SECOND ADDENDUM

to

ECOLOGICAL ASSESSMENT
dated 9 February 2004

and

FIRST ADDENDUM
dated 26 May 2004

for

Proposed Subdivision into 144 Rural Residential Lots

Lots 1-80, 83, 84, 86-88 (DP 791199) and Lots 90-95 (DP 805549) Le Clos Verdun Estate SANCROX

27 January 2008

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INTRODUCTION

An ecological assessment of the potential impact of development on these Lots was undertaken and a report prepared by myself on 9 February 2004. Additionally, following some minor amendments to the proposal, an Addendum dated 26 May 2004 was prepared to address these amendments.

Since then rezoning has occurred. Subject to the anticipated rezoning occurring, given the minor ecological impact of the proposal, the initial eco assessment was undertaken to address both rezoning and subsequent subdivision.

However due to: the passage of time since the initial report; legislative changes since that date (including revised Part 5A assessment, new declarations in relation to threatened species, endangered communities, threatening processes etc); variations to the proposal assessed (particularly lot layout and numbering, a road crossing of Haydon's Creek and filling on several lots) - it is necessary to update the ecological assessments previously undertaken to ensure the conclusions and recommendations still apply to the modified proposal.

A second Addendum is considered adequate to address this update requirement. Both the initial Report and the first Addendum must be referred to in conjunction with this Addendum. For ease of reference, identical numbering to that used in the initial report will be adopted for this Addendum.

1. General (p.1 of 9.2.04)

In addition, the requirements of the Native Vegetation Act (2003) and Regulation have been addressed (see **PART D1**).

2. The Proposal (p. 4 of 9.2.04 and first addendum dated 26.5.04)

The revised proposal now includes the following:

- All areas not proposed for development are now all zoned 7(h) Environment Protection Habitat or 6(a) Open Space. The balance is zoned 1(r1) Rural Residential.

  It is noted though that some proposed lots contain both zonings. At rezoning, with the prior agreement of Department of Planning, some development will occur within the 7(h) zone – namely an access road across Haydon's Creek and minor driveways through about six proposed lots.

- Variations in lot layout and numbering (previously 123 lots now 144 lots). Essentially though the numbers of lots and layout are very similar to the proposal previously analysed. The increased intensity of development is essentially within the cleared/vineyard areas.

- An access road across the headwaters of Haydon's Creek (locality is broad and grassed).

The attached revised subdivision Plan (see Attachments 2 and 3) shows these modifications.

Close field review of the proposal indicates that to undertake the proposal, negligible (if any) vegetation removal (other than groundcover vegetation – mostly introduced grasses and weeds) will be required. No (or negligible) tree or shrub vegetation will require removal. All development can take place within cleared areas, or located between overstorey trees, eg driveways through Lots 28-20 and 36-38. At most some very minor widening of existing access driveway to Lot 133 may be required - young regrowth wattle may need removal. Location of a link road and about six driveways to dwellings within components of the Environment Protection Zone will only require removal of introduced grasses and weeds (endorsed by Department of Planning at time of rezoning).

PART A

SEPP 44 (KOALA HABITAT) ASSESSMENT

Review indicates that essentially the previous assessment is still applicable. However, the proposed road through the 7(h) zoning across Haydon's Creek (adjacent lots 132/144) has the potential to create a minor barrier to the free movement of koalas within the identified corridor. An additional Recommendation has been provided (See **PART E**) to minimise impact of this road.

PART B

SECTION 5A (EP&A Act)
THREATENED SPECIES ASSESSMENT

1 LEGISLATIVE REQUIREMENTS

Section 5A of the EP&A Act and Reg. now requires that a 7 Part Test be undertaken in lieu of the 8 Part Test undertaken in the 9.2.04 assessment. This revised 7 Part test is in Attachment 7.

2 FLORA

2.3 Threatened species and communities detected

A review was undertaken of species and communities detected compared with the most recent lists of threatened species and endangered ecological communities (TSC Act). Whilst essentially no variation to the previous conclusions occurs, in hindsight, certainly Area D and possibly part of Area I could be considered *Swamp Oak Floodplain Forest of the NSW North Coast* - an endangered ecological community. For the purpose of impact assessment this determination will apply.

2.4 Threatened species recorded within 25 km

An update of TSC Act Schedule 1 & 2 species recorded within 25 km of the study area was undertaken (source - NP&WS Wildlife Atlas Databases for Kempsey and Camden Haven dated 8.5.07 and 19.09.07 respectively). Whilst not the latest database records, these are considered adequate to assist in determining possible presence of species.

No additional species were included as result of this search.

3 FAUNA

3.2 Survey methodology

Whilst *Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities* have been issued since the 9.2.04 Assessment - these Guidelines have not been gazetted, they are still Draft and have no legal standing. Additionally, these

draft Guidelines, even if applicable, do not prescribe "full" survey for each and every assessment. Judgement is required based on habitat presence, likely species presence and likely disturbance as a result of the proposal.

The level of survey required (and undertaken) was justified in the 9.2.04 Report and this justification still stands.

However, as a road crossing of Haydon's Creek is now proposed an amphibian search was undertaken in the vicinity of the proposed road crossing (one night). This search was undertaken by two persons for a period of about two hours and followed a period of wet weather.

3.3 Survey results

No additional amphibian species were detected at the road crossing location. However, several previously undetected species were incidentally observed at this and other locations. These are:

Amphibians

Eastern Sedge Frog *(Littoria fallax)*

Birds

Yellow-tailed Black-Cockatoo *(Calyptorhunchus funereus)*
Willie Wagtail *(Rhipidura leucophrys)*
White-throated Nightjar *(Caprimulgus mystacalis)*

Mammals

[IS]Deer

3.4 Threatened species detected

No change.

3.5 Threatened species recorded within 10 km

A search of the NP&WS Atlas Databases (source - NP&WS Wildlife Atlas Databases for Kempsey and Camden Haven dated 8.5.07 and 19.09.07 respectively). Whilst not the latest database records, these are considered adequate to assist in determining possible presence of species.

The following additional species were included as result of this search;

Amphibians

Giant Barred Frog *(Mixophyes iteratus)*
Green and Golden Bell Frog *(Litoria aurea)*
Wallum Froglet *(Crinia tinnula)*

Birds

Australasian (Australian) Bittern *(Botaurus poiciloptilus)*
Brown Treecreeper *(Climacteris picumnus)*
Grass Owl (*Tyto longimembris)*
Regent Honeyeater *(Xanthomyza phrygia)*

4 SECTION 5A (EP&A ACT) ASSESSMENT

Section 5A of the EP&A Act and Reg. now requires that a 7 Part Test be undertaken in lieu of the 8 Part Test undertaken in the 9.2.04 assessment. This revised 7 Part test is in Attachment 7.

5 CONCLUSION and DISCUSSION

Essentially there is no variation to the conclusions previously drawn.

The only variation to impacts is that some very minor disturbance (negligible vegetation removal, ie introduced grasses and weeds only) will occur in what is now an Environment Protection Zone (EPZ). This disturbance is for a recently proposed access (link) road across the EPZ (endorsed by DoP at time of rezoning).

Conversely, due to some redesign of lot layout and less stringent bushfire protection buffers, some previously identified vegetation removal is not now required.

PART C

SECTION 79C (EP&A ACT) REQUIREMENTS

IMPACT ON THE NATURAL ENVIRONMENT

(FLORA AND FAUNA)

There is no variation to the assessment and conclusions previously drawn. In relation to Wildlife Corridors, an additional Recommendation (see **PART E**) has been included to minimise impact of the proposed road crossing of Haydon's Creek on wildlife that may utilise this vegetation as a corridor.

PART D

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT ASSESSMENT

The latest lists were reviewed and there is no variation to the assessment and conclusions previously drawn.

PART D1

NATIVE VEGETATI0N ACT

This is a new section that addresses the Native Vegetation Act.

Given negligible (if any) native vegetation removal as a result of the proposal, an application under the provisions of this Act will not be required.

PART E

RECOMMENDATIONS

Following review, those recommendations made in relation to subdivision are still applicable. However, additional Recommendations are required as follows:

Recommendation 10

The road proposed through the 7 (h) Environment Protection Zone adjacent lots 114 and 132 either should not be fenced, or alternatively be fenced with koala/wildlife friendly fencing that does not restrict the free movement of koalas and larger mammals across this road. This road should have Koala warning signs installed and speed humps. Additional planting of trees/shrubs should not occur immediately adjacent this road.

Recommendation 11

The road proposed through the 7 (h) Environment Protection Zone adjacent proposed lots 114 and 132 should be adequately designed and engineered to ensure no sediment movement into Haydon's Creek occurs.

Recommendation 12

Within lots that either contain or adjoin land within the Environment Protection Zone, eg proposed Lots 28-31, 36-38 and 132-133, 141-144 (but not exclusively so) - building sites, access driveways, bushfire buffers can and should be located to avoid the need for tree removal. Council should adopt controls to ensure this vegetation is protected.

Recommendation 13

On other partly forested lots, eg proposed Lots 11-16, 65, 101-102 (but not exclusively so), building sites, access driveways, other structures and where required bushfire protection buffers - can and should be located to avoid the need for tree removal. Council should adopt controls to ensure this vegetation is protected.

Recommendation 14

To the extent reasonably deemed practical, the Environment Protection Zoned land should be managed by application of the proposed Community Management Plan and address issues such as access, fencing, grazing, weed control, fire protection and enrichment planting. Development Consent condition, eg Covenants, may be needed to address this matter.

Recommendation 15

If in accord with Council policy, dogs should be constrained within fenced enclosures on all lots that adjoin the Environment Protection Zone corridor. Other koala protection practices, eg escape means from swimming pools, should be considered on these lots.

PART F
ATTACHMENTS

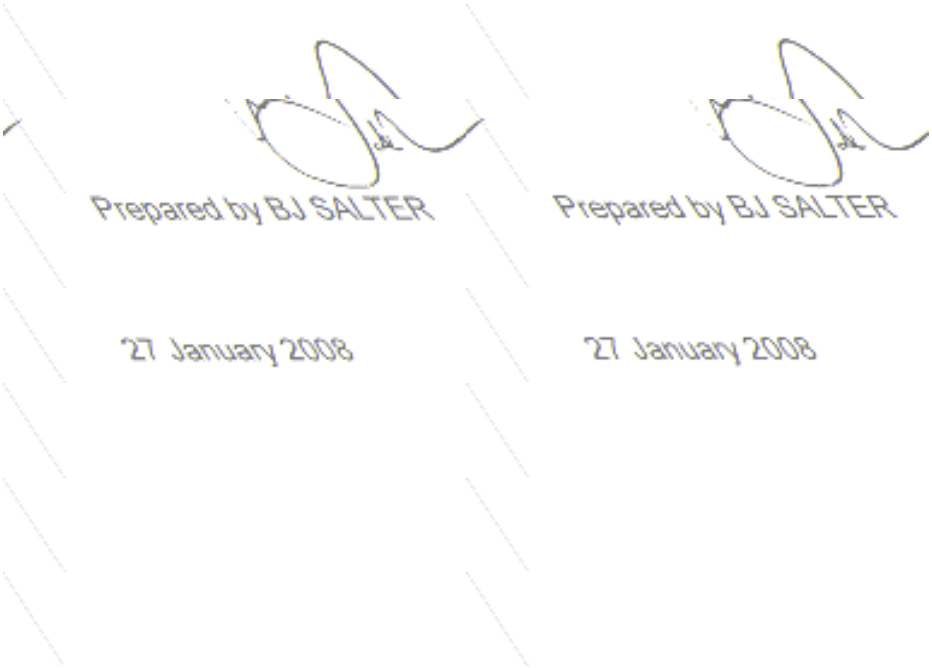
Attachment 2 – Concept Proposal – subdivision and roads

Attachment 3 - Concept Proposal – subdivision and vegetation (Air Photo)

Attachment 7 – *Section 5A* (Seven Part Test) Assessments

Attachment 10 (new) – Rezoning Map

CERTIFICATION



ATTACHMENT 2

CONCEPT PROPOSAL - SUBDIVISION AND ROADS

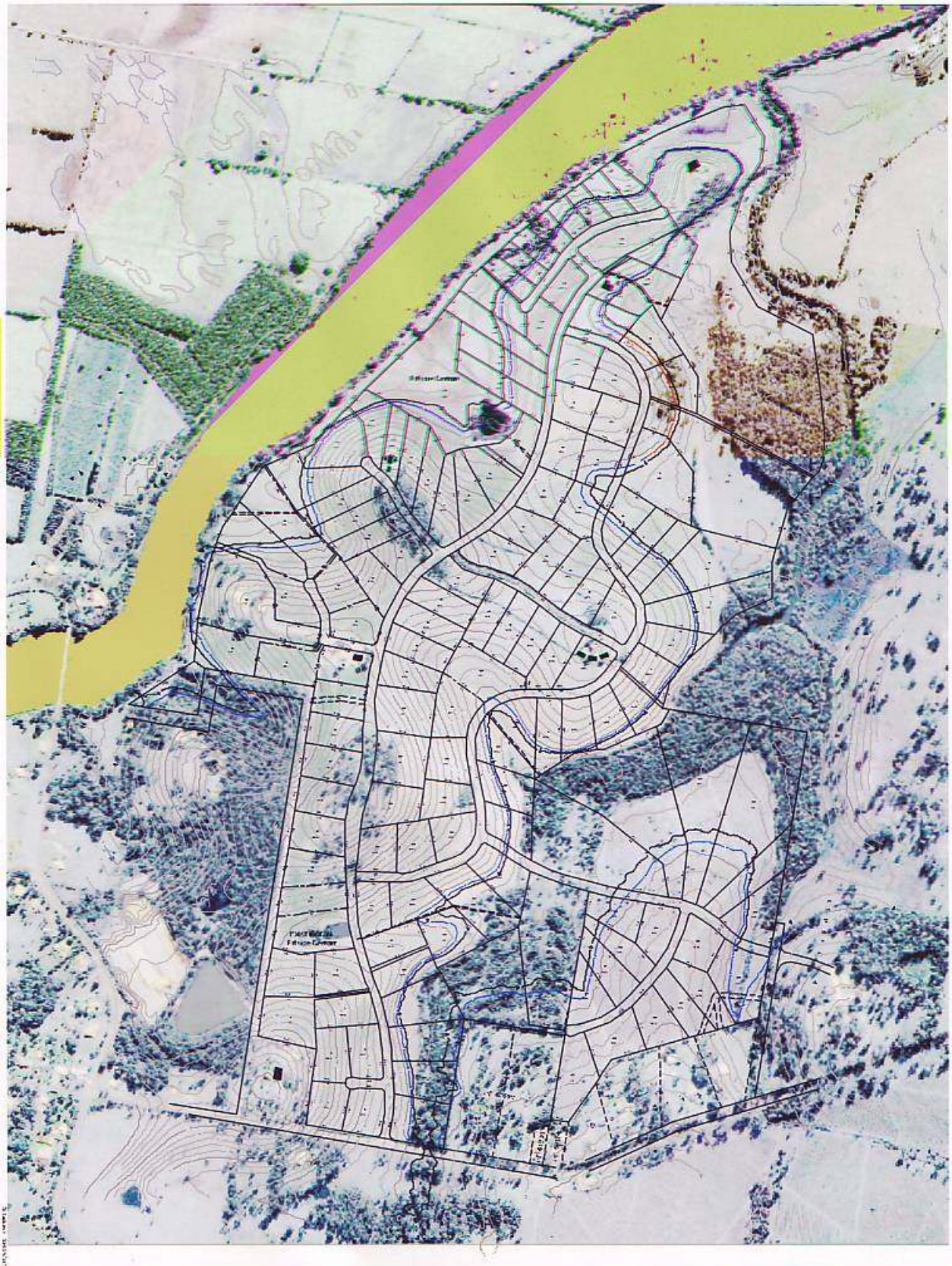
HOPKINS CONSULTANTS

PROPOSED LOT LAYOUT
WITH CONTOURS ONLY
LE CLOS VERDUN
SANCROX

			A2
		LW	30/01/2008
		A.H.D	1:5000 6096
G.H			1 1

ATTACHMENT 3

CONCEPT PROPOSAL – SUBDIVISION AND VEGETATION (AIR PHOTO)



HOPKINS CONSULTANTS

PROPOSED LOT LAYOUT
WITH AERIAL & CONTOURS
LE CLOS VERDUN
SANCROX

			A2
		L.W	
	A.M.U		6096
		1	1

ATTACHMENT 7

SECTION 5A (Seven Part Test) ASSESSMENTS

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SECTION 5A (EP&A ACT) THREATENED SPECIES ASSESSMENT

SEVEN PART TESTS

In addition to undertaking these tests, as a means of assisting in determining whether impacts are likely to be significant, the items (where relevant) in a NP&WS recommended Checklist (1996) were considered for each species assessed as a component of the seven part test format listed below. This checklist poses the following questions:

Q1 How is the proposal likely to affect the lifecycle of a threatened species and/or population which could occur on the subject land?

a) displaces or disturbs threatened species and/or populations
b) disrupts the breeding cycle
c) disturbs the dormancy period
d) disrupts roosting behaviour
e) changes foraging behaviour
f) affects migration and dispersal ability
g) disrupts pollination cycle
h) disturbs seedbanks
i) disrupts recruitment of plants
j) affects the interaction between threatened species and other species in the community
k) other matters

Q2 How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

a) disturbs any permanent, semi-permanent or ephemeral water bodies
b) degrades soil quality
c) clears or modifies native vegetation
d) introduces weeds, vermin or feral species
e) removes or disturbs key habitat features such as trees with hollows, caves and rock crevices, foraging habitat
f) affects natural revegetation and recolonisation of existing species following disturbance
g) other matters

Q3 How is the proposal likely to affect current disturbance regimes?

a) modifies the intensity and frequency of fires
b) modifies flooding flows
c) other matters

Q4 How is the proposal likely to affect habitat connectivity?

a) creates a barrier to fauna movement
b) removes remnant vegetation or wildlife corridors
c) modifies remnant vegetation or wildlife corridors
d) other matters

Q5 How is the proposal likely to affect critical habitat?

a) removes or modifies key habitat features
b) affects natural revegetation or recolonisation of existing species following disturbance
c) introduces weeds, vermin or feral species
d) generates or disposes of solid, liquid or gaseous waste
e) uses pesticides, herbicides, other chemicals
f) other matters

Assessments were undertaken for the following groups of flora and fauna in the categories listed below:

4.1 FAUNA

4.1.1 Threatened species detected - 7 part tests

4.1.2 Threatened species with a likelihood of occurrence

4.1.3 Generic seven part test

4.1.4 Fish and marine vegetation

4.1.5 Endangered Populations

4.2 FLORA

4.2.1 Threatened species, endangered populations / ecological communities detected

4.2.2 Threatened species, endangered populations / ecological communities recorded within 25 km

4.2.3 Threatened species, endangered populations / ecological communities not recorded within 25 km - but which may occur

4.1 FAUNA

4.1.1 Threatened species detected (on *Site*)

Koala *(Phascolarctos cinereus)* – Sch 2 Vulnerable

Habitat requirements: Found in eucalypt forest and woodland feeding almost entirely on the foliage of species of this genus. However there are marked local and regional preferences. Forest Red Gum, Tallowwood and Grey Gum are very important browse species. The more abundant populations tend to be linked to species growing on higher nutrient soils – such as occur in river valleys - but koalas also occur in forests on the poorer coastal soils (Strahan, R. 1995). Koalas depend on habitat which grows on fertile soils on higher quality sites (Moon 1994).

Throughout NSW koalas have been observed to feed on the leaves of approximately 70 species of eucalypt and 30 non eucalypt species (Phillips, B. 1990). However, in any one area, koalas will feed almost exclusively on a small number of preferred species. The preferred tree species vary widely on a regional and local basis (Hindell M.A. and Lee A.K. 1990). In coastal areas Tallowwood and Swamp Mahogany are important food species (Smith, M. 1992).

The koala is solitary and individuals spend most of their time in distinct home ranges, the size of which varies according to the density of the population and the abundance of mature food trees in an area. In the denser populations, these ranges overlap but they appear to be discreet at lower densities (Strahan, R. 1995). Home range size is related to density of occurrence of large trees and possibly population density of the koala, but it can vary from several hectares to 15 ha (Mitchell, P. 1990).

Habitat conservation, particularly the preservation of large tracts of habitat and the linking of isolates with habitat corridors, is now the key issue in koala conservation (Strahan, R. 1995). Distribution in NSW is determined by those preferred trees that are growing on nutrient rich soils, and the key to koala management will be to conserve it within such locations, mainly now the largely degraded or cleared valleys (Reed *et al* 1991).

Unreferenced: Optimal habitat has been found to be forest edges between plant communities where there was seasonal diversity in the available food source. Habitat is sometimes characterised by high-use trees which serve an integral role in the social and reproductive life of the colony. Such trees are identifiable by a large number of scats and the highly scratched nature of the tree – particularly characterised by a “railway line” straight up the tree.

Utilises a suite of food trees, with site specific preferences from the suite at each locality. Often primary browse species include Grey Gum and Tallowwood. Secondary browse species include Forest Red Gum, Swamp Mahogany, Ironbark, White Mahogany, Spotted Gum, Cabbage Gum, Broad leaved Paperbark, Blackbutt and Red Bloodwood. Requires an oasis of nutrient rich habitat in tracts of optimal and marginal forest.

Habitat occurrence: Lack of consolidated larger areas, lack of suitable feed tree species, lack of connectivity to other broader areas of habitat and extensive cleared areas – all preclude likely occurrence - for all but one of the identified vegetation occurrences. This area (Area I), contains habitat (identified as Potential Koala Habitat under provisions of SEPP 44). **Subsequent analysis will be confined to Area I only.**

Likelihood of species occurrence: Occurs. Scats were detected (see location in Attachment 6) in Area I. Closest most recent sighting on NPWS database is 4 km distant to south in 1998. However, adjacent neighbours (pers comm) have detected koalas over at least the past 12 years.

Seven part test:

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,

Whilst evidence of the presence of a mature koala was found, there is no evidence that a social breeding aggregate occurs. Few koalas have been seen in the general area and it is therefore likely that the scats detected were from a transient, wide ranging male. Development will not remove any vegetation. Regardless, given that only 1.8 ha of sclerophyll vegetation occurs in the vicinity, as the Area is not core habitat, it is unlikely that the vegetation contributes significantly to the food substrate for this species. Therefore undertaking the proposal will not have any impact on feed tree availability.

As this animal co-exists amongst development and human presence this development will not necessarily discourage utilisation of other nearby available habitat. No significant reduction in connectivity between probable habitat nodes is likely [see **d)** below] and Recommendations.

The increased presence of domestic dogs could be detrimental to the survival of this species. Given that dogs already occur in adjacent developments (at least four on adjacent lot), only two dwellings are proposed, and very few koalas are likely to occur – this additional impact is likely to be negligible. Recommendations provide for constraining dog movements.

Hence it can reasonably be concluded there will be no significant impact on life cycle, ie movement, breeding, food supply. Whilst this species may transiently occur, life cycle of the species should not be affected to a degree that creates a significant effect on the species' survival to the extent that a viable local population is affected in any manner. This species is known to co-exist with human development.

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

No endangered population of this species is listed as at latest date of gazettal as occurring on or near the *Site*. Although koalas are found sparsely in the locality, there is no "known" population in the vicinity. Regardless, as detailed in **(a)** above, habitat removal is very minor hence the proposal will not disrupt the viability of a population.

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

This assessment is for fauna species – see **Section 4.2** for flora assessment.

(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,

This assessment is for fauna species – see **Section 4.2** for flora assessment.

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

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

No vegetation (habitat) will be removed out of 1.8 ha of sclerophyll forest that occurs within the *Site* at this locality. Local and regional distribution of the habitat for these species whilst extensive – that remaining is being fragmented and reduced by development. Impact on connectivity of habitat is far more important and this will not be significantly affected. The lot is not the recorded location for any endangered populations at date of last gazettal.

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

The general area in the *Locality* is variously developed. The *Site* is mainly cleared and most of those components of vegetation that do occur are disparate and small. Area I is an exception. Nearby, rural residential development occurs mainly to the south, south-west and south-east, on both sides of Sancrox Road – these areas are variously forested. Area I is mainly lowlands, comprising mainly semi-cleared, small Swamp Oak regrowth. The small (1.8 ha) of sclerophyll forest adjacent the southern boundary of Lot 106 is an exception. This is where the scats were located. It is probable that koalas reach this area either along the remaining vegetation adjacent the eastern boundary of proposed Lots 142-144 (some is dry sclerophyll) and/or through the adjacent lot to the south. In this latter case the owner has at least four dogs roaming the lot -

and this could preclude use of the lot as a corridor (see Attachments 1, 2, 3 and 6). It is unlikely (but possible) that they then traverse the considerable area north containing semi-clearing/regrowth Swamp Oak to reach broader areas of suitable habitat well to the north-east.

Therefore, as a precautionary measure, it is desirable that a link be retained/improved between and within the 50 ha described above and the forested areas south of Sancrox Road (see Attachments 1, 2 and 3).

Hence, retained habitat in the *Site* will retain connections to adjacent areas of habitat.

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

No vegetation (habitat) will be removed. No fragmentation or isolation of habitat will occur. No reduction in feed or shelter trees will occur. Connective links are far more important than feed tree loss in this location and this connectivity will remain. The only disturbance within the 50 ha of adjoining Environment Protection Zone will be a single road crossing of Haydons Creek – hence this habitat will remain and will be enhanced.

Compensatory planting of favoured koala food tree species has been included in the Recommendations within the 50 ha of adjoining Environment Protection Zone that forms a corridor for koala movement in this locality. Hence there will not be any impact on the long-term survival of any species.

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

Critical habitats (as per TSC Act) are yet to be defined. No habitat will be removed on the *Site*.

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

A recovery plan has been prepared for this species. Given the negligible impact on habitat and negligible impact on connectivity between habitats – the proposal and the recommendations to minimise impacts are considered to be consistent with the plan's objectives and actions.

(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.

None of the gazetted key threatening processes would significantly impact on this species.

Whilst "clearing" is a listed process, no vegetation removal is proposed. The potential impacts of the proposal have been addressed elsewhere in the seven part test and found not to be significant. As yet a threat abatement plan for clearing has not been produced – hence any "provisions" cannot be addressed (not relevant).

Other non "key" processes are unlikely to be caused – and this species will not be significantly impacted upon by the proposal. Planned and programmed hazard reduction burning (if undertaken) by infrequent low intensity fire, is not considered to be the threatening process of "high frequency fire". Further, low intensity fire is likely to have a positive impact by prevention of intense wildfire injuries/death. Increased predation by domestic animals could also be regarded as a threatening process. There are already dogs at nearby residences – not always contained. Should this be considered an issue by Council then it can be controlled by the use of a Section 88 Instrument banning domestic pets (or containment).

Swimming pools could be a threat to koalas. Provided adequate fencing and escape means are provided this threat can be minimised. Threats by traffic should be minimal as traffic will generally be slow moving.

Conclusion: Subject to the adoption and implementation of the Recommendations, it is considered that there will be no significant impact on this species as a result of the proposal.

4.1.2 Threatened species with a likelihood of occurrence

Habitat requirements of these species have been assessed in conjunction with an assessment of the presence of such habitat, and the likely disturbance as a result of the proposal. Thereafter impact has been assessed and a determination made on whether a seven part test is required.

Note that this assessment has been confined to habitat that will be directly (and to a lesser extent, indirectly) affected by the proposal, ie the *development envelope*.

As listed in **PART B Sections 3.5 and 3.6**, the following threatened fauna have potential to occur:

Reptiles

Nil

Amphibians

Giant Barred Frog *(Mixophyes iteratus)*
Green and Golden Bell Frog *(Litoria aurea)*
Wallum Froglet *(Crinia tinnula)*
Green-thighed Frog *(Litoria brevipalmata)*

Birds

Australasian (Australian) Bittern *(Botaurus poiciloptilus)*
Black Bittern *(Ixobrychus flavicollis)*
Black-necked Stork *(Ephippiorhynchus asiaticus)*
Brown Treecreeper *(Climacteris picumnus)*
Eastern Grass Owl (*Tyto longimembris)*
Glossy Black-Cockatoo *(Calyptorhynchus lathami)*
Mangrove Honeyeater *(Lichenostomus fasciogularis)*
Marbled Frogmouth *(Podargus ocellatus)*
Masked Owl *(Tyto novaehollandiae)*
Osprey *(Pandion haliaetus)*
Painted Snipe *(Rostratula benghalensis)*
Powerful Owl *(Ninox strenua)*
Regent Honeyeater *(Xanthomyza phrygia)*
Rose-crowned Fruit-dove *(Ptilinopus regina)*
Sooty Owl *(Tyto tenebricosa)*
Square-tailed Kite *(Lophoictinia isura)*
Superb Fruit Dove *(Ptilinopus superbus)*
Swift Parrot *(Lathamus discolor)*
Terek Sandpiper *(Xenus cinerus)*
Wompoo Fruit-dove *(Ptilinopus magnificus)*
Yellow-eyed Cuckoo-shrike (*Coracina lineata)*

Mammals

Common Bent-wing Bat *(Miniopterus schreibersii)*
Common Planigale *(Planigale maculata)*
Queensland (Common) Blossom-bat *(Syconycteris australis)*
Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*
Eastern False Pipistrelle *(Falsistrellus tasmaniensis)*
Eastern Freetail-bat *(Mormopterus norfolkensis)* (also Eastern Little Mastiff Bat)
Greater Broad-nosed Bat *(Scoteanax rueppellii)*
Grey-headed Flying-fox *(Pteropus poliocephalus)*
Koala *(Phascolarctos cinereus)* – addressed under species detected.
Large-eared Pied Bat *(Chalinolobus dwyeri)*
Large-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*
Queensland Tube-nosed Bat *(Nyctimene robinsoni)*
Squirrel Glider *(Petaurus norfolcensis)*
Tiger Quoll *(Dasyurus maculatus)*
Yellow-bellied Glider *(Petaurus australis)*
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)*

Of these species, the Koala *(Phascolarctos cinereus)* has had a Seven Part test undertaken in **4.1.1** above and hence requires no further consideration.

Habitat requirements of these species have been assessed in conjunction with an assessment of the presence of such habitat on the *Site*, on adjacent lands, and the likely disturbance to this habitat as a result of the proposal. Thereafter, impact has been assessed (moreso if no possible impact) and a determination made on whether a seven part test is required.

The following species have been excluded from further consideration of undertaking a seven part test due to total lack of habitat/nil impact:

SPECIES	HABITAT REQUIREMENTS	Habitat Occurrence & Disturbance	Impact	7 Part Test Yes/No
Amphibians				
Giant Barred Frog *(Mixophyes iteratus)*	Streams adjacent forest	Does not occur	Nil	No
Wallum Froglet *(Crinia tinnula)*	Wallum marshes	Does not occur	Nil	No
Green-thighed Frog *(Litoria brevipalmata)*	Lagoons adjacent forest	Does not occur	Nil	No
Reptiles				
Nil				
Birds				
Glossy Black-Cockatoo *(Calyptorhynchus lathami)*	Obligate food substrate of Allocasuarina/large nest hollows	Does not occur	Nil	No
Mammals				
Squirrel Glider *(Petaurus norfolcensis)*	Requires forests/woodlands hollow trees for nests, and a range of food substrates	Does not occur	Nil	No
Tiger Quoll *(Dasyurus maculatus)*	Requires forests, connectivity to larger areas of habitat	Does not occur	Nil	No
Yellow-bellied Glider *(Petaurus australis)*	Requires forests, with hollows and a range of ecotones and suitable feed trees	Does not occur	Nil	No

4.1.3 Generic Seven Part Test Analysis

4.1.3.1 Species

Of the remaining species listed above, these will have a generic seven part analysis undertaken. Profiles of these species have been prepared as well as an indication of habitat presence and likelihood of occurrence. Given obvious negligible potential for most to occur, or obvious minimal impact on most species as a result of the proposed development – a generic seven part test is considered adequate to demonstrate extent of likely impact. This Test could be considered to equally apply to other excluded species. Whilst a large number of species have been considered, it is obvious that

virtually all, even if present, will not be impacted upon as a result of undertaking the proposal. Examples could include all rainforest/wet sclerophyll forest species and estuarine species.

Species are:

Reptiles

Nil

Amphibians

Green and Golden Bell Frog *(Litoria aurea)*

Birds

Australasian (Australian) Bittern *(Botaurus poiciloptilus)*
Black Bittern *(Ixobrychus flavicollis)*
Black-necked Stork *(Ephippiorhynchus asiaticus)*
Brown Treecreeper *(Climacteris picumnus)*
Eastern Grass Owl (*Tyto longimembris)*
Mangrove Honeyeater *(Lichenostomus fasciogularis)*
Marbled Frogmouth *(Podargus ocellatus)*
Masked Owl *(Tyto novaehollandiae)*
Osprey *(Pandion haliaetus)*
Painted Snipe *(Rostratula benghalensis)*
Powerful Owl *(Ninox strenua)*
Regent Honeyeater *(Xanthomyza phrygia)*
Rose-crowned Fruit-dove *(Ptilinopus regina)*
Sooty Owl *(Tyto tenebricosa)*
Square-tailed Kite *(Lophoictinia isura)*
Superb Fruit Dove *(Ptilinopus superbus)*
Swift Parrot *(Lathamus discolor)*
Terek Sandpiper *(Xenus cinerus)*
Wompoo Fruit-dove *(Ptilinopus magnificus)*
Yellow-eyed Cuckoo-shrike (*Coracina lineata)*

Mammals

Common Bent-wing Bat *(Miniopterus schreibersii)*
Common Planigale *(Planigale maculata)*
Queensland (Common) Blossom-bat *(Syconycteris australis)*
Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*
Eastern False Pipistrelle *(Falsistrellus tasmaniensis)*
Eastern Freetail-bat *(Mormopterus norfolkensis)* (also Eastern Little Mastiff Bat)
Greater Broad-nosed Bat *(Scoteanax rueppellii)*
Grey-headed Flying-fox *(Pteropus poliocephalus)*
Large-eared Pied Bat *(Chalinolobus dwyeri)*

Mammals (cont'd)

Large-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*
Queensland Tube-nosed Bat *(Nyctimene robinsoni)*
Squirrel Glider *(Petaurus norfolcensis)*
Tiger Quoll *(Dasyurus maculatus)*
Yellow-bellied Glider *(Petaurus australis)*
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)*

4.1.3.2 Species profiles

Amphibians

Green and Golden Bell Frog *(Litoria aurea)* – Schedule 1 Endangered

Habitat requirements: Individuals are generally found in permanent, clear water bodies in a range of more open vegetation types. It will inhabit cleared land. The species' strongholds are coastal swamps and heaths, shelter such as grass tussocks or rocks appears to be critical (Pyke, G.H. 1995). This frog inhabits marshes, dams and stream sides, particularly those containing emergent vegetation such as bullrushes *Typha sp.* or spikerushes *Eleocharis sp.* Optimum habitat includes waterbodies which are unshaded, free of predatory fish *Gambusia holbrooki*, have a grassy area nearby and diurnal sheltering sites available such as vegetation and/or rocks (White and Pyke, 1996).

Most of the ponds used by this species appear to have little connection with permanent waterways and have few or no exotic fish present (Australian Museum Business Services 1995). The frog is capable of utilising open and disturbed areas where regenerating vegetation or debris provide cover (Lim, L. 1995). Most current breeding localities in NSW are ephemeral pools in areas that have been recently stripped of fringing vegetation, physically disturbed and in a depauperate state (White A. W, 1995, Pyke & White, 1996).

Now known in only thirteen sites in NSW – Lake Innes NR, Hathead, Yuragir and Myall Lakes National Parks (NSW NP&WS 1999). Species has been recorded in ponds within *Melaleuca* swamp (Markwell, K. & Knight, R. 1986). Very rare.

Unreferenced: It is preferable if dams are associated with permanent swampy marshlands. Generally will only occur (invade) within the first 5-10 years of the dams presence, after which if present, the species will die out. Will not be found in streams. Frogs are semi-aquatic and are the only frogs known to bask in the sun. They can be located in suitable sunny perches around the water. Unlikely to occur in forests and are more coastal orientated.

Habitat occurrence: Possibly dams on *Site*.

Likelihood of species occurrence: Very low.

Seven Part Test: See Generic Seven Part Test under.

Birds

Australasian Bittern *(Botaurus poiciloptilus)* – Sch 2 Vulnerable

Habitat requirements: Temperate and sub tropical swamps. Large areas of dense reed, sedge beds and swamp edges and lagoons, sluggish rivers, tussocky wet paddocks and drains. Main habitat is shallow (up to 0.3 m), freshwater or brackish wetlands, vegetated with tall dense beds of reeds, sedges or rush species. Breeds in deeper water.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in Hastings River and Haydon's Creek.

Likelihood of species occurrence: High

Seven Part Test: Whilst high possibility of occurrence, within the development area there is a negligible possibility of occurrence, ie potential habitat occurs adjacent to the *Site.* Due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Black Bittern *(Ixobrychus flavicollis)* – Schedule 2 Vulnerable

Habitat requirements: Referenced: Found in forested reedy coastal wetlands, fresh rivers and estuarine inlets, < 200m elevation. Often nests in trees above water. Confined to margins of quiet watercourses flowing through coastal forests and woodlands. Freshwater sites seem preferred, especially when densely vegetated margins are present with species such as *Melaleuca* sp, *Casuarina* sp., Mangroves. Has been observed in narrow fringes of vegetation adjacent lagoons, tidal creeks and mudflats. Main food source is fish, amphibians, molluscs and insects foraging along the shallow margins of woodland watercourses. Occurs all of north coast. (Blakers *et al.,* 1984, Hancock *et al* 1984).

Habitat occurrence: None on *Site,* but does occur immediately adjacent in Hastings River and Haydon's Creek.

Likelihood of species occurrence: High.

Seven Part Test: Whilst high possibility of occurrence, within the development area there is a negligible possibility of occurrence, ie potential habitat occurs adjacent to the *Site.* Due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Black-necked Stork *(Ephippiorhynchus asiaticus)* - Schedule 1 Endangered

Habitat requirements: Referenced: At south-eastern end of its range in north-eastern NSW, but found as far south as Sydney. Occurs in tropical and warm temperate fresh or saline swamps up to 0.5 m (ie shallow) deep. Includes wetland areas such as lagoons, permanent billabongs, swamps, creeks, wet heathland, flooded fields and dams, sewage

ponds etc. Main food is fish but also eat reptiles, frogs, crabs, rodents and carrion. Requires large areas of suitable habitat to maintain one pair. Nests in a large bulky stick nest platform up to 1.8 m wide at the top of a high tree, usually in a swamp. The same nest maybe used year after year (*Complete Book of Australian Birds* 1994). Species moves in pairs and occasionally in groups up to 18 individuals. Roosts in live or dead trees in eg centre of swamp, or overhanging water. Although it may establish long term residence in a particular area it is capable of making long journeys to access suitable wetland habitat. Breeds March to June in the northern part of its distribution. (Pizzey, P & Knight ,F.1997. *Field Guide to the Birds of Australia,* Blakers *et al* 1984*).*

Habitat occurrence: None on *Site* – the small dams are unlikely to attract this species. Habitat does occur immediately adjacent in Hastings River and Haydon's Creek.

Likelihood of species occurrence: High on adjacent habitat.

Seven Part Test: Whilst high possibility of occurrence, within the development area there is a negligible possibility of occurrence, ie potential habitat occurs adjacent to the *Site.* Due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Brown Treecreeper (*Climacteris picumnus)* – Schedule 2 Vulnerable

Habitat requirements: Eucalypt woodlands and drier open forest – thus benefit from partial clearing. Forage on the ground amongst litter and logs and up tree trunks. Nest in a hollow limb or trunk in early summer. (Reader's Digest Complete Book of Australian Birds).

Habitat occurrence: Minimal.

Likelihood of species occurrence: Low.

Seven Part Test: Whilst more than a low possibility of occurrence this species will be assessed in the Generic 7 Part Test (see under).

Eastern Grass Owl *(Tyto capensis)* – Sch 2 Vulnerable

Habitat requirements: Found on coastal plain in grasslands and heath south to at least Hallidays Point. Owl roosts alone by day in squats on the ground entered by runways beneath undergrowth.

Habitat occurrence: Possibly within broad grassland swathe adjacent Haydon's Creek. This area is in Environment Protection Zone and will not be disturbed (apart from road crossing).

Likelihood of species occurrence: Moderate

Seven Part test: Whilst more than a low possibility of occurrence this species will be assessed in the Generic 7 Part Test (see under).

Mangrove Honeyeater *(Lichenostomus fasciogularis)* – Sch 2 Vulnerable

Habitat requirements: Mangroves usually along coastal estuaries, creeks and rivers. Favour areas that have flower sources nearby eg gardens. Occurs south to Port Macquarie. Found in many estuaries northwards.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in Hastings River and Haydon's Creek.

Likelihood of species occurrence: High.

Seven Part Test: Whilst high possibility of occurrence, within the development area there is a negligible possibility of occurrence, ie potential habitat occurs adjacent to the *Site.* Due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Marbled Frogmouth *(Podargus ocellatus)* – Sch 2 Vulnerable

Habitat requirements: Rainforest and adjacent dense wet sclerophyll forest. South to Manning.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in small area of rainforest within Environment Protection Zone

Likelihood of species occurrence: Low.

Seven Part Test: Whilst a low possibility of occurrence, this is on potential habitat adjacent to the *Site*, and due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Masked Owl *(Tyto novaehollandiae)* – Sch 2 Vulnerable

Habitat requirements:

Known to be the most sparsely distributed owl (Debus 1994). Usually keep to heavily forested country (Readers Digest 1993). Inhabitant of forest, woodland and partly cleared areas (Debus 1993). Birds are often seen in disturbed areas. Species is significantly associated with sites having high densities of old hollow trees and a sparse/grassy understorey (Kavanagh and Bamkin 1995). Considered a species of forest margins (Debus and Rose 1994). It also lives in isolated stands of trees in agricultural land (Hollands 1991). Owls not recorded in forest at a successional stage of less than 60 years (Davey 1993). Distances of 1, 5 and 10 km between breeding pairs have been observed (Garnett 1992). Have home range of 500-1000 hectares per pair, covering forested and partly open country (NPWS 2000). As exploits disturbed environments, may be less vulnerable in coastal forests (Debus and Rose 1994).

Often hunt along forest edges including road sides (NPWS 2000). Hunts prey close to the ground, over open country (Debus 1993). Takes larger prey: mainly small terrestrial mammals up to the size of a rabbit, and to a lesser degree arboreal prey such as possums and medium sized birds (Readers Digest 1993). Rats feature prominently in their diet - indicator species (Hyem, 1979).

Roost and breed primarily in moist open forest particularly in the gullies. Favour large roomy vertical hollows for nesting, with depth varying from 0.4 m to 5 m (Hyem, 1979). Roosts in the same places: big hollows in trees, crevices in cliffs and even caves, but rarely heavy foliage like the *Ninox Owls* (Readers Digest 1993). Nest sites used in successive years and therefore remain in the same territory (Readers Digest 1993). Birds maintain separate roost sites (Debus 1993).

Unreferenced. Occupy a range of environments from tall wet eucalypt forests to dry woodland, often - but not always, at the ecotone with cleared land, in fragmented forest - pastoral country usually near creeklines, and in open grassy woodlands. Has been known to occur in rainforest. Prefers open, flatter forests with an understorey and shrub component. Nests and roosts by day in large vertical hollows (35-50 cm dia and 1-5+ m deep) in large old trees usually in or near gullies. They also roost by day in the dense foliage of Lilly Pilly and other rainforest species. Does not appear to have the strong relationship with drainage lines as do Sooty and Powerful Owls.

Habitat occurrence: Forested areas could be minute component of the large home range of this species. However, due to the large open spaces that separate potential habitat areas this could detract from possible occurrence. No hollows of consequence for nesting occur. Prey likely to be minimal.

Likelihood of species occurrence: Low.

Seven Part Test: See generic Generic 7 Part Test under.

Osprey *(Pandion haliaetus)* – Sch 2 Vulnerable

Habitat requirements: Referenced: Associated with coastal and estuarine habitats and lake shores. Require expanses of water with tall trees and perches for feeding bases. Require availability of sufficient suitable mature fish – up to about 30 cm. Prefers open and swamp forest. Nests high in mainly dead trees in open forests next (ie within 1 km) to waterways, or on cliff faces between April and November. Require nest material closeby eg Melaleuca sticks. Confined to isolated occurrences along coastline, eg Stewarts River, Harrington, Forster, Manning (Blakers *et al* 1984, Clancy 1991).

Habitat occurrence: Location of *Site* makes general area suitable. Whilst no nests were observed it is possible they could occur well within areas not proposed for any disturbance. No dead trees of suitable branching structure for nests observed – however these are in decline and alternate live trees could be used. Perching sites for fishing would be in adjacent Reserve.

Likelihood of species occurrence: High. Not detected. Closest record in NPWS database is 3 km south-west.

Seven Part Test: See Generic 7 Part Test under.

Painted Snipe *(Rostratula benghalensis)* – Sch 2 Vulnerable

Habitat requirements: Swampy vegetation bordering tropical and warm temperate freshwater wetlands. Mudflats and mangroves. Require shallow water for breeding. Roosts in dense vegetation by day. Isolated occurrences eg Hunter, Yuragir.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in Hastings River and Haydon's Creek.

Likelihood of species occurrence: High.

Seven Part Test: Whilst high possibility of occurrence, within the development area there is a negligible possibility of occurrence, ie potential habitat occurs adjacent to the *Site.* Due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Powerful Owl *(Ninox strenua)* – Sch 2 Vulnerable

Habitat requirements: This species occurs in rainforest (Schodde & Mason 1980) and in wet and dry eucalypt forest utilising unlogged or lightly logged forest as well as undisturbed forest (Davey, S M 1993). This owl is considered a habitat generalist, occupying a wide range of tree species communities (Kavanagh 1991). They are characteristically found in densely forested gullies (or threads of rainforest) on coastal slopes (Lindsey 1992).

Large trees with large hollows at least 0.5 m deep are required for nesting (Schodde & Mason 1980). These trees tend to be live eucalypts which are typically the largest and oldest in the vicinity and usually in tall, open forest (Debus & Chafer 1994). These trees are often at the head of a gully or on the face of a hill (Fleay 1968). They roost during the day in tall trees (require a horizontal branch) which give them a commanding view of their surroundings. Each pair has a number of roosting trees and the birds roost on different trees on different days, not always together but always within calling distance (Readers Digest 1993).

Diet consists mainly of small to medium sized arboreal mammals especially the Greater Glider and Common Ringtail Possum (80-90% of prey). Also eats Sugar Gliders and young Brushtail Possums. Other prey includes rats, birds and young rabbits (Readers Digest 1993) and flying foxes (Schodde and Mason 1980). Kavanagh (1988) believes that the owls concentrate on patches of forest where higher population densities of the prey occur.

Unreferenced: This species nests in large hollows (35-50 cm internal dia and 1-3 m deep) inside large, old eucalypt trees usually in or near gullies, at least 12 m from the ground. Hollow mouth usually has a pronounced lower lip. They roost by day among the foliage of stands of Sheoaks, Lilly Pilly, Coachwood, Blackwood, or in tall eucalypts and turpentines. The species prefers unlogged forests for daytime roosting sites.

Preferred habitat is densely forested gullies or slopes – on the flatter coastal plains (but not restricted to this habitat). Home range of a pair may be 1000-3000 hectares, governed by population density of prey, ie unlikely to occur within 5 km of another pair.

Habitat occurrence: Unlikely habitat due to lack of dense forest and absence of suitable hollows for nesting. Prey would also be minimal. Forested areas could be minute component of the large home range of this species. However, due to the large open spaces that separate potential habitat areas this could detract from possible occurrence. Prey likely to be minimal on *Site.*

Likelihood of species occurrence: Low. Closest record on NPWS database is 6 km distant.

Seven Part Test: See generic seven part test under.

Regent Honeyeater *(Xanthomyza phrygia)* – Sch 1 Endangered

Habitat requirements: Referenced: Mainly inhabits tableland areas, however individuals appear on the coast, primarily in winter. Found in upper canopy of mature trees in eucalypt woodland and open dry forest, including forest edges, woodland remnants on farmland and urban areas with mature eucalypts. Also utilises gallery forests of *Allocasuarina cunninghamiana*. Prefers to forage on large-flowered eucalypts (*E robusta, sideroxylon, planchoniana, camaludensis*) and mistletoe flowers. Other food substrates include fruit and arthropods. Found sparsely - Upper Hunter, vagrants at Coffs Harbour. Most found westwards.(Blakers *et al 1984,* Officer, 1965).

Habitat occurrence: Minimal.

Likelihood of species occurrence: Low.

Seven Part Test: Whilst more than a low possibility of occurrence this species will be assessed in the generic seven part test (see under).

Rose-crowned Fruit-dove *(Ptilinopus regina)* – Sch 2 Vulnerable

Habitat requirements: Occurs in sub tropical and warm temperate rainforest and associated moist open forests. Also found in dry and littoral rainforest. Forage on a range of rainforest and exotic fruits. Known to occur in mangrove and melaleuca forests.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in small area of rainforest within Environment Protection Zone

Likelihood of species occurrence: Low.

Seven Part Test: Whilst a low possibility of occurrence, this is on potential habitat adjacent to the *Site*, and due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the generic seven part test (see under).

Sooty Owl *(Tyto tenebricosa)* – Sch 2 Vulnerable

Habitat requirements: Found on coastal forests where rainforest makes up a significant component of the understorey or overstorey. Is a specialist inhabitant of rainforest and tall, wet, eucalypt forests - but rainforest is not essential. Nests and roosts in large hollows inside large old trees usually in or near gullies. Require large entry hole with lower extended lip to land on. Also roosts by day amongst the darkest, densest foliage of Lilly Pilly and other rainforest species, Casuarinas, Blackwood, Turpentine, Coachwood and Callicoma. Diet comprises Ringtail Possums, Greater Glider, Antechinus, Bush Rats, Sugar Gliders and Bandicoots - hence home range can include regrowth forest.

Habitat occurrence: Possible habitat but small area and narrow disposition may preclude occurrence. Due to the large open spaces that separate potential habitat areas this could detract from possible occurrence. No hollows for nesting occur. Prey likely to be minimal on *Site.*

Likelihood of species occurrence: Low. Closest record on NPWS database is 9 km distant.

Seven Part Test: See generic seven part test under.

Square-tailed Kite *(Lophoictinia isura)* – Sch 2 Vulnerable

Habitat requirements: Inhabits open and swamp forest and heathland adjacent to the coastline or estuaries. Prefers open forests and woodlands particularly large wooded watercourses. Common features of habitat is profuse eucalypt/angophora blossom and attendant insectivorous birds. Commonly nests in Angophora woodland/forests with associated box/ironbarks flats along moist valleys. Has a home range up to fifty square kilometres. Widespread from coast to tablelands

Habitat occurrence: Barely suitable for nesting. Possibility though – no nests observed of this species.

Likelihood of species occurrence: Low. Closest record on NPWS database is 3 km distant.

Seven Part Test: See generic seven part test under.

Superb Fruit-dove *(Ptilinopus superbus)* – Sch 2 Vulnerable

Habitat requirements: Rainforest and adjacent moist open forest. Occasionally mangroves, moist forest margins and isolated feeding trees. Isolated distribution - Taree and Barrington Tops, Newcastle.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in small area of rainforest within Environment Protection Zone

Likelihood of species occurrence: Low.

Seven Part Test: Whilst a low possibility of occurrence, this is on potential habitat adjacent to the *Site*, and due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the generic seven part test (see under).

Swift Parrot *(Lathamus discolor)* – Sch 2 Vulnerable

Habitat requirements: Inhabits eucalypt forests and woodlands, also found in plantations, gardens and city streets and has been known to feed in green grasslands. Nomadic feeder on nectar, pollen and lerps. Also known to eat fruit and seeds of native plants and forages on the nectar of winter flowering eucalypts, preferring Red Ironbark, White Box and Yellow Gum. Require hollow branches for nesting. Scattered sightings along coast eg Gloucester, North Haven, Myall Lakes and Yuragir. Known to occur for specific limited periods on the coast – particularly in Forest Red Gum.

Habitat occurrence: Minimal.

Likelihood of species occurrence: Low.

Seven Part Test: Whilst more than a low possibility of occurrence this species will be assessed in the generic seven part test (see under).

Terek Sandpiper *(Xenus cinereus)* – Sch 2 Vulnerable

Habitat requirements: Occurs on coast, frequenting flat expanses of tidal muds along shore and estuaries and around mangroves. Visits to rock pools, coral reefs and muddy shores of brackish lakes close inland are rarer. Roosts on mangroves or on banks with other waders at high tide. In breeding grounds keep to marshes in the forest, nesting on the banks of slow rivers and marshy lake shores overgrown with shrubs and sedges. Rare to be found other than northern Australia in the summer months.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in Hastings River and Haydon's Creek.

Likelihood of species occurrence: High.

Seven Part Test: Whilst high possibility of occurrence, within the development area there is a negligible possibility of occurrence, ie potential habitat occurs adjacent to the *Site.* Due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the Generic 7 Part Test (see under).

Wompoo Fruit-dove *(Ptilinopus magnificus)* – Sch 2 Vulnerable

Habitat requirements: Occurs in Rainforests and associated moist open forests. Feeds on fleshy rainforest fruits such as figs, white cedar, rose maple, lilly pilly, native ivy, wild lime and seeds of Cabbage Tree Palm. Nests in low rainforest bushes, vines or trees. Can be found in adjacent eucalypt forests. Relatively common northwards. Breeding populations south to Taree.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in small area of rainforest within Environment Protection Zone

Likelihood of species occurrence: Low.

Seven Part Test: Whilst a low possibility of occurrence, this is on potential habitat adjacent to the *Site*, and due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the generic seven part test (see under).

Yellow-eyed Cuckoo-shrike (*Coracina lineata)*

Habitat requirements: Occurs in Rainforests and associated moist open forests. Feeds on fleshy rainforest fruits such as figs, white cedar, rose maple, lilly pilly, native ivy, wild lime and seeds of Cabbage Tree Palm. Nests in low rainforest bushes, vines or trees. Can be found in adjacent eucalypt forests.

Habitat occurrence: None on *Site,* but does occur immediately adjacent in small area of rainforest within Environment Protection Zone

Likelihood of species occurrence: Low

Seven Part Test: Whilst a low possibility of occurrence, this is on potential habitat adjacent to the *Site*, and due to the total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed in the generic seven part test (see under).

Mammals

Mega and micro Bats; including:

Common Bent-wing Bat - *(Miniopterus shreibersii)* Sch 2 Vulnerable
Common (Queensland) Blossom-bat *(Syconycteris australis)* – Sch 2 Vulnerable
Eastern Bent-wing Bat *(Miniopterus schreibersii)* – Sch 2 Vulnerable
Eastern Freetail-bat *(Mormopterus norfolkensis)* – Sch 2 Vulnerable
Greater Broad-nosed Bat *(Scoteanax rueppellii)* – Sch 2 Vulnerable
Grey-headed Flying Fox *(Pteropus poliocephalus)* – Sch 2 Vulnerable
Large-eared Pied Bat *(Chalinolobus dwyeri)* – Sch 2 Vulnerable
Large-footed Myotis *(Myotis adversus)* – Sch 2 Vulnerable
Little Bent-wing Bat *(Miniopterus australis)* - Sch 2 Vulnerable
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)* - Sch 2 Vulnerable

Habitat Requirements: Wide range of habitat utilised. Critical features include roost and nest sites – tree hollows, buildings, caves and rock overhangs. Other species require expanse of water, rainforest and streams.

Range of requirements from rainforest and moist hardwood to dry sclerophyll. Include coastal forests and heaths. Bats are insectivorous – above and below canopy.

Some require roosts in caves or mines, drains, disused tunnels or houses - several thousand bats can occur. Others roost in tree hollows (Strahan, R 1995). Large distances are often travelled between different roosts.

Creeks and small rivers are favourite corridors for catching prey and for some species the open nature of eucalypt woodlands and forests appears to suit its direct flight pattern, and in the more cluttered environments of the wetter forests appear to be overcome by making use of natural and man made openings in the forest. (Hoy, G A & Richards G C 1995).

Habitat occurrence (for all bat species listed above): Minimal within areas proposed for development. Lack of trees with decorticating bark would likely preclude use of the *Site* for roosting for the micro bats. Adjacent areas and larger vegetated areas of *Site* where no disturbance is proposed could be habitat for a range of micro bat species.

Likelihood of species occurrence (for all bat species listed above): Low to moderate.

Seven part test (for all bat species listed above): See generic seven part test.

Common Planigale *(Planigale maculata)* – Sch 2 Vulnerable

Habitat requirements: Occupies a wide variety of habitats, rainforest, sclerophyll forests, grasslands, wet and dry heath, swampy and open forest, marshlands and rocky areas. Found most commonly near swampy areas containing trees, scrub, sedges and grass. In these habitats they shelter under logs and rocks and in available burrows. Ecological requirements are not well known. A predator of insects and small prey. Home range is shifting and between 500-2000 square metres. Little known about occurrence - very few captured. Occurs along coast and ranges.

Habitat occurrence: Occurs in the wetland component of the *Site* – environment protection zone. Does not occur where development will take place.

Likelihood of species occurrence: Moderate but not in the *development envelopes.*

Seven Part Test: See Generic seven part test under.

Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)* - Sch 2 Vulnerable

Habitat requirements: Uses runways in thick sedges and grasses in wet heathland. However, occurs in open forest country where it uses Bladey Grass or tussocks as runways. Requires dry grassy areas for nesting. Moist habitat particularly associated with heath is optimum habitat. Optimum habitat is regenerating vegetation after fire. Occurs at very low densities, from coast to ranges.

Habitat occurrence: Occurs in the wetland component of the *Site* – environment protection zone. Does not occur where development will take place.

Likelihood of species occurrence: Moderate but not in the *development envelopes.*

Seven Part Test: See Generic seven part test under.

Tiger Quoll (Spotted-tailed) (*Dasyurus maculatus)* – Sch 2 Vulnerable

Habitat requirements:

Referenced: Found in a range of forested habitats including open forest and woodland. Also found in rainforest. Prefers tall, open sclerophyll forest, denser forest, rainforest and coastal woodlands with a number of understoreys. Adapted to an arboreal existence and requires hollows, hollow logs, rock crevices or caves for nesting or breeding. A solitary animal requiring possibly 500-1000 ha of home range with a preference for large unfragmented forest. Numbers and occurrence could be reduced by predators, eg dogs and foxes. Are agile climbers for hunting arboreal mammals. Needs and feeds on a wide range of medium sized arboreal and terrestrial animals. Low densities, numerous sightings in many areas. Occurs from coast to ranges (Edgar 1991).

Habitat occurrence: Could be a component of large home range. Lack of cover (logs, rocks etc) may preclude all but transient presence.

Likelihood of species occurrence: Low.

Seven part test: See generic seven part test.

Squirrel Glider *(Petaurus norfolcensis)* – Sch 2 Vulnerable

Habitat requirements: Found in woodland and dry and moist open sclerophyll forest. Occurs in low densities (where occur can be up to 3 per ha), broad distribution from coast to ranges. Feeds on predominantly nectar as well as insects, acacia gum, sap of certain eucalypts, pollen, Acacia gum and the green seeds of Golden Wattle – especially in winter months when insect numbers are low (Strahan, R. 1995). Although mostly rare, the species appears locally to be common (Suckling, G.C. 1995).

In coastal NSW it lives in small groups that occupy home ranges of 2-4 ha, at population densities of 0.9 to 1.5 individuals per ha (Quin, D. G. 1993) and family groups of between 2 and 10 (Suckling, G.C. 1995). Later, Quin (1995) states home ranges can be 0.65 ha to 8.55 ha, they can glide for 50 m and night movements are estimated to be 300 m to 500 m (equivalent to a range of 30 ha). The habitat of Squirrel Gliders is stated to be restricted to specific late-successional forest or older multi-aged stands (Davey, S. M. 1984).

In addition to the availability of trees with suitable hollows for nest and den sites (smooth-barked eucalypts are preferred as these form hollows more readily than rough-barked eucalypts and support a greater diversity of invertebrates), critical habitat for this species is likely to be in areas where winter-flowering Banksias or gum producing Acacias are common. During winter when other food resources are scarce the Glider may obtain its energy from the winter flowers of coastal Banksia, Red Ironbark, River Red Gum, Grey Ironbark, Spotted Gum, Forest Red Gum and in some

areas Blackbutt. Xanthorrhoea and mature Acacias may also provide a valuable food source (Quin, D. G. 1995).

The glider is an ecological specialist requiring abundant hollow-bearing trees and a mix of eucalypts, Acacias and Banksias. Within a suitable vegetation community at least one flora species should flower heavily in winter and one or more of the eucalypts should be smooth-barked (Menkhorst *et al*., 1988; Quin, D. G. 1993). The Squirrel Glider forages at all levels in the forest strata to obtain its diet of plant exudates and arthropods (Bennett *et al*, 1991).

The species also uses hollows in tree stumps left after timber harvesting and hollows formed at the rotting base of trees regrown from coppice stumps (Traill, B.J. and Coates, T.D. 1993). It is a species requiring old growth forest for nesting (Scotts, D. 1991).

Excessive site disturbance and feral carnivores would reduce likely occurrence in some areas (Menkhorst *et al*., 1988)

Unreferenced: However is found in coastal habitats including swamp mahogany forests. Ranges up to 30 ha have been found.

Habitat occurrence: Habitat is not suitable - minimal numbers of trees with hollows occur (two). Forest is moreso a mature to immature regrowth forest. Other than eucalypts no significant foraging substrates occur (no Banksia).

Likelihood of species occurrence: Low potential to occur, low to negligible potential to depend on lot for food substrate or nesting.

Seven part test: See generic seven part test.

Yellow-bellied Glider *(Petaurus Australis)* – Sch 2 Vulnerable

Habitat requirements: Occurs in a wide range of eucalypt forests but most frequently in dry sclerophyll forests with a xeric understorey. Tends to prefer moister gully areas but is common on the ecotone between dry and wet sclerophyll forests. More common on the coastal forests, less in the highlands. Requires hollows in trees as dens with smooth barked trees preferred. Habitat is characterised by a mosaic of tree species associations, including those which flower in winter and those with smooth-barked eucalypts that shed bark in long strips. A variety of mainly smooth-barked eucalypts such as *E. maculata,E. propinqua, E. signata, E. tereticornis, E. viminalis, E. saligna and E. grandis* and rough-barked species such as *E. fastigata, E. gummifera, E. obliqua* are incised to obtain sap. Diet also consists of invertebrates, nectar, pollen, manna and insect exudates. Gliders concentrate their foraging efforts on ephemeral food resources, particularly those obtained from under loose shedding bark and flowering eucalypts. Home range in the order of 30-65 hectares and require 10 sap site trees in this range. Very low abundance, in coastal and sub coastal areas. Up to 1000 locations known.

Critical habitat is characterised by a mosaic of tree species associations.

Known to be capable of using highly disturbed forested habitat in urban areas.

Habitat occurrence: Habitat is not suitable - minimal numbers of trees with hollows occur (two). Forest is moreso an immature to mature regrowth forest. Moist forest ecotone is very narrow. Other than eucalypts no significant foraging substrates. Species prefers a mosaic of tree species normally adjacent moister gully environments.

Likelihood of species occurrence: Low potential to occur, low to negligible potential to depend on the lot for food substrate or nesting.

Seven part test: See generic seven part test.

4.1.3.3 Generic Seven Part Test

Whilst the species list analysed is relatively extensive, given; the negligible disturbance to habitat within the *Site;* retention of the likely main habitat areas virtually undisturbed within the Environment Protection Zone; and the very low likelihood of occurrence of many of these species; the mobility of many species; and obvious minimal (if any) impact on most species - an all inclusive Generic 7 Part Test for all these species is considered adequate. This test could equally apply to other excluded species.

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,

Whilst some species may transiently occur, life cycle of these species can either be protected, or impact will be so minimal (if at all), so that a viable local population is not placed at the risk of extinction. Many of these species are known to co-exist with human development.

The proposal will not remove vegetation other than introduced grasses and weeds. No cumulative impact will occur.

The principal estuarine habitat and rainforest areas will be retained undisturbed.

The two habitat trees (trees with small hollows) will be retained. As frequency is very low, these trees will not necessarily provide habitat for many species.

Very few (if any) logs and other ground cover occur, and generally these will be retained. Although non-threatened species occur and others could occur (and are prey for some threatened species), they are expected to be minimal and it is not considered that the proposal will impact significantly on such species.

No specialised food substrates will be affected.

Therefore, this minor impact on habitat availability or food substrates would not be significant over the broad area of habitat in the area - as this area has been retained and protected as an Environment Protection Zone.

Links with proximate habitat will be maintained by the retained vegetation (and enrichment planting recommended). Further, lack of direct connectivity is not so significant to those species capable of flight (and to a lesser degree to gliders).

Hence it can reasonably be concluded there will be no significant impact on life cycle, ie movement, breeding, food supply – these should not be affected to a degree that creates a significant effect on any species' survival to the extent that a viable local population is affected in any manner.

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:

None of the endangered populations gazetted as at latest date of gazettal occur on the *Site*. There is no "known" population in the vicinity. Regardless, as detailed in (a) above, habitat removal is not proposed - hence the proposal will not disrupt the viability of a population.

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
This assessment is for fauna species – see **Section 4.2** for flora assessment.

(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,
This assessment is for fauna species – see **Section 4.2** for flora assessment.

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

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

No vegetation (habitat) will be removed other than introduced grasses and weeds. The lot is not the recorded location for any endangered populations as at date of last gazettal.

(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

Habitat removal will not occur - hence proposal will not further fragment habitat nor isolate habitat from other areas of habitat. Loss of habitat is less critical for the many more mobile species capable of flight.

Hence, habitat in the Site will not become more fragmented than currently occurs.

(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,

No habitat will be removed. Development will be on the fringes of larger existing areas of habitat within adjacent cleared pasture. Hence minimal impact will result. No areas of critical habitat value for any species will be removed. Hence there will not be any impact on the long-term survival of any species.

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

Critical habitats (as per TSC Act) are yet to be defined.

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

Whilst draft and final recovery plans have been prepared for some species, given the minor impact on habitat and negligible impact on connectivity between habitats – the proposal and the recommendations to minimise impacts are likely to be consistent with the objectives and actions of these plans.

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

None of the gazetted key threatening processes would impact on these species. No defined "clearing" will occur. As yet a threat abatement plan for clearing has not been produced. Predation by the European Red Fox is listed as a key threatening process that could impact on some species. Development of the *Site* is likely to deter fox predation. Other non "key" processes are unlikely to be caused – and these species will not be significantly impacted upon by the proposal. Planned and programmed hazard reduction burning (if undertaken) by the use of infrequent low intensity fire, is not considered to be the threatening process of "high frequency fire". Further, low intensity fire is likely to have a positive impact by prevention of intense wildfire injuries/death.

Conclusion: Subject to the adoption and implementation of the Recommendations, it is considered that there will be no significant impact on these species as a result of the proposal.

4.1.4 Fish and marine vegetation

The Fisheries Management Act 1994, has provisions similar to the TSC Act in that in Part 7A, threatened species of fish and marine vegetation, endangered populations

and ecological communities and key threatening processes have been declared and listed. *Section 5C* of the EP&A Act provides for an assessment as is undertaken for other species under the provisions of *Section 5A*.

There were no specific aquatic surveys undertaken. Whilst there are watercourses on and adjacent the *Site,* eg Hastings River and Haydon's Creek, no disturbance to these will occur. Where the road crosses the upper reaches of Haydon's Creek, the watercourse is ephemeral in nature – a broad grassed drainage swathe. Based on the following considerations, it was concluded that neither declared fish nor marine vegetation could occur in or immediately adjacent to where development is proposed - and therefore the proposal could not possibly have an impact on potentially occurring threatened aquatic fauna.

These considerations are :

- none of the species, populations or critical habitat listed in the Act as threatened are likely to occur in the aquatic habitats on the site that may be disturbed, ie minor drainage lines. No disturbance will occur in areas where species may occur.
- all development is limited to cleared areas.
- mitigation measures would be required as a component of construction approval to minimise movement of sediment and nutrients from the *Site*

Therefore it can reasonably be concluded that as neither fish nor marine vegetation occur (or would occur immediately downstream), there can not be any impact on species, populations or critical habitat of fish nor marine vegetation as listed in the Act.

Therefore a seven part test is not required.

4.2 FLORA

4.2.1 Threatened species, endangered populations/ ecological communities detected

Two endangered ecological communities occur. These are located fully within the Environment Protection Zone. A significant proportion of the *Site* consists of vegetation listed as "*Swamp Oak Floodplain Forest of the NSW North Coast*.". Additionally, a small occurrence of "*Coastal Lowlands Rainforest"* occurs.

Even though there will not be any significant disturbance to these communities (one road crossing through introduced pasture), as a precaution a seven part test has been undertaken for these endangered ecological communities, as follows:

Seven part test:

a) The proposal will not remove any significant part of these communities. These communities exclusively occur within areas not proposed for disturbance (although a road crossing will be located within the *Swamp Floodplain* – no vegetation removal

required). Therefore the proposal is not likely to disrupt the life cycle of the component species nor have a significant impact on the long term viability of the communities.

To ensure minimal, if any impact, Council will need to consider the Recommendations and impose appropriate conditions (see Recommendations).

b) An endangered population does not occur although a "local" population occurs. Regardless, as detailed in a) above the impact of the proposal will not be to a degree that is likely to disrupt the viability of the population.

c) No component of the endangered communities will be removed by the proposal.

d) As no disturbance to these communities will occur, the proposal will not have any effect on connectivity (seed distribution and cross fertilisation) between this and other occurrences.

e) Critical habitats (as per TSC Act) are yet to be defined. In this case no critical habitats have been defined which could incorporate these Communities. Critical habitats are likely to be moreso related to fauna habitats. Protection in this case has been achieved by listing as an endangered community.

f) Insufficient information is available to determine whether these ecological Communities are "adequately" represented in conservation reserves or other similar protected areas in the region. It is most unlikely as lands upon which such communities are found occur on the floodplain – virtually all being freehold lands. Given that areas of these Communities are obviously limited in occurrence it is unlikely that adequate representation occurs in conservation reserves. Regardless, the proposal will not reduce the extent of occurrence.

g) Clearing is a key gazetted threatening process. However, these communities will not be directly or indirectly disturbed. No other threatening process will affect the communities, eg no hazard reduction burning has been prescribed.

Conclusion:

Subject to adoption of appropriate consent conditions, the impact of the proposal is not considered significant on these endangered ecological communities and a Species Impact Statement is not required.

4.2.2 Threatened species, endangered populations/ ecological communities recorded within 25 km

A review of possible TSC Act Schedule 1 & 2 species, endangered populations and endangered ecological communities which could occur on or in the vicinity of the study area was undertaken - see **2.4** above.

Many of the species listed would not occur in such a site as they have specific niches that do not occur. Further, all species occurring that belong to threatened species families have been identified (and most of other species). As most species occur in populations rather than single plants – it is most unlikely that any species, if present, was not detected. Whilst some species may occur in the Swamp Oak wetland forest/rainforest/riparian vegetation - there will be no impact as these areas will not be disturbed (minor disturbance for road crossing passes through pasture).

Hence none of the species, populations or ecological communities listed as threatened in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 No 101 (up to and including latest amendments occur or are likely to occur.

Seven part test: Not required.

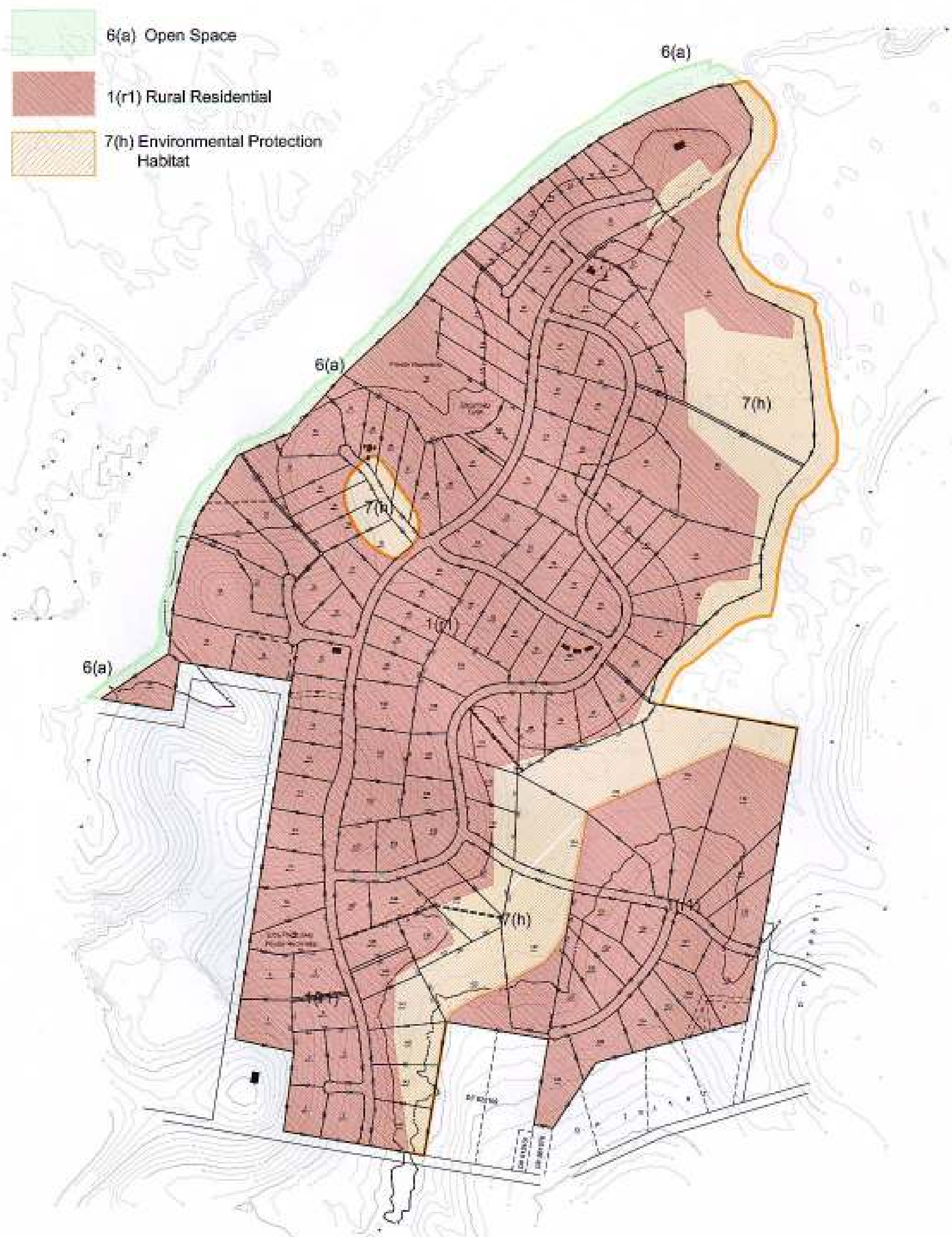
4.2.3 Threatened species, endangered populations/ ecological communities not recorded within 25 km - but which may occur

None expected.

Seven part test: Not required

ATTACHMENT 10 (NEW)

REZONING MAP



HOPKINS CONSULTANTS

PROPOSED LOT LAYOUT & ZONES
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SANCROX

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