Appendix E
Flora and Fauna Investigation

PROPOSED REZONING OF LAND

OLD NORTHERN ROAD, HASTINGS ROAD, AND NEW LINE ROAD, SOUTH DURAL

FLORA AND FAUNA INVESTIGATION

January 2009

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FLORA AND FAUNA INVESTIGATION

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1 INTRODUCTION

1.1 Context

This report investigates potential flora and fauna issues pertaining to a proposed rezoning of approximately 240 hectares of land at South Dural.

The study area for this report is located immediately south of Round Corner at Dural, and includes 130 land titles in an area bounded by Old Northern Road, Hastings Road and New Line Road (Figure 1).

A relatively steep-sided gully associated with Georges Creek dominates the central part of the study area. This gully area contains relatively intact native vegetation and habitats, which connect across New Line Road to the east to similarly vegetated creekline gullies.

Lands surrounding the gully are gently undulating, and have been extensively cleared for agricultural landuses, including stock grazing, market gardens and pine plantations.

Substantial areas of native vegetation occur within the Dooral Dooral Creek corridor to the northwest of the study area. These areas are currently separated from the Georges Creek corridor within the study area by cleared and developed lands.

1.2 Objectives

The objectives of this investigation and report are:

- to identify and describe the existing vegetation and habitats of the study area;
- to identify and map the extent of any 'endangered ecological communities' occurring within the study area (as listed under the *NSW Threatened Species Conservation Act 1995*, and/or under the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999*);
- to consider the likelihood of 'threatened species' occurring within the study area (as listed under the *NSW Threatened Species Conservation Act 1995*, and/or under the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999*);
- to list and describe potential flora and fauna issues that may constrain further development of the study area, and to consider the implications of these in relation to Growth Centres Commission sustainability criteria;

- to identify and describe opportunities for improving existing ecological values within the study area and in the locality, and to illustrate these as appropriate;
- to provide input and comments on the Indicative Concept Master Plan (ICMP) prepared by Inspire (13 January 2009).

2 FIELD SURVEYS AND RESEARCH

2.1 Desktop Research and Review

Relevant data (including records of threatened species) were obtained from a search of records listed within 10km of the study area on the NSW NPWS Atlas of NSW Wildlife (data obtained August 2008).

Threatened fauna species recorded within 10km of the study area since 1980 are listed in Appendix 1 of this report, along with known details of their habits, habitat and foraging requirements, and distributions.

The following documents were reviewed as part of the investigation:

- Vegetation Communities Map, prepared by P Smith & J Smith for Hornsby Shire Council, August 2007, and a more detailed supplementary map of the study area provided by Council officer Jamie Slaven in June 2008;
- Sydney Metropolitan Strategy, Fact Sheet 5: Sustainability Criteria;
- South Dural Area Stream Classification, NSW Department of Water and Energy (2007);
- Land Capability Planning Context Report, submission to Hornsby Shire Council prepared by Michael Brown & Associates for the South Dural Land Owners Group, March 2007;
- South Dural Future Urban Release Area, prepared by McKenzie Land Planning Services, April 2002;
- Hornsby Shire Council, Executive Manager's Report No. PLN191/07, Rezoning request of land in the South Dural area.

2.2 Flora Field Survey

A general botanical survey was conducted across the study area on the 16th of August 2008.

The survey included ground-truthing of previous vegetation mapping of the study area (Hornsby Council 2007), and some opportunistic targeted searches in areas of potential habitat for plant species of conservation significance known from the general region (NPWS Atlas), or otherwise anticipated to occur.

An inventory was compiled of all plant species recorded during the survey (Appendix 2). Plant identifications conform to nomenclature in Harden (1990-1993) and to recent reclassifications and name changes listed in *Cunninghamia* and *Telopea*.

Ecological communities were identified and described with reference to the vegetation descriptions of P & J Smith (August 2007), Native Vegetation Maps (NVM) of the Cumberland Plain Western Sydney (NPWS 2002), and to the descriptions included in the Final Determinations of communities listed on

the *NSW Threatened Species Conservation Act 1995* (TSC Act) and the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

The conservation significance of individual species, populations and vegetation communities recorded during the survey was established with reference to the EPBC Act in the national context, and to the TSC Act in the state context.

2.3 Fauna Field Survey

A general inspection and assessment of fauna habitats across the study area was conducted on the 16th and 25th of August 2008.

Fauna habitats were assessed with particular consideration to the specific requirements of fauna species of conservation significance known from the general region (NPWS Atlas), or otherwise anticipated to occur. Relevant details are reported in Appendix 1.

A list of fauna species known to have occurred in the vicinity, and therefore likely to occur within the study area, is provided in Appendix 3.

The conservation significance of native fauna expected to occur within the study was established with reference to the EPBC Act in the national context, and to the TSC Act in the state context.

3 EXISTING VEGETATION AND HABITATS

3.1 General Description

The study area is dominated (ecologically) by a broad vegetation corridor located within and adjacent to the steep-sided gully associated with Georges Creek.

Georges Creek is a Category 1 stream (DWE classification), which drains to the southeast through the study area, exiting near the intersection of Hastings Road with New Line Road.

The vegetation within this main gully area is relatively intact and undisturbed, although with dense shrubby weed infestations in some places, and with usual edge-effects include hazard reduction works and incursion of exotic grasses and groundcovers.

The creekline itself is affected by invasive exotic groundcovers indicating higher than natural nutrient levels in the water.

Surrounding lands within the study area contain isolated small patches of remnant/regrowth native vegetation, and scattered native trees. These areas vary in condition and regeneration potential. Typically, these areas have a canopy of native trees, and either a shrub layer dominated by invasive woody weeds, or no shrub layer, and a groundcover containing a mixture of native and exotic grasses maintained as lawn or as grazed pasture.

The study area contains a range of habitat features for native fauna, include a range of tree-hollow sizes, rocky boulders, crevices, small sandstone escarpments, ephemeral and permanent drainage lines, perched soaks, and a range of woodland and forest structures.

3.2 Flora and Fauna Species

Compilation of detailed inventories of flora and fauna species were beyond the scope of this investigation.

However, an inventory was compiled of all plant species recorded during the survey (Appendix 2), and a list of fauna species known to have occurred in the vicinity, and therefore likely to occur within the study area, is provided in Appendix 3.

3.3 Ecological Communities (TSC Act & EPBC Act)

Three native ecological communities have been previously mapped within the study area (Smith & Smith, 2007):

- Blackbutt Gully Forest;
- Sydney Turpentine Ironbark Forest; and
- Blue Gum High Forest.

Recent surveys conducted for this report confirmed the presence of these three communities within the study area, although with some variation to their previously mapped location and extent. Refer to Figure 2 (A:northern and B:southern).

3.3.1 Blackbutt Gully Forest (as described by Smith & Smith, 2007)

Blackbutt Gully Forest within the study area occurs predominantly within and adjacent to the main gully associated with Georges Creek Figure 2A and 2B). The study area contains approximately 20 hectares of Blackbutt Gully Forest.

The canopy is dominated by Blackbutt *Eucalyptus pilularis*, with common occurrences of Sydney Red Gum *Angophora costata* and Turpentine *Syncarpia glomulifera* ssp *glomulifera*. Occurring occasionally are Sydney Blue Gum *Eucalyptus saligna* and Red Bloodwood *Corymbia gummifera.*

There is a midstorey with Black She-oak *Allocasuarina littoralis*, Christmas Bush *Ceratopetalum gummiferum*, Sweet Pittosporum *Pittosporum undulatum*, and regenerating canopy species.

The shrub layer is a mosaic of established native cover, with patches of dense weed infestations in places. Common native shrubs include White Wattle *Acacia linifolia*, Tea-trees *Leptospermum* spp, regenerating Sweet Pittosporum *Pittosporum undulatum* and Elderberry Panax *Polyscias sambucifolia*. Common exotic shrubs include Lantana *Lantana camara*, Mickey Mouse Plant *Ochna serrulata* and Small-leaved Privet *Ligustrum sinense*.

The groundcover is dominated by native species such as Maiden-hair Fern *Adiantum aethiopicum*, Soft Bracken *Calochlaena dubia*, Wombat Berry *Eustrephus latifolius*, Spiny-headed Mat-rush *Lomandra longifolia*, Basket Grass *Oplismenus* spp and Common Bracken *Pteridium esculentum*. Exotic groundcovers are limited mainly to the disturbed edges of the community. Wandering Jew *Tradescantia albiflora* forms dense carpets along Georges Creek itself, and on adjacent alluvial deposits.

Resilience and regeneration potential are moderate to high within the relatively undisturbed areas of this community (including areas with thickets of Lantana infestation), but are low to moderate within the edge areas disturbed by bushfire hazard reduction works.

In general, areas of this community labelled patch 3 on Figure 2A and 2B are in moderate to good condition, and areas labelled patch 7 are in poor condition.

3.3.2 Sydney Turpentine Ironbark Forest (described by the NSW Scientific Committee)

Sydney Turpentine Ironbark Forest (STIF) occurs across the northern part of the study area, as a large and relatively intact stand at the northern extremity of the vegetated Georges Creek corridor, and as several small and highly modified stands scattered through surrounding agricultural land (Figure 2A). Approximately 3.5 hectares of STIF in moderate to good condition occurs within the study area, and approximately 3 hectares of STIF in poor to very poor condition occurs within the study area.

The canopy is dominated by Blackbutt *Eucalyptus pilularis*, with Sydney Red Gum *Angophora costata*, and Turpentine *Syncarpia glomulifera* ssp *glomulifera*. Occurring occasionally are Grey Ironbark *Eucalyptus paniculata*, and Grey Gum *Eucalyptus punctata*.

Common midstorey species include Black Wattle *Acacia decurrens*, Sydney Green Wattle *Acacia parramattensis* and Sweet Pittosporum *Pittosporum undulatum*.

Common shrubs include Rough Guinea Flower *Hibbertia aspera*, Prickly Beard-heath *Leucopogon juniperinus*, Rice Flower *Ozothamnus diosmifolius*, Narrow-leaved Geebung *Persoonia linearis*, Shrubby Platysace *Platysace lanceolata*, Elderberry Panax *Polyscias sambucifolia* and Sandfly Zieria *Zieria smithii*.

Common native groundcovers include Mulga Fern *Cheilanthes sieberi*, Blady Grass *Imperata cylindrica*, Mat-rush *Lomandra obliqua*, Weeping Meadow Grass *Microlaena stipoides*, Common Silkpod *Parsonsia straminea*, *Phyllanthus hirtellus*, Whiteroot *Pratia purpurascens* and Woolly Xanthosia *Xanthosia pilosa*.

The structure of this community within the study area varies considerably, depending on past and current landuses:

- patch 1 is highly degraded and best described as a 'mixed native and exotic shrubland'. It is currently dominated by *Acacia* spp and the invasive Privet *Ligustrum* spp, with scattered native trees. Native resilience is very low. This patch of vegetation would be unlikely to regenerate to a representative example of STIF;
- patch 2 is in moderate to good condition, although with some minor occurrences of Lantana. Vegetation to the north and west of the dam is in better condition than vegetation to the southwest of the dam, which has a cleared understorey and has been disturbed through firewood cutting;
- patches 4 and 5 are highly degraded and best described as 'disturbed woodland'. The understorey of patch 5 is heavily infested with woody weeds such as Lantana. The groundcover is dominated by annual and perennial weeds, with exotic pasture grasses invading from adjacent cleared areas. Although native resilience is low, there is some potential for this area to be regenerated with sustained input of effort and resources.

3.3.3 Blue Gum High Forest (described by the NSW Scientific Committee)

Blue Gum High Forest (BGHF) occurs through the southwestern part of the study area. There is one relatively intact patch located on a major tributary to Georges Creek in the south of the study area, and numerous other tiny stands and narrow rows of trees. The study area contains approximately 4 hectares of BGHF in moderate to good condition, and approximately 12 hectares of BGHF in poor condition.

Common canopy trees include Blue Gum *Eucalyptus saligna*, Turpentine *Syncarpia glomulifera*, White Mahogany *Eucalyptus acmenioides*, Grey Ironbark *Eucalyptus paniculata*, Grey Gum *Eucalyptus punctata*, Blackbutt *Eucalyptus pilularis*. The relative dominance of these tree species varies within the various patches mapped on Figure 2A and 2B.

The midstorey and shrub layer of much of this community has been cleared, and is currently either very sparse or absent. Native shrubs present in some areas include Sweet Pittosporum *Pittosporum undulatum* and Blackthorn *Bursaria spinosa*.

The groundcover is generally dominated by mown or grazed exotic pasture grasses, with patches of native species including Weeping Meadow Grass *Microlaena stipoides* and Native Geranium *Geranium homeanum*.

The condition of BGHF within the study area varies considerably:

- patch 6 consists of narrow corridors of remnant and regrowth native trees, above a maintained lawn of exotic pasture grasses. This area is best described as 'disturbed woodland'. It has a low resilience, and would require significant and sustained input of effort and resource to regenerate to representative example of BGHF;
- patch 8 is probably the most representative of BGHF of the vegetation surveyed. This patch contains a sparse midstorey of Pittosporum, and a sparse shrub layer of Blackthorn, with some woody weeds at low densities. Resilience of this area is low to moderate. Regeneration to a representative example of BGHF would be possible with conventional bush regeneration techniques;
- patch 9 was not surveyed for this report, but appears to contain relatively intact BGHF, with native understorey, and some invasion of exotic woody weeds;
- patch 10 consists of several extant stands and disturbed corridors of vegetation best described as 'disturbed woodland'. The patch contains remnant and regrowth native trees, above a maintained lawn of exotic pasture grasses. It has a low resilience, and would require significant and sustained input of effort and resource to regenerate to representative example of BGHF. Some parts of this patch, such as along the major tributary to Georges Creek, could be more similar to Blackbutt Gully Forest than BGHF. This would only be determined through the use of statistical quadrat surveys which were beyond the scope of this investigation.

3.4 Conservation Significance

3.4.1 Species

One plant species listed as "*threatened*" under the TSC Act, *Epacris purpurascens* var *purpurascens*, was recorded within the study area, as illustrated on Figure 2A.

Thirty-nine (39) fauna species listed as threatened under the TSC Act and/or EPBC Act have been recorded previously in the locality (NPWS Atlas). These species are listed in Appendix 1, along with details of their habits and habitat requirements, and a discussion as to their likelihood to occur within the study area. In summary of Appendix 1, thirty (30) of these threatened fauna species could potentially or theoretically occur within the study area.

Twenty-seven (27) bird species listed as migratory under the EPBC Act are known to have occurred in the locality (Appendix 3). Most of these species could occur within the study area on occasions.

3.4.2 Populations

No flora species being part of any "*endangered population*" listed under the TSC Act was recorded within the study area.

An endangered population of a threatened fauna species, the Gang Gang Cockatoo, is listed as occurring within the Hornsby Shire. This species is likely to occur within the study area (see details in Appendix 1).

3.4.3 Ecological Communities

Sydney Turpentine Ironbark Forest (STIF) and Blue Gum High Forest (BGHF) are both listed under the TSC Act and the EPBC Act. Blackbutt Gully Forest is not listed under either Act.

STIF is listed as an 'endangered ecological community' under the TSC Act, and as a 'critically endangered ecological community' under the EPBC Act, whilst BGHF is listed as a 'critically endangered ecological community' under both Acts. The distributions of these communities are illustrated on Figures 2A and 2B.

4 FLORA AND FAUNA ISSUES

4.1 NSW Threatened Species Conservation Act 1995

4.1.1 General

The *Threatened Species Conservation Act 1995* (TSC Act) outlines the protection of threatened species, populations, ecological communities and critical habitat in New South Wales. Schedules 1, 2 and 3 of the Act list the species, populations, ecological communities and critical habitat that are protected.

The TSC Act, and subsequent *NSW Threatened Species Legislation Amendment Act 2004,* modified the *NSW Environmental Planning & Assessment Act 1979* (EP&A Act) by including in Section 5A seven factors which are to be considered when determining "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*".

These seven factors "*must be taken into account*" by a consent or determining authority when considering a development proposal or Development Application.

The seven factors are:

(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*"

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

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

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

  (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"

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

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

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

  (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"

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

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

4.1.2 Relevant Matters

Epacris purpurascens var purpurascens

One plant species listed as "*threatened*" under the TSC Act, *Epacris purpurascens* var *purpurascens*, was recorded in the northern part of the Georges Creek vegetation corridor within the study area, as illustrated on Figure 2A.

It should be assumed that the individuals recorded are part of a 'viable' population of this threatened species. The extent of known habitat for this species should be retained and protected.

Note that the population of *Epacris purpurascens* var *purpurascens* occurs within an area of vegetation that is also otherwise identified as being of high conservation significance for its riparian and wildlife corridor values – see Chapters 4.3 and 4.4 below.

The Indicative Concept Master Plan (ICMP) would retain the majority of, if not all of, the *Epacris purpurascens* var *purpurascens* population within the study area. Further targeted surveys and GPS mapping would be required to accurately determine the extent of this population in relation to the ICMP.

The ICMP would probably not significantly affect this threatened species.

Threatened fauna

Thirty-nine (39) fauna species listed as threatened under the TSC Act have been recorded previously in the locality (NPWS Atlas). The majority of these species could theoretically occur within the study area either regularly or on occasions, based on consideration of habitats present.

Habitats and resources of potential value for threatened fauna species generally occur within the broad vegetation corridor along Georges Creek, and possibly also along its major tributary in the southern part of the study area.

Surrounding lands which contain scattered trees and small stands of highly disturbed vegetation are less likely to be of value for threatened fauna.

Further detailed survey work would be required to determine which threatened fauna species do utilise the study area, and to determine the relative importance of habitat and resources for threatened fauna species within the study area.

It should be assumed at this stage that the broad vegetation corridor along Georges Creek is of significance for one or more threatened fauna species.

It is probable that retention of the Georges Creek corridor as proposed within the ICMP would adequately protect threatened fauna species in the study area.

Sydney Turpentine Ironbark Forest

Sydney Turpentine Ironbark Forest (STIF) is listed as an 'endangered ecological community' under the TSC Act. The distribution of this community is illustrated on Figure 2A.

Areas of STIF which are in moderate to good condition should be retained and protected within the study area.

Small isolated remnants of STIF which are in poor condition, with low resilience and low regeneration potential, are of some significance but could be considered for removal in exchange for appropriate compensatory works which improve the condition, extent or security of other areas of STIF either within the study area or in the locality.

The ICMP would retain the largest and most intact remnant of STIF, adjacent to the Georges Creek corridor. Other smaller, more disturbed and isolated remnants would be removed.

Details of compensatory off-set works would need to be determined in consultation with DECC and/or Council. It would seem to be possible that such works could be accommodated within the ICMP.

Blue Gum High Forest

Blue Gum High Forest (BGHF) is listed as a 'critically endangered ecological community' under the TSC Act. The distribution of this community is illustrated on Figure 2A.

Areas of BGHF which are in moderate to good condition should be retained and protected within the study area.

The significance of highly degraded remnants of BGHF is currently a subject of debate within the Ecological Consultants Association of NSW, following recent findings of the NSW Land & Environment Court.

At present, all remnants containing Sydney Blue Gum *Eucalyptus saligna* are of significance, regardless of size, condition, resilience or regeneration potential. This includes small groups of trees with no native understorey or groundcover vegetation, and isolated paddock/garden specimens.

It would clearly not be practicable to retain all individual Blue Gum trees within the study area. A good ecological outcome could be achieved through improvement of the condition, extent and/or security of the larger and more intact remnants of BGHF within the study area, with compensatory off-set revegetation works in strategic locations to improve connectivity and management of these larger remnants.

The ICMP would retain the larger and more intact remnants of BGHF, generally along the Georges Creek corridor, and its southern tributary. Smaller, more disturbed remnants, and most isolated trees would be removed.

Considerable revegetation of the Blue Gum High Forest community would be required to off-set the loss of numerous individual and small stands of trees. This revegetation could occur in a corridor that also improves linkage of vegetation within the site to the Dooral Dooral Creek vegetation corridor to the northwest of the study area. Such a corridor could be accommodated within the ICMP, but would need to be located and designed following further more detailed studies at a later stage of planning.

Details of compensatory off-set works would need to be determined in consultation with DECC and/or Council. However, it would seem to be possible that such works could be accommodated within the ICMP.

4.2 Commonwealth Environment Protection & Biodiversity Conservation Act 1999

4.2.1 General

The *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* requires that an action which has, will have or is likely to have a significant impact upon one or more matters of National Environmental Significance (NES) must be referred to the Commonwealth Minister for Environment & Heritage for approval. These actions are referred to as 'controlled actions'.

Matters of NES include World Heritage properties, Ramsar Wetlands of international importance, listed threatened species and communities, listed migratory species, nuclear actions and Commonwealth marine areas.

4.2.2 Relevant Matters

Threatened fauna

Nine (9) fauna species listed as threatened under the EPBC Act have been recorded previously in the locality (NPWS Atlas). The majority of these species could theoretically occur within the study area either regularly or on occasions, based on consideration of habitats present.

Habitats and resources of potential value for threatened fauna species generally occur within the broad vegetation corridor along Georges Creek, and possibly also along its major tributary in the southern part of the study area.

Surrounding lands which contain scattered trees and small stands of highly disturbed vegetation are less likely to be of value for threatened fauna.

Further detailed survey work would be required to determine which threatened fauna species do utilise the study area, and to determine the relative importance of habitat and resources for threatened fauna species within the study area.

It should be assumed at this stage that the broad vegetation corridor along Georges Creek is of significance for one or more threatened fauna species.

It is probable that retention of the Georges Creek corridor as proposed within the ICMP would adequately protect threatened fauna species in the study area.

Migratory species

Twenty-seven (27) bird species listed as migratory under the EPBC Act are known to have occurred in the locality (Appendix 3). Most of these species could occur within the study area on occasions.

Habitats and resources of potential value for migratory species generally occur within the broad vegetation corridor along Georges Creek, and possibly also along its major tributary in the southern part of the study area.

Surrounding lands which contain scattered trees and small stands of highly disturbed vegetation are less likely to be of value for migratory species.

It should be assumed at this stage that the broad vegetation corridor along Georges Creek is of significance for migratory species.

It is probable that retention of the Georges Creek corridor as proposed within the ICMP would adequately protect migratory species habitats in the study area.

Turpentine - Ironbark Forest of the Sydney Basin Bioregion

Turpentine - Ironbark Forest of the Sydney Basin Bioregion (referred to as Sydney Turpentine Ironbark Forest under the TSC Act) is listed as a 'critically endangered ecological community' under the EPBC Act. The distribution of this community is illustrated on Figure 2A.

The following excerpt was taken from the *Nationally Threatened Species and Ecological Communities Information Sheet* (Department of the Environment and Heritage, September 2005):

> "Many patches of Turpentine-Ironbark Forest have become degraded with the remaining ecological community now embedded within an urban environment. The listed ecological community includes patches with an intact vegetation structure, a tree canopy cover greater

than 10%, and an area greater than one hectare. Patches with less than 10% tree canopy cover are also included if they are more than one hectare in size and are part of a native vegetation remnant larger than five hectares."

Areas of Sydney Turpentine Ironbark Forest which meet the above criteria should be retained and protected within the study area.

Only one of the remnant stands of STIF in the study area is considered to meet the above criteria. This being the largest stand which would be retained in the ICMP adjacent to the Georges Creek corridor.

The ICMP would probably not significantly affect this EPBC Act listed community.

Blue Gum High Forest

Blue Gum High Forest (BGHF) is listed as a 'critically endangered ecological community' under the EPBC Act. The distribution of this community is illustrated on Figure 2A.

The following excerpt was taken from the *Nationally Threatened Species and Ecological Communities Information Sheet* (Department of the Environment and Heritage, September 2005):

"Many patches of Blue Gum High Forest have become degraded with the remaining ecological community now embedded within an urban environment. The listed ecological community includes patches with an intact vegetation structure, a tree canopy cover greater than 10%, and an area greater than one hectare. Patches with less than 10% tree canopy cover are also included if they are more than one hectare in size and are part of a native vegetation remnant larger than 5 hectares."

Areas of BGHF which meet the above criteria should be retained and protected within the study area.

The ICMP appears to retain the majority of BGHF meeting the above criteria within the study area. Further targeted surveys and GPS mapping would be required to accurately determine the extent of this community in relation to the ICMP.

The ICMP would probably not significantly affect this EPBC Act listed community.

4.3 Department of Water and Energy: Stream Classifications

4.3.1 General

The study area contains almost entirely the upper catchment of Georges Creek. The Department of Water and Energy (DWE) have classified the streams within the study area.

4.3.2 Relevant Matters

Georges Creek and one of its tributaries (tentatively linking to Dooral Dooral Creek to the west) are Category 1 streams, with a minimum riparian setback of 40m either side, plus an additional 10m wide buffer either side. This is equivalent to a 100m wide corridor, containing an 80m wide vegetated riparian corridor.

Other major tributaries are designated Category 2 streams, with a minimum riparian setback of 20m either side plus an additional 10m wide buffer either side. This is equivalent to a 60m wide corridor, containing a 40 m wide vegetated riparian corridor.

Several minor drainage lines at the upper limits of the Category 2 streams are designated as Category 3 streams, with a minimum riparian setback of 10m either side. This is equivalent to a 20m wide vegetated riparian corridor.

The minimum setback distances should be measured from top of the creek bank. These areas would need to be retained, managed and/or revegetated to achieve a relatively dense riparian vegetation corridor. There is very little flexibility in this regard.

Buffer areas can include grassed roadsides and parklands with scattered native trees and shrubs, and can be managed to meet bushfire asset protection zone requirements.

4.4 Hornsby Shire Council: concerns and issues

4.4.1 General

A review of correspondence and reports from Hornsby Shire Council pertaining to the request for rezoning of land within the study area identified the following concerns and issues:

- occurrence of two endangered ecological communities within the study area – Blue Gum High Forest and Sydney Turpentine Ironbark Forest;
- occurrence of the threatened plant species, *Epacris purpurascens* var *purpurascens*;
- occurrence of threatened microchiropteran bat species, and the threatened Grey-headed Flying-fox;
- possible adverse impacts upon the Berowra Creek catchment via Georges Creek;
- requirement for a wetland to be created to manage water quality; and
- that the study area is of importance for its potential value in providing a wildlife corridor linking the Georges Creek vegetation corridor within the site to the Dooral Dooral Creek vegetation corridor to the west.

Council require that a rezoning proposal for the site provides the following:

- consideration of total catchment planning;
- consideration of potential impacts, including stormwater, loss of habitat, pollution, bushfire mitigation, introduction of exotic species and domesticated animals;
- consideration of the environmental footprint of an urban proposal for the study area, versus the environmental footprint of the current rural zoning of the study area; and
- appropriate buffers between development and retained bushland areas.

4.4.2 Relevant Matters

Discussion of the significance of threatened species and endangered ecological communities is provided in Chapters 4.1 and 4.2 above.

Water management issues are beyond the scope of this flora and fauna investigation. However, water issues are considered capable of satisfactory resolution through the application of water sensitive urban design (WSUB) principles.

There is potential for a broad wildlife corridor to be created within the study area which links extensive tracts of vegetation within the Hornsby area with tracts of vegetation in Baulkham Hills area. Such a link could be of immense ecological benefit to the region, but would need to be located and designed following further more detailed studies at a later stage of planning.

The increased density of development which would occur following rezoning of the study area would need to be off-set by appropriate development design and compensatory works which improve the condition, extent or security of areas of significant vegetation within the study area.

4.5 Sydney Metropolitan Strategy: Sustainability Criteria

4.5.1 General

The Sydney Metropolitan Strategy has set sustainability criteria such that no new land is to be released outside of the identified growth centres unless it meets strict sustainability criteria. The criteria will apply to any greenfield site planned for urban rezoning, regardless of scale or lot production, including rural, residential and employment developments.

Threshold Sustainability Criteria, Item 7 – Environmental Protection includes:

- maintains or improves areas of regionally significant terrestrial and aquatic biodiversity (as mapped and agreed by DEC and DPI). This includes regionally significant vegetation communities, critical habitat, threatened species, populations, ecological communities and their habitats.

4.5.2 Relevant Matters

The study area is known to contain one threatened plant species, two endangered ecological communities and potential habitat for approximately 30 threatened fauna species.

Any clearing of vegetation that affects these threatened biota would need to be off-set through compensatory works which improve the condition, extent or security of other areas of significant vegetation within the study area.

It is understood that the development scheme as reflected in the ICMP could fulfil the environmental protection sustainability criteria threshold, once the extent of compensatory off-set works have been determined following more detailed studies, and in consultation with DECC and/or Council.

5 SUMMARY OF CONSTRAINTS

5.1 Georges Creek Vegetation Corridor

The Georges Creek vegetation corridor contains:

- known habitat for the threatened plant *Epacris purpurascens* var *purpurascens*;
- potential habitat for 30 threatened fauna species;
- minimum riparian vegetation setbacks as required by the DWE. These generally equate to a riparian corridor of 100m in width along the main creekline, 60m in width along major tributaries, and 20m in width along minor upper sections of tributaries.

The existing broad vegetation corridor along Georges Creek is of significant ecological value, and should be retained to the extent that it continues to function as a wildlife corridor and provide habitat for threatened species. This will generally exceed the minimum requirements of the DWE.

The ICMP proposes retention of a broad vegetation corridor varying from approximately 100m in width at the upstream end of tributaries, to 200m in width along Georges Creek through the central part of the study area.

It is expected that this proposed corridor would continue to function ecologically in the long-term, and would continue to protect and provide for threatened flora and fauna species.

5.2 Endangered Ecological Communities

Areas of 'endangered' and 'critically endangered' ecological communities that are in moderate to good condition, or are within or adjacent to the main vegetated riparian corridors, are of significant ecological value and should be retained and protected.

Other patches of these communities that are in poor condition, with low resilience and low regeneration potential are also of significance, but cannot be practicably retained within the study area. The ICMP does not allow for retention of these smaller generally isolated remnants, nor individual trees.

It is recommended that off-set revegetation works are designed in consultation with DECC and/or Council, to provide adequate compensation for loss of these small patches of endangered ecological communities. It is envisaged that these works could be accommodated within the ICMP.

6 OPPORTUNITIES TO IMPROVE FLORA AND FAUNA VALUES

6.1 Wildlife Corridors

The study area includes lands that are located strategically such that an important and sought after wildlife corridor could be created, which connects vegetation in the Hornsby area on the eastern side of the study area with vegetation in the Baulkham Hills area on the western side of the study area.

Creation of such a wildlife corridor could provide an off-set to compensate for loss of vegetation elsewhere within the study area.

This opportunity is a valuable asset that could enable a rezoning of the study area to meet the Sydney Metropolitan Strategy sustainability criteria, and address many of Council's concerns.

6.2 Water Quality

The study area contains the upper catchment of Georges Creek. The creekline is currently exhibiting signs of degradation due to increased nutrient loads, which would be expected given the surrounding landuses (including agriculture, grazing and market gardens).

There is opportunity for development of the study area to improve the current water quality of Georges Creek, through thoughtful design of the development to minimise water management issues, and through implementation of WSUD practices.

Reduction of nutrient loads within Georges Creek and its tributaries would lessen current pressures on threatened species and their habitats, and upon endangered ecological communities present.

6.3 Weed Control and Native Vegetation Regeneration

There are areas of native vegetation in moderate to good condition within the study area which contain patches of invasive woody weeds such as Lantana and Privet. The removal of these weeds would lessen pressures on threatened species and their habitats, and upon endangered ecological communities.

Implementation of a native vegetation regeneration program for the study area would improve the condition and long term viability of native vegetation within the study area. There would be direct benefits to threatened species and their habitats, and to endangered ecological communities.

7 CONCLUSIONS/OVERVIEW

The study area contains ecological features and habitats of conservation significance. These include:

- riparian corridor values along Georges Creek, which occupies the central part of the study area;
- a population of the threatened plant *Epacris purpurascens* var *purpurascens* adjacent to Georges Creek in the northern part of the study area;
- the potential for a large number of threatened and/or migratory fauna species to utilise the study area on a regular, or occasional, basis;
- presence of two endangered ecological communities listed under both the TSC Act and the EPBC Act, namely Blue Gum High Forest and Sydney Turpentine Ironbark Forest.

In general, most of these ecological issues converge within the broad Georges Creek vegetation corridor.

Patches of endangered ecological community also occur outside of the main corridor, but as isolated and highly degraded remnants, and as individual trees.

The Indicative Concept Master Plan (ICMP) proposes that the broad Georges Creek corridor be retained at a width varying from 100-200m, that the southern tributary of Georges Creek also be retained at a width of approximately 100m, and that some additional adjacent areas of endangered ecological community also be retained.

Revegetation of a wildlife corridor that improves linkage of vegetation within the site to the Dooral Dooral Creek vegetation corridor to the northwest of the study area, could be accommodated within the ICMP, but would need to be located and designed following further more detailed studies at a later stage of planning.

Additional works would also be implemented to improve the quality and security of retained vegetation within the study area. This compensatory package would be designed in consultation with DECC and Council.

On balance, a positive and sustainable ecological outcome could be achieved within the study area, if urban development is sensitively pursued.

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FIGURE 1 Aerial view of the study area in relation to surrounding lands.

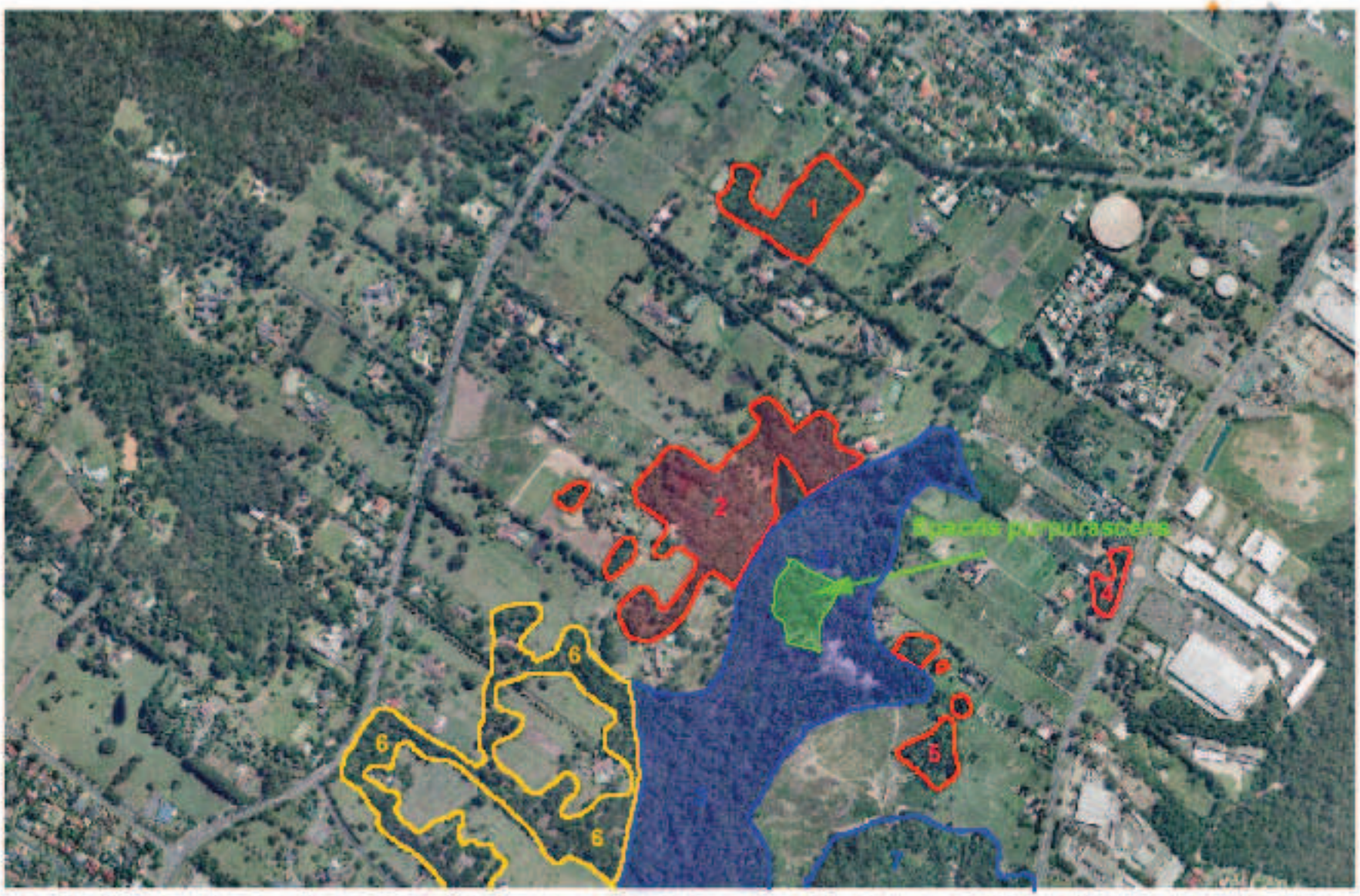

FIGURE 2A

Ecolgoical communities within the study area: northern.

FIGURE 2B
Ecological communities within the study area: southern

PROPOSED REZONING OF LAND AT SOUTH DURAL

FLORA AND FAUNA INVESTIGATION

APPENDIX 1

Threatened fauna species known from the locality

August 2008

APPENDIX 1

Threatened fauna species known to have occurred within 10km of the study area at South Dural since 1980 (NPWS Atlas, data obtained August 2008)

Species	**Habits/Requirements/Records in the locality**	**Occurrence in the study area**
BIRDS		
Black-necked Stork *Ephippiorhynchus asiaticus* E (TSC)	Usually inhabits swamps associated with river systems and large permanent pools (Blakers *et al* 1984). Inhabits tropical to warm temperate wetlands, lagoons, swamps, mud-flats and irrigated cropland (Lindsey 1992). Feeds in shallow water for fish and frogs (Blakers *et al* 1984). Nests high in a tree in a secluded swamp (Lindsey 1992). 1 record in the locality since 1980 (NPWS Atlas).	The study area does not contain suitable habitat for this species. The Black-necked Stork would not be likely to occur within the study area.
Broad-billed Sandpiper *Limicola falcinellus* V (TSC)	The eastern form of this species breeds in northern Siberia before migrating southwards in winter to Australia. In Australia, Broad-billed Sandpipers overwinter on the northern coast, particularly in the north-west, with birds located occasionally on the southern coast. In NSW, the main site for the species is the Hunter River estuary, with birds occasionally reaching the Shoalhaven estuary. There are few records for inland NSW (DEC Profile). Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches (DEC Profile). The species is an active forager, typically feeding by rapidly and repeatedly jabbing its bill into soft wet mud. Feeding also occurs while wading, often in water so deep that they have to submerge their heads and necks in order to probe the underlying mud. Their diet includes insects, crustaceans, molluscs, worms and seeds (DEC Profile). Individuals are strongly migratory and only mildly gregarious when not breeding. Large flocks are seldom recorded and birds are often either encountered alone or feeding with other waders such as Red-necked Stints or Curlew Sandpipers (DEC Profile). 1 record in the locality since 1980 (NPWS Atlas).	The study area does not contain suitable habitat for this species. The Broad-billed Sandpiper would not be likely to occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Australasian Bittern *Botaurus poiciloptilus* V (TSC)	Widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west (DEC Profile). Common in the wetlands of the Murray-Darling basin (Lindsey 1992). Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp) and spikerushes (*Eleoacharis* spp) (DEC Profile). Hides during the day amongst dense reeds or rushes, and feeds mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird, and are often littered with prey remains (DEC Profile) Breeding occurs in summer from October to January. Nests are built in secluded places in densely-vegetated wetlands on a platform of reeds (DEC Profile). 1 record in the locality since 1980 (NPWS Atlas).	The study area does not contain suitable habitat for this species. The Australasian Bittern would not be likely to occur within the study area.
Black Bittern *Ixobrychus flavicollis* V (TSC)	A wide distribution across Australia. In NSW, the species is scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves (DEC Profile). Inhabits quiet pools and backwaters of meandering densely wooded coastal streams, always with dense vegetation (Lindsey 1992). Feeds on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night. During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again (NPWS Profile). Generally solitary, but occurs in pairs during the breeding season, from December to March. Nests are built on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks. The species has a characteristic booming call that is mainly heard during the breeding season, at day or night. 4 records in the locality since 1980 (NPWS Atlas).	The study area does not appear to contain suitable habitat for this species. The Black Bittern would not be likely to occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Osprey *Pandion haliaetus* V (TSC)	The Osprey occurs around the entire coastline of Australia. The species is common around the northern coast, especially on rocky shorelines, islands and reefs, and uncommon to rare or absent from closely settled parts of south-eastern Australia (DEC Profile). It favours coastal areas, especially the mouths of large rivers, lagoons and lakes, and feeds on fish over clear, open water (DEC Profile). Nests high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. Breeds from July to September in NSW (DEC Profile). 1 record in the locality since 1980 (NPWS Atlas).	The study area does not contain suitable habitat for this species. The Osprey would not be likely to occur within the study area.
Square-tailed Kite *Lophoictinia isura* V (TSC)	Has a widespread distribution across virtually all of mainland Australia, excepting waterless desert (NPWS 1999). Typically inhabits tropical and temperate coastal forests and woodlands, and also inland along timbered watercourses (NPWS 1999). Appears to migrate seasonally, south in summer, north in winter (Blakers *et al* 1984). In NSW, it is often associated with forests dominated by *Eucalyptus longifloria*, *Corymbia maculata* or *E elata, E smithii*. Also sighted within forests containing other eucalypts, *Angophora* spp and *Callitris* spp with a shrubby understorey and Box-Ironbark woodland (NPWS 1999). Feeds on passerine birds, especially honeyeaters, nestling birds, rabbits, reptiles and carrion (NPWS 1999; Lindsey 1992). Nests is a substantial structure of sticks, usually constructed in a fork or on a large horizontal limb of *Angophora* spp or *Eucalyptus* spp approx 15-20m above the ground, along or near watercourses (Lindsey 1992; NPWS 1999). 1 record in the locality since 1980 (NPWS Atlas).	The study area contains potential foraging and nesting habitat for this species. The Square-tailed Kite may occur within the study area, potentially foraging and/or nesting in woodland areas along the main watercourses.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Superb Fruit-dove *Ptilinopus superbus* V (TSC)	Inhabits rainforest and similar closed forests principally from NE Queensland to NE NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya (DEC Profile). Forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees (DEC Profile). Part of the population is migratory or nomadic. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn. Nests usually 5-30 metres up in rainforest and rainforest-edge tree and shrub species. Breeding takes place from September to January 4 records in the locality since 1980 (NPWS Atlas).	The study area does not contain suitable habitat for this species. The Superb Fruit-dove would not be likely to occur within the study area.
Gang Gang Cockatoo *Callocephalon fimbriatum* V (TSC) E population (TSC)	Inhabits tall montane forests and woodlands in summer, particularly heavily timbered mature wet sclerophyll forests. Also occurs in sub-alpine Snow Gum woodland and occasionally in temperate rainforests. Undertakes nomadic and seasonal movements, and in winter tends to occur at lower altitudes in drier, more open eucalypt forest and woodland, particularly Box-Ironbark associations, and in dry forest in coastal areas (NSW Scientific Committee). Feeds on green acacia seeds, eucalypt seeds, fruits and berries, including seeds, fruits and berries of introduced plant species (Lindsey 1992; Blakers *et al* 1984). Tends to exhaust one food supply before moving to another (Blakers *et al* 1984). Nests in hollows in large old trees, usually close to water. Shows strong nest site fidelity. Breeding occurs mainly in tall mature wet sclerophyll forests with a dense understorey (NSW Scientific Committee). 46 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species, although the species may only be a winter migrant to the area. The Gang Gang Cockatoo may occur within the study area, foraging in the larger remnants of woodland.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Glossy Black Cockatoo *Calyptorhynchus lathami* V (TSC)	Inhabits drier eucalypt forest and woodland, characteristically on sites with low soil nutrient status (Blakers *et al* 1984; NPWS 1999; DEC 2004a). Prefers intact landscapes (NPWS 1999; DEC 2004a). Feeds almost exclusively on seeds of *Allocasuarina* spp - predominantly *A littoralis* and *A torulosa* (Lindsey 1992; Blakers *et al* 1984; NPWS 1999). Inland birds use a more diverse range of species, including *A cristata* (Blakers *et al* 1984). In the central west of NSW they also eat the seeds of Cypress Pine (DEC 2004a). Birds favour individual trees which produce seeds with high nutrient content, and may sample a few trees before selecting one to feed in (DEC 2004a). Lives in loose groups which occupy an area permanently (Blakers *et al* 1984) Nests in a large tree hollow (Lindsey 1992; NPWS 1999). 43 records in the locality since 1980 (NPWS Atlas).	The study area contains potential foraging and nesting habitat for this species. The Glossy Black Cockatoo may occur within the study area, foraging and/or nesting in the larger and more intact woodland remnants along the main watercourse.
Swift Parrot *Lathamus discolor* E (TSC) E (EPBC)	Breeds only in Tasmania, (Lindsey 1992, Blakers *et al* 1984; NSW Scientific Committee). Occurs in forests and woodlands of NSW from May to August (NSW Scientific Committee). Forages in the upper tree canopy for nectar, pollen and lerps (Blakers *et al* 1984). Lives in small flocks which appear in areas where eucalypts are flowering in profusion (Blakers *et al* 1984). Dependent on flowering resources across a wide range of habitats in its wintering grounds of NSW (NSW Scientific Committee). 20 records in the locality since 1980 (NPWS Atlas).	The study area contains potential wintering habitat for this species. The Swift Parrot may occur within the study area on occasions, foraging in the larger remnants of woodland.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Turquoise Parrot *Neophema pulchella* V (TSC)	Inhabits open eucalypt woodland and forest, especially with a grassy understorey and rocky outcrops (Lindsey 1992). Prefers the edge of eucalypt woodland adjoining clearings and also timbered ridges and creeklines in farmland (Blakers *et al* 1984; NPWS 1999). Birds may move from eucalypt woodland to pasture after the breeding season in some places (Blakers *et al* 1984). Usual forests/woodlands have mixed assemblages of Cypress Pine *Callitris* sp and a variety of eucalypts including White Box, Yellow Box, Red Box, Blakely's Red Gum, Red Stringybark, Bimble Box or Mulga Ironbark (NPWS 1999). Usually occurs in small family groups, forages on the ground for seeds (native and introduced) (Lindsey 1992; Blakers *et al* 1984). Requires a reliable drinking supply (NPWS 1999). Nests may be located in hollows of small trees, in holes or stumps of dead eucalypts, fence posts or even logs lying on the ground (NPWS 1999). Suffered a major decline in numbers early this century (NPWS 1999; Lindsey 1992), possibly due to competition with livestock during drought and/or trapping (Blakers *et al* 1984). Appears now to have regained much of its former range (Blakers *et al* 1984; Lindsey 1992). 2 records in the locality since 1980 (NPWS Atlas).	The study area does not contain typical habitat for this species. However, due to loss and constriction of habitat in the region, it is possible that the Turquoise Parrot could occur within the study area, utilising the woodland areas for shelter, and adjacent lightly timbered pasture land for foraging.
Superb Parrot *Polytelis swainsonii* V (TSC) V (EPBC)	The Superb Parrot predominantly inhabits woodland dominated by River Red Gum in the interior of NSW (Lindsey 1992; Blakers *et al* 1984). In the west of its range it is restricted to near watercourses due to the dry plains in between. In the east of its range it may range into lightly timbered areas between watercourses (Blakers *et al* 1984). Also occurs in box or mixed box woodlands, and White Cypress Pine woodlands (Lindsey 1992). Lives in small flocks foraging on the ground or in trees. Feeds on seeds, nectar, blossoms, fruits and insects, and also on spilled cereal grains (Lindsey 1992). Nests in a deep tree hollow, high in a large River Red Gum, near water (Lindsey 1992). 3 records in the locality since 1980 (NPWS Atlas).	The study area is outside of the usual range of this species, and does not contain likely habitat. The Superb Parrot would not be likely to occur within the study area, other than as a rare vagrant or aviary escapee.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Powerful Owl *Ninox strenua* V (TSC)	Inhabits tall moist productive eucalypt forests of the eastern tableland edge, and the mosaic of wet and dry sclerophyll forests occurring on undulating, gentle terrain near the coast. Ideally with a tall shrub layer and/or abundant hollows supporting a high density of arboreal marsupials (DEC 2005a; Blakers *et al* 1984; Lindsey 1992). A nocturnal sedentary species which lives alone or in pairs, occupies permanent territories up to 1500 ha in size which contain several roost sites (Blakers *et al* 1984; Lindsey 1992; DEC 2005a). Roosts by day in dense foliage of mid-canopy trees (including *Allocasuarina* spp, rainforest species, Turpentine and eucalypts), often amongst groves of up to 2ha of similar-sized trees in the height range of 3-15m (DEC 2005a), in sheltered gullies, often along streams and wide creek flats between ridges covered with eucalypt forest (DEC 2005a; Blakers *et al* 1984). Prefers to forage in moist unlogged forest in gully systems, but also forages in dry and regrowth forest. Preys on arboreal mammals (80% of diet), birds (18%) and insects and some terrestrial mammals (2%) (Blakers *et al* 1984). The Common Ringtail Possum is a primary prey species in lowland areas, and the Greater Glider in highland areas (DEC 2005a). Nests in a large tree-hollow (greater than 45cm wide and 100cm deep), usually high (at least 20m from the ground) in a very large eucalypt (with a DBH of at least 80cm) (Lindsey 1992; DEC 2005a). Nesting sites are typically in unlogged unburnt gullies and lower slopes, within 100m of streams, and surrounding by trees or tall shrubs (DEC 2005a). 122 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Powerful Owl is likely to utilise the site for foraging, and could potentially roost within the main vegetated gully within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Masked Owl *Tyto novaehollandiae* V (TSC)	Inhabits eucalypt forest and woodland from the coast to the western plains (DEC 2005a). It is most abundant within 300km of the coast (DEC 2005a; Blakers *et al* 1984). Optimal habitat includes a mosaic of sparse (grassy) and dense (shrubby) groundcover on gentle terrain (DEC 2005a). A sedentary species which occupies permanent territories 500-1000 ha in size (Blakers *et al* 1984). Nocturnal, roosts by day in hollows, in cover of dense vegetation in gullies or in caves (Blakers *et al* 1984; Lindsey 1992; DEC 2005a). Roosts at least 5m above the ground (DEC 2005a). Forages at forest edges or in partial clearing for small terrestrial mammals including rabbits, supplemented by some arboreal mammals, bats and birds (Blakers *et al* 1984; Lindsey 1992; DEC 2005a)). Nests in tree hollows greater than 40cm wide and greater than 100cm deep. No relationship with distance to streams. Entrances are at least 3m above the ground in trees with DBH of at least 90cm. Generally faithful to traditional hollows (DEC 2005a). 17 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Masked Owl could utilise the site for foraging, and could potentially roost within the main vegetated gully within the study area.
Sooty Owl *Tyto tenebricosa* V (TSC)	Inhabits tall moist eucalypt forests and rainforests of the escarpment and coastal areas along the southeastern coastline of Australia (DEC 2005a; Lindsey 1992). Sooty Owls are strongly associated with sheltered gullies, particularly those with a tall dense understorey (DEC 2005a) Nocturnal, feeds mainly on terrestrial mammals, to a lesser extent arboreal mammals and occasionally birds (Blakers *et al* 1984). A sedentary species which occupies permanent territories 200-800 ha in size (Blakers *et al* 1984). Generally roosts in dense foliage in rainforest gullies, caves, and crevices in cliffs, in the darkest and most secluded positions in the forest, usually less than 100m from streams (DEC 2005a). Nests in a large high tree cavity greater than 40cm wide and 100cm deep, usually in a live tree but occasionally in stags, surrounded by canopy. Also nests in caves (DEC 2005a; Lindsey 1992). Nest sites are generally in unlogged unburnt gullies and lower slopes within 100m of streams. Faithful to traditional hollows (DEC 2005a). 4 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Sooty Owl could utilise the site for foraging, and could potentially roost within the main vegetated gully within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Barking Owl *Ninox connivens* V (TSC)	Lives in pairs in forests and woodlands typically dominated by eucalypts, often Red Gum species in temperate and semi-arid areas (Blakers *et al* 1984; NPWS 2003b). Has been recorded in remnant patches on farms and golf courses (NPWS 2003b). Usually roosts in or under dense foliage in large trees including rainforest species, *Casuarina* and *Allocasuarina* spp, eucalypts, *Angophora* spp or *Acacia* spp. Roost sites are often near watercourses or wetlands (NPWS 2003b). Forages from dusk to dawn (occasionally in daylight) for a variety of birds, mammals and insects (Blakers *et al* 1984; Lindsey 1992; NPWS 2003b). Most prey birds and mammals are hollow-dependent, prefers native arboreal mammals, but will also prey on rabbits (NPWS 2003b; Lindsey 1992). Nests in a large open hollow, often vertical or sloping, in large eucalypts or paperbarks. Nest entrances are usually 2-35m above the ground, with a diameter of 20-46cm and depth of 20-300cm (NPWS 2003b). Nests are usually near watercourses or wetlands (NPWS 2003b). Presumed to breed in traditional permanent territories ranging in size from 30ha up to 200ha in southern Qld (Blakers *et al* 1984; NSW Scientific Committee; NPWS 2003b). Forages over a larger area (Blakers *et al* 1984). 10 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Barking Owl could utilise the site for foraging, and could potentially roost within the main vegetated gully within the study area.
Brown Treecreeper *Climacteris picumnus victoriae* V (TSC)	Inhabits a variety of drier vegetation types across eastern Australia, commonly eucalypt woodland, sometimes adjacent forest where there is dead timber (Lindsey 1992; Blakers *et al* 1984). Mainly occurs in the central-west of NSW. Prefers open woodland lacking a dense understorey (NSW Scientific Committee). A sedentary species that lives in small groups and occupies permanent home territories of about 5-10ha (Blakers *et al* 1984; Lindsey 1992). Forages on tree trunks and amongst leaf litter for insects, spending approx half of its time on the ground (NSW Scientific Committee; Blakers *et al* 1984). Nests in a tree-hollow (Lindsey 1992). 1 record in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Brown Treecreeper could occur within the study area, and in this case, could be wholly dependent upon the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Hooded Robin *Melanodryas cucullata cucullata* V (TSC)	Occurs throughout SE Australia, although mainly west of the Great Dividing Range, in a range of drier eucalypt woodlands, acacia shrublands and open forests, often in or near clearings (Blakers *et al* 1984; Lindsey 1992). Possibly seasonally migratory in some areas (Blakers *et al* 1984). Lives in small family groups within large home ranges (NSW Scientific Committee). Forages mainly on open ground by pouncing from a perch. Forages in areas with a mix of bare ground, ground cover and litter (Blakers *et al* 1984; NSW Scientific Committee). Nests in a cup of grass in a fork or small tree hollow usually within a few metres of the ground (Lindsey 1992). 1 record in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Hooded Robin could occur within the study area, and in this case, could be wholly dependent upon the study area.
Diamond Firetail *Stagonopleura guttata* V (TSC)	Inhabits eucalypt woodland, forests and mallee where there is a grassy understorey, including agricultural land, mainly inland of the Great Dividing Range (Lindsey 1992; Blakers *et al* 1984; NSW Scientific Committee). Generally sedentary, lives in pairs or small groups, consolidating into flocks during winter (Lindsey 1992; Blakers *et al* 1984; NSW Scientific Committee). Forages on the ground for grass seeds, other plant material and insects (NSW Scientific Committee; Lindsey 1992; Blakers *et al* 1984). Nests in a bulky flask-shaped structure with a side entrance approached by a woven tunnel, usually placed in dense foliage in a bush or mistletoe clump, several metres from the ground (Lindsey 1992). 1 record in the locality since 1980 (NPWS Atlas).	The study area is outside of the usual range of this species, but does contain some potential habitat. The Diamond Firetail could occur within the study area, and in this case, could be wholly dependent upon the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Black-chinned Honeyeater *Melithreptus gularis gularis* V (TSC)	Inhabits mainly eucalypt forest and woodland, paperbark woodland, acacia scrub and spinifex, particularly where there are patches of flowering shrubs, across northern and eastern Australia (Lindsey 1992; Blakers *et al* 1984). In NSW, it occurs generally inland of the Great Dividing Range, mainly in eucalypt woodlands containing Box-Ironbark associations and River Red Gum (Blakers *et al* 1984; NSW Scientific Committee). A sedentary species which lives in small groups which maintain permanent, extensive territories. It is an active bird, forever on the move, and forages high in the tree canopy (Lindsey 1992). Feeds on nectar, honeydew and insects (Blakers *et al* 1984). Occurs mainly in larger remnants, reportedly affected by competition for food and by nest predation in smaller remnants (NSW Scientific Committee). 2 records in the locality since 1980 (NPWS Atlas).	The study area is outside of the usual range of this species. However, the Black-chinned Honeyeater could occur in the study area on occasions, at times when the shrubs are flowering in profusion. This species would be more likely to utilise the larger woodland remnants along the major watercourses.
Regent Honeyeater *Xanthomyza phrygia* E (TSC) E (EPBC)	Semi-nomadic, usually recorded on western slopes of the Great Dividing Range, in open eucalypt forest and woodland. Usually recorded in box-ironbark associations, also wet lowland coastal forests. Forages in the upper canopy of flowering eucalypts for nectar, fruits and insects (NPWS 1999; Lindsey 1992; Blakers *et al* 1984). Nectar taken from approximately 16 species of eucalypt (NPWS 1999). A noisy, aggressive and conspicuous species, gregarious when not breeding. Observed bathing in roadside puddles. Nests in the fork of a tree 1-20m above the ground (Lindsey 1992). Specific requirements in mature Ironbark and Red-Yellow Box communities (NPWS 2003). 1 record in the locality since 1980 (NPWS Atlas).	The study area is outside of the usual range of this species. However, the Regent Honeyeater could occur in the study area on occasions, at times when the trees present are flowering in profusion. This species would be more likely to utilise the larger woodland remnants within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
REPTILES		
Rosenberg's Goanna *Varanus rosenbergi* V (TSC)	Occurs in heath, open forest and woodland, on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions, and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River (DEC Profile). Individuals require large areas of habitat, and shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens (DEC Profile). Feeds on carrion, birds, eggs, reptiles and small mammals (DEC Profile). Nests in termite mounds, and these are a critical habitat component (DEC Profile). Is generally slow moving, and on the tablelands is likely only to be seen on the hottest days. Runs along the ground when pursued (as opposed to the Lace Monitor, which climbs trees) (DEC Profile). 9 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species, but may not be large or connected enough to provide suitable habitat. Rosenberg's Goanna could theoretically occur within the study area.
AMPHIBIANS		
Red-crowned Toadlet *Pseudophryne australis* V (TSC)	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones, within the Sydney Basin (Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains) (DEC Profile). Inhabits periodically wet drainage lines below sandstone ridges, that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter (DEC Profile). Breeding congregations occur in dense vegetation and debris beside ephemeral creeks and gutters (DEC Profile). 166 records in the locality since 1980 (NPWS Atlas).	The study area contains areas of sandstone escarpment, and watercourses that may provide habitat for this species. The Red-crowned Toadlet may occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Green & Golden Bell Frog *Litoria aurea* E (TSC) E (EPBC)	Has been recorded in a wide variety of both ephemeral and permanent water bodies, including marshes, dams and stream-sides (NPWS 2005; NPWS 1999). Apparently prefers unshaded water with plenty of emergent vegetation, particularly bullrushes *Typha* spp or spikerushes *Eleocharis* spp (NPWS 2005, NPWS 1999, Robinson 1998; Cogger 1996), with nearby grassy areas and diurnal sheltering sites such as rocks or tussocky vegetation (NPWS 1999). Does not usually occur in conjunction with the predatory fish Plague Minnow *Gambusia holbrooki* (NPWS 1999). Once abundant along the whole coast of NSW and extending up into tableland areas, most surviving populations are now coastal (NPWS 1999). 5 records in the locality since 1980 (NPWS Atlas).	The study area contains numerous farm dams and a variety of watercourses. It is possible that the Green & Golden Bell Grog could occur within the study area.
Giant Burrowing Frog *Heleioporus australiacus* V (TSC) V (EPBC)	In the Sydney area there is a marked preference for sandstone ridgetop habitat and broader upland valleys. In these locations the frog is associated with small headwater creeklines and along slow flowing to intermittent creeklines. The vegetation is typically woodland, open woodland and heath, and may be associated with 'hanging swamp' seepage lines and where small pools form from the collected water. They have also been observed occupying artificial ponded structures such as fire dams, gravel 'borrows', detention basins and box drains that have naturalised over time and are still surrounded by other undisturbed habitat (DEC Profile). Limited observations on this species suggest an ability to range widely, frequently being observed on roads at considerable distance from suitable riparian breeding, or other moist habitat (DEC Profile). 17 records in the locality since 1980 (NPWS Atlas).	The study area contains areas of sandstone escarpment, and watercourses that may provide habitat for this species. The Giant Burrowing Frog may occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
MAMMALS		
Southern Brown Bandicoot *Isoodon obesulus obesulus* E (TSC) E (EPBC)	Generally only found in heath or open forest with a heathy understorey, on sandy or friable soils. Has a patchy distribution, and in NSW is found in the south-east, east of the Great Dividing Range and south from the Hawkesbury River (DEC Profile). Southern Brown Bandicoots are largely crepuscular (DEC Profile), and prefer to stay close to cover (Braithwaite 1995). Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Feeds on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil (DEC Profile; Braithwaite 1995). Relies on the high abundance of insects present in vegetation newly regenerating after fire, and therefore requires a mosaic of areas being burnt regularly (Braithwaite 1995). Nests in a shallow depression in the ground covered by leaf litter, grass or other plant material (DEC Profile; Braithwaite 1995). Nests may be located under Grass trees *Xanthorrhoea sp.*, blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest (DEC Profile). 1 record in the locality since 1980 (NPWS Atlas).	The study area provides potential habitat for this species. The Southern Brown Bandicoot could occur within the study area.
Spotted-tailed Quoll *Dasyurus maculatus* V (TSC) E (EPBC)	Variety of habitats including sclerophyll forest and woodlands, coastal heathlands and rainforest (NPWS 1999; Edgar & Belcher 1995). Occasionally sighted in open country, grazing lands, rocky outcrops and other treeless areas (NPWS 1999). Usually nocturnal, partly arboreal (Edgar & Belcher 1995; NPWS 1999). Apparently defines its territory with 'latrines' (Edgar & Belcher 1995). Requires suitable den sites (*eg* hollow logs, tree-hollows, rock crevices or caves), an abundance of food (small terrestrial birds and mammals, up to the size of small wallabies), and relatively large areas of intact vegetation for foraging (NPWS 1999; Edgar & Belcher 1995). Uses numerous den sites within its home range, which is estimated to be between 800ha and 20km^2 (NPWS 1999). A highly mobile species recorded travelling several kilometres overnight (NPWS 1999). 11 records in the locality since 1980 (NPWS Atlas).	The main vegetated gully of the study area contains potential habitat for this species, but may not be large or connected enough to be of value. It would be expected that any Spotted-tailed Quolls resident or regularly occurring within this area would have been sighted by local residents and farmers on lands surrounding the gully, and reported. The Spotted-tailed Quoll could theoretically occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Koala *Phascolarctos cinereus* V (TSC)	In NSW the Koala occurs mainly on the north coast and central coast, extending west of the Great Dividing Range along inland rivers (NPWS 1999). Koalas inhabit eucalypt forest and woodland, and are influenced in distribution by size and species of tree present, soil nutrients, climate, rainfall, and size and disturbance history of habitat patches (NPWS 1999). Although solitary in appearance, Koalas live in complex groups with individuals having overlapping territories (NPWS 1999). Koalas are relatively sedentary, and spend the majority of their time resting in the forks of trees (NPWS 1999; Martin & Handasyde 1995). Koalas are generally most active at dusk (NPWS 1999). Koalas feed almost exclusively on the leaves of a wide range of eucalypts, although within any one area Koalas will prefer only a small number of species (NPWS 1999; Martin & Handasyde 1995). 3 records in the locality since 1980 (NPWS Atlas).	The main vegetated gully of the study area contains potential habitat for this species, but may not be large or connected enough to be of value. It would be expected that any Koalas resident or regularly occurring within this area would have been sighted by local residents and farmers on lands surrounding the gully, and reported. The Koala could theoretically occur within the study area.
Eastern Pygmy-possum *Cercartetus nanus* V (TSC)	Inhabits rainforest, sclerophyll forest, and tree heath in coastal areas and at higher elevations in NSW (Strahan 1995; NSW Scientific Committee). The Eastern Pygmy-possum is an agile climber, and feeds mainly on pollen and nectar from banksias, eucalypts and understorey plants, and also insects (NSW Scientific Committee; Strahan 1995). Trapping is most successful in areas of flowering banksias (NSW Scientific Committee). A nocturnal species which shelters and nests in very small spaces during the day, in tree hollows, disused bird nests, shredded bark in the forks of tea-trees *etc* (Strahan 1995). 7 records in the locality since 1980 (NPWS Atlas).	The study area provides potential habitat for this species. The Eastern Pygmy-possum could occur within the study area.
Yellow-bellied Glider *Petaurus australis* V (TSC)	Inhabits tall mature forests in areas of high rainfall along the east coast of Australia (Menkhorst & Knight 2001). Prefers areas where year-round food resources are available from a mixture of eucalypt species (NPWS 1999). Plant and Insect exudates make up the bulk of its diet (Russell 1995). Makes characteristic triangular or V-shaped incisions in tree trunks to obtain sap (NPWS 1999; Menkhorst & Knight 2001). Nocturnal, it rests by day in a den in a hollow branch. Usually occurs in very low densities. Its home range is in the order of 30-65ha (NPWS 1999; Russell 1995). 31 records in the locality since 1980 (NPWS Atlas).	The main vegetated gully of the study area contains potential habitat for this species, but may not be large or connected enough to be of value. The Yellow-bellied Glider could theoretically occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Grey-headed Flying-fox *Pteropus poliocephalus* V (TSC) V (EPBC)	Occurs in rainforest, tall sclerophyll forests and woodlands, heaths and swamps along the east coast of Australia from Bundaberg to Melbourne, generally to the east of the Great Dividing Range (NPWS 2001). Also recorded in urban gardens and cultivated fruit crops (NPWS 2001). Forages on pollen, nectar and fruits of native trees (in particular *Melaleuca, Eucalyptus* and *Banksia*), and is an important pollinator and seed-disperser of native trees (NPWS 2001). Partly migratory in response to food availability. Roosts in large congregations or 'camps' during the day (NPWS 2001; Strahan 1995), which are generally located within 20km of a regular food source, in stands of riparian rainforest paperbark or casuarina forest (NPWS 2001). Camp site fidelity is high. 92 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species, although is not known to contain a 'camp' or primary roost site. The Grey-headed Flying Fox would be likely to forage within the study area on occasions.
Large-eared Pied Bat *Chalinolobus dwyeri* V (TSC) V (EPBC)	Inhabits dry sclerophyll forests and woodlands to the east and west of the Great Dividing Range, from Queensland to Bungonia. Has also been recorded occasionally in sub-alpine woodlands above 1500m, and at the edge of rainforest and moist eucalypt forest (Hoye & Dwyer 1995). First recorded in a dis-used mine tunnel near Copeton, NSW in early 1960's. Probably forages for insects below the forest canopy (Hoye & Dwyer 1995). Roosts by day in tree-hollows, caves and dis-used mine-tunnels (DEC NRMAS-7 2004; Hoye & Dwyer 1995). In caves it often selects positions close to the entrance in the 'twilight zone'. Appears to hibernate during winter (Hoye & Dwyer 1995). 2 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species, although is not known to contain caves or important roost sites. The Large-eared Pied Bat could occur within the study area.
Eastern False Pipistrelle *Falsistrellus tasmaniensis* V (TSC)	Thought to forage above the forest canopy, in open woodland or over water. Occurs along the Great Dividing Range of SE Australia, and east to the coast. Is more common at cooler elevations (Phillips 1995). Has been recorded roosting in tree hollows (Phillips 1995). Occasionally found in caves (DEC NRMAS-7 2004). Apparently hibernates during winter, and may sexually segregate for part of the year (Phillips 1995). 5 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Eastern False Pipistrelle could occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Large-footed Myotis *Myotis adversus* V (TSC)	Occurs in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers (DEC Profile). Generally roosts 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 (DEC Profile). Colonies never occur far from bodies of water, ranging from rainforest streams to large lakes and reservoirs (Richards 1995b). Forage over streams and pools catching insects and small fish by raking their feet across the water surface (DEC Profile; Richards 1995b). Males roost alone and defend territories when not breeding. Torpid in winter in roosts separate to maternity sites (Richards 1995b). 9 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Large-footed Myotis could occur within the study area.
Eastern Freetail Bat *Mormopterus norfolkensis* V (TSC)	Usually recorded in dry eucalypt forest and woodland east of the Great Dividing Range, but has also been recorded in rainforest and wet sclerophyll forest (Allison & Hoye 1995). Apparently solitary. Predominantly tree-dwelling, but has been recorded roosting in the roof of a hut (Allison & Hoye 1995). 19 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Eastern Freetail Bat could occur within the study area.
Yellow-bellied Sheath-tail Bat *Saccolaimus flaviventris* V (TSC)	Occurs throughout eastern and northern Australia, foraging above the canopy in eucalypt forests, and closer to the ground in mallee or open country (Richards 1995a). Usually solitary, occasionally occurring in colonies of less than 10 individuals (Richards 1995a). Roosts in tree hollows (Richards 1995a), occasionally in caves (DEC NRMAS-7 2004), and has been found in the abandoned nests of Sugar Gliders (Richards 1995a). Possibly migratory in southern Australia (Richards 1995a). 3 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Yellow-bellied Sheathtail Bat could occur within the study area.

Species	Habits/Requirements/Records in the locality	Occurrence in the study area
Greater Broad-nosed Bat *Scoteanax rueppellii* V (TSC)	Inhabits gullies and river systems draining the Great Dividing Range, occurs in a variety of woodland and forest habitats, from open eucalypt woodland to rainforest. Open woodlands suit its direct flight pattern, in denser rainforests it favours creekline corridors for foraging (Hoye & Richards 1995). Usually roosts in tree-hollows, but has been found in old buildings (Hoye & Richards 1995). 7 records in the locality since 1980 (NPWS Atlas).	The study area contains potential habitat for this species. The Greater Broad-nosed Bat could occur within the study area.
INVERTEBRATES		
Land Snail *Meridolum corneovirens* E (TSC)	Appears to be restricted to the Cumberland Plain and Castlereagh Woodlands of Western Sydney, and also along the fringes of River-flat Forest (NPWS 1999). Typically occurs in moist loose soil under logs and other debris, amongst leaf and bark accumulations around the base of trees, and sometimes under grass clumps (NPWS 1999). Apparently burrows deeply into soil during dry conditions (R Hayes *pers obs*). 36 records in the locality since 1980 (NPWS Atlas).	The study area does not contain suitable habitat for this species. The land snail *Meridolum corneovirens* is not likely to occur within the study area.

PROPOSED REZONING OF LAND AT SOUTH DURAL

FLORA AND FAUNA INVESTIGATION

APPENDIX 2

Inventory of flora species recorded

August 2008

APPENDIX 2 Flora species recorded in the study area at South Dural during recent field surveys.

Sydney Turpentine Ironbark Forest

Canopy:

Eucalyptus pilularis Blackbutt
Angophora costata Sydney Red Gum
Syncarpia glomulifera ssp *glomulifera* Turpentine
Eucalyptus paniculata Grey Ironbark
Eucalyptus punctata Grey Gum

Sub-canopy:

Acacia decurrens Black Wattle
Acacia parramattensis Sydney Green Wattle
Pittosporum undulatum Sweet Pittosporum

Understorey:

Hibbertia aspera Rough Guinea Flower
Leucopogon juniperinus Prickly Beard-heath
Ozothamnus diosmifolius Rice Flower
Persoonia linearis Narrow-leaved Geebung
Platysace lanceolata Shrubby Platysace
Polyscias sambucifolia Elderberry Panax
Zieria smithii Sandfly Zieria
**Lantana camara* Lantana

Groundcover:

Cheilanthes sieberi ssp *sieberi* Mulga Fern
Imperata cylindrica Blady Grass
Lomandra obliqua
Microlaena stipoides var *stipoides* Weeping Grass
Parsonsia straminea Common Silkpod
Phyllanthus hirtellus
Pratia purpurascens Whiteroot
Xanthosia pilosa Woolly Xanthosia

Blackbutt Gully Forest

Canopy:

Eucalyptus pilularis Blackbutt
Angophora costata Sydney Red Gum
Syncarpia glomulifera ssp *glomulifera* Turpentine
Eucalyptus saligna Sydney Blue Gum
Corymbia gummifera Red Bloodwood
Corymbia eximia Yellow Bloodwood
**Pinus radiata* Radiata Pine

Sub-canopy:

Allocasuarina littoralis Black She-oak
Ceratopetalum gummiferum Christmas Bush
Pittosporum undulatum Sweet Pittosporum

Understorey:

Acacia linifolia White Wattle
Leptospermum spp

Pittosporum undulatum Sweet Pittosporum
Polyscias sambucifolia Elderberry Panax
**Lantana camara* Lantana
**Ochna serrulata* Mickey Mouse Plant
**Ligustrum sinense* Small Leaved Privet
**Ligustrum lucidum* Large Leaved Privet
Solanum mauritianum Wild Tobacco
Pittosporum undulatum Sweet Pittosporum

Groundcover:

Adiantum aethiopicum Common Maidenhair
Calochlaena dubia Soft Bracken
Eustrephus latifolius Wombat Berry
Lomandra longifolia Spiny-headed Mat-rush
Oplimenus spp
Pteridium esculentum Common Bracken
**Tradescantia fluminensis* Wandering Jew

Blue Gum High Forest

Canopy:

Eucalyptus saligna Blue Gum
Eucalyptus pilularis Blackbutt
Syncarpia glomulifera ssp *glomulifera* Turpentine
Eucalyptus acmenoides White Mahogany
Eucalyptus paniculata Grey Ironbark
Eucalyptus punctata Grey Gum

Sub-canopy:

Pittosporum undulatum Sweet Pittosporum

Understorey:

Bursaria spinosa Blackthorn

Groundcover:

Microlaena stipoides var *stipoides* Weeping Grass
Geranium homeanum Native Geranium

PROPOSED REZONING OF LAND AT SOUTH DURAL

FLORA AND FAUNA INVESTIGATION

APPENDIX 3

Fauna species from the locality

August 2008

APPENDIX 3 Fauna species recorded opportunistically within the study area during the recent surveys, and species known to occur within 5km of the study area (NPWS Atlas).

KEY	
Status	
*	Introduced species
M	Migratory species listed under the Commonwealth EPBC Act
E (TSC)	Endangered species listed on the NSW TSC Act
V (TSC)	Vulnerable species listed on the NSW TSC Act
E (EPBC)	Endangered species listed on the Commonwealth EPBC Act
V (EPBC)	Vulnerable species listed on the Commonwealth EPBC Act
Record	
A	Species recorded opportunistically within the study area during recent surveys
B	Species listed as occurring within 5km of the study area (NPWS Atlas)

Status	COMMON NAME	SCIENTIFIC NAME	A	B
	BIRDS			
	Phasianidae			
	Brown Quail	*Coturnix ypsilophora*		✓
	Anatidae			
M	Pacific Black Duck	*Anas superciliosa*		✓
M	Chestnut Teal	*Anas castanea*		✓
M	Grey Teal	*Anas gracilis*		✓
*	Mallard	*Anas platythynchos*		✓
M	Musk Duck	*Biziura lobata*		✓
M	Australian Wood Duck	*Chenonetta jubata*		✓
	Podicepedidae			
	Australasian Grebe	*Tachybaptus novaehollandiae*		✓
	Columbidae			
	Emerald Dove	*Chalcophaps indica*		✓
	White-headed Pigeon	*Columba leucomela*		✓
*	Rock Dove	*Columba livia*		✓
	Bar-shouldered Dove	*Geopelia humeralis*		✓
	Peaceful Dove	*Geopelia placida*		✓
	Wonga Pigeon	*Leucosarcia melanoleuca*		✓
	Topknot Pigeon	*Lopholaimus antarcticus*		✓
	Brown Cuckoo-dove	*Macropygia amboinensis*		✓
	Crested Pigeon	*Ocyphaps lophotes*		✓
	Brush Bronzewing	*Phaps elegans*		✓
	Common Bronzewing	*Phaps chalcoptera*		✓
	Superb Fruit-dove	*Ptilinopus superbus*		✓
*	Spotted Turtledove	*Streptopelia chinensis*		✓
	Podargidae			
	Tawny Frogmouth	*Podargus strigoides*		✓
	Aegothelidae			
	Australian Owlet-nightjar	*Aegotheles cristatus*		✓
	Apodidae			
	Fork-tailed Swift	*Apus pacificus*		✓
M	White-throated Needletail	*Hirundapus caudacutus*		✓
	Phalacrocoracidae			
	Great Cormorant	*Phalacrocorax carbo*		✓
	Little Pied Cormorant	*Phalacrocorax melanoleucos*		✓
	Little Black Cormorant	*Phalacrocorax sulcirostris*		✓
	Pied Cormorant	*Phalacrocorax varius*		✓

APPENDIX 3 cont Fauna species recorded opportunistically within the study area during the recent surveys, and species known to occur within 5km of the study area (NPWS Atlas).

Status	COMMON NAME	SCIENTIFIC NAME	A	B
	Pelecanidae			
	Australian Pelican	*Pelecanus conspicillatus*		✓
	Ardeidae			
	Great Egret	*Ardea alba*		✓
	Cattle Egret	*Ardea ibis*		✓
	White-necked Heron	*Ardea pacifica*		✓
	White-faced Heron	*Egretta novaehollandiae*		✓
V (TSC)	Black Bittern	*Ixobrychus flavicollis*		✓
	Threskiornithidae			
	Royal Spoonbill	*Platalea regia*		✓
	Australian White Ibis	*Threskiornis molucca*		✓
	Straw-necked Ibis	*Threskiornis spinicollis*		✓
	Accipitridae			
M	Collared Sparrowhawk	*Accipiter cirrocephalus*		✓
M	Brown Goshawk	*Accipiter fasciatus*		✓
M	Grey Goshawk	*Accipiter novaehollandiae*		✓
M	Wedge-tailed Eagle	*Aquila audax*		✓
M	Pacific Baza	*Aviceda subcristata*		✓
M	Black-shouldered Kite	*Elanus axillaris*		✓
M	White-bellied Sea-eagle	*Haliaeetus leucogaster*		✓
M	Whistling Kite	*Haliastur sphenurus*		✓
V (TSC)	Square-tailed Kite	*Lophoictinia isura*		✓
M	Little Eagle	*Hieraaetus morphnoides*		✓
M	Black Kite	*Milvus migrans*		✓
	Falconidae			
M	Nankeen Kestrel	*Falco cenchroides*		✓
M	Australian Hobby	*Falco longipennis*		✓
M	Peregrine Falcon	*Falco peregrinus*		✓
M	Brown Falcon	*Falco berigora*		✓
V (TSC)	Grey Falcon	*Falco hypoleucos*		✓
	Rallidae			
	Dusky Moorhen	*Gallinula tenebrosa*		✓
	Purple Swamphen	*Porphyrio porphyrio*		✓
	Spotless Crake	*Porzana tabuensis*		✓
	Charadriidae			
M	Masked Lapwing	*Vanellus miles*		✓
	Turnicidae			
	Painted Button-quail	*Turnix varius*		✓
	Laridae			
	Silver Gull	*Larus novaehollandiae*		✓
	Crested Tern	*Thalasseus bergii*		✓
	Cacatuidae			
	Galah	*Cacatua roseicapilla*		✓
	Sulphur-crested Cockatoo	*Cacatua galerita*		✓
	Little Corella	*Cacatua sanguinea*		✓
	Long-billed Corella	*Cacatua tenuirostris*		✓
V (TSC)	Glossy Black Cockatoo	*Calyptorhynchus lathami*		✓
V (TSC)	Gang Gang Cockatoo	*Callocephalon fimbriatum*		✓
E(TSC)	Gang Gang Cockatoo population in the Hornsby & Ku-ring-gai LGA's	*Callocephalon fimbriatum*		✓
	Yellow-tailed Black Cockatoo	*Calyptorhynchus funereus*		✓
	Psittacidae			
	Australian King Parrot	*Alisterus scapularis*		✓
	Australian Ringneck	*Barnardius zonarius*		✓
	[Mallee Ringneck]	*Barnardius zonarius barnardi*		✓
	Musk Lorikeet	*Glossopsitta concinna*		✓
	Little Lorikeet	*Glossopsitta pusilla*		✓
E (TSC)	Swift Parrot	*Lathamus discolor*		✓

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	Psittacidae cont			
	Blue Bonnet	*Northiella haematogaster*		✓
	Eastern Rosella	*Platycercus eximius*		✓
	Crimson Rosella	*Platycercus elegans*		✓
V (TSC)	Superb Parrot	*Polytelis swainsonii*		✓
	Red-rumped Parrot	*Psephotus haematonotus*		✓
	Scaly-breasted Lorikeet	*Trichglossus chlorolepidotus*		✓
	Rainbow Lorikeet	*Trichoglossus haematodus*		✓
	Cuculidae			
	Fan-tailed Cuckoo	*Cacomantis flabelliformis*		✓
	Brush Cuckoo	*Cacomantis variolosus*		✓
	Horsfield's Bronze-cuckoo	*Chalcites basalis*		✓
	Shining Bronze-Cuckoo	*Chalcites lucidus*		✓
	Black-eared Cuckoo	*Chalcites osculans*		✓
	Pallid Cuckoo	*Cuculus pallidus*		✓
	Oriental Cuckoo	*Cuculus saturatus*		✓
	Pacific Koel	*Eudynamys orientalis*		✓
	Channel-billed Cuckoo	*Scythrops novaehollandiae*		✓
	Strigidae			
	Southern Boobook	*Ninox boobook*		✓
V (TSC)	Barking Owl	*Ninox connivens*		✓
V (TSC)	Powerful Owl	*Ninox strenua*		✓
	Tytonidae			
V (TSC)	Masked Owl	*Tyto novaehollandiae*		✓
V (TSC)	Sooty Owl	*Tyto tenebricosa*		✓
	Alcedinidae			
	Azure Kingfisher	*Alcedo azurea*		✓
	Laughing Kookaburra	*Dacelo novaeguineae*		✓
	Sacred Kingfisher	*Todiramphus sanctus*		✓
	Coraciidae			
	Dollarbird	*Eurystomus orientalis*		✓
	Menuridae			
	Superb Lyrebird	*Menura novaehollandiae*		✓
	Climacteridae			
	White-throated Treecreeper	*Cormobates leucophaeus*		✓
	Ptilonorhynchidae			
	Satin Bowerbird	*Ptilonorhynchus violaceus*		✓
	Maluridae			
	Superb Fairy-wren	*Malurus cyaneus*		✓
	Variegated Fairy-wren	*Malurus lamberti*		✓
	Southern Emu-wren	*Stipiturus malachurus*		✓
	Acanthizidae			
	Brown Thornbill	*Acanthiza pusilla*		✓
	Striated Thornbill	*Acanthiza lineata*		✓
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*		✓
	Yellow Thornbill	*Acanthiza nana*		✓
	Buff-rumped Thornbill	*Acanthiza reguloides*		✓
	Brown Gerygone	*Gerygone mouki*		✓
	White-throated Gerygone	*Gerygone olivacea*		✓
	Rockwarbler	*Origma solitaria*		✓
	White-browed Scrub-wren	*Sericornis frontalis*		✓
	Weebill	*Smicrornis brevirostris*		✓
	Pardalotidae			
	Spotted Pardalote	*Pardalotus punctatus*		✓
	Striated Pardalote	*Pardalotus striatus*		✓

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	Meliphagidae			
	Eastern Spinebill	*Acanthorhynchus tenuirostris*		✓
	Red Wattlebird	*Anthochaera carunculata*		✓
	Little Wattlebird	*Anthochaera chrysoptera*		✓
	Yellow-faced Honeyeater	*Lichenostomus chrysops*		✓
	Fuscous Honeyeater	*Lichenostomus fuscus*		✓
	White-eared Honeyeater	*Lichenostomus leucotis*		✓
	Yellow-tufted Honeyeater	*Lichenostomus melanops*		✓
	White-plumed Honeyeater	*Lichenostomus penicillatus*		✓
	Noisy Miner	*Manorina melanocephala*		✓
	Bell Miner	*Manorina melanophrys*		✓
	Lewin's Honeyeater	*Meliphaga lewinii*		✓
V (TSC)	Black-chinned Honeyeater	*Melithreptus gularis gularis*		✓
	White-naped Honeyeater	*Melithreptus lunatus*		✓
	Scarlet Honeyeater	*Myzomela sanguinolenta*		✓
	Noisy Friarbird	*Philemon corniculatus*		✓
	Little Friarbird	*Philemon citreogularis*		✓
	White-cheeked Honeyeater	*Phylidonyris nigra*		✓
	New Holland Honeyeater	*Phylidonyris novaehollandiae*		✓
E (TSC)	Regent Honeyeater	*Xanthomyza phrygia*		✓
	Psophodidae			
	Eastern Whipbird	*Psophodes olivaceus*		✓
	Neosittidae			
	Varied Sittella	*Daphoenositta chrysoptera*		✓
	Campephagidae			
	Cicadabird	*Coracina tenuirostris*		✓
	White-winged Triller	*Lalage tricolor*		✓
	White-bellied Cuckoo-shrike	*Coracina papuensis*		✓
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*		✓
	Pachycephalidae			
	Grey Shrike-thrush	*Colluricincla harmonica*		✓
	Eastern Shrike-tit	*Falcunculus frontatus*		✓
	Golden Whistler	*Pachcephala pectoralis*		✓
	Rufous Whistler	*Pachycephala rufiventris*		✓
	Oriolidae			
	Olive-backed Oriole	*Oriolus sagittatus*		✓
	Australasian Figbird	*Sphecotheres vieilloti*		✓
	Artamidae			
	Dusky Woodswallow	*Artamus cyanopterus*		✓
	Masked Woodswallow	*Artamus personatus*		✓
	White-browed Woodswallow	*Artamus superciliosus*		✓
	Pied Butcherbird	*Cracticus nigrogularis*		✓
	Grey Butcherbird	*Cracticus torquatus*		✓
	Australian Magpie	*Gymnorhina tibicen*		✓
	Grey Currawong	*Strepera versicolor*		✓
	Pied Currawong	*Strepera graculina*		✓
	Dicruridae			
	Spangled Drongo	*Dicrurus bracteatus*		✓
	Rhipiduridae			
	Grey Fantail	*Rhipidura albiscapa*		✓
M	Rufous Fantail	*Rhipidura rufifrons*		✓
	Willie Wagtail	*Rhipidura leucophrys*		✓
	Corvidae			
	Australian Raven	*Corvus coronoides*		✓
	Monarchidae			
	Magpie-lark	*Grallina cyanoleuca*		✓
M	Black-faced Monarch	*Monarcha melanopsis*		✓
	Satin Flycatcher	*Myiagra cyanoleuca*		✓

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	Monarchidae cont			
M	Restless Flycatcher	*Myiagra inquieta*		✓
	Leaden Flycatcher	*Myiagra rubecula*		✓
	Spectacled Monarch	*Symposiarchus trivirgatus*		✓
	Corcoracidae			
	White-winged Chough	*Corcorax melanoramphos*		✓
	Petroicidae			
	Eastern Yellow Robin	*Eopsaltria australis*		✓
	Scarlet Robin	*Petroica boodang*		✓
	Red-capped Robin	*Petroica goodenovii*		✓
	Flame Robin	*Petroica phoenicea*		✓
V (TSC)	Pink Robin	*Petroica rodinogaster*		✓
	Rose Robin	*Petroica rosea*		✓
	Cisticolidae			
M	Golden-headed Cisticola	*Cisticola exilis*		✓
	Timaliidae			
	Silvereye	*Zosterops lateralis*		✓
	Hirundinidae			
	White-backed Swallow	*Cheramoeca leucosterna*		✓
	Welcome Swallow	*Hirundo neoxena*		✓
	Pycnonotidae			
*	Red-whiskered Bulbul	*Pycnonotus jocosus*		✓
	Turdidae			
	Bassian Thrush	*Zoothera* lunulata		✓
	Unidentified ground thrush	*Zoothera* sp		✓
*	Eurasian Blackbird/Common Blackbird	*Turdus merula*		✓
	Sturnidae			
*	Common Starling	*Sturnus vulgaris*		✓
*	Common Myna	*Acridotheres tristis*		✓
	Nectariniidae			
	Mistletoebird	*Dicaeum hirundinaceum*		✓
	Estrildidae			
	Chestnut-breasted Mannikin	*Lonchura castaneothorax*		✓
	Nutmeg Mannikin	*Lonchura punctulata*		✓
	Red-browed Finch	*Neochmia temporalis*		✓
	Double-barred Finch	*Taeniopygia bichenovii*		✓
	Zebra Finch	*Taeniopygia guttata*		✓
V (TSC)	Diamond Firetail	*Stagonopleura guttata*		✓
	Passeridae			
*	House Sparrow	*Passer domesticus*		✓
	Motacillidae			
	Australian Pipit	*Anthus australis*		✓
	Fringillidae			
*	European Goldfinch	*Carduelis carduelis*		✓
	REPTILES			
	Chelidae			
	Eastern Snake-necked Turtle	*Chelodina longicollis*		✓
	Varanidae			
	Lace Monitor	*Varanus varius*		✓
	Gekkonidae			
	Eastern Stone Gecko/Wood Gecko	*Diplodactylus vittatus*		✓

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	Gekkonidae cont			
	Lesueur's Velvet Gecko	*Oedura lesueuri*		✓
	Broad-tailed Gecko	*Phyllurus platurus*		✓
	Thick-tailed Gecko	*Underwoodisaurus*		✓
	Agamidae			
	Eastern Bearded Dragon	*Pogona barbata*		✓
	Eastern Water Dragon	*Physignathus lesueurii*		✓
	Pygopodidae			
	Common Scaly-foot	*Pygopus lepidopodus*		✓
	Scincidae			
	Cream-striped Shinning-skink	*Cryptoblepharus virgatus*		✓
	Robust Ctenotus	*Ctenotus robustus*		✓
	Copper-tailed Ctenotus/Skink	*Ctenotus taeniolatus*		✓
	Cunningham's Spiny-tailed Skink	*Egernia cunninghamii*		✓
	Eastern Water Skink	*Eulamprus quoyii*		✓
	Barred-sided Forest Skink	*Eulamprus tenuis*		✓
	Dark-flecked Garden Sun-skink	*Lampropholis delicata*		✓
	Pale-flecked Garden Sun-skink	*Lampropholis guichenoti*		✓
	Unidentified grass skink	*Lampropholis sp.*		✓
	Yellow-bellied Three-toed Skink	*Saiphos equalis*		✓
	Weasel Sunskink	*Saproscincus mustelina*		✓
	Shingle-back	*Tiliqua rugosa*		✓
	Eastern Blue-tongue Lizard	*Tiliqua scincoides*		✓
	Boidae			
	Diamond Python	*Morelia spilota spilota*		✓
	Typhlopidae			
	Blackish Blind Snake	*Ramphotyphlops nigrescens*		✓
	Elapidae			
	Golden-crowned Snake	*Cacophis squamulosus*		✓
	Yellow-faced Whip Snake	*Demansia psammophis*		✓
	Red-naped Snake	*Furina diadema*		✓
	Eastern Brown Snake	*Pseudonaja textilis*		✓
	Red-bellied Black Snake	*Pseudechis porphyriacus*		✓
	Bandy-bandy	*Vermicella annulata*		✓
	AMPHIBIANS			
	Bufonidae			
*	Cane Toad	*Bufo marinus*		✓
	Myobatrachidae			
	Common Eastern Froglet	*Crinia signifera*		✓
V (TSC)	Giant Burrowing Frog	*Heleioporus australiacus*		✓
	Bullfrog/Eastern Banjo Frog	*Limnodynastes dumerilii*		✓
	Ornate Burrowing Frog	*Limnodynastes ornatus*		✓
	Striped Marsh Frog/Brown-striped Frog	*Limnodynastes peronii*		✓
	Spotted Marsh Frog/Spotted Grass Frog	*Limnodynastes tasmaniensis*		✓
V (TSC)	Red-crowned Toadlet	*Pseudophryne australis*		✓
	Smooth Toadlet	*Uperoleia laevigata*		✓
	Hylidae			
E (TSC)	Green & Golden Bell Frog	*Litoria aurea*		✓
	Kefersteins Tree Frog/Bleating Tree Frog	*Litoria dentata*		✓
	Eastern Dwarf Tree Frog	*Litoria fallax*		✓
	Jervis Bay Tree Frog	*Litoria jervisiensis*		✓
	Broad-palmed Frog	*Litoria latopalmata*		✓
	Peron's Tree Frog	*Litoria peronii*		✓

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	Hylidae cont			
	Green Stream Frog/Leaf-green Tree Frog	*Litoria phyllochroa*		✓
	Verreaux's Tree Frog	*Litoria verreauxii*		✓
	MAMMALS			
	Tachyglossidae			
	Short-beaked Echidna	*Tachyglossus aculeatus*		✓
	Phascolarctidae			
V (TSC)	Koala	*Phascolarctos cinereus*		✓
	Dasyuridae			
	Brown Antechinus	*Antechinus stuartii*		✓
	Dusky Antechinus	*Antechinus swainsonii*		✓
V (TSC)	Spotted-tailed Quoll	*Dasyurus maculatus*		✓
	Common Dunnart	*Sminthopsis murina*		✓
	Peramelidae			
	Long-nosed Bandicoot	*Perameles nasuta*		✓
	Unidentified bandicoot	*Isoodon /Perameles sp.*		✓
	Acrobatidae			
	Feathertail Glider	*Acrobates pygmaeus*		✓
	Petauridae			
	Sugar Glider	*Petaurus breviceps*		✓
	Pseudocheiridae			
	Common Ringtail Possum	*Pseudocheirus peregrinus*		✓
	Greater Glider	*Petauroides volans*		✓
	Phalangeridae			
	Short-eared Possum	*Trichosurus caninus*		✓
	Brushtail Possum	*Trichosurus sp*		✓
	Common Brushtail Possum	*Trichosurus vulpecula*		✓
	Macropodidae			
	Unidentified macropod	*Macropod sp.*		✓
	Eastern Grey Kangaroo	*Macropus giganteus*		✓
	Red-necked Wallaby	*Macropus rufogriseus*		✓
	Swamp Wallaby	*Wallabia bicolor*		✓
	Muridae			
	Bush Rat	*Rattus fuscipes*		✓
	Pteropodidae			
V (TSC)	Grey-headed Flying-fox	*Pteropus poliocephalus*		✓
	Little Red Flying-fox	*Pteropus scapulatus*		✓
	Flying-fox	*Pteropus sp.*		✓
	Emballonuridae			
V (TSC)	Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*		✓
	Molossidae			
	Little Northern Freetail-bat	*Mormopterus loriae*		✓
V (TSC)	Eastern Freetail-bat	*Mormopterus norfolkensis*		✓
	Undescribed Mastiff-bat	*Mormopterus norfolkensis/*sp 1		✓
	Undescribed Freetail-bat	*Mormopterus* sp 2		✓
	White-striped Freetail-bat	*Tadarida australis*		✓
	Vespertilionidae			
V (TSC)	Large-eared Pied Bat	*Chalinolobus dwyeri*		✓
	Gould's Wattled Bat	*Chalinolobus gouldii*		✓
	Chocolate Wattled Bat	*Chalinolobus morio*		✓
V (TSC)	Eastern False Pipistrelle	*Falsistrellus tasmaniensis*		✓
V (TSC)	Eastern Bent-wing Bat	*Miniopterus schreibersii oceanis*		✓

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	Vespertilionidae cont			
V (TSC)	Large-footed Myotis	*Myotis adversus*		✓
	Lesser Long-eared Bat	*Nyctophilus geoffroyi*		✓
	Gould's Long-eared Bat	*Nyctophilus gouldi*		✓
	Unidentified Long-eared Bat	*Nyctophilus* sp		✓
V (TSC)	Greater Broad-nosed Bat	*Scoteanax rueppellii*		✓
	Eastern Broad-nosed Bat	*Scotorepens orion*		✓
	Large Forest Bat	*Vespadelus darlingtoni*		✓
	Eastern Forest Bat	*Vespadelus pumilus*		✓
	Southern Forest Bat	*Vespadelus regulus*		✓
	Unidentified Eptesicus	*Vespadelus sp.*		✓
	Little Forest Bat	*Vespadelus vulturnus*		✓
	Introduced Mammals			
*	European Cattle	*Bos taurus*		✓
*	Horse	*Equus caballus*		✓
*	Dingo	*Canis lupus*		✓
*	Dog	*Canis lupus familiaris*		✓
*	Cat	*Felus catus*		✓
*	Fox	*Vulpes vulpes*		✓
*	Rabbit	*Oryctolagus cuniculus*		✓
*	House Mouse	*Mus musculus*		✓
*	Black Rat	*Rattus rattus*		✓
	THREATENED INVERTEBRATES			
	Camaenidae			
E (TSC)	Cumberland Plain Land Snail	*Meridolum corneovirens*		✓