

Table B.2 Fauna species recorded in the Site

Common Name	Scientific Name
Frogs	
Common Eastern Froglet	<i>Crinia signifera</i>
Peron's Treefrog	<i>Littoria peronii</i>
Smooth Toadlet	<i>Uperoleia laevigata</i>
Whistling Treefrog	<i>Littoria veauxii</i>
Reptiles	
-	<i>Drysdalia rhodogaster</i>
Diamond Python	<i>Morelia spilota</i>
Red-bellied Black-snake	<i>Pseudechis porphyriacus</i>
Small-eyed Snake	<i>Cryptophis nigrescens</i>
Birds	
Australian Magpie	<i>Gymnorhina tibicen</i>
Australian Raven	<i>Corvus coronoides</i>
Basian Thrush	<i>Zoothera lunulata</i>
Black Faced Monarch ^M	<i>Monarcha melanopsis</i>
Black-faced Cuckoo-Shrike	<i>Coracina novaehollandiae</i>
Brown Gerygone	<i>Gerygone mouki</i>
Brown Thornbill	<i>Acanthiza pusilla</i>
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>
Chesnut Teal	<i>Anas castanea</i>
Chestnut Teal	<i>Anas castanea</i>
Common Blackbird	<i>Turdus merula</i>
Crimson Rosella	<i>Platycercus elegans</i>
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>
Eastern Whipbird	<i>Psophodes olivaceus</i>
Eastern Yellow Robin	<i>Eopsaltria australis</i>
Fantail Cuckoo	<i>Cacomantis flabelliformis</i>
Gang Gang Cockatoo	<i>Callocephalon fimbriatum</i>
Glossy Black Cockatoo	<i>Calyptorhynchus lathami</i>
Golden Whistler	<i>Pachycephala pectoralis</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Grey Fantail	<i>Rhipidura albiscapa</i>
Grey Shrike Thrush	<i>Colluricincla harmonica</i>
Hooded Plover	<i>Thinornis rubricollis</i>
King Parrot	<i>Alisterus scapularis</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Leaden Flycatcher	<i>Myiagra rubecula</i>
Lewin's Honeyeater	<i>Meliphaga lewinii</i>
Little Lorikeet	<i>Glossopsitta pusilla</i>
Little Tern	<i>Sterna albifrons</i>

Table B.2 Fauna species recorded in the Site

Common Name	Scientific Name
Little Wattlebird	<i>Anthochaera chrysoptera</i>
Magpie Lark	<i>Grallina cyanoleuca</i>
Masked Lapwing	<i>Vanellus miles</i>
Mistletoe Bird	<i>Dicaeum hirundinaceum</i>
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Osprey	<i>Pandion haliaetus</i>
Pacific Black Duck	<i>Anas superciliosa</i>
Pallid Cuckoo	<i>Cacomantis pallidus</i>
Pied Currawong	<i>Strepera graculina</i>
Pied Oyster Catcher	<i>Haematopus longirostris</i>
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>
Red Wattlebird	<i>Anthochaera carunculata</i>
Red-browed Finch	<i>Neochmia temporalis</i>
Restless Flycatcher	<i>Myiagra inquieta</i>
Rose Robin	<i>Petroica rosea</i>
Rufous Fantail ^M	<i>Rhipidura rufifrons</i>
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>
Silverye	<i>Zosterops lateralis</i>
Sooty Owl	<i>Tyto tenebricosa</i>
Sooty Oyster Catcher	<i>Haematopus fuliginosus</i>
Southern Boobook Owl	<i>Ninox novaeseelandiae</i>
Spotted Pardalote	<i>Pardalotus punctatus</i>
Square-tailed Kite	<i>Lophoictinia isura</i>
Striated Thornbill	<i>Acanthiza lineata</i>
Superb Fairy Wren	<i>Malurus cyaneus</i>
Tawny Frogmouth	<i>Podargus strigoides</i>
Variegated Wren	<i>Malurus lamberti</i>
Welcome Swallow	<i>Hirundo neoxena</i>
White Goshawk	<i>Accipiter novaehollandiae</i>
White-bellied Sea Eagle ^M	<i>Haliaeetus leucogaster</i>
White-browed Scrub Wren	<i>Sericornis frontalis</i>
White-cheeked Honeyeater	<i>Phylidonyris niger</i>
White-naped Honeyeater	<i>Melithreptus lunatus</i>
White-throated Gerygone	<i>Gerygone olivacea</i>
White-throated Honeyeater	<i>Melithreptus albogularis</i>
White-throated Treecreeper	<i>Cormobates leucophaea</i>
Wonga Pigeon	<i>Leucosarcia melanoleuca</i>
Yellow Thornbill	<i>Acanthiza nana</i>
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>

Table B.2 Fauna species recorded in the Site

Common Name	Scientific Name
Mammals	
-	<i>Mormopterus species 2 (pr)</i>
Agile Antechinus	<i>Antechinus agilis</i>
Black Rat*	<i>Rattus rattus</i>
Brown Antechinus	<i>Antechinus stuarti</i>
Brushtail Possum	<i>Trichosurus vulpecula</i>
Bush Rat	<i>Rattus fuscipes</i>
Chocolate Wattled Bat	<i>Chalinolobus morio (pr)</i>
East Coast Freetail Bat	<i>Mormopterus norfolkensis (ERM record)</i>
Eastern Bentwing Bat	<i>Miniopterus schreibersii (pr)</i>
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis (pr)</i>
Eastern Grey Kangaroo	<i>Macropus giganteus</i>
European Rabbit*	<i>Oryctolagus cuniculus</i>
Fox*	<i>Vulpes vulpes</i>
Gould's Wattled Bat	<i>Chalinolobus gouldii (pr)</i>
Greater Broad-nosed Bat	<i>Scoteanax ruepellii (po)</i>
Greater Glider	<i>Petaurus volans</i>
House Mouse*	<i>Mus musculus</i>
Large Forest Bat	<i>Vespadelus darlingtoni (pr)</i>
Little Bentwing Bat	<i>Miniopterus australis (pr)</i>
Little Forest Bat	<i>Vespadelus vulturnus (pr)</i>
Long-eared Bat	<i>Nyctophilus spp.</i>
Long-nosed Bandicoot	<i>Perameles nasuta</i>
Red-neck Wallaby	<i>Macropus rufogriseus</i>
Ringtail Possum	<i>Pseudocheirus peregrinus</i>
Sugar Glider	<i>Petaurus breviceps</i>
Swamp Rat	<i>Rattus lutreolus</i>
Swamp Wallaby	<i>Wallabia bicolor</i>

Notes: Bold – threatened species under the TSC Act/EPBC Act, * - introduced species, ^M – migratory species under the EPBC Act, pr – probably identification, po – possible identification.

Appendix C

Assessments of significance

C.1 NSW assessments of significance

C.1.1 Significant impact criteria in accordance with the TSC Act

Section 5A of the *Environment Planning and Assessment Act 1979* provides the criteria that must be considered in the assessment of the significance of potential impacts on all threatened species listed under the TSC Act. An Assessment of Significance (known as the seven-part test) is made up of the following seven questions:

1. 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;
2. 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;
3. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - a) 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;
 - b) 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;
4. In relation to the habitat of a threatened species, population or ecological community:
 - a) the extent to which habitat is likely to be removed or modified as a result of the action proposed;
 - b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;
 - c) 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;
5. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);
6. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan; and
7. 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.

The following assessments of significance have been undertaken in accordance with *Threatened species assessment guidelines: The assessment of significance* (DEC 2007).

C.1.2 Assessments of significance

Communities and species requiring additional assessment, as identified in Appendix A, and which are listed as threatened under the TSC Act were assessed using the seven-part test. Seven-part tests have been prepared in accordance with the criteria presented in Section A.1.1 Assessments have been undertaken for guilds of species or communities which have similar habitat requirements. The results of tests have been tabulated for ease of reading and are presented in the following sections.

i Threatened Ecological Communities: Bangalay Sand Forest (BSF EEC), Swamp Oak Floodplain Forest (SOFF EEC) and Swamp Sclerophyll Forest (SSF EEC)

BSF EEC, SOFF EEC and SSF EEC are listed as endangered ecological communities under the TSC Act. All three TECs were identified at the North Manyana site, occurring in varying condition throughout. Collectively, these TEC's cover over 46 ha of the Site.

BSF EEC occurs on deep coastal sands on the hind-dunes at the eastern side of North Manyana. SOFF EEC occurs as a disturbed forest in the centre of the Site and a more intact forest on the south-west part of the Site associated with a small drainage depression. SSF occurs in the lower parts of the Site, particularly along the intermittent drainage depressions on alluviums and sandy flats.

Only SOFF EEC and SSF EEC will be directly impacted by the rezoning proposal. However, both communities would have been impacted, with SOFF being impacted to a higher degree, by the existing zoning.

An assessment of impact criteria has been completed to assess potential impacts of the proposed rezoning on BSF EEC, SOFF EEC and SSF EEC (Table C.1).

Table C.1 Assessment of impact criteria for threatened ecological communities

Criteria	Discussion
1: life cycle of threatened species	This question addresses threatened species, therefore is not relevant to this assessment.
2: life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3: EEC extent of removal and modification	Proposed rezoning at North Manyana will involve the removal of some areas identified as SOFF and SSF TEC's. Up to 1.3 ha of SOFF will be removed by the rezoning, in comparison to 3.9 ha (2.6 ha less) under the existing zoning, which represents 33% of the community at the Site in moderate to good condition. Up to 10.4 ha of SSF will be removed by the rezoning, which is 0.1 ha more than the existing zoning, and represents 29% of the community at the Site. The removal of 11.7 ha of TEC is considered to be significant in the locality. However, when considered with the current allowable development, it is a reduced impact for the locality. There is also the potential for indirect impacts to remaining TEC's through soil disturbance, edge effects and nutrient runoff. The proposed development areas have been rezoned to minimise edge effects, fragmenting communities and clearing TEC's. Further, due to the likely requirements for bushfire protection for future residential development of the area, a buffer would be created on the edge of most patches of remnant vegetation between the TECs and housing. As a result, it is unlikely that the proposed development will substantially modify the composition of these communities where indirect impacts may occur. No BSF EEC is to be removed or indirectly impacted from the proposed rezoning.

Table C.1 Assessment of impact criteria for threatened ecological communities

Criteria	Discussion
4: habitat removal, fragmentation, isolation and importance	As discussed above, the removal of 11.7 ha of TEC is considered to be significant in the locality. However, when considered with the current allowable development, it is a reduced impact for the locality. Considering that a large part of the TECs to be removed by future development are already disturbed from the use of the Site and surrounding areas, the importance of the habitat present is considered to be low to moderate in the locality. A total of three existing patches of SOFF and one patch of SSF will be impacted by the rezoning. SOFF in particular, is already fragmented at the Site and exists in lower condition than intact remnants in the region. In the west of the Site, the rezoning will reduce the size of the community occurring, however it will not fragment the patch. Impacts on SSF will occur immediately adjacent to existing residential development in an area that is already heavily impacted by edge effects and encroachment from these properties and adjacent to the existing motorbike track. The proposed rezoning will not significantly increase the amount of edge exposed to indirect impacts. Accordingly, it is unlikely that the rezoning will adversely impact the TECs due to the extent of existing fragmentation, isolation and the low importance of some of the remnants, particularly heavily disturbed areas of SSOF. No BSF EEC is to be removed or indirectly impacted from the proposed rezoning.
5: critical habitat	Critical habitat under the TSC Act has not been declared for these TEC's.
6: consistency with recovery or threat abatement plans	No recovery or threat abatement plans exist for these TEC's. However priority actions focus on undertaking weed control for Bitou Bush and Boneseed, conducting targeted field surveys to identify gaps in knowledge, liaising with stakeholders, undertaking and promoting programs and undertaking research to determine fire frequency. The proposed rezoning is not inconsistent with the recovery of these TEC's.
7: key threatening processes	The loss of hollow-bearing trees and clearing of native vegetation are key threatening processes (KTP's) that would result from the rezoning of North Manyana. However these would also result with the development of the Site under the current zoning. This impact is therefore not considered significant.
Conclusion	Significant impacts to TECs are considered unlikely as: • no BSF EEC will be removed or indirectly impacted; • only 11.7 ha (33%) of SOFF and SSF EECs will be removed (compared with 14.2 ha with the current zoning); • the rezoning will not fragment patches of the EECs; and • impacts will be compensated by the protection and enhancement of remaining TEC areas.

ii Threatened raptors: Osprey (*Pandion haliaetus*) and Square-tailed Kite (*Lophoictinia isura*)

The **Osprey** is listed as vulnerable under the TSC Act. It was recorded flying over the Site during the survey. The Osprey favours coastal areas and breeds within 1 km of the sea in nests up high in large or dead trees. Breeding habitat is absent in the Site. The Osprey forages for fish over clear, open water. Foraging habitat for this species is available nearby to the east of the Site in the ocean, but is not present onsite.

The **Square-tailed Kite** is listed as vulnerable under the TSC Act. It was recorded foraging in the Site during the survey. The Square-tailed Kite is found in timbered habitats and has a preference for timbered watercourses. This species breeds in forks or horizontal limbs in nests near watercourses and is a specialist hunter of passerines. No breeding habitat is present for this species on the Site due to the absence of nests and feed trees in the Site. Foraging habitat is present in the Site in eucalypt dominated open forest and inland riparian woodland. This species is known to forage around suburban trees and shrubs.

Table C.2 provides a seven part test to assess the significance of the proposed rezoning on threatened raptors.

Table C.2 Assessment of impact criteria for threatened raptors

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning avoids breeding habitat for both species and thus is unlikely to impact on the lifecycle of the Osprey and Square-tailed Kite. The proposed zoning may remove foraging habitat (up to 31.8 ha) for the Square-tailed Kite. However a large contiguous patch of alternative foraging habitat is available in the surrounding areas which are available for this highly mobile species and this represents 9.7 ha less impact than the current zoning. No foraging habitat will be impacted for the Osprey by the rezoning. Temporary noise disturbances from plant and machinery during construction may indirectly impact on these species. However this would occur under both the proposed and the current zoning and is therefore not considered significant.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning may remove up to 31.8 ha of potential foraging habitat for the Square-tailed Kite. This is 9.7 ha less than the current zoning would require to be impacted. The habitat to be removed has low importance to these species as there is alternate, higher quality habitat available to the north of the Site and marine habitat for the Osprey to the east of the Site. No breeding habitat or foraging for the Osprey will be removed areas a result of the rezoning. Indirect impacts to potential foraging habitat may occur through noise disturbance during construction but any impact will be temporary. Potential habitat will not be fragmented or isolated from the proposed rezoning. Potential foraging habitat will remain at the Site in the future to compensate for the habitat losses associated with future residential development of the Site.
5. Critical habitat	Critical habitat has not been listed for these threatened bird species.

Table C.2 Assessment of impact criteria for threatened raptors

Criteria	Discussion
6. Consistency with recovery or threat abatement plans	The Square-tailed Kite and Osprey do not have a recovery plan or threat abatement plan. Osprey priority actions focus on protecting nest sites and surrounding vegetation, identifying and protecting regular feeding areas, considering impacts of species and habitat in planning process, continuing breeding monitoring and continuing ecological research to determine limiting resources. Priority actions for the Square-tailed Kite focus on reducing the disturbance of riparian areas, identifying and protect nest trees and obtaining local data on this species. The proposed development is not inconsistent with these actions.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the rezoning of North Manyana. However this would also result with the development of the Site under the current zoning. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Square-tailed Kite and Osprey as: • no breeding habitat is present at the Site; • foraging resources are abundant in the locality for these highly mobile species; and • the proposed rezoning reduces the amount of potential habitat removed at the Site.

iii Threatened woodland birds: Little Lorikeet (*Glossopsitta pusilla*), Gang Gang Cockatoo (*Callocephalon fimbriatum*) and Glossy Black Cockatoo (*Calyptorhynchus lathami*)

The **Little Lorikeet** is listed as vulnerable under the TSC Act. A pair was recorded on a number of locations across the Site. The Little Lorikeet forages for nectar and pollen in the canopy of Eucalypt forest, woodland and also isolated flowering trees in open country. They roost in treetops and typically breed in the hollows of smooth-barked Eucalypts. Some of the hollow-bearing trees at the Site may provide suitable breeding habitat for this species, however from observations it appeared to be nesting in more mature vegetation to the north of the Site. The Site provides roosting and foraging habitat in the areas dominated by eucalypt woodland and forest.

The **Gang-gang Cockatoo** is listed as vulnerable under the TSC Act. This species was recorded flying over the south-western part of the Site. The Gang-gang Cockatoo forages on seeds, with a preference for eucalypts and wattles. They require open eucalypt forest and woodlands in winter and tall montane forests and woodlands in summer. In the winter, this species may be observed in parks and gardens within urban areas. The Gang-gang Cockatoo will frequently breed in eucalypt hollows in live trees close to water and breeding occurs in mature sclerophyll forest with a dense understorey. The Site does not provide breeding habitat for this species, with no hollows recorded large enough to support this species. Foraging habitat for this species occurs on the Site in the communities dominated by eucalypt woodland and forest.

The **Glossy Black Cockatoo** is listed as vulnerable under the TSC Act. The Glossy Black Cockatoo forages in stands of *Allocasuarina*, foraging on their seeds within the cones. Evidence of this species was recorded with chewed *Allocasuarina* spp. cones observed on the Site. They require large hollow-bearing eucalypts for breeding with large hollows. The Site does not provide breeding habitat for this species, with no hollows recorded large enough to support this species. Foraging habitat for this species occurs on the Site in the communities dominated by eucalypt woodland and forest. Foraging habitat for this species is concentrated on the eastern side of the Site.

Table C.3 provides a seven part test to assess the significance of the proposed rezoning on threatened woodland birds.

Table C.3 Assessment of impact criteria for threatened woodland birds

Criteria	Discussion
1. Life cycle of threatened species	The proposed development areas under the new rezoning contain limited potential breeding habitat for the Little Lorikeet and no suitable breeding habitat for the Gang-gang Cockatoo or the Glossy Black Cockatoo due to the immaturity of the eucalypts present. Foraging habitat is present for all species in five of the six vegetation communities listed on the Site. The Little Lorikeet will forage on Bangalay, Bastard Mahogany, Blackbutt, Sydney Peppermint, Forest Red Gum, Rough-barked Apple, White Stringy Bark and Blue Box on the Site, particularly in periods when they are flowering. The Gang-gang Cockatoo will forage across all vegetation communities identified on the Site and the Glossy Black Cockatoo will forage in Swamp Sclerophyll Forest and Swamp Oak Forest. The proposed rezoning of North Manyana will remove foraging and roosting habitat for the Little Lorikeet, Gang-gang Cockatoo and Glossy Black cockatoo. Indirect impacts such as noise disturbance from plant and machinery will temporarily affect the foraging ability of these species in the area. These impacts will occur regardless of whether the current or proposed zoning method is implemented, with potentially more habitat impacted by the existing zoning. As such, impacts are not considered to significantly impact the lifecycle of these species.

Table C.3 Assessment of impact criteria for threatened woodland birds

Criteria	Discussion
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will not remove any suitable breeding habitat but will remove up to 31.8 ha foraging habitat for the Gang-gang Cockatoo and 13.8 ha for the Glossy Back Cockatoo. This is 9.7 ha and 1.7 ha less, respectively, than the current zoning would require to be removed. The proposed rezoning would remove a few trees that could contain potential breeding habitat for the Little Lorikeet and 31.8 ha of foraging habitat, which is 9.7 ha less than the current zoning. The foraging areas to be removed have low ecological value due to the level of existing disturbance in these areas (motorbike trails) and are not important to the species as higher quality habitat is present to the west and north of the Site in crown land and the Conjola National Park. As a result, temporary indirect impacts such as noise disturbance to potential foraging habitat, will not affect the long-term survival of these species in the locality. Extensive potential foraging habitat will remain for the Little Lorikeet, Gang-gang Cockatoo and Glossy Black Cockatoo on the Site. This habitat will not be fragmented or isolated as it is a large contiguous tract of vegetation which is connected to remnant vegetation to the north and the west of the Site through proposed vegetated corridors. Despite this, these woodland birds are highly mobile and can travel for foraging resources.
5. Critical habitat	Critical habitat has not been listed for these species.
6. Consistency with recovery or threat abatement plans	There are no recovery plans for the threatened woodland birds, however priority actions are present for all species except the Little Lorikeet. The priority actions for the Glossy Black Cockatoo focus on identifying and mapping key foraging and breeding habitat and develop strategic planning at the local and regional level. Gang-gang Cockatoo priority actions focus on minimising the effects of fire on critical resources, determine the status of representative local populations and investigate the breeding biology of selected populations. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of habitat protected and enhanced for woodland birds.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Little Lorikeet, Gang-gang Cockatoo and Glossy Black Cockatoo as: • no suitable breeding habitat is present at the Site for most species with only limited potential breeding habitat present for the Little Lorikeet; • they are highly mobile species with access to additional higher quality habitat nearby; • the proposed rezoning reduces the amount of potential habitat removed at the Site; and • the proposed rezoning provides for the long-term protection of potential habitat at the Site.

iv Threatened marine birds: Hooded Plover (*Thinornis rubricollis*), Pied Oyster Catcher (*Haematopus longirostris*) and Sooty Oyster Catcher (*Haematopus fuliginosus*)

The **Hooded Plover** is listed as critically endangered under the TSC Act. It has been recorded nesting on dunes to the east of the Site, associated with the opening of the lagoon from the Site. The Hooded Plover forages in sand with a wide wave-wash zone and beachcast seaweed. They breed and nest in sparsely vegetated sand dunes. The Site does not provide breeding or foraging habitat for this species. Potential indirect impacts may occur to such habitat to the east of the Site as a result of the rezoning proposal.

The **Pied Oystercatcher** is listed as endangered under the TSC Act. It has been recorded on dunes to the east of the Site. The Pied Oystercatcher favours intertidal flats and forages for crustaceans and fish on exposed sand, mud and rock at low tide. It utilises coastal or estuarine beaches to build nests above the high tide mark. The Site does not provide breeding or foraging habitat for this species. Potential indirect impacts may occur to such habitat to the east of the Site as a result of the rezoning proposal.

The **Sooty Oyster Catcher** is listed as vulnerable under the TSC Act. It has been recorded on dunes to the east of the Site. The Sooty Oystercatcher favours rocky headlands, exposed reefs, beaches and muddy estuaries. It forages at low tide for limpets and mussels at low tide on exposed rock and breeds almost exclusively on offshore islands. There is no breeding habitat for this species on the Site and foraging habitat is available to the east of the Site at the saline coastal lagoon and ocean beach.

Table C.4 provides a seven part test to assess the significance of the proposed rezoning on threatened marine birds.

Table C.4 Assessment of impact criteria for threatened marine birds

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning will not remove any breeding or foraging habitat for the Hooded Plover, Pied Oystercatcher and Sooty Oystercatcher. Potential breeding habitat is unavailable for the Sooty Oystercatcher but the Hooded Plover and Pied Oystercatcher may breed nearby in the sand dunes to the east of the Site. Potential foraging habitat for these species is present to the east of the Site on the intertidal flats of the saline lagoon and the tide wash associated with the opening of this feature to the ocean. Indirect impacts from the development of the Site may include sediment run-off and water contamination to the waterways which feed into the saline lagoon. However the current zoning also has the same potential to result in these indirect impacts on habitat for these marine birds. The impacts of the proposed rezoning are not expected to cause a significant impact the life cycle of these species.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will not remove any foraging or breeding habitat for the Hooded Plover, Pied Oystercatcher and Sooty Oystercatcher as this habitat is present directly east of the Site and surrounded by the proposed conservation zoning. Habitat fragmentation and isolation will not impact these marine birds as no relevant habitat will be removed. The Pied Oyster Catcher and Hooded Plover may breed in the east of the Site. While this area may be considered important for this species, the proposed rezoning will not result in direct impacts on this area and the proposed conservation zoning will minimise any potential indirect impacts.
5. Critical habitat	Critical habitat has not been listed for these threatened marine bird species.

Table C.4 Assessment of impact criteria for threatened marine birds

Criteria	Discussion
6. Consistency with recovery or threat abatement plans	The Hooded Plover, Sooty Oystercatcher and Pied Oystercatcher have no recovery or threat abatement plan, but priority actions have been listed. These priority actions focus on providing local managers and community groups with materials for site protection, undertaking annual survey and monitoring of distribution and numbers, and implementing fox control around identified nesting habitat. The proposed rezoning is not inconsistent with these actions.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However no habitat for these species will be impacted by the proposed rezoning. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Hooded Plover, Pied Oystercatcher and Sooty Oystercatcher as: • no breeding or foraging habitat is present at the Site; • the lagoon entrance and lagoon will not be directly impacted by the development of the Site; • indirect impacts to habitat for these species will be mitigated by the proposed conservation areas at the Site; and • foraging and breeding resources are available in abundance along the coastline.

v Threatened forest owls: Powerful Owl (*Ninox strenua*), Masked Owl (*Tyto novaehollandiae*) and Sooty Owl (*Tyto tenebricosa*)

The **Powerful Owl** is listed as vulnerable under the TSC Act and is known to occur in the locality. The Powerful Owl requires large tracts of forest and woodland but also occurs in fragmented landscapes. They forage for arboreal mammals at night and roost during the day in dense vegetation such as Turpentine, Black She-oak and Rough-barked Apple. The Powerful Owl requires large tree hollows (at least 0.5m deep) in large eucalypts for breeding. Open woodland on the Site provides potential foraging habitat and limited roosting habitat. There is no breeding habitat for this species on the Site.

The **Masked Owl** is listed as vulnerable under the TSC Act and is known to occur in the locality. The Masked Owl lives in dry eucalypt forests, and forages for both arboreal and ground-dwelling species along the edges of forests. Tree hollows and caves are used as nesting habitat. The Site provides foraging habitat along its edges but does not provide breeding habitat.

The **Sooty Owl** listed as vulnerable under the TSC Act and was recorded calling near the northern boundary of the Site. They are found in a variety of rainforests and also moist eucalypt forest. The Sooty Owl nests in hollows or caves and will often roost in dense foliage in rainforest gullies, caves, recesses or ledges in cliffs. They forage on small mammals in unlogged corridors of moist forest but will also forage occasionally in regrowth forest. Breeding and roosting habitat is not present in the Site. Potential foraging habitat is widespread throughout the Site due to the level of current regrowth.

Table C.5 provides a seven part test to assess the significance of the proposed rezoning on threatened owls.

Table C.5 Assessment of impact criteria for threatened forest owls

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning will not remove any potential breeding habitat for the Powerful Owl, Masked Owl and Sooty Owl and is unlikely to impact on the lifecycle of these species. The proposed rezoning will remove up to 31.8 ha of foraging habitat for these threatened owls, with 40.1 ha of foraging habitat to remain in the Site. The lifecycle of these threatened owls is unlikely to be significantly impacted by the proposal due to their extensive home ranges and the lack of suitable breeding habitat at the Site. Indirect impacts to the rezoning such as noise disturbance from plant and equipment is unlikely to affect roosting of these species, as they prefer dense mid canopy foliage which is patchy throughout the Site in habitat to be conserved, and the construction stage will only be temporary, with extensive more suitable habitat in surrounding areas.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.

Table C.5 Assessment of impact criteria for threatened forest owls

Criteria	Discussion
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will remove up to 31.8 ha of owl foraging habitat. This is 9.7 ha less than the current zoning would require to be impacted. All areas of North Manyana constitute potential foraging habitat with the exception of the Swamp Sclerophyll Forest which has vegetation too dense for foraging. Breeding habitat for the Powerful Owl, Masked Owl and Sooty Owl is absent from the Site and thus no impacts (direct or indirect) is likely to occur to such habitat. The foraging habitat to be removed by the proposed rezoning forms part of a larger continuous patch of bushland and is not considered important to these owls as it is predominantly low condition. In addition to this, proposed conservation zoning and corridors in the Site will connect with the large tracts of bushland in the north and ensure that habitat for these species will not become isolated or fragmented. Up to 40.1 ha (56%) of foraging habitat will remain at the Site to compensate for habitat losses in the future when it is developed.
5. Critical habitat	Critical habitat has not been listed for this threatened owl species.
6. Consistency with recovery or threat abatement plans	Objectives in the recovery plan for the Powerful Owl, Masked Owl and Sooty Owl relevant to the project focus on estimating population numbers, monitoring trends in populations parameters, assessing how forest management prescriptions impact on species abundance and ensuring the adequate assessment of owls during the environmental assessment process. Priority actions for these species focus on owl conservation management and the protection of existing habitat. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of habitat (up to 40.1 ha) protected and enhanced for owls.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Powerful Owl, Masked Owl and Sooty Owl as: • no breeding habitat will be impacted and roosting habitat is limited at the Site; • the proposed rezoning reduces the amount of potential habitat removed at the Site; • indirect impacts such as noise disturbance will only be temporary; and • they have extensive home ranges and are highly mobile.

vi Threatened cave-roosting bats: Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*) and Little Bentwing Bat (*Miniopterus australis*)

The **Eastern Bentwing Bat** is listed as vulnerable under the TSC Act. This species was recorded foraging at the Site using an Anabat detector. The Eastern Bentwing Bat forages above the canopy of forested areas and also in more open areas such as grasslands. They roost in caves but will also use abandoned mines and road culverts as alternative roosting habitat. The Site does not provide roosting or breeding habitat for this species but contains known foraging habitat.

The **Little Bentwing Bat** is listed as vulnerable under the TSC Act. This species was recorded foraging at the Site using an Anabat detector. The Little Bentwing Bat roosts in maternity caves in limestone cave systems and disperse to other caves, abandoned mines, tunnels, tree hollows and stormwater drains in winter. They inhabit well-timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests. Little Bentwing Bats forage between the shrub and canopy layers of densely wooded areas. The Site does not provide breeding habitat for this species as there are no caves on site and contains limited roosting habitat. The Site provides potential foraging habitat for this species at all vegetation communities with the exception of the White Stringybark Grassy Woodland (SR544) which does not contain a shrub layer.

Table C.6 provides a seven part test to assess the significance of the proposed rezoning on these threatened cave-roosting bats.

Table C.6 Assessment of impact criteria for threatened cave-roosting bats

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning will not remove any potential breeding habitat for the Little Bentwing Bat or Eastern Bentwing Bat due to the absence of suitable structures and therefore is unlikely to impact on the lifecycle of this species. The proposed rezoning will remove up to 31.8 ha of potential foraging habitat for cave-roosting bats, with 40.1 ha of foraging habitat remaining onsite, respectively. Both species are highly mobile and as a result, the lifecycle of these species are unlikely to be threatened by the proposed rezoning.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will remove up to 31.8 ha of potential foraging habitat for cave-roosting bats. This is 9.7 ha less than the current zoning would require to be impacted. No breeding habitat will be removed for both species and only limited potential roosting habitat may be removed for the Little Bentwing Bat in the few tree hollows available on site. Habitat removal will not fragment or isolate foraging habitat for either species as a contiguous patch of habitat will remain linked to adjacent bushland to the north in crown land and the Conjola National Park. The habitat to be removed has no significant importance to the Eastern Bentwing Bat or Little Bentwing Bat as substantial amounts of foraging and roosting habitat is present in adjacent bushland surrounding the Site. The indirect impacts of the development of the Site such as noise disturbance from plant and equipment, may impact roosting Little Bentwing Bats in tree hollows however this is unlikely given the availability of more suitable roosting habitat in surrounding areas.
5. Critical habitat	Critical habitat has not been listed for these threatened cave-roosting bats.

Table C.6 Assessment of impact criteria for threatened cave-roosting bats

Criteria	Discussion
6. Consistency with recovery or threat abatement plans	There are currently no recovery or threat abatement plans for the Eastern Bentwing bat and Little Bentwing Bat. Priority actions for both species focus on monitoring the breeding success of maternity colonies to determine the viability of regional populations, identifying the types of winter roosts used by species and regular censuses of maternity colonies and other key roosts. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of foraging habitat protected and enhanced for threatened cave-roosting bats.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed development will not have a significant impact on the Eastern Bentwing Bat and Little Bentwing Bat as: • no breeding habitat will be removed; • a contiguous patch of foraging habitat will remain; and • suitable habitat is abundant in the locality.

vii Threatened hollow-dependant microchiropteran bats: Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), East-coast Freetail Bat (*Mormopterus norfolkensis*), Greater Broad-nosed Bat (*Scoteanax ruepellii*)

The **Eastern False Pipistrelle** is listed as vulnerable under the TSC Act. The Eastern False Pipistrelle was recorded foraging onsite using an Anabat detector and prefers moist habitats, with trees taller than 20 m and a dense understorey. They roost in hollow trunks of eucalypt trees and are occasionally found in old wooden buildings. The Eastern False Pipistrelle forages within gaps and spaces of forests and prefer continuous forest where they will forage along tracks, creeks and rivers. Roosting and breeding habitat for this species is limited in the Site but foraging habitat is readily available in Swamp Sclerophyll Forest (SR648) to the southern & eastern parts of the Site, Swamp Oak Forest (SR649) to the south west and in the centre of the Site and Blackbutt Turpentine Moist Forest (SR516) to the northwest of the Site.

The **East-coast Freetail Bat** is listed as vulnerable under the TSC Act. The East-coast Freetail Bat was recorded foraging onsite using an Anabat detector and roosts in the hollow spouts of large mature trees and occasionally under exfoliating bark of mature trees and in buildings. They inhabit dry eucalypt forest and woodland and show a preference for open spaces in woodland and forest. The East-coast Freetail Bat forages within a few kilometres of their roost site. The Site provides limited roosting and breeding habitat and contains potential foraging habitat in the southwest (Banksia Sand Forest (SR512) & White Stringybark Grassy Woodlands (SR544)).

The **Greater Broad-nosed Bat** is listed as vulnerable under the TSC Act. The Greater Broad-nosed Bat was recorded foraging onsite with an Anabat detector and roosts in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark and in the roofs of old buildings. They inhabit a variety of habitats including wet and dry sclerophyll forest, open woodland, swamp woodland and cleared paddocks. Potential foraging habitat is widespread throughout the Site but roosting and breeding habitat is limited.

Table C.7 provides a seven part test to assess the significance of the proposed rezoning on these threatened hollow-dependant bats.

Table C.7 Assessment of impact criteria for threatened hollow-dependant bats

Criteria	Discussion
1. Life cycle of threatened species	Limited breeding habitat is available for the Eastern False Pipistrelle, East-coast Freetail Bat and Greater Broad-nosed Bat at North Manyana. The proposed rezoning will remove some potential roosting and breeding habitat through the removal of six hollow-bearing trees but is unlikely to have an impact on the lifecycle of these species due to the abundance of higher quality habitat in bushland to the north of the Site. The proposed rezoning will remove up to 31.8 ha of foraging habitat for tree-roosting bats. However up to 40.1 ha of foraging habitat will remain and be conserved at the Site for these species. Temporary noise disturbances from plant and machinery during development may indirectly impact on breeding or roosting of these species. However this would occur under both the proposed and the current zoning and is therefore not considered significant.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.

Table C.7 Assessment of impact criteria for threatened hollow-dependant bats

Criteria	Discussion
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will remove up to 31.8 ha of foraging habitat for the tree-roosting bats, which is 9.7 ha less than the current zoning would require to be impacted. The foraging habitat to be removed is considered of low importance to these species due to the availability and abundance of similar habitat in crown land and the Conjola National Park to the north of the Site. Due to the limited number of hollow-bearing trees at the Site, it is not considered to be important roosting and breeding habitat. Six hollow-bearing trees which provide potential roosting and foraging habitat will be removed for the rezoning. Potential habitat will not be fragmented or isolated from the proposed rezoning as 40.1 ha of foraging habitat will be retained at the Site which is connected by surrounding habitat.
5. Critical habitat	Critical habitat has not been listed for these threatened hollow-dependant bat species.
6. Consistency with recovery or threat abatement plans	There are currently no recovery or threat abatement plans for the Eastern False Pipistrelle, East-coast Freetail Bat and Greater Broad-nosed Bat. Priority action plans for these species focus on researching the roosting ecology of tree-roosting bats, research the degree of long-term fidelity to roost trees and roosting areas in order to assess their importance, investigate the effectiveness of logging prescriptions, studying the ecology, habitat requirements and susceptibility to logging. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of foraging and future roosting habitat protected and enhanced for hollow-dependant bats.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Eastern False Pipistrelle, East-coast Freetail Bat and Greater Broad-nosed Bat as: • limited roosting and breeding habitat is present at the Site; • the proposed rezoning reduces the amount of potential habitat removed at the Site; • the proposed rezoning only removes six hollow-bearing trees; and • suitable habitat is abundant in the locality.

viii Threatened non-flying mammals: Squirrel Glider (*Petaurus norfolcensis*) and Yellow-bellied Glider (*Petaurus australis*)

The **Squirrel Glider** is as vulnerable under the TSC Act. The Squirrel Glider inhabits mature trees associated with Box-Ironbark Woodland, River Red Gum Forest and Blackbutt-bloodwood forest with a heath understorey. They require multiple dens site and refuge tree hollows and forage on *Acacia* gum, eucalypt sap or invertebrates. The Site provides widespread potential foraging habitat for this species with the exception of parts of the south-western corner and also the centre of the Site. There is only limited potential breeding habitat on the Site due to the low number of suitable hollow-bearing trees and this species was not recorded onsite, but is known to occur in the area.

The **Yellow-bellied Glider** is listed as vulnerable under the TSC Act. The Yellow-bellied Glider occurs in tall mature eucalypt forest where it forages on insects, nectar and sap. The Yellow-bellied Glider dens in the hollows of large trees and is very mobile in response to seasonally variable food resources. The Site provides only limited potential den site habitat, but potential foraging habitat for this species is widespread with the exception of parts of the south-western corner and also the centre of the Site. Foraging habitat on the Site includes communities containing Black Wattle, Bangalay, Blackbutt, Sydney Peppermint, Forest Red Gum or Blue Box. This species was not recorded at the Site, but is known to occur in the area.

Table C.8 provides a seven part test to assess the significance of the proposed rezoning on these threatened non-flying mammals.

Table C.8 Assessment of impact criteria for threatened non-flying mammals

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning avoids the most suitable breeding habitat for both species and thus is unlikely to impact on the lifecycle of this species. The proposed rezoning may remove up to 20.2 ha of foraging habitat for non-flying mammals, but foraging habitat for these species at North Manyana will remain linked with potential breeding habitat to the north irrespective of this. Indirect impacts through construction such as noise disturbance through plant and machinery are unlikely to impact den sites that may occur to the north of the Site as these will be temporary and a vegetated buffer will be maintained between the development and suitable habitat to the north.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning may remove up to 29.6 ha of potential foraging habitat for non-flying mammals, which is 4.6 ha less than the current zoning would require to be impacted. Only a small amount of low quality potential breeding habitat will be impacted by the proposed rezoning, due to the absence of hollow-bearing trees in regrowth vegetation. Preferable foraging and breeding habitat is available to the north in Conjola National Park and on crown land, where old growth vegetation is present. The habitat to be removed is not considered important to these species because of the low quality habitat and the presence of more suitable available habitat to the north. Indirect impacts such as noise disturbance to foraging habitat will be limited, assuming that construction works occur during daylight hours. Potential habitat will not be fragmented or isolated as bushland from the proposed rezoning will remain connected, particularly to the surrounding bushland to the north of the Site. Up to 37.4 ha of potential foraging habitat for the Squirrel Glider and Yellow-bellied Glider will remain on the Site.
5. Critical habitat	Critical habitat has not been listed for the Squirrel Glider and Yellow-bellied Glider.

Table C.8 Assessment of impact criteria for threatened non-flying mammals

Criteria	Discussion
6. Consistency with recovery or threat abatement plans	The Yellow-bellied Glider has a recovery plan which focuses on co-ordinating its recovery, encouraging and assisting and improving its protection and management, identifying and monitoring significant populations of the species and increasing community awareness of the species. Priority actions for the Yellow-bellied Glider focus on co-ordinating the implementation of the actions from the recovery plan, considerations to the species in reserve management, consideration of the species' habitat in planning instruments and liaising with relevant stakeholders to protect habitat. The Squirrel Glider does not have a recovery plan or threat abatement plan. Priority actions for the Squirrel Glider focus on determining population size and extent and connectivity of populations and ensure the largest hollow-bearing trees are given the highest priority for retention. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of habitat protected and enhanced for threatened non-flying mammals.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Squirrel Glider and Yellow-bellied Glider as: • only a small amount of low quality breeding habitat is present at the Site; • the proposed rezoning reduces the amount of potential foraging habitat removed at the Site; • similar foraging resources are abundant in the locality.

The **Eastern Ground Parrot** is listed as vulnerable under the TSC Act. The Eastern Ground Parrot occurs in low heathlands and sedgeland which are very dense. They forage on seeds and nest in shallow bowls of sticks under grass, sedge or low heathy shrubs within the heathy areas of Swamp Sclerophyll Forest (SR648). It was not recorded in the Site despite targeted surveys but potential habitat occurs in the east of the Site for this species.

Table C.9 provides a seven part test to assess the significance of the proposed rezoning on the Eastern Ground Parrot.

Table C.9 Assessment of impact criteria for the Eastern Ground Parrot

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning may impact on breeding and foraging habitat of the Eastern Ground Parrot, should it occur. However approximately three times as much potential foraging and breeding habitat will be retained on the Site than will be developed by the proposed rezoning. The impacts on a small amount of potential habitat will not have a significant impact on the lifecycle of the Eastern Ground Parrot. Temporary noise disturbances from plant and machinery during construction may indirectly impact on this species. However this would occur under both the proposed and the current zoning and is therefore not considered significant.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will remove up to 11.6 ha of potential foraging and breeding habitat for the Eastern Ground Parrot. This habitat is exclusively contained to the SSF community which dominates the eastern half of the Site. This is slightly more (1 ha) than what the current zoning would require to be impacted. The habitat to be removed has low importance to this species as it is only a small portion of low, dense heath and significantly more suitable areas will be retained (up to 25.2 ha). Potential habitat of the Eastern Ground Parrot will not be fragmented or isolated as the proposed rezoning will leave a contiguous patch of habitat for this species.
5. Critical habitat	Critical habitat has not been listed for the Eastern Ground Parrot.
6. Consistency with recovery or threat abatement plans	The Eastern Ground Parrot does not have a recovery plan or threat abatement plan. Eastern Ground Parrot priority actions focus on including operational guidelines in Reserve Fire Management Strategies to protect this species from fire. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of habitat protected and enhanced for the Eastern Ground Parrot.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Eastern Ground Parrot as: • only a small portion of potential lower quality foraging and breeding habitat will be removed; • habitat to be removed has low importance to this species; and • a large portion of potential foraging and breeding habitat will be retained.

- x Threatened ground-dwelling mammals: Spotted-tailed Quoll (*Dasyurus maculates*), Southern Brown Bandicoot (*Isodon obesulus obesulus*) and Long-nosed Potoroo (*Potorous tridactylus*)

The **Spotted-tailed Quoll** is listed as vulnerable under the TSC Act. It was not recorded in the Site but potential habitat is widespread through North Manyana. The Spotted-tailed Quoll has been recorded in a variety of habitats including coastal heaths and wet and dry sclerophyll forests. They will use hollow-bearing trees, caves, logs, rock crevices and boulder fields as refuge and den shelters. The Spotted-tailed Quoll prey on small and medium sized prey from rats to wallabies, but will also eat carrion. Potential habitat is widespread throughout the Site, though minimal den sites are present.

The **Southern Brown Bandicoot** is listed as vulnerable under the TSC Act. It was not recorded in the Site but potential habitat is available in the Site in heath and open forest where sandy soils are present. The Southern Brown Bandicoot feeds on invertebrates, ground dwelling fungi and plant roots. They nest or burrow in shallow depressions in the ground covered by leaf litter and plant material. Potential habitat is widespread throughout the Site, particularly the eastern part of the Site.

The **Long-nosed Potoroo** is listed as vulnerable under the TSC Act. It was not recorded in the Site but potential habitat is available in the Site in the coastal health, dry and wet sclerophyll forests. They forage on ground-dwelling fungi and also eat roots, tubers, insects and other soft-bodied animals in the soils. Potential habitat is widespread throughout the Site.

Table C.10 provides a seven part test to assess the significance of the proposed rezoning on threatened non-flying mammals.

Table C.10 Assessment of impact criteria for threatened non-flying mammals

Criteria	Discussion
1. Life cycle of threatened species	The proposed rezoning may remove breeding and foraging habitat for the Southern Brown Bandicoot, Long-nosed Potoroo and potential foraging habitat for the Spotted-tailed Quoll. This will result in up to 31.8 ha of potential habitat being removed. None of these species were recorded in the area despite targeted surveys and therefore habitat to be impacted is not considered important to the lifecycle of these species. Temporary noise disturbances from plant and machinery during construction may indirectly impact on this species. However this would occur under both the proposed and the current zoning and is therefore not considered significant.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	The proposed rezoning will remove up to 31.8 ha of potential habitat for these species. This is 9.7 ha less than the current zoning would require to be impacted. The importance of the habitat to be removed for these species is considered to be low, due to the absence of species records. The Spotted-tailed Quoll has high mobility and up to a 3,500 ha home range (DEC 2005) and the removal of a small patch of habitat is not important to this species. The rezoning will not fragment or isolate habitat for these species, but will result in the long-term protection of habitat for these species.
5. Critical habitat	Critical habitat has not been listed for the Spotted-tailed Quoll, Southern Brown Bandicoot and Long-nosed Potoroo.

Table C.10 Assessment of impact criteria for threatened non-flying mammals

Criteria	Discussion
6. Consistency with recovery or threat abatement plans	The Spotted-tailed Quoll and Long-nosed Potoroo do not have a recovery plan or threat abatement plan. Priority actions for the Spotted-tailed Quoll focus on renegotiating habitat prescriptions, adequately conserving the habitat requirements of this species and incorporating Fire Management Strategies that protect rocky outcrops and riparian zones within areas of known habitat. Priority actions for the Long-nosed Potoroo focus on excluding forestry activities from refuge area used in times of stress and minimising damage to lower stratum vegetation and litter layer during forestry operations. The Southern Brown Bandicoot has a recovery plan in which its objectives focus on identifying and implementing land management practices that assist in the recovery of the species, clarifying the status of the species by better defining its distribution and relative abundance, undertaking research to broaden the knowledge base on the species, improving community awareness and significance of the species. Priority actions for the Southern Brown Bandicoot is focused on ensuring informed environmental assessment and planning decisions are made, informing the community of the conservation significance of the Southern Brown Bandicoot, establishing mortality registers and protecting this species from fire through operational guidelines in the Reserve Fire Management Strategy. The proposed rezoning is not inconsistent with these actions and may assist in the recovery of these species by increasing the amount of habitat protected and enhanced for threatened non-flying mammals.
7. Key threatening processes	The clearing of native vegetation is a KTP that would result from the development of the rezoned North Manyana site. However this would also result under the current zoning, and the current proposal reduces the amount of vegetation to be impacted, and therefore reduces this threat from the project. This impact is therefore not considered significant.
Conclusions	The proposed rezoning will not have a significant impact on the Spotted-tailed Quoll, Southern Brown Bandicoot and Long-nosed Potoroo as: • only a small portion of potential foraging and breeding habitat will be removed; • the proposed rezoning reduces the amount of potential habitat impacted at the Site; • a large connective patch of habitat will be conserved; and • suitable habitat is abundant in the locality.

C.2 Significant impact criteria in accordance with the EPBC Act

The following sections provide the criteria that must be considered in the assessment of all threatened species listed under the EPBC Act. There are separate criteria for each listing category under the EPBC Act, in accordance with *'EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance'* (DEH 2006).

C.2.1 Significant impact criteria for critically endangered and endangered ecological communities

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

- reduce the extent of an ecological community;
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of an ecological community;
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
 - assisting invasive species, that are harmful to the listed ecological community, to become established; or
 - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or
- interfere with the recovery of an ecological community.

C.2.2 Significant impact criteria for critically endangered and endangered species

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

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of the species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;

- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

C.2.3 Significant impact criteria for vulnerable species

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

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

C.2.4 Significant impact criteria for listed migratory species

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

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

C.2.5 Assessments of impact criteria

Assessments of impact criteria have been prepared for species listed under the EPBC Act, in accordance with the criteria above.

i Endangered mammals: Spotted-tail Quoll (*Dasyurus maculatus*) and Southern Brown Bandicoot (*Isoodon obesulus*)

See Section A.1.2 (ix) for a description of the Spotted-tail Quoll and Southern Brown Bandicoot. An assessment of impact criteria has been completed to assess potential impacts of the proposed modification on these endangered mammals (Table C.11).

Table C.11 Assessment of impact criteria for endangered mammals

Criteria	Discussion
1: long-term decrease in population size	The Spotted-tail Quoll and Southern Brown Bandicoot occupy a variety of habitats including heathland, dry and wet sclerophyll forests. Habitat at the Site is not considered important to these species given their absence from the Site despite targeted surveys. Therefore, the loss of some of this potential habitat is unlikely to impact on any local population of the species.
2: reduce area of occupancy	The proposed rezoning may reduce the potential area of occupancy of these species by 31.8 ha for the Spotted-tailed Quoll and Southern Brown Bandicoot.
3: fragment a population	The proposed rezoning area may support nomadic populations of these species which may move into the area from more suitable habitat in surrounding areas. The proposed rezoning has been planned in a way such that a habitat corridor allows movement of animals through a riparian corridor to the west and a large patch of vegetation will be retained in the north to allow movement to adjacent habitat in crown land and the Conjola National Park. The rezoning will not fragment any areas of potential habitat for these species and therefore is unlikely to fragment any populations of the species in the locality.
4: adversely affect critical habitat	Habitat in the Site is not considered critical to the survival of the Spotted-tail Quoll as it is expected that they occur as vagrants or temporary visitors, moving between patches of habitat. The habitat in the Site is not considered critical to the survival of the Southern Brown bandicoot as a known population has not been recorded onsite.
5: disrupt the breeding cycle of a population	The breeding cycle of the Spotted-tailed Quoll and Southern Brown Bandicoot will not be directly disrupted by the proposed rezoning. These are highly mobile species with access to supplementary habitat in the west and north. The breeding cycle of these species may be subject to disturbances including light, dust and noise, particularly for dispersing individuals looking for mates, but this is unlikely to be significant for these species.
6: decrease availability or quality of habitat	Spotted-tail Quolls have large home ranges up to 3500 ha (DEC 2005) so individuals can readily disperse to alternative breeding sites outside the Site, should the Site represent an area of habitat for this species. The Southern Brown Bandicoot has a home range between two to 20 ha. Even so, most individuals will be able to disperse to other areas of habitat including the habitat to be conserved in the eastern part of the Site.
7: result in invasive species	The European Red Fox is known to prey upon the Spotted-tailed Quoll (Murray and Poore 2004) and Southern Brown Bandicoot. European Red Fox numbers will not increase as a result of the proposed rezoning as a large proportion of the area to be rezoned is already disturbed through a series of motorbike tracks which foxes may already use.
8: introduce disease	The Spotted-tail Quoll and Southern Brown Bandicoot are not known to be susceptible to any diseases.

Table C.11 **Assessment of impact criteria for endangered mammals**

Criteria	Discussion
9: interfere with recovery	The proposed rezoning will only remove up to 31.8 ha of potential habitat for the Spotted-tailed Quoll and Southern Brown Bandicoot, which is not critical to the survival of these species in the locality or region, given the amount of suitable habitat present. The proposed rezoning is not inconsistent with identified recovery actions for these species, and the proposal will result in the conservation of potential habitat which may assist in the recovery of these species.
Conclusion	The proposed rezoning is not expected to result in significant impacts to the Spotted-tail Quoll and Southern Brown Bandicoot as: • they are mobile species which can readily move out of the proposed rezoning and disturbance area; • the Site is not considered to constitute important habitat for these species, due to non-detection during targeted surveys; and • the proposed rezoning will conserve habitat for these species into the future.

ii Vulnerable endangered mammals: Long-nosed Potoroo (*Potorous tridactylus tridactylus*)

See Section A.1.2 (ix)) for a description of the Long-nosed Potoroo. An assessment of impact criteria has been completed to assess potential impacts of the proposed rezoning on this vulnerable mammal (Table C.12)

Table C.12 Assessment of impact criteria for the Long-nosed Potoroo

Criteria	Discussion
1: long-term decrease of an important population	An important population of the Long-nosed Potoroo does not occur at the Site.
2: reduce area of occupancy of an important population	An important population of the Long-nosed Potoroo does not occur at the Site.
3: fragment an important population	An important population of the Long-nosed Potoroo does not occur at the Site.
4: adversely affect critical habitat	As no Long-nosed Potoroos or evidence of their presence was detected during targeted surveys, habitat in the Site is not considered critical to the survival of the Long-nosed Potoroo in the locality or region.
5: disrupt the breeding cycle of an important population	An important population of the Long-nosed Potoroo does not occur at the Site.
6: decrease availability or quality of habitat	The proposed rezoning will remove approximately 31.8 ha of potential Long-nosed Potoroo habitat. This will decrease the availability and quality of potential habitat for the species in the locality. However, this is 9.7 ha less than the habitat to be impacted by the current zoning.
7: result in invasive species	The Long-nosed Potoroo is known to be subject to predation by the European Red Fox. The proposed rezoning is not considered to increase the threat of predation.
8: introduce disease	The proposed rezoning will not introduce disease that the Long-nosed Potoroo is susceptible to.
9: interfere with recovery	There is no recovery plan for the Long-nosed Potoroo. The proposed rezoning is unlikely to interfere with recovery of the species given the conservation of potential habitat at the Site.
Conclusion	The proposed rezoning is not expected to result in significant impacts to the Long-nosed Potoroo as: • an important population of this species does not occur in this area; and • this species has a low likelihood of occurrence at the Site due to non-detection during targeted surveys.

iii Migratory birds: Osprey (*Pandion haliaetus*) and Black-faced Monarch (*Monarcha melanopsis*)

The Black-faced Monarch is likely to occur in the eucalypt woodlands and coastal scrub of the proposed rezoning. It breeds in rainforest habitat and forages on arthropods from the foliage. It was recorded foraging in the Site during the survey but the area is likely to be part of a larger home range.

A description of the Osprey is provided in Section A.1.2. An assessment of significance has been completed to assess potential impacts of both migratory birds (Table C.13).

Table C.13 Assessment of impact criteria for migratory birds

Assessment part	Discussion
1: substantially modify important habitat	The Site does not constitute an area of important habitat for these species, as an ecologically significant proportion (as defined under the guidelines (DEH, 2006)) of their population does not reside in the Site, no breeding occurs in the area, they are not at the limit of their range and they are not known to be declining. In addition, the proposed rezoning will remove 31.8 ha of habitat for the Black-faced Monarch which would only constitute a small portion of this highly mobile species home range.
2 : result in invasive species	These migratory species are not known to be impacted by any invasive species.
3: disrupt lifecycle of ecologically significant proportion of population	An ecologically significant proportion of these species do not reside in the Site. In addition, they do not breed in the Site, foraging habitat is sub-optimal and the proposed rezoning is unlikely to disrupt their migration patterns.
Conclusion	The proposed rezoning is not expected to result in significant impacts to these migratory bird species as: • an ecologically significant proportion of the species is not known to reside in the Site; and • the Site does not contain important habitat for the species.

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