Centennial Hunter Pty Limited

ANVIL HILL PROJECT

environmental assessment

VOLUME 5 - APPENDICES 9b - 12

Umwelt
Environmental Consultants

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Ecological Assessment

Anvil Hill Project

Part B

Part A of the Anvil Hill Project Ecological Assessment is located in Volume 4 of the Environmental Assessment

APPENDIX G

Assessment of Significance (Commonwealth EPBC Act 1999)

Assessment of Significance under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999

A search of the Department of Environment and Heritage (DEH) Protected Matters Search Tool (16 January 2006) identified (discounting fishes and marine species) nine threatened species, six migratory species (terrestrial), 14 migratory wetland species, 14 migratory marine birds, 10 marine species and 43 listed marine species (overfly marine area) known to occur, or considered likely to occur, on the basis of habitat modelling, within 20 kilometres of the Study Area. Of these species, those with potential habitat in the Study Area are shown in Tables 4.6, 5.1 and 8.3 of the main text.

A number of endangered species are considered to have potential habitat within the Study Area. These are assessed below. None of these species were recorded during extensive, seasonal surveys of the Study Area.

A number of vulnerable species are considered to have potential habitat within the Study Area. These are assessed below. The brush-tailed rock-wallaby (*Petrogale penicillata*), large-eared pied bat (*Chalinolobus dwyeri*), painted diuris (*Diuris tricolor)*, narrow goodenia *(Goodenia macbarronii)* and *Lasiopetalum longistamineum* were recorded from the Study Area, while *Bothriochloa biloba* was recorded nearby.

The following Migratory species were identified within the Study Area: rainbow bee-eater (*Merops ornatus*), white-bellied sea-eagle (*Haliaeetus leucogaster*), white-throated needletail (*Hirundapus caudacutus*) and satin flycatcher (*Myiagra cyanoleuca*). A number of other Migratory species are considered to have potential habitat within the Study Area.

An assessment of the impact on potential habitat for these recorded species is provided below, as well as for those threatened and migratory species considered to have potential habitat within the Study Area. The aim of this assessment is to determine whether the Anvil Hill Project is likely to have a significant impact on any matters of national environmental significance (NES) with the potential to occur within the Study Area. In this instance, matters of NES with potential to occur within the Study Area include:

- Listed threatened species and communities; and
- Migratory species protected under international agreements;

Each category will be assessed according to the relevant significant impact criteria below.

Critically Endangered and Endangered Species

The endangered species swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) and *Cynanchum elegans* are considered to have potential habitat within the Study Area. None of these species were recorded during extensive, seasonal surveys of the Study Area. An assessment according to the relevant significant impact criteria is provided below.

In this case, a *population* means:

- a geographically distinct regional population, or collection of local populations; or
- a regional population, or collection of local populations, that occurs within a particular bioregion.

No swift parrots, regent honeyeaters or specimens of *Cynanchum elegans* were recorded within the Study Area. The Study Area does not contain a geographically distinct regional population, or collection of local populations for these species. The Study Area does not contain a regional population, or collection of local populations of these species that occur within the Sydney Basin bioregion.

The spotted-tailed quoll was not recorded within the study area, despite extensive seasonal surveys. During fauna surveys in 2004, a call was heard that was similar to the 'circular saw' call known to be made by this species, however the call was too short and too distant to verify. The spotted-tailed quoll is an elusive, trap-shy species which is difficult to detect. It occurs at low densities characterized by large home ranges, a further hindrance to identifying the species in the field. Despite the lack of confirmed records, it is considered possible that this species may occur within the Study Area. This is based on the availability of potentially suitable habitat and the small number of historic records of this species with a 20 kilometre radius of the Study Area.

It is likely that the Study Area forms habitat for part of a population of spotted-tailed quolls that extends to the west, north-west and south-west into the remote escarpment country of Manobalai Crown Land. It is also likely that the Study Area forms marginal habitat for a population with a core area in the remote escarpment country to the west, north-west and south west. There is potential foraging habitat for this species across the Study Area, as well as potential breeding and denning habitat in the form of hollow logs, hollow-bearing trees, and rocky escarpment areas.

The failure to record the spotted-tailed quoll and the likelihood the Study Area forms marginal habitat suggests that the Study Area does not contain a geographically distinct regional population, or collection of local populations for the spotted-tailed quoll. The Study Area does not contain a regional population, or collection of local populations, that occur within the Sydney Basin bioregion.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- **lead to a long-term decrease in the size of a *population*; or**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not lead to a long-term decrease in the size of a *population* of these species.

- **reduce the area of occupancy of the species; or**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not lead to a long-term decrease in the size of a *population* of these species.

- **fragment an existing *population* into two or more populations; or**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not fragment an existing *population* of these species into two or more populations.

- **adversely affect habitat critical to the survival of a species; or**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not adversely affect habitat critical to the survival of these species.

- **disrupt the breeding cycle of a population; or**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not disrupt the breeding cycle of a population of these species.

- **modify, destroy, remove isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline; or**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that these species are 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**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area.

The Anvil Hill Project will not result in invasive species that are harmful to these species becoming established in their habitat. Indeed, it is likely that monitoring and management requirements of the Anvil Hill Project will result in the reduction of such invasive species within this habitat.

- **interfere with the recovery of the species.**

No populations of the swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans* were recorded within the Study Area. The Anvil Hill Project will not interfere with the recovery of these species.

Vulnerable Species

The vulnerable species green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), brush-tailed rock-wallaby (*Petrogale penicillata*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), large-eared pied bat (*Chalinolobus dwyeri*), *Bothriochloa biloba*, small snake orchid *(Diuris pedunculata)*, painted diuris *(Diuris tricolor)*, slaty red gum *(Eucalyptus glaucina)*, narrow goodenia *(Goodenia macbarronii)*, *Kennedia retrorsa*, *Lasiopetalum longistamineum*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood *(Pterostylis*

gibbosa), *Rulingia procumbens* and austral toadflax (*Thesium australe)* are considered to have potential habitat within the Study Area.

Of these, brush-tailed rock-wallaby large-eared pied bat, painted diuris, narrow goodenia and *Lasiopetalum longistamineum*, were recorded within the Study Area during surveys, and *Bothriochloa biloba* was recorded outside of the Study Area. An assessment according to the relevant significant impact criteria is provided below.

In this case, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

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

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

The brush-tailed rock-wallaby (*Petrogale penicillata*), large-eared pied bat (*Chalinolobus dwyeri*), painted diuris, narrow goodenia and *Lasiopetalum longistamineum*, were recorded within the Study Area during surveys. *Bothriochloa biloba* was recorded nearby.

The record of the brush-tailed rock-wallaby within the Proposed Offset Area comes from the positive identification of a number of scats found in caves and overhangs on the Limb of Addy Hill. All of these scats were positioned in sheltered positions in crevices and holes where wildlife were unable to trample or disturb them. No fresh scats were collected, despite repeat visits to identified sites. Despite the large amount of seasonal field survey (including target field survey for this species), no brush-tailed rock-wallabies were observed. No further indication of the presence of this species was recorded from the Study Area. It is highly likely that these scats are from an extinct population of these species from the Proposed Offset Areas. It is not considered that an extant population of this species is present within the Study Area, as such an important population of this species is not considered to be present within the Study Area.

Records of the large-eared pied bat (*Chalinolobus dwyeri*) are from the Proposed Offset Areas only. There are a small number of records of this species from the Study Area, and it is unlikely that a roosting or breeding colony of this species is present within the Study Area. The records of this species within the Study Area do not represent an extension to the known range of this species. It is not considered that an important population of this species is present within the Study Area.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. This species is moderately widespread, although uncommon, in the Hunter Valley. The record of this species outside (although near to) the Study Area do not represent an extension to the known distribution of this species. It is unlikely that this record represents an important population of this species.

Records of painted diuris are from the Proposed Offset Areas. The Proposed Disturbance Area contains potential habitat for this species, and it is considered likely that a population of this species exists within the Proposed Disturbance Area. If there were further records of this species within the Proposed Disturbance Area, these will be lost as a result of clearing for the project. The known record of this species within the Study Area would not be placed at risk as a result of the project. The records of this species within the Study Area are likely to be at, or approaching the eastern limit of the known range for this species. While there is only one record of this species within the Study Area, the likelihood of further unidentified records within the Proposed Disturbance Area is high. As such, it is at least reasonably likely that an important population of this species is present within the Study Area.

Records of narrow goodenia within the Study Area come from both the Proposed Disturbance Area (majority of records), and from the Proposed Offset Areas. The records of this species within the Study Area add to the small number of records for this species in the Hunter Valley. In particular, the records of this species within the Proposed Disturbance Area represent the largest area of known habitat for this species within the Hunter Region. All of this known habitat will be lost as a result of the proposal. Some records of this species will be retained within the Proposed Offset Areas, however this will represent only a small proportion of the population identified within the Study Area. These current records add to a previous record of the species from the Study Area, and are likely to be approaching the eastern limit of this species in the Hunter Valley. It is likely that these records represent an important population of this species within the Study Area.

Records of *Lasiopetalum longistamineum* within the Study Area come only from the Proposed Offset Areas. The known records of this species will not be impacted by the proposal. It is possible that further examples of this species could be present within the Study Area, however habitat for this species is restricted to sandstone outcrops, the majority of which occur within the Proposed Offset Areas. The record of this species would not represent an extension to the known distribution of this species. It is not considered that an important population of this species is present within the Study Area.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- **lead to a long-term decrease in the size of an *important population* of a species; or**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

While not identified, it is possible that an important population of painted diuris is present within the Proposed Disturbance Area. As the majority of highly likely habitat for this species lies within the Proposed Disturbance Area, it is likely that the proposal would lead to a long-term decrease in the size of an important population of painted diuris.

The large number of records of narrow goodenia within the Study Area (particularly in the Proposed Disturbance Area) represents an important population of this species. The loss of the majority of this population (all records from within the Proposed Disturbance Area) will result in the long-term decrease of an important population of this species.

- **reduce the area of occupancy of an *important population*; or**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, *Eucalyptus glaucina*, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

While not identified, it is possible that an important population of painted diuris is present within the Proposed Disturbance Area. As the majority of highly likely habitat for this species lies within the Proposed Disturbance Area, it is likely that the proposal would lead to a reduction in the area of occupancy of an important population of painted diuris.

The large number of records of narrow goodenia within the Study Area (particularly in the Proposed Disturbance Area) represents an important population of this species. The loss of the majority of this population (all records from within the Proposed Disturbance Area) will result in a reduction in the area of occupancy of an important population of this species.

- **fragment an existing important population into two or more populations; or**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood,

Rulingia procumbens and austral toadlfax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

While not identified, it is possible that an important population of painted diuris is present within the Proposed Disturbance Area. The majority of records of this species within the Hunter Valley come from the Wybong area. The removal of potential habitat within the Proposed Disturbance Area will isolate the known record of this species to the north of the Study Area from areas of potential habitat to the south. This will lead to fragmentation of an important population of this species into two or more populations.

The large number of records of narrow goodenia within the Study Area (particularly in the Proposed Disturbance Area) represent an important population of this species. There are known occurrences of this species outside of the Study Area within the local area. The loss of the population located within the Proposed Disturbance Area will increase the fragmentation of other known populations in the local area.

- **adversely affect habitat critical to the survival of a species; or**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

While not identified, it is possible that an important population of painted diuris is present within the Proposed Disturbance Area. The Study Area does represent a large area of habitat for this species, however as this species is known from the local area, it is unlikely that the habitat within the Proposed Disturbance Area is critical to the survival of this species within the Hunter Valley.

The large number of records of narrow goodenia within the Study Area (particularly in the Proposed Disturbance Area) represents an important population of this species. The

Study Area does represent possibly the largest area of known habitat for this species within the Hunter Valley, however as this species is also known from the local area, it is unlikely that the habitat within the Proposed Disturbance Area is critical to the survival of this species within the Hunter Valley.

- **disrupt the breeding cycle of an important population; or**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

While not identified, it is likely that an important population of painted diuris is present within the Proposed Disturbance Area. The loss of the majority of this important population is likely to disrupt the breeding cycle of this species.

The large number of records of narrow goodenia within the Study Area (particularly in the Proposed Disturbance Area) are likely to represent an important population of this species. The loss of the majority of this important population is likely to disrupt the breeding cycle of this species.

- **modify, destroy, remove isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline; or**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

While not identified, it is possible that an important population of painted diuris is present within the Proposed Disturbance Area. The loss of habitat within the Proposed Disturbance Area may remove a large area of potential habitat for this species, although the only record of the species is from within the Proposed Offset Areas.

The large number of records of narrow goodenia within the Study Area (particularly in the Proposed Disturbance Area) represent an important population of this species. The loss of a large proportion of the important population of this species is likely to cause this species to decline in the Study Area.

- **result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat; or**

The Anvil Hill Project will not result in invasive species that are harmful to these species becoming established in their habitat. Indeed, it is likely that monitoring and management requirements of the Anvil Hill Project will result in the reduction of such invasive species within this habitat.

- **interferes substantially with the recovery of the species.**

No populations of the green and golden bell frog (*Litoria aurea*), pink-tailed legless lizard (*Aprasia parapulchella*), broad-headed snake (*Hoplocephalus bungaroides*), red goshawk (*Erythrotriorchis radiatus*), red-tailed black-cockatoo (*Calyptorhynchus banksii*), superb parrot (*Polytelis swainsonii*), grey-headed flying-fox (*Pteropus poliocephalus*), greater long-eared bat (*Nyctophilus timoriensis*), small snake orchid, slaty red gum, *Kennedia retrorsa*, *Ozothamnus tessellatus*, *Philotheca ericifolia*, *Picris evae*, *Prostanthera cineolifera*, *Prostanthera cryptandroides*, *Prostanthera discolor*, Illawarra greenhood, *Rulingia procumbens* and austral toadflax are known to occur within the Study Area. The Study Area is unlikely to contain an important population of these species.

An important population of the brush-tailed rock-wallaby (*Petrogale penicillata*) is not considered to be extant within the Study Area.

The small numbers of records of the large-eared pied bat (*Chalinolobus dwyeri*) within the Study Area are not considered to form an important population of this species.

The record of *Bothriochloa biloba* comes from outside of the Study Area, to the south of the Proposed Offset Areas. It is unlikely that this record represents an important population of this species.

The potential loss of a proportion of an important population of painted diuris within the Study Area may interfere with the recovery of the species on a local level, although the only record of this species is from the Proposed Offset Areas.

The loss of a potentially significant proportion of an important population of narrow goodenia within the Study Area may interfere with the recovery of the species on a local level.

Migratory Species

The migratory species rainbow bee-eater (*Merops ornatus*), cicadabird (*Coracina tenuirostris*), cattle egret (*Ardea ibis*), great egret (*Ardea alba*), white-bellied sea-eagle

(*Haliaeetus leucogaster*), white-throated needletail (*Hirundapus caudacutus*), black-faced monarch (*Monarcha melanopsis*), satin flycatcher (*Myiagra cyanoleuca*), regent honeyeater (*Xanthomyza phrygia*), fork-tailed swift (*Apus pacificus*) are considered to have potential habitat within the Study Area. Of these, the rainbow bee-eater, white-bellied sea-eagle, white-throated needletail and satin flycatcher were recorded within the Study Area. An assessment according to the relevant significant impact criteria is provided below.

An area of *important habitat* is:

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

The rainbow bee-eater (*Merops ornatus*), white-bellied sea-eagle (*Haliaeetus leucogaster*), white-throated needletail (*Hirundapus caudacutus*) and satin flycatcher (*Myiagra cyanoleuca*) were recorded within the Study Area.

Records of the rainbow bee-eater are distributed broadly across NSW, with no obvious concentrations to suggest an ecologically significant proportion of the population of the species is using habitat within the local area. The site is not at the limit of the known distribution for this species, and there is no evidence to suggest the species is declining in this area. It is unlikely that the Study Area forms and area or important habitat for the rainbow bee-eater, nor is it likely that local records of this species represent an ecologically significant proportion of the entire population of this species.

The record of the white-bellied sea-eagle within the Study Area is not likely to represent an ecologically significant proportion of the population of this species. Records of this species this far inland are not uncommon, and the Study Area does not represent the limit of the known range for this species. There is no evidence to suggest that this species is declining in the local area. It is not considered that the Study Area forms and area of important habitat for this species, is it likely that local records of this species represents an ecologically significant proportion of the entire population of this species.

Records of the white-throated needletail are distributed broadly across NSW, with no obvious concentrations of records in the local area to suggest the presence of an ecologically significant proportion of the entire population of this species. The Study Area is not at the limit of the known distribution for this species, nor is there any evidence to suggest this species is declining in the local area. It is unlikely that the Study Area forms and area or important habitat for the white-throated needletail, nor is it likely that local records of this species represent an ecologically significant proportion of the entire population of this species.

The records of the satin flycatcher are distributed broadly across the eastern half of NSW, with no obvious concentrations of records in the local area to suggest the presence of an ecologically significant proportion of the entire population of this species. The Study Area is not at the limit of the known distribution for this species, nor is there any evidence to suggest this species is declining in the local area. It is unlikely that the Study Area forms and area or important habitat for this species, nor is it likely that local records of this species represent an ecologically significant proportion of the entire population of this species.

A *population*, in regards to migratory species, relates to the entire population.

It is likely that the Study Area contains populations of the rainbow bee-eater (*Merops ornatus*), white-throated needletail (*Hirundapus caudacutus*) and satin flycatcher (*Myiagra cyanoleuca*) however this is not considered to be an ecologically significant proportion of the total population of this species.

It is not likely that the record of the white-bellied sea-eagle (*Haliaeetus leucogaster*) represents a population of this species in the local area. Rather, this record is likely to be of a vagrant, using the habitat in the local area while travelling between major inland rivers or waterbodies.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- **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; or**

The Anvil Hill Project will require the removal of a significant area of native vegetation within the Study Area. This will result in fragmentation of the Study Area. However, it is not considered that the Study Area provides an area of *important habitat* for the rainbow bee-eater (*Merops ornatus*), white-bellied sea-eagle (*Haliaeetus leucogaster*), white-throated needletail (*Hirundapus caudacutus*) and satin flycatcher (*Myiagra cyanoleuca*).

- **result in invasive species that is harmful to the migratory species becoming established in the area of *important habitat* of the migratory species; or**

The Anvil Hill Project will not result in invasive species that are harmful to these species becoming established in their habitat. Indeed, it is likely that monitoring and management requirements of the Anvil Hill Project will result in the reduction of such invasive species within this habitat.

- **seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an *ecologically significant proportion* of the population of the species.**

The Anvil Hill Project will require the removal of a substantial area of native vegetation within the Study Area. This will result in fragmentation of the Study Area. However, it is not considered that the Study Area provides an ecologically significant proportion of the entire populations for the rainbow bee-eater (*Merops ornatus*), white-bellied sea-eagle (*Haliaeetus leucogaster*), white-throated needletail (*Hirundapus caudacutus*) and satin flycatcher (*Myiagra cyanoleuca*).

Conclusion

Extensive seasonal surveys of the Study Area have identified the presence of a number of species listed under the EPBC Act 1999. A number of additional species are considered to have the potential to occur within the Study Area, however were not identified.

The Anvil Hill Project is not considered likely to cause a significant impact on a population of the Endangered swift parrot (*Lathamus discolor*), regent honeyeater (*Xanthomyza phrygia*), spotted-tailed quoll (*Dasyurus maculatus maculatus*) or *Cynanchum elegans.*

The vulnerable brush-tailed rock-wallaby (*Petrogale penicillata*), large-eared pied bat (*Chalinolobus dwyeri*), painted diuris, narrow goodenia and *Lasiopetalum longistamineum* were recorded within the Study Area during surveys. *Bothriochloa biloba* was recorded nearby. It is not considered that the Study Area contains habitat for an important population of the brush-tailed rock-wallaby (*Petrogale penicillata*), large-eared pied bat (*Chalinolobus dwyeri*), *Bothriochloa biloba* and *Lasiopetalum longistamineum*. It is possible that an important population of painted diuris and likely that an important population of narrow goodenia are present within the Study Area. It is possible that the Anvil Hill Project will lead to a significant impact on important populations of painted diuris and narrow goodenia.

The migratory species rainbow bee-eater (*Merops ornatus*), white-bellied sea-eagle (*Haliaeetus leucogaster*), white-throated needletail (*Hirundapus caudacutus*) and satin flycatcher (*Myiagra cyanoleuca*) were recorded within the Study Area. It is not considered that the Study Area provides important habitat or an ecologically significant proportion of the entire populations for the rainbow bee-eater, white-bellied sea-eagle, white-throated needletail and satin flycatcher. The Anvil Hill Project is unlikely to result in a significant impact on identified or potential migratory species within the Study Area.

While it is likely that any significant impact could be successfully ameliorated through the application of the detailed Biodiversity Offsets Strategy, it is likely that the project should be referred to the Minister for the Environment for further assessment.

APPENDIX H

Fauna Species List

Fauna Species List

The following list was developed from surveys of the Anvil Hill Project Area detailed in the main report. It includes all species of vertebrate fauna observed on the Anvil Hill Project Area during fieldwork.

The following abbreviation or symbols are used to identify the method of detection in the appendix table:

✓	Identified from visual sighting or characteristic call;
S	Identified from scat sample(s) in field;
D	"Definite" identification from scat or hair sample by Barbara Triggs;
Pr	"Probable" identification from scat or hair sample by Barbara Triggs;
H	Identified from hair funnel sample(s);
T	Identified from tracks and/or traces such as burrows, nests or feathers;
C	"Confident" identification by Fly by Night Bat Surveys Pty Ltd;
P	"Probable" identification by Fly by Night Bat Surveys Pty Ltd; and
Po	"Possible" identification by Fly by Night Bat Surveys Pty Ltd;

Any species that could not be identified to the species taxonomic level are denoted in the following manner:

sp.	specimens that are identified to genus level only;
?	specimens for which identification was uncertain;
prob.	specimens for which identification was considered highly likely but not definite;
poss.	specimens for which identification was considered likely but not definite.

The following abbreviations or symbols are used in the list:

asterisk (*)	denotes species not indigenous to the study area;
subsp.	subspecies;
MAR	Listed marine species under the *Environment Protection and Biodiversity Act* 1999 (EPBC Act);
MIG	Listed migratory species under the EPBC Act;
V	Vulnerable under Schedule 2 of the *Threatened Species Conservation Act* 1995; and,
E	Endangered under Schedule 2 of the TSC Act.

Bold font denotes a threatened species

Birds recorded were identified using descriptions in Slater et al. (2003) and the scientific and common name nomenclature of Birds Australia. Reptiles recorded were identified using keys and descriptions in Cogger (1994), Swan et al. (2004), Weigel (1990) and Wilson & Swan (2003) and the scientific and common name nomenclature of Cogger (1994).

Amphibians recorded were identified using keys and descriptions in Cogger (1994), Robinson (1998), Anstis (2002) and Barker et al. (1995) and the scientific and common name nomenclature of Cogger (1994). Mammals recorded were identified using keys and descriptions in Strahan (1998), Churchill (1998) and Menkhorst & Knight (2004) and the scientific and common name nomenclature of Strahan (1998) for non bat species and Churchill (1998) for bats.

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Phasianidae																
Coturnix pectoralis	stubble quail		MAR					431, 74					431, 74			
Coturnix ypsilophora	brown quail							150					150			
Anatidae																
Chenonetta jubata	Australian wood duck			✓	✓			142, 144, 118	✓			✓	142, 144, 397, 412, 390	✓		
Anas superciliosa	Pacific black duck			✓	✓				✓					✓		
Anas gracilis	grey teal				✓			118				✓				
Podicipedidae																
Tachybaptus novaehollandiae	Australasian grebe			✓	✓			118	✓					✓		
Pelecanidae																
Pelecanus conspicillatus	Australian pelican		MAR							✓			326			
Ardeidae																
Egretta novaehollandiae	white-faced heron			✓	✓			424, 97, 118	✓		✓		424, 412			
Ardea pacifica	white-necked heron							431					431			
Threskiornithidae																
Threskiomis spinicollis	straw-necked ibis		MAR								✓		412			
Platelea flavipes	yellow-billed spoonbill												11			
Accipitridae																
Pandion haliaetus	**osprey**	**V**													✓	

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Elanus notatus	black-shouldered kite			✓	✓				✓							
Lophoictinia isura	**square-tailed kite**	**V**													✓	
Haliastur sphenurus	whistling kite		MAR	✓					✓				148(Poss)			
Haliaeetus leucogaster	white-bellied sea-eagle		MAR & MIG					152								
Accipiter fasciatus	brown goshawk		MAR										148(Poss)			
Accipiter cirrhocephalus	collared sparrowhawk												162			
Aquila audax	wedge-tailed eagle			✓	✓			152	✓			✓	62	✓		
Hieraaetus morphnoides	little eagle			✓				62	✓					✓		
Falconidae																
Falco berigora	brown falcon			✓	✓			219, 132	✓			✓				
Falco longipennis	Australian hobby			✓					✓				219, 132, 412			
Falco peregrinus	peregrine falcon						✓	62			✓	✓	62			
Falco cenchroides	nankeen kestrel		MAR	✓	✓		✓	30, 90, 144, 431	✓	✓	✓	✓	18, 30, 90, 144, 431, 412, 390			
Charadriidae																
Elseyornis melanops	black-fronted dotterel			✓												
Vanellus miles	masked lapwing			✓					✓		✓	✓	109			
Columbidae																
**Columba livia*	rock dove							144					144			
Phaps chalcoptera	common bronzewing				✓			53, 91			✓	✓	150	✓		
Phaps elegans	brush bronzewing			✓					✓							

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Ocyphaps lophotes	crested pigeon			✓	✓			144, 131, 200	✓		✓	✓	144, 131, 200	✓		
Geopelia striata	peaceful dove			✓				137	✓			✓	137, 148			
Geopelia humeralis	bar-shouldered dove											✓				
Cacatuidae																
Calyptorhynchus lathami	**glossy black-cockatoo**	**V**						**91**			✓			✓	✓	
Calyptorhynchus funereus	yellow-tailed black-cockatoo			✓					✓							
Cacatua roseicapilla	galah			✓	✓	✓	✓	30, 42, 55, 144, 78, 114, 424, 410, 154, 21, 347	✓	✓	✓	✓	30, 78, 144, 424, 412, 410, 154, 21, 109, 410, 347	✓		
Cacatua galerita	sulphur-crested cockatoo			✓	✓			85, 144, 424, 21, 410, 347	✓	✓	✓	✓		✓		
Psittacidae																
Glossopsitta concinna	musk lorikeet			✓					✓			✓				
Glossopsitta pusilla	little lorikeet							102, 139				✓	139, 148			
Alisterus scapularis	Australian king-parrot			✓	✓			62, 78, 91	✓	✓	✓	✓	62, 78, 390	✓		

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Platycercus eximius	eastern rosella			✓	✓			30, 42, 142, 144, 89, 78, 62, 424, 106, 410, 21, 347	✓	✓	✓	✓	30, 142, 144,89, 78, 62, 424, 106, 410, 21, 8, 109, 121, 390, 347	✓		
Psephotus haematonotus	red-rumped parrot			✓	✓			30, 410	✓	✓		✓	30, 410			
Neophema pulchella	**turquoise parrot**	**V**			✓										✓	
Cuculidae																
Cuculus pallidus	pallid cuckoo		MAR	✓					✓					✓		
Cacomantis flabelliformis	fan-tailed cuckoo		MAR	✓	✓			78	✓		✓	✓	78	✓		
Chrysococcyx basalis	Horsfield's bronze-cuckoo		MAR	✓				30	✓				30			
Strigidae																
Ninox strenua	**powerful owl**	**V**													**✓ (local area)**	
Ninox connivens	**barking owl**	**V**													**✓ (local area)**	
Ninox novaeseelandiae	southern boobook		MAR					75, 78 (D)					149, 78(D)			
Tytonidae																
Tyto novaehollandiae	**masked owl**	**V**									✓				✓	
Tyto alba	barn owl												160			

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Podargidae																
Podargus strigoides	tawny frogmouth				✓			75, 42	✓		✓	✓		✓		
Caprimulgidae																
Eurostopodus mystacalis	white-throated nightjar		MAR	✓												
Aegothelidae																
Aegotheles cristatus	Australian owlet-nightjar			✓				94	✓		✓	✓	94	✓		
Apodidae																
Hirundapus caudacutus	white-throated needletail		MAR & MIG								✓			✓		
Halcyonidae																
Dacelo novaeguineae	laughing kookaburra			✓	✓			90, 138, 126, 29, 410	✓		✓	✓	90, 138, 29, 410	✓		
Todiramphus macleayii	forest kingfisher		MAR					74					74	✓		
Todiramphus sanctus	sacred kingfisher		MAR	✓	✓			62, 74, 125, 114	✓	✓	✓		62, 74, 125			
Meropidae																
Merops ornatus	rainbow bee-eater		MAR & MIG	✓	✓			30, 62, 64, 382, 104, 41	✓	✓	✓	✓	30, 62, 382, 148, 145	✓		

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Coraciidae																
Eurystomus orientalis	dollarbird		MAR		✓			29		✓				✓		
Climacteridae																
Corombates leucophaeus	white-throated treecreeper			✓	✓			78, 90, 114, 53	✓	✓	✓	✓	78, 90, 148	✓		
Climacteris picumnus	**brown treecreeper**	**V**		✓	✓			**64, 21, 410, 382**	✓			✓	21, 382, 410	✓	✓	
Maluridae																
Malurus cyaneus	superb fairy-wren			✓	✓			30, 62, 90, 53, 137, 382	✓	✓	✓	✓	30, 62, 90, 53, 137, 148, 382	✓		
Pardalotidae																
Pardalotus punctatus	spotted pardalote			✓				78, 79, 151, 137, 347	✓		✓	✓	78, 151, 137, 148, 347	✓		
Pardalotus striatus	striated pardalote			✓	✓			62, 78, 151, 90, 21, 68, 152, 347	✓	✓	✓	✓	62, 78, 151, 90, 21, 162, 347	✓		
Sericornis frontalis	white-browed scrubwren			✓					✓		✓			✓		
Pyrrholaemus sagittata	**speckled warbler**	**V**		✓	✓			**152, 79, 137**	✓		✓	✓	137	✓	✓	
Smicrornis brevirostris	weebill			✓	✓			347	✓		✓	✓	347	✓		
Gerygone fusca	western gerygone											✓		✓		

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Gerygone olivacea	white-throated gerygone				✓					✓						
Acanthiza pusilla	brown thornbill			✓					✓							
Acanthiza reguloides	buff-rumped thornbill			✓	✓				✓		✓	✓				
Acanthiza chrysorrhoa	yellow-rumped thornbill			✓	✓			30, 29, 21, 152410, 347	✓	✓	✓	✓	30, 29, 21, 410, 347	✓		
Acanthiza nana	yellow thornbill			✓	✓			74, 55, 78, 79	✓	✓	✓	✓	74, 78	✓		
Meliphagidae																
Plectorhyncha lanceolata	striped honeyeater							21, 95				✓	21, 95			
Philemon corniculatus	noisy friarbird			✓	✓			42, 62, 53, 30, 89, 78, 114, 21, 382	✓	✓	✓	✓	62, 53, 30, 89, 78, 21, 382	✓		
Manorina melanocephala	noisy miner			✓	✓			53, 42, 89, 131, 154, 21, 92	✓	✓	✓	✓	53, 89, 131, 154, 21, 121, 390	✓		
Meliphaga lewinii	Lewin's Honeyeater													✓		
Lichenostomus chrysops	yellow-faced honeyeater				✓			151, 137			✓	✓	151, 137, 148, 162			

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Lichenostomus leucotis	white-eared honeyeater				✓			78, 102, 90, 64, 137			✓	✓	78, 90, 137, 148, 162	✓		
Lichenostomus penicillatus	white-plumed honeyeater				✓			410, 21, 382				✓	410, 21, 382	✓		
Melithreptus gularis gularis	black-chinned honeyeater (eastern subspecies)														✓	
Melithreptus brevirostris	brown-headed honeyeater				✓							✓				
Acanthorhynchus tenuirostris	eastern spinebill											✓				
Myzomela sanguinolenta	scarlet honeyeater									✓						
Petroicidae																
Microeca leucophaea	Jacky winter			✓	✓			30, 29, 410, 382, 21, 152, 347	✓			✓	30, 29, 410, 382, 21, 148, 347	✓		
Petroica multicolor	scarlet robin							126				✓				
Petroica goodenovii	red-capped robin			✓	✓			54, 153, 139	✓			✓	153, 139	✓		
Melanodryas cucullata cucullata	**hooded robin (south-eastern form)**	**V**		**✓**	**✓**			**152, 410, 42**	**✓**			**✓**	410		**✓**	
Eopsaltria australis	eastern yellow robin			✓	✓			62, 30, 79	✓	✓	✓	✓	62, 30, 162	✓		

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Pomatostomidae																
Pomatostomus temporalis temporalis	**grey-crowned babbler (eastern subspecies)**	**V**		✓	✓			**78, 113, 54**	✓				78, 390	✓	✓	
Pomatostomus superciliosus	white-browed babbler			✓				137	✓		✓		137, 148			
Cinclosomatidae																
Cinclosoma punctatum	spotted quail-thrush													✓		
Neosittidae																
Daphoenositta chrysoptera	varied sittella				✓			62, 78, 126, 21					62, 78, 21	✓		
Pachycephalidae																
Falcunculus frontatus	crested shrike-tit													✓		
Pachycephala pectoralis	golden whistler						✓	90				✓	90	✓		
Pachycephala rufiventris	rufous whistler			✓	✓			30, 62, 53, 126, 151, 76, 102, 89, 78, 114, 75, 139, 95, 137, 20	✓	✓	✓	✓	30, 62, 151, 89, 78, 139, 95, 137, 20	✓		
Colluricincla harmonica	grey shrike-thrush			✓	✓			78, 79, 21, 29, 67, 89, 152, 382	✓		✓	✓	78, 21, 29, 89, 162, 382	✓		

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Dicruridae																
Myiagra rubecula	leaden flycatcher							101								
Myiagra cyanoleuca	satin flycatcher		MAR	✓					✓							
Myiagra inquieta	restless flycatcher			✓				30, 152	✓			✓	30			
Grallina cyanoleuca	magpie-lark		MAR	✓	✓			78, 21	✓	✓	✓	✓	78, 21, 412	✓		
Rhipidura rufifrons	rufous fantail		MAR											✓		
Rhipidura fuliginosa	grey fantail			✓	✓			30, 63, 62	✓	✓	✓	✓	30, 62, 162	✓		
Rhipidura leucophrys	willie wagtail			✓	✓			30, 42, 53, 54, 55, 144, 89, 114, 29, 410, 21, 152, 410, 382, 347	✓	✓	✓	✓	30, 144, 89, 150, 29, 410, 21, 410, 382, 347	✓		
Campephagidae																
Coracina novaehollandiae	black-faced cuckoo-shrike		MAR	✓	✓			30, 62, 78, 132, 144, 131, 163, 21, 124	✓	✓	✓	✓	30, 62, 78, 132, 144, 131, 163, 21, 124, 162, 412	✓		
Lalage sueurii	white-winged triller				✓			30, 42, 78, 131		✓			30, 78, 131			
Oriolidae																
Oriolus sagittatus	olive-backed oriole											✓				
Sphecotheres viridis	figbird			✓					✓					✓		

Scientific Name	Common Name	Conservation		Proposed Disturbance Area					Proposed Offset Areas					HLA Records	Abel Ecology (2005) Threatened Species Records	Local Resident Records
		TSC Act	EPBC Act	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic	Autumn 2004	Spring 2004	Summer 2004-2005	Autumn 2005	Opportunistic			
Artamidae																
Artamus superciliosus	white-browed woodswallow				✓					✓						
Artamus cinereus	black-faced woodswallow				✓											
Artamus cyanopterus	dusky woodswallow			✓	✓			53, 30, 113	✓				30	✓		
Cracticus torquatus	grey butcherbird				✓			55, 144, 78, 151, 139, 21, 95		✓	✓	✓	144, 78, 151, 139, 21, 95	✓		
Cracticus nigrogularis	pied butcherbird			✓	✓			42, 66, 125, 78, 424, 91, 410, 410, 382, 347	✓		✓	✓	125, 78, 424, 410, 121, 410, 382, 390, 347	✓		
Gymnorhina tibicen	Australian magpie			✓	✓			30, 62, 42, 142, 89, 78, 144, 424, 132, 21, 382, 347	✓	✓	✓	✓	30, 62, 142, 89, 78, 144, 424, 132, 21, 382, 347	✓		
Strepera graculina	pied currawong			✓	✓			30, 62, 94, 90, 126, 151, 144, 78, 21	✓	✓	✓	✓	30, 62, 94, 90, 151, 144, 78, 21, 121, 148	✓		

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Corvidae																
Corvus coronoides	Australian raven				✓			42, 62, 78, 144, 424, 163, 143, 21, 152, 410	✓	✓	✓	✓	42, 62, 78, 424, 397, 163, 143, 21, 410	✓		
Corvus orru	Torresian crow			✓					✓					✓		
Corcoracidae																
Corcorax melanorhamphos	white-winged chough			✓	✓			64, 151, 138, 114, 64, 410, 382	✓		✓	✓	151, 138, 410, 382	✓		
Motacilidae																
Anthus novaeseelandiae	Richard's pipit		MAR	✓	✓			142, 131, 431	✓		✓	✓	142, 131, 431	✓		
Passeridae																
Taeniopygia guttata	zebra finch							156					412, 156			
Taeniopygia bichenovii	double-barred finch			✓	✓			30, 62, 76, 89, 131, 29, 152	✓	✓	✓	✓	30, 62, 89, 131, 29, 148	✓		
Neochmia temporalis	red-browed finch			✓	✓			90, 137	✓	✓	✓		90, 137			
Stagonopleura guttata	**diamond firetail**	**V**			**✓**			**53, 410**					410	**✓**	**✓**	
Dicaeidae																
Dicaeum hirundinaceum	mistletoebird			✓	✓			21, 347	✓		✓	✓	21,347	✓		

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Hirundinidae																
Hirundo neoxena	welcome swallow		MAR	✓	✓			42, 78	✓	✓		✓	78, 162(T)	✓		
Hirundo nigricans	tree martin		MAR	✓					✓							
Hirundo ariel	fairy martin							78, 162 (T)						✓		
Sylviidae																
Cincloramphus mathewsi	rufous songlark							62, 132		✓		✓	62, 132			
Zosteropidae																
Zosterops lateralis	silvereye		MAR	✓	✓			62, 78	✓	✓	✓	✓	62, 78, 162	✓		
Sturnidae																
**Sturnus vulgaris*	common starling				✓			144, 131, 424, 154		✓		✓	144, 131, 424, 412, 154, 399, 412, 390	✓		
**Acridotheres tristis*	common myna							220					220			
REPTILES																
Cheloniidae																
Chelodina longicollis	snake-necked turtle			✓				75						✓		
Gekkonidae																
Diplodactylus vittatus	stone gecko				✓			151					151	✓		
Underwoodisaurus milii	thick-tailed gecko			✓				62, 77, 90		✓	✓	✓	62, 85, 77, 90			
Varanidae																
Varanus varius	lace monitor			✓				78			✓		78			

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Agamidae																
Pogona barbata	eastern bearded dragon			✓								✓				
Scincidae																
Anomolpus sp.														✓		
Carlia tetradactyla	southern rainbow skink				✓							✓				
Ctenotus taeniolatus	copper-tailed skink									✓	✓	✓	160			
Egernia modesta					✓					✓		✓		✓		
Egernia striolata	tree skink			✓	✓				✓	✓		✓		✓		
Egernia whitii	White's skink			✓	✓			62, 86, 77, 90	✓	✓			62, 85, 86, 77, 90			
Morethia boulengeri										✓		✓		✓		
Elapidae																
Furina diadema	red-naped snake				✓							✓				
Pseudechis guttatus	blue-bellied black snake							33				✓				
AMPHIBIANS																
Myobatrachidae																
Crinia signifera	brown froglet			✓	✓			103, 63	✓		✓	✓		✓		
Limnodynastes dumerilii	banjo frog, eastern pobblebonk							103						✓		
Limnodynastes ornatus	ornate burrowing frog				✓			75						✓		

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Limnodynastes peronii	Peron's tree frog				·									✓		
Limnodynastes tasmaniensis	spotted marsh frog			✓				103						✓		
Uperoleia laevigata	smooth toadlet				✓						✓			✓		
Hylidae																
Litoria caerulea	green tree frog										✓					
Litoria fallax	green reed frog													✓		
Litoria latopalmata	broad-palmed frog			✓	✓			55, 75, 113	✓		✓	✓		✓		
Litoria peronii	Peron's tree frog			✓	✓			113								
Litoria verreauxii	Verreaux's tree frog							113								
MAMMALS																
Tachyglossidae																
Tachyglossus aculeatus	short-beaked echidna			✓	T			74			T	T	74	✓		
Dasyuridae																
Antechinus flavipes	yellow-footed antechinus						✓					✓		✓		
Antechinus stuartii	brown antechinus			✓			D	90(Pr), 139(D), 29(D), 95(D)					90(Pr), 139(D), 29(D), 95(D)	✓		
Phascolarctidae																
Phascolarctos cinereus	**koala**	**V**										**D**				

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Vombatidae																
Vombatus ursinus	common wombat			✓	T, S		D	62, 90, 151, 138, 137, 125, 126, 75, 52, 124(S)			S	S	62, 90, 151, 138, 137, 125, 124(S), 148(S), 162(S)	✓		
Petauridae																
Petaurus breviceps	sugar glider							63(D)					150, 160(Pr)			
Petaurus norfolcensis	**squirrel glider**	**V**		✓	✓			138			✓		138			
Petaurus sp.													149(Pr)			
Pseudocheiridae																
Pseudocheirus peregrinus	common ringtail possum			✓	✓			138, 137, 125, 126, 75, 74			✓	✓	138, 137, 125, 74	✓		

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Phalangeridae																
Trichosurus vulpecula	common brushtail possum			✓	✓			90, 138, 137, 125, 126, 102, 75, 68, 347, 90(D), 139(D), 382(D), 347(D), 29(D), 21(D), 103(D), 54(D), 63(D), 86(D)	✓		✓	✓	90, 138, 137, 125, 150, 347, 162(S), 90(D), 139(D), 382(D), 347(D), 29(D), 21(D), 86(D), 149(D)	✓		
Trichosurus sp.							D	382(D), 29(D)		D	D	D	382(D), 29(D)			
Macropodidae																
Macropus giganteus	eastern grey kangaroo			✓	✓		D	42, 54, 63, 62, 55, 66, 152, 151, 75, 30, 114, 431, 130, 141, 92, 410, 152, 78(D)	✓		✓	✓	62, 151, 75, 30, 431, 396, 130, 410, 78(D)	✓		

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Macropus robustus	common wallaroo				✓			62, 152, 151, 132, 21, 152, 93				✓	62, 396, 151, 132, 21			
Macropus rufogriseus	red-necked wallaby			✓	✓		D	94, 75, 76, 164, 152, 93		Pr	✓	✓	94, 164	✓		
Petrogale penicillata	**brush-tailed rock-wallaby**	**E**										**D**			**S**	
Wallabia bicolor	swamp wallaby			✓	✓		D	90, 151, 64, 152, 78(D), 90(Pr), 63(D), 86(Pr)	✓	D	✓	✓	90, 151, 64, 150, 148, 78(D), 90(Pr), 86(Pr)			
Rhinolophidae																
Rhinolophus megaphyllus	eastern horseshoe-bat				C											
Molossidae																
Mormopteris norfolkensis	**eastern freetail-bat**	**V**									✓	**C**				
Mormopterus planiceps	southern freetail-bat			C				118 (P)	C			C				
Mormopterus “Species 2”	Little freetail-bat			P					P							
Nyctinomus australis	white-striped freetail-bat			C	✓			94, 75	C		De	C	94	✓		

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Vespertilionidae																
Miniopterus schreibersii oceanensis	**eastern bentwing-bat**	**V**		**C**	**Po**			118 (Po)	**C**		✓	**C**				
Nyctophilus geoffroyi	lesser long-eared bat										✓	✓				
Nyctophilus gouldi	Gould's long-eared bat										✓					
Nyctophilus sp.												P				
Chalinolobus dwyeri	**large-eared pied bat**	**V**						118 (C)				**C**				
Chalinolobus gouldii	Gould's wattled bat			C	C			118 (C)	C		✓, De	✓, C				
Chalinolobus morio	chocolate wattled bat			P					P		✓, Pr	C				
Myotis adversus	**large-footed myotis**	**V**						**118 (C), 56 (P)**				**Po**				
Scoteanax rueppellii	**greater broad-nosed bat**	**V**		**P**												
Scotorepens balstoni	inland broad-nosed bat											C				
Scotorepens orion	eastern broad-nosed bat											C				
Vespadelus darlingtoni	large forest bat											✓				
Vespadelus pumilus	eastern forest bat											✓				
Vespadelus regulus	southern forest bat			P	Po				P		✓	Po				
Vespadelus troughtoni	**eastern cave bat**	**V**		**P**	**P**			**118 (P)**	**P**			**P**			**✓ (Pr)**	

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Vespadelus vulturnus	little forest bat			P	P			118 (P)	P		✓, Pr	✓, C				
Muridae																
**Mus musculus*	house mouse						D	103(D), 160(Pr)				D	160(Pr), 149(D)			
Rattus fuscipes	bush rat													✓		
**Rattus rattus*	black rat						D			Pr		✓, D	149(D)			
Rattus sp.								86(Pr)					86(Pr)			
Canidae																
**Canis families*	dog			✓			D	90(D)				✓	90(D)			
**Vulpes vulpes*	fox			✓	✓		D	151, 75(S), 78(D)			D		151, 78(D)	✓		
Felidae																
**Felis catus*	cat			✓			D									
Leporidae																
**Oryctolagus cuniculus*	rabbit			✓	✓		D	30, 151, 137, 79, 90(D)	✓	D	✓	✓	30, 151, 137, 90(D)	✓		
**Lepus capensis*	brown hare							75					85			
Bovidae																
**Capra hircus*	goat						D	78(D)				D	78(D), 162			

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**Ovis aries*	sheep			✓	✓		D	90(D)				D	90(D)			
Cervidae																
**Cervus timoriensis*	rusa deer											Prob				