the long term survival of the ecological community in the locality. As can be seen in the maps (Appendix 1) a significant portion of the critically endangered ecological community will remain both on and off site.

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

There is no critical habitat present on the site.

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

The removal of vegetation is not consistent with the objectives of the recovery plan for Cumberland Plain Woodlands.

(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:

Key threatening processes for Cumberland Plain Woodlands which may be caused or exacerbated by the proposed development include:

- The main threat is further clearing for urban or rural development, and the subsequent impacts from fragmentation.
- Grazing and mowing, which stops regrowth of the community.
- Inappropriate water run-off entering the site, which leads to increased nutrients and sedimentation.
- Weed invasion.
- Inappropriate fire regimes, which have altered the appropriate floristic and structural diversity.

Conclusion: The proposed action is not likely to have a significant effect on Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest in the locality. A Species Impact Statement is **not** required.

Flora

Shrubs

Acacia bynoeana
Allocasuarina glareicola
Dillwynia tenuifolia
Grevillea juniperina subsp. *juniperina*
Micromyrtus minutiflora
Persoonia nutans
Pimelea spicata
Pultenaea parviflora

Under Section 5A of the *Environmental Planning and Assessment Act 1979* (as amended) a Seven Part Test is Required to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" listed on Schedules 1 or 2 of the *Threatened Species Conservation Act 1995*, and consequently, whether a Species Impact Statement is required.

(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:

A population of *Grevillea juniperina* subsp. *juniperina* was found just outside of the site boundary to the north-west of the site. While it is unlikely that individuals themselves will be removed during the development it is possible that some key threatening processes for the species may be caused as a result of the development. While individuals were not recorded on the site it is very likely that they are present on site in the soil seed bank and the proposed development could prevent their germination. Altered fire regimes as a result of residential land use could affect the local success of the species.

The other seven threatened species recorded within 10 km of the site were not present during the vegetation survey however it is also possible that these could exist in the soil seed bank. It is unlikely that the development would increase the likelihood of local extinction in these seven species.

It is unlikely that a significant impact will occur as a result of the proposed development.

(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 species is likely to be placed at risk of extinction:

N/A. This test is for threatened species.

(c) In the case of an endangered ecological community or critically 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:

N/A. This test is for threatened species.

(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:

N/A. This test is for threatened species.

(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:

The area in which the house is to be built is 475 m^2 with an APZ of between 25 and 32 m surrounding the house. A separation of 42 m from the edge of the APZ to the western property boundary will be retained. A population of *Grevillea juniperina* subsp. *juniperina* was identified offsite adjacent the western boundary. The retained area of 42m provides the population some protection which will allow it to reproduce to some extent. The threatened species may not be able to germinate from the soil seed bank in the cleared areas however these only take up a small area of the total suitable habitat on site.

The other seven threatened species recorded within 10 km of the site were not seen during the vegetation survey and it is likely that the remaining habitat on and off site will be sufficient for the species to continue if they are present in the soil seed bank.

It is unlikely that a significant impact will occur as a result of the proposed development.

(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:

Only slight fragmentation of the suitable habitat for these species will occur. As can be seen in the site plans (Appendix 1) the house and the garage will only take up a small portion of the site and suitable habitat continues off site.

(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 to be removed is of little importance to the survival of the species as long as the remaining area on the site where building is not taking place is left undisturbed. There is also suitable habitat for these species to continue of site.

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

There is no critical habitat present on the site.

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

Recovery plans do not exist for *Allocasuarina glareicola*, *Dillwynia tenuifolia*, *Pultenaea parviflora*, *Micromyrtus minutiflora*, or *Grevillea juniperina* subsp. *juniperina*. A recovery plan is currently being written for *Acacia bynoeana*. Recovery plans exist for *Persoonia nutans* and *Pimelea spicata*. Land clearing in suitable habitat for these species is not consistent with the objectives of these recovery plans.

(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:

Key threatening processes for *Allocasuarina glareicola* that may be caused or exacerbated by the proposed development include:

- Current or potential future land management practices do not support conservation.
- Habitat degradation through rubbish dumping and unrestricted access creating tracks.
- Population is threatened with invasion and competition by weeds including African lovegrass, Whisky grass, *Pennisetum clandestinum*, *Ricinus communis* and Asparagus fern.
- Habitat loss due to clearing for development.

Key threatening processes for *Dillwynia tenuifolia* that may be caused or exacerbated by the proposed development include:

- Habitat fragmentation makes individual patches more isolated and also more likely to suffer local fire or other major disturbance.
- Partial clearance may have a significant impact upon vegetation structure. This can result in dense monospecific regrowth e.g. *Allocasuarina littoralis* or *Melaleuca* spp. which out-compete smaller species.
- The implementation of inappropriate fire regimes, which may often result from arson, is a threat to the species if done too frequently, or not often enough to maintain a more open mid-storey and allow light to penetrate to the groundcover layer. Periods of less than 4 years between fires will likely lead to local extinction. Minimum intervals of 8 years are recommended while 10-15 years is sufficient to allow sufficient seed to accumulate and sufficient fuel to be present, particularly if burnt late summer to autumn.
- Uncontrolled vehicular access can result in loss through clearing, destruction and the possibly introduction of pathogens and weeds.
- Dumping of materials into accessible patches will reduce the capacity of the species to germinate and grow, or may also cause hotter fires (especially when green-waste dumping occurs).
- Invasive grasses - particularly African Love Grass and Coolatai Grass - can alter the ground-cover density and both out-compete the species (particularly during dry times and when young) or increase the temperature of burns as more leafy matter is available as fuel.
- Repeated slashing of sites occupied by the species will reduce recruitment by affecting the amount of flowering and seed-set.

Key threatening processes for *Pultenaea parviflora* that may be caused or exacerbated by the proposed development include:

- Fragmentation of habitat for development.
- African lovegrass and other invasive grasses; increase biomass which carries fires, as well as competition and shading.
- Clearing for rural residential and urbanisation, as well as industrial purposes.
- Uncontrolled vehicular access

Key threatening processes for *Acacia bynoeana* that may be caused or exacerbated by the proposed development include:

- Weeds can invade the species' habitat.

Key threatening processes for *Micromyrtus minutiflora* that may be caused or exacerbated by the proposed development include:

- Habitat loss through vegetation clearing for urban development.
- Habitat degradation through recreational activities
- Rubbish dumping
- Weed invasion including African lovegrass.

Key threatening processes for *Grevillea juniperina* subsp. *juniperina* that may be caused or exacerbated but the proposed development include:

- Degradation and reduction of habitat following clearing and fragmentation of native vegetation is a major threat.
- Disturbance by rubbish dumping, trampling, dumping of fill, changes in drainage, and recreational activities.
- Invasion from exotic perennial grasses, particularly African lovegrass (*Eragrostis curvula*).
- Current or potential future land management practices do not support conservation
- Inappropriate fire regime.

Key threatening processes for *Persoonia nutans* that may be caused or exacerbated by the proposed development include:

- Habitat loss and fragmentation (due to clearing for mining, and rural/residential development).
- Inappropriate fire regimes, particularly too frequent or too infrequent fire.
- Habitat degradation due to disturbance associated with unrestricted access to habitat.
- Infestation of weed grasses - whisky grass, African lovegrass and to an extent kikuyu in areas with historic dumping or grazing.
- Primarily affected by *Acacia baileyana* that has naturalized in the area, but also by other non-native and native woody weed species.

Key threatening processes for *Pimelea spicata* that may be caused or exacerbated by the proposed development include:

- Loss of habitat to urban development.
- Mowing, grazing, spraying or other types of similar habitat modification.
- Weeds including African olive, African box thorn, lantana, privets, green caestrum, blackberry, crofton weed, bridal creeper and exotic grasses pose an increasing threat to this species.
- Changed hydrology and soil movement.
- Nutrient rich runoff / run-on.

Conclusion: The proposed action is **not** likely to have a significant effect on the threatened species *Acacia bynoeana, Allocasuarina glareicola, Dillwynia tenuifolia, Micromyrtus minutifolia, Persoonia nutans, Pimelea spicata,* or *Pultenaea parviflora*. The proposed action is **not** likely to have a significant effect on the population of *Grevillea juniperina* subsp. *juniperina* located off site or the individuals that may be present in the soil seed bank on the site as long as the site is managed correctly.

Fauna

Frogs

Giant burrowing frog *Heleioporus australiacus*

(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:

There is a watercourse located onsite which could provide breeding habitat for the Giant Burrowing Frog *Heleioporus australiacus*.

In regards to *H. australiacus*, the open woodland habitat, although disturbed, could provide potential overwintering and foraging habitat. The species is known to travel up to 200 – 300 m a night, taking advantage of animal diggings for shelter. Records of the species suggest a dependency on native vegetation, and it is likely that the species is restricted to areas within, and in close proximity to, the properties riparian zone.

Surveys for *H. australiacus* were not designed to maximize the chance of detecting the species, as they required more survey effort. In the absence of adequate surveys, the SPRAT database states that species should be assumed to be present on sites where suitable habitat exists (DEWHA 2009ac). Suitable habitat exists onsite, therefore the species is assumed to be present.

To accommodate for the development, a significant portion of woodland vegetation is to be removed. Over wintering habitat will be lost. During the construction phase of the development, the chemical and physical properties of the waterways may potentially be altered by siltation and increased turbidity, these parameters can be minmised with strict control measures. Control measures will need to be maintained for a set period following construction to allow for sediments to settle and stabilize.

It is unlikely that the proposed development will threaten the lifecycle of these species such that they are likely to be placed at risk of extinction. A significant impact is not likely in relation to the proposed development.

(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 species is likely to be placed at risk of extinction:

Not applicable. This test is for threatened species.

(c) In the case of an endangered ecological community or critically 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:

Not applicable. This test is for threatened species.

(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. This test is for threatened species.

(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:

To accommodate for residential developments and Asset Protection Zones, woodland habitat suitable for foraging and over wintering shall be removed.

Additionally, the impacts on waterways post clearance and construction are likely to alter breeding habitat for these species. Strict mitigation measures during clearing and construction could help to reduce the impacts, however it is important that the same mitigation strategies are enforced post construction to allow sediments to settle and stabilise.

(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:

The area of habitat is bounded by semi-rural holdings that are scattered with pockets of native vegetation. A corridor exists within the study site, linking adjacent offsite habitats. The removal of vegetation is likely to disturb connectivity within the local area, and reduce the amount of habitat available to these frog species. The extent of clearing is not considered to fragment or isolate habitats.

(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:

Removal of woodland habitat onsite is unlikely to cause these species to become extinct. It is however important to consider the long term cumulative impacts of small scale habitat removal to the survival of the species. A significant impact is not likely in relation to the proposed development.

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

There is no critical habitat present on the site.

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

The removal of vegetation is not consistent with the objectives or actions of any plan.

The Giant Burrowing Frog is listed as a species that requires a recovery plan to be prepared. Thus, the action proposed is likely to exacerbate the threats facing 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:

Key threats for the Giant Burrowing Frog are:

- Habitat loss through clearing for residential, agricultural and urban infrastructure development.
- Disease (chytrid fungus).
- Reduction of water quality generally in the vicinity of urban development.
- Forest disturbance associated with forestry operations.
- Climate change
- Populations appear fragmented and are consequently susceptible to stochastic events.

Conclusion: The proposed action is unlikely to have a significant impact on *H. australiacus*..

Predatory Birds

Square tailed kite *Lophoictinia isura*

Under Section 5A of the *Environmental Planning and Assessment Act* (1979) (as amended) a Seven Part Test is Required to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" listed under Schedules 1 or 2 of the *Threatened Species Conservation Act 1995*, and consequently, whether a Species Impact Statement is required.

(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:

Tall mature trees may be used for nesting by the Square Tailed Kite and it is advised that all vegetation is assessed for nesting birds prior to removal.

The Square-tailed Kite is highly mobile and able to move within and between habitat patches. Considering the extent of the offsite habitat available, the proposed development is unlikely to threaten these species such that they are 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 species is likely to be placed at risk of extinction:

Not applicable. This test is for threatened species.

(c) In the case of an endangered ecological community or critically 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:

Not applicable. This test is for threatened species.

(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. This test is for threatened species.

(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:

Both species are highly mobile and will frequently move between and within habitat patches and will be able to use resources available on and off the site.

However a significant area of habitat will be removed to accommodate for the development, and it is unlikely that these species will continue to use the site to the same degree following its development.

(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:

The area of habitat is bounded by semi-rural holdings that are scattered with pockets of native vegetation. A corridor exists within the study site, linking adjacent offsite habitats. The removal of vegetation is likely to disturb connectivity within the local area, and reduce the amount of habitat available to these species. Both species however are highly mobile and are unlikely to be significantly impacted on by small scale fragmentation.

(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:

These species have a large home range. Although the habitat on the site forms a portion of the resources for these species, it is unlikely that the proposed action will adversely affect this species as they are able to utilise on and off site resources.

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

There is no critical habitat present on the site.

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

The removal of vegetation is not consistent with the objectives or actions of any plan.

(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:

Key threats to the Square tailed kite *Lophoictinia isura* are:

- Clearing, logging, burning, and grazing of habitats resulting in a reduction in nesting and feeding resources.
- Disturbance to or removal of potential nest trees near watercourses.
- Illegal egg collection and shooting.

Conclusion: The proposed action is **not** likely to have a significant effect on *L. isura*, A species impact statement is deemed **not** be required.

Parrots

Little lorikeet *Glossopsitta pusilla*
Glossy black cockatoo *Calyptorhynchus lathami*
Gang Gang Cockatoo *Callocephalon fimbriatum*
Turquoise Parrot *Neophema pulchella*

Under Section 5A of the *Environmental Planning and Assessment Act* (1979) (as amended) a Seven Part Test is Required to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" listed under Schedules 1 or 2 of the *Threatened Species Conservation Act 1995*, and consequently, whether a Species Impact Statement is required.

(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:

All of these species may potentially use the site for foraging and breeding resources. However considering that these species are mobile and there is larger expanses of undisturbed habitat available offsite, is unlikely that the proposed action will cause a population of these species to be placed at risk of extinction.

Mature trees containing hollows are not proposed to be removed.

(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 species is likely to be placed at risk of extinction:

Not applicable. This test is for threatened species.

(c) In the case of an endangered ecological community or critically 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:

Not applicable. This test is for threatened species.

(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. This test is for threatened species.

(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:

The site contains a low number of tree hollows, which are used for breeding by all species. These hollows are located outside of the building envelope, and their removal is not necessary to achieve the building envelope or Asset Protection Zone.

In terms of foraging habitat, the species occupy a large home range, and it is unlikely that the removal of such a small portion of habitat will significantly reduce what is available to these 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:

The area of habitat is bounded by semi-rural holdings that are scattered with pockets of native vegetation. Although the habitat onsite does contribute to connectivity across the landscape, its development is unlikely to significantly disconnect existing habitats. These species are also highly mobile and able to alternate habitat resources.

(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:

These species are mobile and are likely to use resources on and off the site. The proposed development is unlikely to threaten the long term survival of these species.

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

There is no critical habitat present on the site.

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

The removal of vegetation is not consistent with the objectives or actions of any plan.

(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:

Key threats for the Little Lorikeet *Glossopsitta pusilla* are:

- Given that large old *Eucalyptus* trees on fertile soils produce more nectar, the extensive clearing of woodlands for agriculture has significantly decreased food for the lorikeet, thus reducing survival and reproduction. Small scale clearing, such as during roadworks and fence construction, continues to destroy habitat and it will be decades before revegetated areas supply adequate forage sites.
- The loss of old hollow bearing trees has reduced nest sites, and increased competition with other native and exotic species that need large hollows with small entrances to avoid predation. Felling of hollow trees for firewood collection or other human demands increases this competition.
- Competition with the introduced Honeybee for both nectar and hollows exacerbates these resource limitations

Key threats for the Glossy black Cockatoo *Calyptorhynchus lathami are:*

- Habitat loss - the clearing of *Casuarina* trees in woodland areas, and the loss of mature eucalypts for nest hollows.
- Illegal bird trade.
- Changes to patterns of bushfires in eastern Australia since European Settlement.
- Feral cats and possums, which raid the birds' nests.
- Competition for nests from galahs and introduced honeybees.

Key threats for the Gang Gang Cockatoo *Callocephalon fimbriatum* are:

- Clearing of vegetation and degradation of habitat may reduce the abundance of optimal foraging and roosting habitat.
- Individual pairs show high fidelity to selected nesting trees (choosing nesting hollows of particular shape, position and structure), with clearing and frequent fire posing a threat to continued successful breeding.
- Climate change may alter the extent and nature of its preferred habitat (cool termperate vegetation).
- Susceptible to *Psittacine cirovirus* disease (PCD) which is spread through contaminated nest chambers. PCD is known to have increased near Bowral in the southern highlands of New South Wales over the past decade and constitutes a further threat to the species.

Key threats for the Turquoise Parrot *Neophema pulchella are:*

- Clearing of grassy-woodland and open forest habitat.
- Loss of hollow-bearing trees.
- Degradation of habitat through heavy grazing, firewood collection and establishment of exotic pastures.
- Predation by foxes and cats.
- Illegal trapping of birds and collection of eggs which also often results in the destruction of hollows

Conclusion: The proposed action is **not** likely to have a significant effect on the Little lorikeet *Glossopsitta pusilla, the* Glossy black cockatoo *Calyptorhynchus lathami,* the Gang Gang Cockatoo *Callocephalon fimbriatum* and the Turquoise Parrot *Neophema pulchella*. A species impact statement is deemed **not** be required.

Large Forest Birds

Regent honeyeater *Anthochaera phrygia*
Black chinned honeyeater *Mellthreptus gulgaris*

Under Section 5Aof the *Environmental Planning and Assessment Act* (1979) (as amended) a Seven Part Test is Required to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" listed under Schedules 1 or 2 of the *Threatened Species Conservation Act 1995*, and consequently, whether a Species Impact Statement is required.

(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:

These species are highly mobile and are able to move within and between habitat patches. Considering the extent of the offsite habitat available, the proposed development is unlikely to threaten these species such that they are 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 species is likely to be placed at risk of extinction:

Not applicable. This test is for threatened species.

(c) In the case of an endangered ecological community or critically 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:

Not applicable. This test is for threatened species.

(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. This test is for threatened species.

(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:

Both species are highly mobile and will frequently move between and within habitat patches. They have the ability to use resources available on and off the site.

However some area of habitat will be removed onsite to accommodate for the development, and it is unlikely that these species will continue to use the site to the same degree following its development. Particular emphasis should be placed on the Black Chinned Honeyeater where high quality habitat is available onsite 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:

The area of habitat is bounded by semi-rural holdings that are scattered with pockets of native vegetation. A corridor exists within the study site, linking adjacent offsite habitats. The removal of vegetation is likely to disturb connectivity within the local area, and reduce the amount of habitat available to these species. Both species however are highly mobile and are unlikely to be significantly impacted on by small scale fragmentation.

(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:

These species have a large home range and are able to utilise on and off site habitats. The Black Chinned Honeyeater however has high quality foraging habitat onsite and vegetation clearance within the study site may impact on local populations.

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

There is no critical habitat present on the site.

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

The removal of vegetation is not consistent with the objectives or actions of any plan.

(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:

Key Threatening Processes for the Black Chinned Honeyeater *Mellthreptus gulgaris* include:

- Clearing of remnant open forest and woodland habitat.
- Poor regeneration of open forest and woodland habitats because of intense grazing.
- May be excluded from smaller remnants by aggressive species such as the Noisy Miner (*Manorina melanocephala*)

Key threatening processes for the Regent honeyeater *Anthochaera phrygia* include:

- Historical loss, fragmentation and degradation of habitat from clearing for agricultural and residential development, particularly fertile Yellow Box-White Box-Blakely's Red Gum woodlands.
- Continuing loss of key habitat tree species and remnant woodlands from strategic agricultural developments, timber gathering and residential developments.
- Suppression of natural regeneration of over-storey tree species and shrub species from overgrazing. Riparian gallery forests have been particularly impacted by overgrazing.

- Inappropriate forestry management practices that remove large mature resource-abundant trees. Firewood harvesting in Box-Ironbark woodlands can also remove important habitat components.
- Competition from larger aggressive honeyeaters, particularly Noisy Miners, Noisy Friarbirds and Red Wattlebirds.
- The small population size and restricted habitat availability make the species highly vulnerable to extinction via stochastic processes.
- Egg and nest predation by native birds.

The proposed development is likely to result in a number of the Key Threatening Processes mentioned above.

Conclusion: The proposed action is **not** likely to have a significant effect on the Regent honeyeater *Anthochaera phrygia* and the Black chinned honeyeater *Mellthreptus gulgaris*.
A species impact statement is deemed **not** to be required, however broad scale cumulative impacts of habitat loss should be considered.

Small Forest Birds

Varied sittella *Daphoeno sittachrysoptera*
Scarlet Robin *Petroica boodang*
Flame Robin *Petroica phoenicea*
Brown Treecreeper *Climacteris picumnus*
Speckled Warbler *Chthonicola sagittata*

Under Section 5Aof the *Environmental Planning and Assessment Act* (1979) (as amended) a Seven Part Test is Required to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" listed under Schedules 1 or 2 of the *Threatened Species Conservation Act 1995*, and consequently, whether a Species Impact Statement is required.

(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:

All of these species may potentially use the site for foraging and breeding. While the vegetation clearing proposed is unlikely to directly impact the life cycle of these species, it is important to consider the cumulative impact of clearing for residential developments, and also the impact that this will have on limiting resources.

It is advised that clearing is done in stages to allow displaced individuals to move on. It is also advised that the vegetation to be cleared is thoroughly inspected to ensure that no nestlings or fledglings will be harmed.

(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 species is likely to be placed at risk of extinction:

Not applicable. This test is for threatened species.

(c) In the case of an endangered ecological community or critically 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:

Not applicable. This test is for threatened species.

(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. This test is for threatened species.

(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:

The composition of the study site is to be significantly altered, to accommodate for the residential development. It is unlikely that the species will utilize the site to the same degree post development.

(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:

The area of habitat is bounded by semi-rural holdings that are scattered with pockets of native vegetation. A corridor exists within the study site, linking adjacent offsite habitats. The removal of vegetation is likely to disturb connectivity within the local area, and reduce the amount of habitat available. However, all species are highly mobile and capable of seeking offsite 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:

These species are mobile and are likely to use resources on and off the site. The proposed development is unlikely to threaten the long term survival of these species however cumulative impacts of vegetation clearance needs to be considered.

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

There is no critical habitat present on the site.

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

The removal of vegetation is not consistent with the objectives or actions of any plan.

(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:

Key threatening processes related to the Varied sitella *Daphoenositta chrysoptera* are:

- Apparent decline has been attributed to declining habitat. The sedentary nature of the Varied Sittella makes cleared land a potential barrier to movement.
- The Varied Sittella is also adversely affected by the dominance of Noisy Miners in woodland patches
- Threats include habitat degradation through small-scale clearing for fencelines and road verges, rural tree decline, loss of paddock trees and connectivity, 'tidying up' on farms, and firewood collection.

Key Threats relating to the Scarlet Robin *Petroica boodang* are:

- Historical habitat clearing and degradation.
- Habitat modification due to overgrazing.
- Reduction of size of remnant patches.

- Reduction in the structural complexity of habitat, including reductions in canopy cover, shrub cover, ground cover, logs, fallen branches and leaf litter.
- Reduction of the native ground cover in favour of exotic grasses.
- Loss of nest sites, food sources and foraging sites, such as standing dead timber, logs and coarse woody debris from depletion by grazing, firewood collection and 'tidying up' of rough pasture.
- Predation by over-abundant populations of Pied Currawong (*Strepera graculina*) which are supported by planted exotic berry-producing shrubs; this pressure, is addition to that from other native and exotic predators, may be a potentially severe threat to the breeding success of Scarlet Robin populations.
- Predation by feral cats (*Felis catus*).
- Robbing of nests and predation of fledglings by rats.
- Isolation of patches of habitat, particularly where these patches are smaller than 30 ha, and in landscapes where clearing has been heavy or where remnants are surrounded by cropping or stock grazing.
- Habitat for the Scarlet Robin may become unsuitable if dense regeneration occurs after bushfires or other disturbances

Key Threats relating to the Flame Robin *Petroica phoenicea are:*

- Clearing and degradation of breeding habitat.
- Degradation of wintering habitat.
- Degradation and simplification of habitat by overgrazing and removal of standing dead timber, logs and coarse woody debris.
- Nest predation by native and exotic predators, including artificially large populations of Pied Currawong (*Strepera graculina*) in some areas.
- Habitat for this species may become unsuitable if dense regeneration occurs after bushfires or other disturbances.

Key Threats relating to the Brown Treecreeper *Climacteris picumnus* are:

- Historical loss of woodland, forest and mallee habitats as a result of agriculture, forestry, mining and residential development.
- Fragmentation of woodland and forest remnants which isolates populations and causes local extinctions.
- Ongoing degradation of habitat, particularly the loss of tree hollows and fallen timber from firewood collection and overgrazing.
- Lack of regeneration of eucalypt overstorey in woodland due to overgrazing and too-frequent fires.
- Loss of ground litter from compaction and overgrazing.
- Inappropriate forestry management practices.

Key Threats relating to the Speckled Warbler *Chthonicola sagittata* are:

- Due to the fragmented nature of the populations and their small size the species is susceptible to catastrophic events and localised extinction.
- Clearance of remnant grassy woodland habitat for paddock management reasons and for firewood.
- Poor regeneration of grassy woodland habitats.
- Modification and destruction of ground habitat through removal of litter and fallen timber, introduction of exotic pasture grasses, heavy grazing and compaction by stock and frequent fire.
- Habitat is lost and further fragmented as land is being cleared for residential and agricultural developments. In particular, nest predation increases significantly, to nest failure rates of over 80%, in isolated fragments.
- Nest failure due to predation by native and non-native birds, cats, dogs and foxes particularly in fragmented and degraded habitats.

Conclusion: The proposed action is not likely to have a significant effect on the Varied Sittella *Daphoeno sittachrysoptera*, the Scarlet Robin *Petroica boodang,* the Flame Robin *Petroica phoenicea,* the Brown Treecreeper *Climacteris picumnus* and the Speckled Warbler *Chthonicola sagittata*. A species impact statement is deemed **not** to be required, however broad scale cumulative impacts of habitat loss should be considered.

It is important however, that the cumulative impacts of habitat clearance be considered.

Appendix 4: EPBC Act Considerations

An assessment of the impact of the proposed development upon threatened species, populations, ecological communities, World Heritage values, and migratory species listed under the *Environment Protection and Biodiversity Conservation Act 1999* are listed below.

Impacts on threatened species and ecological communities

An action has, will have, or is likely to have a significant impact on a threatened species if it does, will, or is likely to:

- Lead to a long-term decrease in the size of a population
- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population
- Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species habitat; or
- Interfere with the recovery of the species

Critically endangered and endangered species

No critically endangered species were observed on the subject site, however potential habitat exists for the endangered fauna species the Regent Honeyeater *Anthochaera phrygia* and flora species *Allocasuarina glareicola, Persoonia nutans,* and *Pimelea spicata*.

It is considered that the proposed development will not disrupt the lifecycle of these species such that any potentially viable local population would be placed at increased risk of extinction. The potential impacts of the proposed development is not likely to lead to significant exacerbation of those points listed above.

Vulnerable Species

No species listed as vulnerable by the Commonwealth were recorded at the study site. Potential habitat however, exists for fauna species: the giant burrowing frog *Heleioporus australiacus,* stuttering frog *Mixophyes balbus,* and the flora species *Micromyrtus minutiflora* and *Acacia bynoeana*.

It is considered that the proposed development will not disrupt the lifecycle of these species such that any potentially viable local population would be placed at increased risk of extinction. The potential impacts of the proposed development is not likely to lead to significant exacerbation of those points listed above.

Critically endangered and endangered ecological communities

An important population is one that it necessary for a species long term survival and recovery. This may include populations that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species range.

The critically endangered ecological community of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest was recorded at the study site. However, the proposed development will only impact a small portion of the area, and the ecological community can continue to persist in the surrounding intact vegetation. It is believed that the proposed development will not disrupt the lifecycle of this community such that any potentially viable local population would be placed at increased risk of extinction.

Impacts on migratory species

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species;
- Result in invasive species that are harmful to the migratory species, and prevent the species becoming established in an area of important habitat;
- Seriously disrupt the lifecycle (breeding, feeding, migration or nesting behaviour) of an ecologically significant proportion of the population of the species.

An area of important habitat is:

- Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant portion of the population of the species
- Habitat utilised by a migratory species which is at the limit of the species range; or
- Habitat within an area where the species is declining.

Of the fifteen (15) migratory species likely to occur within a 10km radius of the site, four (4) species are considered to have habitat onsite. These are the White-throated Needletail *Hirundapus caudacutus,* Latham's Snipe *Gallinago hardwickii,* the Rainbow Bee-eater *Merops ornatus* and the Common Sandpiper *Actitis hypoleucos*.

The Rainbow Bee-eater could forage in the airspace above the site. This species is an aerial insectivore that occurs throughout Australia, with southern populations migrating North during the winter months.

Latham's Snipe and Common Sandpiper are all likely to utilise the wetland area for feeding. Species such as the Painted and Latham's Snipes require dense vegetation near the water's edge as daytime cover and therefore will be impacted upon if shrubbery around the wetland is disturbed, however this is not within the scope of the development. Latham's Snipe and the Common Sandpiper do not breed within Australia. It is unlikely that the Great Egret or Painted Snipe would utilise this site for breeding. The disturbance to these species by the proposed development is not considered significant and it will not increase their likelihood of local extinction.

The White-throated Needletail may forage in the airspace above the site. The species does not forage on ground or in trees. It may use trees on site for roosting as it is known to roost in both forest and woodland. The white-throated needletail does not breed in Australia.

The proposed development will not significantly decrease habitat available for these species, or disrupt the lifecycle of these species such that viable populations are likely to be placed at risk of extinction. The proposed development is therefore not likely to have a significant impact on these species and is not likely to result in any points listed above under the migratory species provisions of the EPBC Act.

EPBC Act Assessment

- The proposed action will not significantly impact on any the 4 flora and 3 fauna species listed under the EPBC Act and recorded within a 10km radius of the site.
- The proposed action will not significantly impact on the 15 migratory species that are listed under the EPBC Act and recorded within a 10km radius of the site.
- The proposed action will not have a significant impact upon the critically endangered ecological community of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.

Referral Recommendation

The proposed development will **not** require referral to the Commonwealth Minister for the Environment for consideration under the EPBC Act.