ADDENDUM

to

ECOLOGICAL ASSESSMENT

dated 9 February 2004

for

Proposed Rezoning, Subsequent Subdivision and Dwelling Construction

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

26 May 2004

Prepared by BRIAN SALTER
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1. 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.

It has been recently advised that some amendments to the proposal analysed are to occur.

Accordingly, it is necessary to revisit the ecological assessments undertaken to ensure the conclusions and recommendations still apply to the modified proposal.

2. The Proposal

The additional proposal now includes the following:

- proposed Lot 106 has now been split into two to create another dwelling entitlement. The additional lot will be referred to as proposed Lot 106-1. This additional development envelope can only be located in the south-eastern corner of the proposed Lot (due to flood level constraints). This will now result in the additional removal of about 0.5 ha of dry sclerophyll forest to provide for a building envelope, bushfire protection, access and other infrastructure. Full vegetation removal may not be required in the bushfire protection zone – only that necessary to meet the specifications prescribed in the Bushfire Risk Assessment Report dated 9 th February 2004.

- some of the battleaxe accesses have become roads

- proposed Lots 41-47 have been made smaller and the road that was to be removed now stays

- an access has been created connecting two of the cul-de-sacs

- some lot layouts have been modified, eg proposed Lots 108-122

The attached revised subdivision Plan shows these modifications.

3. Impact Assessment

The previous ecological assessments have been reviewed, namely SEPP 44 – Koala Habitat Protection, Section 5A EP&A Act – Threatened Species, Section 79C EP&A Act – Impact on natural environment and Environment Protection and Biodiversity Conservation Act.

The previous assessment largely determined that there would not be a significant impact on flora nor on fauna as a result of undertaking the proposal.

The only additional vegetation that will be affected by the modifications is that within proposed Lot 106-1 (part Area I in 9th February Report). This will result in the removal of removal of about 0.5 ha of mainly dry sclerophyll forest immediately adjacent that proposed for the dwelling envelope on proposed Lot 106. The principal habitat features of vegetation in and near the dwelling envelope are as follows:

First, evidence of koala usage was found in the dry sclerophyll component of this proposed lot. As only minimal additional numbers of potential feed trees will be lost as a result of the modified proposal, there should not be any impact on food substrate availability for this species. However, the dry sclerophyll forest is only found over a minimal area in this locality, and any feed tree loss is therefore undesirable. Previous Recommendations provided for some planting of feed trees outside the envelope to ameliorate this impact. Provided this planting is undertaken, then the minor additional feed tree loss as a result of an additional dwelling impact should have minimal impact.

Second, proposed Lot 106-1 is a component of a recommended koala corridor. Review indicates that additional vegetation removal over a small area in the south-eastern corner of that lot will not impact on the integrity of the proposed corridor to any significant extent. The corridor will mainly be within vegetation adjacent proposed Lots 105-103 (as the adjoining lot to the east is mostly cleared/has roaming dogs).

Third, the mature dry sclerophyll forest in this locality has two identified habitat trees that will be retained. These are to the north of the development envelope initially intended on proposed Lot 106. Hence an additional envelope immediately adjacent to the west will not impact on the viability of these habitat trees.

4. Conclusion and recommendations

As a result of this review it has been concluded that all previous conclusions and recommendations in the 9 February 2004 Report are still applicable in relation to the revised proposal. Additional recommendations are not required.

Prepared by

Brian SALTER

26 May 2004

Encl: Revised Plan of Development.


RIVER
HASTINGS
RESERVATION
HAYDONS
CREEK
RESERVATION
CREEK
RESERVATION
HAYDONS
FERREY STREET
ROAD
BEND
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10b~1
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LE CLOS VERDUN ESTATE
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H.A. Marken Surveyors 0265 811888

ECOLOGICAL ASSESSMENT

for

Proposed Rezoning, Subsequent Subdivision and Dwelling Construction

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

9 February 2004

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ABBREVIATIONS AND SYMBOLS

AKF – Australian koala foundation

dbhob – diameter breast height over bark

DP – Deposited Plan

E. – *Eucalyptus*

EIS – Environmental Impact Statement

EP&A Act – Environment Planning & Assessment Act

EP&BC Act – Environment Protection and Biodiversity Conservation Act

[ES] – Listed species in Environment Protection and Biodiversity Conservation Act

FIS – Fauna Impact Statement

ha – hectare

[IS] - Introduced species

KPoM – Koala Plan of Management

LGA – Local Government Area

m asl – metres above sea level

NP&WS – National Parks & Wildlife Service

NVC Act – Native Vegetation Conservation Act

[PS] - Protected species – Sch 13 NP&W Act

RCCP – relative crown cover projection

ROTAP – Rare or Threatened Australian Plants

SEPP – State Environment Planning Policy

SFNSW – State Forests of NSW

SIS – Species Impact Statement

[TS] - Threatened species – TSC Act (1995)

TPO – Tree Preservation Order

TSC Act – Threatened Species Conservation Act

Ecological Assessment

for

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9 February 2004

SUMMARY

This Report addresses the ecological requirements of both a proposed rezoning and the legislative requirements of a Development Application for subsequent subdivision - ie SEPP 44 Assessment (Koala Habitat), Section 5A EP&A Act Assessment (Impact on Threatened Species), Section 79C EP&A Act Assessment (Impact on the Natural Environment – flora and fauna) and the Commonwealth's Environment Protection and Biodiversity Conservation Act Assessment.

The lots proposed for subdivision include Lots 1-80, 83, 84, 86-88 (DP 791199) and Lots 90-95 (DP 805549). Area is 186 ha. These lots comprise a failed joint residential/vineyard project known as Le Clos Verdun Estate. This Estate included a number of split lots comprising residential lots of about 1500 sq m as well as an allocated area of vineyard (within the Estate but not necessarily adjacent). Of the 80 available residential lots, residences have been constructed only on three lots. Maintenance of vines has ceased and these are being removed.

Approval is to be sought for the abandonment of the present Rural zoned layout with replacement by a revised Rural Residential layout over the full Estate. Subsequently, development consent will be sought to subdivide the area into 122 consolidated lots of increased size. Some areas will be non residential and will be held in Community Title. Over time, construction of 119 dwellings, minor roads and other services will occur.

This assessment will address the potential ecological impacts of undertaking the proposal (rezoning and subdivision).

Where development will occur, the *Site* consists mainly of cleared land – either as abandoned vineyards and/or fully cleared dwelling lots and roads. Remnants of vegetation occur over a total of 61 ha – most in a consolidated area of 47 ha. These remnants contain a mix of eucalypt regrowth, Swamp Oak/Forest, and a small area of lowland rainforest. The *Site* also adjoins a crown Reserve that also has elements of lowland rainforest, as well as mangrove shrubland adjacent the Hastings River and Haydons Creek. Significantly, these lowland rainforest occurrences are an endangered ecological community under the provisions of the TSC Act.

Development will only remove about 2 ha of the vegetation on the *Site* located in five disparate areas - with no disturbance to the lowland rainforest that occurs either on or adjacent the *Site*. Some of the vegetated areas on the Site provide connectivity between habitat nodes both on the Site and external to the *Site*.

The regrowth eucalypt overstorey and Swamp Oak required to be removed has minimal ecological value as habitat value for threatened fauna – however it is utilised by a range of non threatened birds for perching, nesting and resting during transient visits.

Given the nature of the *Site*, the minimal area to be disturbed and its obvious minimal habitat value for threatened fauna - only limited fauna surveys were deemed as necessary. Full identification of flora present was undertaken. Regardless, observations and full analysis of potential species occurrence has been undertaken to determine the likely presence of threatened flora and fauna and the possible impact of the proposal on any species present or likely to be present. Additionally, potential impact on other native flora and fauna generally has also been assessed. An indicator of the presence of one threatened fauna species was detected and few other species have potential to occur – any are likely to be transient and not dependent on the *Site*. No threatened flora species were detected – nor are any likely to occur.

In relation to these assessments, detailed Eight Part Test analysis determined that the Proposal will not have a significant impact on any potentially occurring threatened flora or fauna species nor their habitats (subject to adoption of Recommendations).

The Section 79C Assessment determined that the proposal should not have a significant impact on flora, fauna and biodiversity. However, some loss of biodiversity occurs with any vegetation removal.

An Environment Protection and Biodiversity Conservation Act Assessment determined that there would not be a significant impact on any matter of national environmental significance.

Essentially, the main considerations that governed the determinations above were that the vegetation that may be removed; is minor in extent; does not have a significant habitat value; no significant loss in connectivity between habitats will occur (subject to adoption of the Recommendations); and finally, of the fauna species that may occur, none are considered to be significantly dependent on the vegetation/habitat that may be removed.

Accordingly, these considerations should not prevent development consent being granted for this proposal.

However, to ensure that a significant impact on potentially occurring threatened species does not occur, and impact on biodiversity is minimised, to the extent possible a precautionary approach has been adopted. Recommendations have been suggested as requirements for inclusion in any development consent granted.

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INTRODUCTION

1 GENERAL

This Report has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act 1979 and Regulation, the Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act.

The author of this Report and field assessor was Brian Salter, aided by a technical assistant. As a professional forestry and ecology consultant with 37 years experience, I consider my credentials as an environmental scientist are more than adequate to undertake ecological assessments including SEPP 44, Section 5A, 79 (C) and the Commonwealth Environment Protection and Biodiversity Conservation Act Assessments - a task which I have undertaken many times previously (see CV – Attachment 9).

This Report has been prepared to address the ecological requirements of an application for a revised rural residential subdivision design of a previously approved rural subdivision. This will require rezoning from the current Rural Zone to Rural Residential.

As elaborated later, within the areas proposed for development, the lots are mostly cleared and have minimal ecological values nor areas warranting conservation. For this and a range of other reasons, it is a reasonable assumption that on ecological grounds both rezoning and subdivision will proceed. With these conclusions in mind, this Report has been prepared to address the ecological requirements of both rezoning and subsequent subdivision. Whilst flora and fauna studies/reports for rezoning proposals have no specific format, the subdivision requirements of SEPP 44, Section 5A and Section 79C Assessments have specified legislative requirements. It is considered that the rezoning requirements are adequately addressed by the ecological investigations required to undertake the SEPP 44, Section 5A and Section 79C Assessments. Should any rezoning approval significantly vary the Concept Plan analysed, it may be necessary to revisit these Assessments to ensure impact has been fully assessed. Therefore presenting this Report in this manner meets both rezoning and subsequent subdivision flora and fauna assessment requirements.

To the extent possible these Assessments were undertaken in an objective manner based on a concept proposal provided by the client. With such a large and complex proposal, some minor variations to the Concept are likely to evolve prior to lodgement of the Application. Given the nature of the *Site*, such variations are unlikely to significantly alter the conclusions or Recommendations of this Report. Major revisions though may require reassessment of this Report to ensure relevance (see Recommendations).

To reach some of the conclusions required, it is necessary that "judgements" and "reasoned logic" be applied - due to the limitations of available data. Availability of data is obviously governed by both time and cost of surveys. Additionally, literature providing general wildlife research undertaken and available results for use as references and to support judgements/conclusions is inadequate in many aspects. Various references and bibliography were used in the preparation of, and as background to, this Report (see Attachment 8 – this list includes some references not necessarily used in these specific assessments).

Information presented in this Report is not intended to necessarily support the Proposal and opinions are as objective as possible.

The Report addresses requirements of:

- SEPP No 44 (Koala Habitat Protection) Assessment – PART A.
- Section 5A (EP&A Act) Threatened Species Assessment – PART B.
- Section 79C (EP&A Act) Requirements – PART C.
- Environment Protection and Biodiversity Conservation Act Assessment – PART D.

Recommendations are in PART E and Attachments in PART F.

Prepared by: ..... (BRIAN SALTER)

Date: 9 February 2004

2 LOCATION AND DESCRIPTION OF THE AREA

The area investigated is located at Sancrox, west of Port Macquarie and east of Wauchope. This area studied is known as Le Clos Verdun Estate - a failed joint residential/vineyard project. This Estate included a number of split lots comprising residential lots of 1500 sq m as well as an allocated area of vineyard (within the Estate – not necessarily adjacent), and a number of other lots. Access roads are mostly constructed, with the principal access being via Le Clos Verdun Road. To date, of the 80 available residential lots, residences have been constructed on only 3 lots. Maintenance of vines has ceased and these are being removed.

The *Site* includes Lots 1-80, 83, 84, 86-88 (DP 791199) and Lots 90-95 (DP 805549). Area is 186 ha. Henceforth the area encompassed by the proposal will be referred to as the *Site.* Areas external to the *Site* will be referred to as the *Locality*. See Attachments 1, 2 and 3.

The boundaries of the *Site* were identified from a 1:5000 Air Photo and Ortho Map, a Concept Plan, and advice from the project manager.

That component of the *Site* to be developed is essentially cleared land – either as abandoned vineyards and/or fully cleared dwelling lots and roads. Three dwellings and an office/machinery shed occur. Prior to vineyard establishment, most of the area would have been pasture. Remnants now only include a small patch of remnant lowland rainforest; several small patches of regrowth dry sclerophyll forest on the ridgeline; as well as a large central area of Swamp/sclerophyll Forest (mainly regrowth and/or disturbed). Three dams occur. Attachments 3 and 4 depict the extent and nature of vegetation occurrence.

Topography is generally gentle over most of the *Site*. Topography falls from a relatively level central north to south main ridge and from side ridges, on slopes of up to 5° to the alluvial flats adjacent the river. Altitude is from 5 m asl to about 20 m asl.

Drainage is either direct to the Hastings River or to Haydons Creek and then to the Hastings River. Haydons Creek is tidal for 1.5 km from the Hastings River.

The general area in the *Locality* is variously developed. The *Site* adjoins a narrow strip of riparian remnant forest that is within a 30 m wide Crown Reserve adjacent the Hastings River for 1300 m and adjacent Haydons Creek for 2200 m. This Reserve contains the narrow fringe of riparian vegetation as well as cleared adjacent land. Rural residential development occurs mainly to the south, south-west and south-east, on both sides of Sancrox Road – these areas are variously forested. Some undeveloped forested lands occur to the west and north-east. The latter are mainly lowlands - unlikely to be disturbed, whilst the western vegetation is dry sclerophyll forest that could be developed over time (see Attachments 1, 2 and 3).

Hence only a small part of the *Site* (disturbed/undisturbed Swamp Forest/Swamp Oak component of about 50 ha) - most not proposed for further disturbance, could be considered as a part of an identifiable, significant habitat node. Generally, the vegetated areas on the *Site* do not provide connectivity between the disparate minor habitat areas within, or any nodes adjoining the *Site*. However, it is desirable that a link be retained/improved between the 50 ha described above (that also adjoins about 250 ha of forested vegetation to the north-east), and the forested areas south of Sancrox Road (see Attachments 1, 2 and 3).

3 PROPOSED DEVELOPMENT AND POTENTIAL IMPACTS

A representative of the proponents has provided a draft Concept Plan of the proposed development (see Attachments 2 and 3).

An application for rezoning is to be lodged to vary zoning from Rural to Rural Residential. Subsequently, a development application is to be lodged for approval to abandon the present vineyards and rural subdivision layout and replace it with a revised layout that includes 122 consolidated rural residential lots of an increased size (0.8-1 ha). Several areas will be non residential and will be held in Community Title. In addition, roads will be repaired, additional roads constructed, possible provision of facilities including a tennis court, squash court, picnic areas, community hall, public jetty and boat ramp. Eventually, over time, construction of 119 dwellings could occur with concurrent evaporation transpiration (or similar system disposal of sewage).

These Assessments will consider impact of this proposal on the *Site* (as well as potential impact on adjacent land/vegetation – particularly the riparian vegetation). The extent of vegetation removal to undertake this proposal is relatively minor, and will include:

- removal of existing grapevines and removal of some planted Conifer hedges adjacent existing roads.
- possible removal of a minor area and quantity of regrowth Swamp Oak and Melaleucas for road construction within the Road Reserve to gain access to proposed lots 106 and 108-122. In terms of area this is negligible.
- possible removal of up to 0.5 ha of young Swamp Oak regrowth on proposed Lots 103-105 to provide an adequate bushfire protection buffer.
- removal of about 0.5 ha of dry sclerophyll forest on proposed Lot 106 to provide a building envelope, bushfire protection, access and other infrastructure.
- removal of up to 0.9 ha of young mainly scattered acacia regrowth (most actually cleared) on proposed Lot 107 to provide a building envelope, bushfire protection, access and other infrastructure.

- possible very minor removal of components of dry sclerophyll regrowth overstorey trees to provide building envelopes for proposed lots 12-14, 23-25, 31, 32, 53, 83 and 84.
- very minor vegetation removal (if any) for the construction of a boat ramp/jetty (potential DA at a later date).

In summary, vegetation removal will be required over five disparate areas, and will include removal of vegetation up to about 2 ha. Minor additional vegetation removal may prove necessary – however provided this additional disturbance is not within the vegetation deemed to be of either high conservation or habitat value (see later), such additional removal can be considered as within the scope of these assessments.

Attachments 2 and 3 depict the proposal.

For the purpose of impact assessment, the possible potential impacts of the proposal on threatened fauna and on threatened flora can be broadly grouped as:

Potential direct impacts

- harm or remove individuals and/or communities of fauna and flora
- loss of habitat including loss of roosting/nesting sites and foraging substrates
- reduction in biodiversity, including management of ecological communities and their habitats and incremental loss of habitat

Potential indirect impacts

- on individuals of fauna by fragmentation of habitat and loss of connectivity
- on individuals and populations by increasing stress levels to unacceptable levels
- impact of human presence eg noise, light, domestic pets, increased weeds, impact on adjacent sensitive, high conservation value vegetation, eg riparian vegetation
- building impacts including run-off, sewerage etc that may impact on adjacent lands eg adjacent riparian areas
- increased predation by feral animals
- removal of connection corridors and remnant vegetation
- impact on soil erosion and water quality
- low intensity repetitive hazard reduction burning impacts

These potential impacts on fauna and flora will be considered in the Eight Part Test analyses undertaken.

PART A
SEPP 44 (KOALA HABITAT) ASSESSMENT

1 LEGISLATIVE REQUIREMENTS

The *Site* was investigated and assessed several times in January 2004.

The purpose of inspection was to determine the presence or otherwise of "Potential Koala Habitat" as defined in SEPP No 44. Additionally, if "Potential Koala Habitat", then determine whether "Core Koala Habitat" exists. Further, if "Core Koala Habitat" exists, then consider preparation of a Plan of Management.

"Potential Koala Habitat" means "areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component".

"Core Koala Habitat" means "an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population".

2 DETERMINATION OF "POTENTIAL KOALA HABITAT"

2.1 Methodology and analysis

2.1.1 Methodology

Within the proposed development envelopes on the *Site*, vegetative cover is principally abandoned grapevines and cleared pasture. Whilst areas of other vegetation occur, some are isolated remnants, and most will be undisturbed by the proposal. The amounts and location of vegetation disturbance possible are listed in **Introduction 3.** above.

Of the 11 identified vegetation occurrences (defined as Areas A-L) on and immediately adjacent the *Site* - see **Part B Section 2.2** below, only one Area (Area I); is likely to be disturbed and; contains habitat and; is not isolated from other nearby suitable habitat, and; in conjunction with adjacent areas has a reasonable area of habitat present (see Attachments 4 and 6). The other Areas will not be considered further in this assessment - but potential impact of the proposal on koalas (as well as other species) will be considered in the Section 5A Assessment undertaken (see **Part B** below). Reference Circular B 35 Department of Planning 22 March 1995, inter alia, states that surveys are to concentrate on areas proposed for disturbance.

Area I is mainly proposed Lot 106 (and some minor areas on other lots) with an area of 47 ha. Of this only up to 0.5 ha will require clearing and or modification for development and this will likely be located against cleared adjacent lots in the south-east corner of proposed Lot 106.

To determine whether Area I is Potential Koala Habitat (as per provisions of SEPP 44), within Area I, two transects were established and a full tree count of trees >10 cm dia was undertaken 20 m each side of the transect (see Attachment 6 for location). These were established over the 1.8 ha dry sclerophyll forested component that occurs on the southern end of proposed Lot 106 in the vicinity of where the vegetation removal for development will occur. Note that to the north (in the remainder of Area I), until further sclerophyll forest is reached in the north-east corner of Area I (and not proposed to be disturbed) only very disturbed, partially cleared Swamp Oak regrowth occurs (no koala feed tree species). Hence assessment was limited to the southern section only.

The following table provides results of these tree counts.

Transect 1 (210 m)

SPECIES		OVERSTOREY		UNDERSTOREY	
Botanical Name	**Common Name**	**No**	**%**	**No**	**%**
**E. microcorys*	Tallowwood	6	11	1	3
** E. tereticornis*	Forest Red Gum	1	2	1	3
** E propinqua*	Grey Gum	1	2	2	6
**E. robusta*	Swamp Mahogany	-	-	-	-
E. carnea	White Mahogany	-	-	-	-
E. globoidea	White Stringybark	38	70	12	33
E. pilularis	Blackbutt	-	-	-	-
C. gummifera	Red Bloodwood	6	11	7	19
Syncarpia glomulifera	Turpentine	2	4	8	22
Melaleuca quinqenervia	Broad-leaved Paperbark	-	-	5	14
TOTAL		**54**	**100**	**36**	**100**
* Schedule 2 species		8	15	4	12
Potential koala habitat			**Yes**		**No**

Transect 2 (130 m)

SPECIES		OVERSTOREY		UNDERSTOREY	
Botanical Name	**Common Name**	**No**	**%**	**No**	**%**
**E. microcorys*	Tallowwood	-	-	-	-
** E. tereticornis*	Forest Red Gum	-	-	-	-
** E propinqua*	Grey Gum	-	-	-	-
**E. robusta*	Swamp Mahogany	4	15	1	4
E. carnea	White Mahogany	5	18	5	20
E. globoidea	White Stringybark	6	22	4	16
E. pilularis	Blackbutt	2	7	1	4
C. gummifera	Red Bloodwood	5	19	5	20
Syncarpia glomulifera	Turpentine	5	19	8	32
Melaleuca quinqenervia	Broad-leaved Paperbark	-	-	1	4
TOTAL		**27**	**100**	**25**	**100**
* Schedule 2 species		4	15	1	4
Potential koala habitat			**Yes**		**No**

2.1.2 Analysis of results

Both transects had an overstorey component of Schedule 2 feed tree species of 15%. Understorey was less than 15%.

2.2 Conclusion

It was concluded that in accordance with the provisions of SEPP 44, the forest cover in Area I is "Potential Koala Habitat" as defined by SEPP 44, ie Schedule 2 species content at least 15%. As development may impact on the vegetation, it is therefore necessary to determine whether this vegetation is "Core Koala Habitat".

3 DETERMINATION OF "CORE KOALA HABITAT"

Further investigations were undertaken to determine the likelihood of the *Site* being "Core Koala Habitat". SEPP 44 specifies "Core habitat" to be:

- "an area of land with a resident population of koalas"
- "attributes such as breeding females (that is, females with young)"
- "recent sightings of and historical records of a population"

3.1 Factors determining core habitat

The following matters were considered in determining whether Core Habitat occurs.

3.1.1 Tree species – number

Whilst Schedule 2 primary browsing overstorey tree species occur, they are just at the threshold of determination as Potential Koala Habitat. Additionally, on the Area (in the locality of the development envelope) they only occur over a small (1.8 ha) area. Other trees known as shelter trees, eg Paperbark are also low in number.

Given this, on this factor alone the vegetation is not desirable koala habitat.

3.1.2 Presence of koalas

The possible presence of koalas has been determined as follows:

- *Site* observations:

  Surveys were limited to daylight observations, with surveys for koalas or evidence of koalas including search for high use trees during assessment of vegetation, together with specific koala usage (scat search) and additional observations associated with other ecological investigations by two persons.

  These observations included all trees within the dry sclerophyll occurrence on the southern portion of the Area. No other surveys, eg spotlight, broadcast calls were considered necessary. No koalas were sighted nor heard.

- Anecdotal Evidence: The proponent was interviewed to ascertain possible sightings (unrecorded in databases) of koalas. He has not sighted nor heard a koala.

  However, a neighbour immediately adjacent and to the south of proposed Lot 106 has sighted an estimated six koalas over the past 12 years, and has heard that an adjacent neighbour to the east once found an ill young koala. On this basis koalas could be expected to occur sparsely in the area.

- NP&WS Wildlife Data Base: The closest detection in recent years was 4 km south in 1998.

- Other Studies/records: The draft Hastings KPoM (not adopted by Council) indicates no close records (NP&WS, Community, SFNSW).

- Scats: Thorough searches by two persons beneath all feed tree species (and shelter tree species) within the transect area were undertaken. Scats were located within the western 100 m of Transect 1. In all, 19 relatively recent scats were found beneath five trees (three Tallowwoods and two Paperbarks). These scats were mainly from a mature koala – although some immature scats were detected. Location is shown on Attachment 6. This indicates certain presence of a koala(s).

- Scratches: Although a dubious indicator, there were no scratches which could be definitely attributed to koalas on the trees observed (most rough barked).

3.1.3 Site nutrient levels

Koalas prefer feed trees growing in high nutrient level areas. Species indicative of higher site quality, eg *E. grandis* do not occur. However, soils are generally deep on this low lying area. Studies indicate that often koalas do not utilise favoured feed tree species if growing in low nutrient sites (reference Vanessa Standing's Report for Kempsey Shire). This conclusion would equally apply to Hastings LGA.

Therefore, on this basis the *Site* could not be expected to be favoured by koalas.

3.1.4 Vegetation disposition

The general area in the *Locality* is variously developed. Whilst 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 – however, 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 in Area I (most is proposed 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 on the eastern boundary of proposed Lots 103-105 (some is dry sclerophyll) and/or through the adjacent lot to the east. In this case the owner has at least four dogs roaming the lot - and this could preclude use of that lot as a corridor (see Attachments 3 and 6). It is unlikely (but possible) that they then traverse the considerable area to the north of clearing/regrowth Swamp Oak, to reach broader areas of suitable habitat well to the north-east (or come from that direction).

Therefore, it is desirable that a link be retained/improved between the 50 ha described above and the forested areas south of Sancrox Road (see Attachments 1, 2, 3 and 6).

The question of connectivity is further addressed below in Part B (Eight Part Test for koala) and Part C (Section 79 C) assessment.

3.1.5 High use studies

Determination of the presence of high use (or core) koala habitat areas using NP&WS/SFNSW protocols - based on presence/count of scats and/or a mother and joey was not undertaken due to the very small (1.8 ha) of potential habitat present. Accordingly, no high use areas (SFNSW methodology) were located. Generally the SFNSW form of survey is more appropriate for larger areas. Further, there were no railway track "runway" trees observed which indicate high use.

AKF methodology (AKF 1995) of determining tree species that are "primary browse trees", or activity levels to determine whether the area contains a "socially stable breeding aggregate", were in the main satisfied by the amended methodology. Given the extensive searches for scats and the results, an activity level $\geq$ 30% (for "plots" – if had been established) may occur. This indicates that the area is likely to contain home range trees and/or an area of major activity currently being used by koalas with well defined home range areas.

Therefore it could reasonably be concluded that on this *Site,* Tallowwood is a primary browse tree species. However, there was inconclusive evidence that the area of potential habitat (1.8 ha) contains a "socially stable breeding aggregate".

3.2 Discussion and conclusion

Based on these considerations it can be concluded that koalas do occur on the *Site* (Area I only – and likely only a small part of that Area) and limited evidence (some small scats/previous detection of a young koala on an adjacent lot) exists that a breeding population exists. Koalas have home ranges of varying extent. It is natural that males require a home range that overlaps that of breeding females, ie a larger range. Hence the scattered trees over the 1.8 ha could be a component of the core habitat of a dispersed population that may interact at breeding time.

For reasons elaborated elsewhere it is not considered that removal of trees on proposed Lot 106 over about 0.5 ha in the south-east corner of the lot will impact on the connectivity to other areas of habitat. Recommendations provide for permanent protection of a corridor linking to the south.

Based on these considerations, whilst it is reasonable to conclude that koalas do occur in this immediate locality, there is insufficient evidence of occurrence of the factors defining core habitat occurring. These are:

- "an area of land with a resident population of koalas" – whilst scats were detected during current surveys, past records are sparse in the locality. Therefore, it is a reasonable conclusion that a resident population does not occur.

- "attributes such as breeding females (that is, females with young)" – no strong evidence exists that breeding females occur (or have previously occurred) on the *Site* (ie small part of Area I).

- "recent sightings of and historical records of a population" – none detected during current surveys. No record of past presence of a population on the *Site* (ie small part of Area I).

As a consequence of the above review the subject site is not considered to be "Core Koala Habitat", and according to the provisions of SEPP 44, a Koala Management Plan is not required.

4 RECOMMENDATIONS

Recommendations are in PART E. Whilst a KPoM is not proposed, the Recommendations include likely conclusions that would eventuate from undertaking preparation of a KPoM.

Hence Rezoning is not prevented, nor is Council prevented by the provisions of SEPP No 44 from granting consent to this development application for residential development (subject to consideration and adoption of the Recommendations). Nor is it considered a Section 91 Licence is required from the NP&WS nor imposition of a Section 88 Instrument.

5 ATTACHMENTS

See Part F attached at the end of the entire Report.

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

1 LEGISLATIVE REQUIREMENTS

It is necessary that an assessment be undertaken in accordance with Section 5A of the EP&A Act, specifically to determine if the proposed development has a significant effect on threatened species, populations or ecological communities or their habitats.

In respect to the Threatened Species Conservation Act (1995), Section 5A of the EP&A Act sets out the factors to be considered in deciding whether there is likely to be a significant effect on threatened species etc, and hence if a Species Impact Statement is required. The requirements of the test are set out in Attachment No 7.

The test is also referred to in Section 79C of the EP&A Act.

2 FLORA

2.1 Survey methodology

Flora surveys and observations of the *Site* were undertaken by B J Salter and a technical assistant on several occasions in January 2004.

Inspection indicated that the component of the *Site* to be developed is essentially cleared land – either as abandoned vineyards and/or fully cleared dwelling lots, roads and three dwellings. Prior to establishment of the Estate, most of the area would have been pasture. Remnants now only include a small patch of remnant lowland rainforest; several small patches of regrowth dry sclerophyll forest on the main ridgeline; as well as a large central area of Swamp/sclerophyll Forest (mainly regrowth and/or disturbed). It is noted that a narrow strip of riparian remnant forest adjacent the Hastings River and Haydons Creek is within a 30 m Crown Reserve and this Reserve is outside the *Site*. Regardless, as this latter vegetation occurrence is of significant conservation and floristic value, and is immediately adjacent the proposed development (and therefore potentially subject to indirect impacts), the vegetation will be included in this study. Attachments 3, 4 and 5 depict the extent and nature of vegetation occurrence.

Floristic composition and habitat components of each of the vegetation occurrences were then verified and further identified by numerous random observations over the vegetation occurrences (regardless of likelihood of disturbance), with virtually all flora species occurring being identified. An exception was Area I – where survey concentrated only on sections where disturbance was proposed.

Targeted surveys for a list of possibly occurring threatened flora species were undertaken (see Sections **2.4** and **2.5** below), concentrating on areas where presence was most likely (as well as likely disturbance).

2.2 Survey results

The *Site* (186 ha) contains the following vegetation (see Attachments 4 and 5):

Area A – About 7.3 ha of a 30 m wide Crown Reserve comprising a narrow (about 15 m wide - 4.8 ha) strip of remnant riparian forest adjoining the Hastings River and Haydons Creek. This area also includes cleared pasture but contains elements of the original coastal lowlands rainforest which occurred on the alluvial flats adjacent the river. The fringe of mangroves that occur on the waters edge have also been included in this Community. **Whilst this Reserve is outside the *Site*, it has been included due to its high conservation, floristic values and closeness to the *Site, ie potential for impact.*** This vegetation is considered to be largely Lowlands Rainforest – an endangered ecological community listed under the TSC Act. Such vegetation is of very high conservation value due to the minimal area remaining. In addition this vegetation serves an important role in maintaining stability of the riverbanks. Whilst mangroves as a species are not protected, removal of vegetation in such locations is governed by a range of consent mechanisms and legislation. Value to fauna is considerable – for nesting, perching and as a food source (many fruiting species occur).

Area B – About 0.7 ha comprising a remnant patch of coastal lowland rainforest. This vegetation is considered to be Lowlands Rainforest – an endangered ecological community under the TSC Act. Such vegetation is of very high conservation value due to the minimal area remaining. Value to fauna is considerable – for nesting, perching and as a food source (some fruiting species occur).

Area C – About 0.75 ha comprising remnant dry sclerophyll eucalypt trees, mostly mature to over-mature. No understorey, shrub nor groundcover occurs. Two dead trees occur – only one has one small hollow low to the ground. Some trees are becoming senescent and wind damaged due to exposure. Allocation of a Community title is not warranted, nor practicable – this is dry sclerophyll forest.

Area D – About 7.7 ha comprising an almost pure stand of Swamp Oak. This area would be mostly tidal and whilst some is regrowth, most is a mature stand that has had little past disturbance. Considered to be a Swamp Oak Community.

Area E – About 0.1 ha comprising a narrow strip of vegetation adjacent a dam. Allocation of a Community title is not warranted, nor practicable.

Area F – About 1.5 ha comprising an almost pure stand of regrowth sclerophyll forest, mainly Blackbutt regrowth to 30 m height, 40 cm dbhob. Allocation of a Community title is not warranted, nor practicable – this is dry sclerophyll forest.

Area G – Only several insignificant individuals of riparian vegetation comprising the minimal vegetation that will require removal for a potential boat ramp and jetty. This is a component of the riparian Coastal Lowlands Rainforest Community (see above in Area A).

Area H – About 2.25 ha comprising an almost pure stand of regrowth sclerophyll forest. This stand is sparse and scattered and is dominated by Blackbutt to 30 m height 20 cm dbhob. Scattered trees extend beyond the 2.25 ha. Allocation of a Community title is not warranted, nor practicable – this is dry sclerophyll forest.

Area I – About 47 ha comprising a mix of cleared, semi-cleared highly disturbed regrowth Swamp Oak, and some less disturbed Swamp Oak with associated moist sclerophyll forest (Flooded Gum). A small area of remnant mature dry sclerophyll forest (1.6 ha) occurs in the southern section. No Community Title is appropriate for the disturbed components. The balance is considered to be a Swamp Oak Community grading into Swamp Forest/Dry Sclerophyll Forest where an eucalypt overstorey occurs.

Area J – Up to about 0.9757 ha comprising scattered young regrowth (Acacias, Flooded Gum to 6 m mainly) amongst areas of clearing. This is a small lot in the extreme south-western corner. Allocation of a Community title is not warranted, nor practicable.

Area K – About 0.3 ha comprising the component of a Road Reserve to be used to provide access to proposed Lots 108-122. This Area is mainly cleared and has minor occurrences of Swamp Oak, *Melaleuca linariifolia and stypheloides.*

Area L - About 125 ha comprising the balance of the area. This "cleared" area contains abandoned grape vines, cleared dwelling lots, three dwellings, dams, roads and vacant (pasture) areas. The grapevines are progressively being removed and eventually will be fully cleared with natural pasture established.

In summary, about 61 ha of vegetation occurs in 10 disparate areas - most of this (47 ha) is in one consolidated area. The balance (125 ha) is cleared land. A further 7.3 ha of vegetation immediately adjacent has been included for impact analysis.

Species occurring in these Areas are:

Overstorey

BOTANICAL NAME	COMMON NAME	AREA											
		A	B	C	D	E	F	G	H	I	J	K	L
Alphitonia excelsa	Red Ash		✓										
Backhousia	Shatterwood	✓											
Cassine australis	Red Olive Plum		✓										
Casuarina glauca	Swamp Oak				✓						✓		
Corymbia gummifera	Red Bloodwood	✓		✓							✓		
Cupaniopsis parvifolia	No common name	✓											
Diospyros australis	Black Plum	✓											
Elaeocarpus obovatus	Hard Quondong	✓	✓										
Elaeocarpus reticulatus	Blueberry Ash	✓											
E. globoidea	White Stringybark										✓		
E. grandis	Flooded Gum										✓		
E. microcorys	Tallowwood			✓					✓		✓		
E. resinifera	Red Mahogany										✓		
E. robusta	Swamp Mahogany										✓		
E. siderophloia	Grey Ironbark	✓		✓			✓		✓				
E. pilularis	Blackbutt						✓		✓				
E. propinqua	Small-fruited Grey Gum	✓		✓			✓						
E. robusta	Swamp Mahogany				✓								
E. tereticornis	Forest Red Gum				✓					✓	✓		
E. umbra	A broad-leaved White			✓									
Hibiscus splendens	A Hibiscus	✓											
Jagera pseudorhus	Foambark Tree	✓											
[IS]*Ligustrum lucidum*	Large-leaved Privet	✓											
Lophostemon confertus	Brushbox	✓											
Mallotus philippensis	Red Kamala	✓											
Schizomeria ovata	Crabapple		✓										
Scolopia braunii	Flintwood	✓											
Syncarpia glomulifera	Turpentine			✓							✓		
	A Mistletoe	✓											

Understorey

BOTANICAL NAME	COMMON NAME	AREA											
		A	B	C	D	E	F	G	H	I	J	K	L
Acacia floribunda	White Sally									✓	✓		
Acacia maidenii	Maiden's Wattle	✓	✓			✓							
Allocasuarina littoralis	Black Sheoak										✓		
Callistemon salignus	Willow Bottlebrush				✓						✓	✓	
Casuarina glauca	Swamp Oak	✓				✓				✓	✓	✓	
[IS]*Cinnamomum*	Camphor Laurel	✓	✓										
Melaleuca linariifolia	No common name				✓							✓	
Melaleuca styphelioides	Prickly-leaved Paperbark				✓						✓	✓	

Shrubs

BOTANICAL NAME	COMMON NAME	AREA											
		A	B	C	D	E	F	G	H	I	J	K	L
Acacia floribunda	White Sally	✓											
Acacia longifolia	Sydney Golden Wattle	✓											
Acacia longissima	No common name	✓									✓		
Acacia myrtifolia	Red-stemmed Wattle										✓		
Aegiceras corniculatum	River Mangrove	✓											
Backhousia myrtifolia	Grey Myrtle, Ironwood		✓										
Breynia oblongifolia	Coffee Bush	✓	✓								✓		
Bursaria spinosa	Blackthorn	✓	✓		✓						✓		
Banksia spinulosa var. collina	No common name									✓			
[IS]*Citrus limonia*	Rough Lemon, Rangpur Lime	✓											
Commersonia fraseri	Brush Kurrajong	✓	✓										
Daviesia nova-anglica	A Bitter Pea										✓		
Daviesia ulicifolia	Gorse Bitter Pea										✓		
Dendrophthoe vitellina	No common name	✓											
Duboisia myoporoides	Corkwood	✓											
Glochidion ferdinandi	Cheese Tree										✓		
[IS]*Lantana camara*	Lantana	✓	✓								✓		
Leucopogon juniperinus	Prickly Beard Heath										✓		
Leptospermum brachyandrum	No common name	✓											
Leptospermum polygalifolium	A Tea Tree										✓	✓	
Maclura cochinchinensis	Cockspur Thorn	✓	✓										
Melaleuca linariifolia	No common name	✓										✓	
Melaleuca quinquenervia	Broad-leaved Paperbark										✓		
Notelaea longifolia	Large Mock-olive	✓	✓								✓		
[IS]*Ochna serrulata*	No common name	✓											
Ozothamnus diosmifolius	White Dogwood									✓	✓		✓
Persoonia lanceolata	No common name										✓		
Pittosporum revolutum	Pittosporum	✓											
Pittosporum undulatum	Pittosporum	✓									✓		
Polyscias sambucifolia	Elderberry Panax										✓		
Pratia purpurascens	Whiteroot		✓										
Pultenaea villosa	An Egg and Bacon Pea										✓		
[IS]*Solanum mauritianum*	Wild Tobacco Bush	✓	✓	✓							✓		
	Wild Bush Lemon	✓											

Groundcover

BOTANICAL NAME	COMMON NAME	AREA											
		A	B	C	D	E	F	G	H	I	J	K	L
[IS]*Ageratina adenophora*	Crofton Weed									✓			
[IS]*Ageratum houstonianum forma houstonianum*	A weed												✓
Austrosteenisia blackii	Blood Vine	✓											
[IS]*Bidens pilosa*	Cobblers Pegs	✓	✓	✓							✓		
Blechnum cartilagineum	Gristle Fern	✓											
Cayratia clematidea	Slender Grape	✓											
Cissus hypoglauca	Giant Water Vine	✓											
Gahnia aspera	Saw-sedge										✓		
Geitonoplesium cymosum	Scrambling Lily										✓		
Hardenbergia violacea	FireVine										✓		
[IS]*Hypochaeris radicata*	Catsear				✓								✓
Imperata cylindrica	Blady Grass										✓		
Juncus usitatus	No common name			✓							✓		✓
Lomandra longifolia	Spiny-headed Mat Rush										✓		
[IS]*Onopordum acanthium*	Scotch Thistle			✓									✓
Parsonsia straminea	Common Silkpod				✓						✓		
Paspalum dilatatum	Paspalum			✓									✓
[IS]*Persicaria* sp.	A Smartweed	✓											✓
[IS]*Pennisetum clandestinum*	Kikuyu Grass			✓									✓
Pteridium esculentum	Bracken	✓									✓		
Rubus hillii	Molucca Bramble	✓									✓		
[IS]*Rubus vulgaris*	Blackberry	✓											
Sarcopetalum harveyanum	Pearl Vine	✓											
[IS]*Senecio madagascariensis*	Fireweed			✓							✓		✓
[IS]*Setaria species*	A Setaria												✓
Smilax australis	Sarsaparilla	✓											✓
[IS]*Verbena bonariensis*	Purpletop	✓											✓
	Other native grasses			✓								✓	✓

In relation to all vegetation occurrences, on the *Site* none of the above detected species are listed as threatened in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 No 101 (up to and including amendments dated 12 December 2003). Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any threatened species, if present, was not detected.

Significantly, the ecological community comprising coastal lowlands rainforest (occurs minimally on and immediately adjacent the *Site*) is listed as an endangered community.

2.3 Threatened species or communities detected

None of the above species occurring are listed as threatened under the provisions of the TSC Act.

The ecological community comprising coastal lowlands rainforest (occurs minimally on and adjacent the *Site*) is listed as an endangered community. Potential impact will be considered (see later). Whilst mangroves as a species are not protected, removal of vegetation in such locations is governed by a range of consent mechanisms and legislation.

2.4 Threatened species recorded within 25 km

A review of TSC Act Schedule 1 & 2 species recorded within 25 km of the study area was undertaken (source - NP&WS Wildlife Atlas Databases dated 25.9.2003).

These species are:

- *Acacia courtii*
- *Allocasuarina defungens*
- *Acronychia littoralis*
- *Chamaesyce psammogeton*
- *Cynanchum elegans*
- *Grevillea caleyi*
- *Grevillea guthrieana*
- *Hakea archaeoides*
- *Hibbertia hexandra*
- *Marsdenia longiloba*
- *Maundia triglochinoides*
- *Melaleuca biconvexa*
- *Melaleuca groveana*
- *Parsonsia dorrigoensis*
- *Phaius tankervilliae*
- *Pimelea spicata*
- *Thesium australe*

None of these species were detected on the *Site*. Further, virtually all species occurring have been identified. Either habitat is unsuitable, most listed species have a specific ecological niche – which does not occur on the *Site*, or as most species occur in populations rather than single plants – it is most unlikely that any threatened species, if present, was not detected. Additionally, some species could only occur in areas that will not be disturbed as a result of the proposal, eg riparian lowland rainforest.

Hence none of the above possibly occurring species listed as threatened in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 No 101 (up to and including amendments dated 12 December 2003) occur or are likely to occur.

Regardless of lack of detection, these species were considered for an Eight Part Test analysis (**see 4.2** and Attachment 7).

2.5 Threatened species not recorded within 25 km - but which may occur

A review was undertaken of other species which could occur in this locality and within habitat as found on the area (Source - SFNSW Wauchope Management Area Plan/ NP&WS List of the Threatened species for Northern Zone/Northern Study area SFNSW Draft Rotap prescriptions/Students Flora of North Eastern NSW/Flora of NSW – G Harden, Hastings Draft Vegetation Management Plan, previous studies, other nearby studies and personal knowledge including a researched Occurrence List - based on known distribution and habitat preference) indicates possible presence of the following species.

The following species have been considered:

- *Amorphospermum whitei* (rainforest only)
- *Arthropteris palisotii* (rainforest only)
- *Asperula asthenes* (moist sites only)
- *Dillwynia tenuifolia*
- *Diuris disposita* (moist sites only)
- *Diuris pedunculata*
- *Phaius australis*
- *Pomaderris queenslandica* (rainforest only)
- *Senna acclinis* (moist sites only)
- *Tetratheca juncea* (moist sites only)
- *Tylophora woollsii* (rainforest only)

This is not to be taken as an all inclusive list but rather an indicative list. As a result of this review it was determined that it is unlikely that any other species could occur.

None of these species were detected on site. Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any species if present was not detected. Most listed species have specific ecological niches – and most, if not all, niches do not occur on the *Site*. The rainforest species have the highest potential to occur – but if they do these would be in the two small areas (Area A and B) not proposed for any disturbance.

Hence none of the above possibly occurring species listed as threatened in Schedules 1 and 2 of the Threatened Species Conservation Act 1995 No 101 (up to and including amendments dated 12 December 2003) occur or are likely to occur.

Regardless of lack of detection, these species were considered for an Eight Part Test analysis (**see 4.2** and Attachment 7).

3 FAUNA

3.1 Habitat value assessment

Preliminary ecological investigations, desk top review and assessment of the habitat values of the *Site* for fauna are a pre-requisite of surveying - to determine target species and design of appropriate survey methodology to detect possibly occurring fauna. Habitat value was assessed for the vegetation "communities" present. Other considerations included the prediction of threatened fauna that may occur (see **Part B Nos 3.4**, **3.5** and **3.6**) and the nature/extent of proposed disturbance/non-disturbance (see **Introduction No 3**). Based on these considerations appropriate determination was made on the nature, intensity and location of surveys necessary to assess fauna presence.

Whilst most of the *Site* to be developed is cleared land (much with abandoned vineyards), as described above there are ten disparate vegetation occurrences on the *Site,* as well as another significant vegetation occurrence immediately adjacent. Whilst other less significant vegetation occurrences are adjacent it is a reasonable assumption that the proposal will not impact on these occurrences of vegetation/habitat/fauna. Additionally, of the 61 ha of vegetation occurring in 10 Areas, only up to 2 ha distributed within five disparate Areas is likely to be removed. Significantly, the vegetation to be removed is of low habitat value and with one exception is not adjacent high habitat value areas. The exception is the development envelope on proposed Lot 106 which is adjacent a proposed wildlife corridor.

Regardless, observations carried out indicate that some of the microhabitat features occur that are considered necessary to host some of the threatened species. These can be considered to be preferred habitat indicators. Such features are indicative of species that may occur, and conversely, lack of presence is equally indicative of species that are unlikely to occur.

An indication of presence or absence of these microhabitat features is shown in the following Table and Notes:

MICROHABITAT FEATURE	PRESENCE
Old growth/large diameter trees	-
Trees with hollows	-
Dead standing trees with hollows or branching structure suitable for nests	-
Dense groundcover	-
Fallen hollow logs on the ground and hollow stumps	-
Rocks or rocky outcrops or cliffs	-
Wet or moist sclerophyll or sub tropical or warm temperate rainforest	✓[1]
Caves, tunnels or cliff faces with crevices	-
Dense undergrowth, particularly associated with extensive edges to open forest or grassland	-
Well grassed (not mown) areas adjacent forest	-
Accessible base hollows (bat habitat)	-
Dense *Allocasuarina* stands	-
Other specialised vegetation and/or foraging substrate, eg mature *Banksia, Xanthorrhoea*, Lilly Pilly, rainforest fruiting species, littoral rainforest, heath, floriferous plants and sap source trees (eg Swamp Mahogany, Bloodwood, *Melaleuca nodosa*. See above re *Allocasuarina)*	✓[2]
Winter flowering eucalypts (and other species)	-
Mistletoe	-
Open woodland	-
Proximity to other areas of habitat/corridors	✓[3]
Trees with decorticating bark	-
Primary koala feed tree species	-
Permanent, semi–permanent or ephemeral water bodies, aquatic habitats or wetlands. Pools with associated soaks, seepages or bogs. Swamps or habitats with sedges and other Cyperaceae.	✓[4]

✓ Occurs

- Does not occur, insignificant in number or quality. For instance Mistletoe occurs very sparsely in the riparian costal lowland rainforest. Koala food trees occur sparsely in some of the small disparate vegetation occurrences. Two trees with habitat value (Lot 106) were located. Both are outside the development envelope and should be retained (see Recommendations).

1. Coastal lowland rainforest occurs in two Areas – one on the *Site*, the other immediately adjacent. As an endangered community this vegetation requires full protection. In this case no impact will occur as a result of the proposal.

2. Many fruiting rainforest species occur in the lowland rainforest Community as well as Mangroves. These species are a food substrate for a variety of fauna and are important to the [TS] Grey-headed Flying-fox and fruit eating birds. In this case no impact will occur as a result of the proposal. Other flowering species, eg Swamp Mahogany will be minimally (if at all) affected. Banksia occurs sparsely as a shrub component over a small area.

3. Generally, the vegetated areas on the *Site* do not provide connectivity between the disparate minor habitat areas within, or any nodes adjoining the *Site*. However, it is desirable that a link be retained/improved between the 47 ha of Area I (that also adjoins about 250 ha of forested vegetation to the north-east), and the forested areas south of Sancrox Road (see Attachments 1 - 5 and SEPP 44 Assessment).

4. The development adjoins the Hastings River, Haydons Creek and both tidal and non-tidal marshes and swamps. These are important aquatic habitats for a range of species. Several dams occur. In this case no impact will occur as a result of the proposal.

Therefore whilst a small number of desirable habitat features occur, the extent and quality of most of those present is minimal. Further, some features are isolated in occurrence and most of these features occur outside the development envelopes and therefore will not be affected.

Habitat value of the small vegetation occurrences is reduced in that the *Site* is adjacent rural and residential development.

3.2 Survey methodology

Therefore, given; the condition, nature, extent and disposition of the habitat; the minimal number of species likely to occur and the obvious minimal impact of minor areas of vegetation removal - the survey methodology adopted is considered appropriate to enable the assessment of impact as required by Section 5A and 79C (EP&A Act). Regardless of the results of survey detections, impact of the proposal will be considered on each of the predicted species deemed to have more than a nil possibility of occurrence - an Eight Part Test will be completed for each species detected or considered "likely" to occur.

Additionally, to the extent feasible and practicable, surveys aimed to identify the diversity, distribution and abundance of fauna - as an indicator of faunal richness of the site.

Essentially, it is considered that threatened species are unlikely to be dependent, and certainly not to any significant extent, on habitat that occurs on the *Site*.

Whilst surveys were minimal, special attention was given to targeting detection of those threatened species listed in **Part B Nos 3.4**, **3.5** and **3.6** below.

Also it needs to be recognised that surveys undertaken can only provide a snapshot of occurrence of species over a very limited seasonal period. Some migratory bird species would not occur at this time of year. Some short term temporal variability in species occurrence can also be expected associated with species movements.

Surveys were therefore limited to diurnal observations. These were undertaken by two observers on several occasions in January 2004. Observations were undertaken over daylight periods whilst establishing vegetation and habitat composition, targeted flora and fauna surveys, koala scat searches and other ecological investigations. These surveys were on foot by random meanders. During most of the survey period weather was very warm (max 30°C), clear and still. Some surveys took place following reasonable falls of rain.

Surveys included the following observations (where relevant), with concentration on targeted threatened species (and their habitats) considered to have a possibility of occurrence on the *Site:*

- searches for key habitat components and location of potential macro and micro habitat areas likely to be favoured by threatened species (also to determine need for spotlight search), eg rocky outcrops, heath, mature Banksias or *Xanthorrhea*, wetlands, winter flowering eucalypts, tree hollows etc.
- location and description of relative habitat values of habitat trees (trees with hollows).
- search and identification, aided by binoculars, of all fauna species sighted or heard. Incidental sighting records were also kept.
- concentrated searches for site specific fauna species, eg [TS]Glossy Black-Cockatoo in *Allocasuarinas*, [TS]koalas and reptiles. These searches, whilst based on a random meander, targeted likely preferred habitat areas.
- nest, den and roost sites of all birds especially owls and raptors.
- nests and dens of hollow dependent fauna, especially [TS]Yellow-bellied Glider, [TS]Squirrel Glider, [TS]Brush-tailed Phascogale and [TS]Glossy Black-Cockatoo.
- latrine and den sites of the [TS]Tiger Quoll.
- [TS]Yellow-bellied Glider "V" notches and other incisions.
- crushed cones beneath *Allocasuarina* spp.
- distinctive scats and pellets, eg owls, koalas, predator scats of [TS]Tiger Quoll. Search for bone and skin fragments were made under all trees (sometimes found under habitat trees with larger hollows - indicator of owl presence).

- scratches on trees.
- diggings, burrows, traces and tracks, skeletal remains.
- diurnal calling amphibians at wetlands, dams, streams, soaks and seepages (calls compared on the spot with pre-recorded calls of threatened frogs).
- any special habitats such as caves, mines, tunnels or old buildings, bridges, accessible tree hollows (bat habitat) or fruit bat camps.

These surveys are considered adequate given the nature of the habitat, the species likely to occur and finally, the anticipated impact of the proposal.

3.3 Survey results

Surveys and inspections revealed the presence of the following fauna.

The following are the results:

Diurnal surveys

Birds

Australian Magpie	*Gymnorhina tibicen*
Australian Magpie-lark	*Grallina cyanoleuca*
Australian Crow	*Corvus orru*
Bar-shouldered Dover	*Geopelia humeralis*
Black-shouldered Kite	*Elanus notatus*
Brush Cuckoo	*Cacomantis variolosus*
Chestnut Teal	*Anas castanea*
Common Koel	*Eudynamys scolopacea*
Crested Pigeon	*Geophaps lophotes*
Dollarbird	*Eurystomus orientalis*
Dusky Moorhen	*Gallinula tenebrosa*
Eastern Whip Bird	*Psophodes olivaceus*
Eurasian Coot	*Fulica atra*
Galah	*Cacatua roseicapilla*
Grey Butcherbird	*Cracticus torquatus*
Grey Fantail	*Rhipidura fuliginosa*
Laughing Kookaburra	*Dacelo novaeguineae*
Maned Duck	*Chenonetta jubata*
Noisy Miner	*Manorina melanocephala*
Pheasant Coucal	*Centropus phasianinus*
Pied Butcherbird	*Cracticus nigrogularis*
Rainbow Lorikeet	*Trichoglossus haematodus*
White-cheeked Honeyeater	*Phylidonyris nigra*
White-cheeked Rosella	*Platycercus eximius*

Reptiles

Eastern Water Dragon *(Physignathus lesueurii)*

Amphibians

Southern Laughing Tree Frog *(Litoria Tyleri)*

Mammals

Red-necked Wallaby *(Macropus rufogriseus)*
Eastern Grey Kangaroo *(Macropus giganteus)*

There were no other species sighted.

Other Ecological Investigations and Results

- Thorough searches were made beneath the minimal occurrences of *Allocasuarina littoralis*. No crushed cones were found. This indicates unlikely presence of the [TS]Glossy Black-Cockatoo.
- Few trees had scratches but none were identifiable.
- No skeletal remains were found.
- Several birds nests were observed – most likely Magpies. A Bower Bird's bower was detected in the coastal lowlands rainforest occurrence. A hollow in an arboreal termites nest was likely to be used by a bird such a Kingfisher.
- Scats of a [TS]Koala were found under Tallowwood and Broad-leaved Paperbark adjacent the southern boundary of Lot 106. Scats were located within the western 100 m of Transect 1. In all, 19 relatively recent scats were found beneath five trees (three Tallowwoods and two Paperbarks). These scats were mainly from a mature koala – although some immature scats were detected. Location is shown on Attachment 6. This indicates certain presence of a [TS]Koala(s).
- Scats were found of a Wallaby

Of the species detected (and species indicators detected and listed immediately above), the [TS]Koala is listed in Schedule 2 of the Threatened Species Conservation Act.

3.4 Threatened species detected

Koala *(Phascolarctos cinereus)* - Schedule 2 TSC Act.

3.5 Threatened species recorded within 10 km

A search of the NP&WS Atlas Database (25.9. 2003 records) revealed records of the following threatened fauna (includes those species detected on site) within a radius of 10 km.

Reptiles

Nil

Amphibians

Green-thighed Frog *(Litoria brevipalmata)*

Birds

Black Bittern (*Ixobrychus flavicollis*)
Black-necked Stork *(Ephippiorhynchus asiaticus)*
Eastern Grass Owl (*Tyto longimembris)*
Glossy Black-Cockatoo *(Calyptorhynchus lathami)*
Masked Owl *(Tyto novaehollandiae)*
Osprey *(Pandion haliaetus)*
Powerful Owl *(Ninox strenua)*
Sooty Owl *(Tyto tenebricosa)*
Square-tailed Kite *(Lophoictinia isura)*
Swift Parrot *(Lathamus discolor)*

Mammals

Common Bent-wing Bat *(Miniopterus schreibersii)*
Common Planigale *(Planigale maculata)*
Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*
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)*
Large-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*
Squirrel Glider *(Petaurus norfolcensis)*
Tiger Quoll *(Dasyurus maculatus)*
Yellow-bellied Glider *(Petaurus australis)*

These species will be considered for eight part analysis (**No 4** below and Attachment 7).

3.6 Threatened species not recorded within 10 km - but which may occur

A review was also undertaken of other threatened fauna species listed in Schedules 1 & 2 of the TSC Act species which could likely occur in this locality and within habitat as found on the area. Species and numbers will be very limited (if occurring at all) primarily due to the lack of suitable habitat. The term likely infers the species is known to occur in the broader area and suitable habitat of a type utilised by the species is present.

Possible species which could occur were reviewed (Source – NP&WS Databases, SFNSW Wauchope Management Area Plan, SFNSW EIS data, NP&WS Mid North Coast Fauna List, NP&WS correspondence, Hastings Draft Vegetation Management Plan, other nearby studies, personal knowledge including a researched Occurrence List based on habitat preference, known distribution and reference books.)

Reptiles

Nil

Amphibians

Nil

Birds

Australasian Bittern *(Botaurus poiciloptilus)*
Mangrove Honeyeater*(Lichenostomus fasciogularis)*
Marbled Frogmouth *(Podargus ocellatus)*
Painted Snipe *(Rostratula benghalensis)*
Rose-crowned Fruit-dove *(Ptilinopus regina)*
Superb Fruit Dove *(Ptilinopus superbus)*
Terek Sandpiper *(Xenus cinerus)*
Wompoo Fruit-dove *(Ptilinopus magnificus)*
Yellow-eyed Cuckoo-shrike (*Coracina lineata)*

Mammals

Queensland (Common) Blossom-bat *(Syconycteris australis)*
Eastern False Pipistrelle *(Falsistrellus tasmaniesis)*
Large-eared Pied Bat *(Chalinolobus dwyeri)*
Queensland Tube-nosed Bat *(Nyctimene robinsoni)*
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)*

These species will also be considered for Eight Part Test analysis (**No 4** below and Attachment 7).

4 SECTION 5A (EP&A ACT) ASSESSMENT

The Eight Part Test of significance is addressed below (and in Attachment 7).

Based on the above, in relation to fauna, for each species detected (none), or recorded within 10 km, or judged as possible to occur (based on distribution and habitat occurrence - (see Nos **3.4**, **3.5** and **3.6** above), species profiles have been prepared, detailing particularly the key and critical habitat requirements of the species.

The extent to which this habitat occurs on the *Site* has been reviewed and a classification of likelihood of species occurrence (nil, low, moderate or high) derived. Definitions of degrees of likelihood are as follows:

Nil – no potentially generally suitable habitat, main habitat requirements absent, no records in the broader region/well outside recognised distribution area/no connectivity.

Low – no records within 10 km and/or habitat only barely suitable. Other factors, eg general past and current disturbance, absence of specific habitat features, poor or no connection links with other areas of similar habitat - would almost certainly preclude occurrence.

Moderate – recorded within 10 km, habitat suitable but not ideal, adjacent habitat similar.

High – recorded within 10 km (including detections on site), optimal habitat including links with adequate adjacent areas to support breeding.

A species specific Eight Part Test will be undertaken for any flora or fauna species that **occurs** or is judged to have a **moderate or high** likelihood of occurrence. A General Eight Part Test will also be undertaken inclusively for all species judged to have a **low** likelihood of occurrence. An Eight Part Test is not required for other species with a **nil** possibility of occurrence.

Note the koala has also been addressed under the SEPP 44 Assessment.

The Eight Part Tests undertaken for fauna and flora as per groups listed in **4.1** and **4.2** below are in Attachment 7.

4.1 FAUNA

4.1.1 Threatened species detected
4.1.2 Threatened species recorded within 10 km
4.1.3 Threatened species not recorded within 10 km - but which may occur
4.1.4 General Eight Part Test
4.1.5 Fish and marine vegetation

4.2 FLORA

4.2.1 Threatened species detected
4.2.2 Threatened species recorded within 25 km
4.2.3 Threatened species not recorded within 25 km - but which may occur

5 CONCLUSION and DISCUSSION

In relation to both threatened flora and fauna, based on the description of the proposal, adoption of the ameliorative measures recommended, and:

- ⇨ exclusion of some possibly occurring species from the base predictive list (37 species) as having **no** potential to occur by analysis of prepared profiles on habitat requirements, presence or absence of microhabitat etc (5), and

- ⇨ the specific Section 5A Assessments on individual species that **occur** (1), and

- ⇨ the specific Section 5A Assessments on individual possibly occurring species that have a **moderate or high** possibility of occurrence (1), and

- ⇨ the general Section 5A Assessment on a group of possibly occurring species that have a **low** possibility of occurrence (31)

some conclusions can be reached. It is noted that:

1. The *Site* has an area of 186 ha - of which most is fully cleared abandoned vineyards/pasture. The main component of the 61 ha of vegetation that occurs will have minimal disturbance. Of the 61 ha that occurs only up to about 2 ha will require removal.

2. Whilst some high conservation value vegetation occurs (and is adjacent) this will not be disturbed nor impacted upon in any manner.

3. Dams will be retained - hence this habitat will be maintained/increased.

4. The vegetation to be removed is small in area, occurs over five disparate areas, and has minimal habitat for threatened species and minimal floristic values.

5. The vegetated areas of the *Site* are not components of an identified habitat node in the locality. With the exception of a component of Area I, removal of several small areas of vegetation will not impact significantly on connectivity for fauna. In Area I provision has been made for retention of the connective link that occurs (see Recommendations).

6. One threatened fauna species was detected on the *Site*. No threatened flora species were detected. The Eight Part Tests undertaken for occurring and potentially occurring species did not find that the impact of the proposal on any one species would be significant. This finding was conditional on the adoption of the Recommendations made later in this Report.

7. Whilst few options exist to ameliorate the minor impact of the proposal (nor are they required), adoption of the Recommendations is desirable.

Therefore it is considered that the impact of the proposal on threatened species will not be significant and a Species Impact Statement is therefore not required.

6 RECOMMENDATIONS

See PART D

7 ATTACHMENTS

See Part E attached at the end of the entire Report.

PART C
SECTION 79C (EP&A ACT) REQUIREMENTS

IMPACT ON THE NATURAL ENVIRONMENT (FLORA AND FAUNA)

Item (1)(b) of this Section requires *"the likely impacts of that development, including Environmental Impacts on both the natural and built environments and social and economic impacts in the locality"* to be considered.

This Assessment is limited to only addressing impact on the natural environment (flora, fauna and biodiversity).

References include the *Biodiversity Planning Guide for NSW Local Government*, numerous EISs, FISs, SISs, the results of this Study and other general references.

1 ANALYSIS OF IMPACT

To consider these impacts the following issues have been analysed and addressed:

a) Maintenance of biodiversity

Conservation of biodiversity is critical to the concept of ecological sustainable development. The NSW Biodiversity Strategy has been prepared to ensure a collaborative approach to achieve this occurs, thus protecting native biodiversity and maintaining ecological processes and systems. To the extent possible the provisions and principles of this Strategy have been taken into consideration when undertaking this review.

The conservation of biodiversity is critical to the concept of ecological sustainable development. Following a review of the nature of the proposal and its effects on the natural environment, it has been concluded that impact on biodiversity should not be significant. That is not to say that there will be no impact. This conclusion is based on the following considerations:

i) Relatively, the *Site* is generally a highly disturbed and modified area. Those areas with most of the vegetation occurring will not be disturbed to any extent.

ii) The proposal will only remove up to 2 ha of insignificant vegetation over five disparate areas with minimal ecological values that has few habitat values for threatened fauna.

iii) The *Site* is adjacent mostly cleared/developed areas. Where adjacent vegetation/habitat of significance occurs, connective links will be retained and enhanced (see later and Recommendations).

iv) Development is likely to significantly improve the available habitat on the *Site* for some species by amenity plantings that occur with development. This will result in an improved and permanent habitat occurring over time.

v) The vegetation to be removed/impacted upon mostly is mainly not a component of definable "communities" - and therefore cannot be listed as a threatened community (TSC Act). There is limited diversity in the vegetation to be removed.

vi) In my view, other than value as individual ecological features, the vegetation to be removed/impacted upon does not contain any significant species, nor tree of exceptional size, historical, heritage or other value.

vii) One threatened fauna species was detected on the *Site* – impact will be minimal on this species. Whilst a number of others may possibly occur, none are expected to be dependent on vegetation/habitat that occurs on the *Site* to any degree. Impact resulting from the proposal will not be significant on any species (Section 5A EP&A Act Assessment/SEPP 44 Assessment). No threatened flora was detected nor are any expected to occur.

viii) Other non threatened fauna are not likely to be prolific in species nor in numbers. Birds are likely to be the only fauna to use the vegetated areas on the *Site* that will be removed. Habitat needs of this fauna (mainly trees that may be used for resting, perching or nesting) are met by the retained tree occurrence. A Recommendation of this report is to maximise retention of trees during development. This function will be even more satisfied over time with trees planted in the Estate.

Whilst some individuals may be temporarily displaced, others more tolerant to human presence and disturbance, eg kookaburra, could flourish. Those displaced will either perish on the site, adapt to the changed environs, or move to adjacent habitats. Whether movement can be successful depends on a variety of factors. Fauna could also be affected by increased predation, disease or have their life cycle significantly affected. It is not considered that any non threatened species (as distinct from individuals) will be unduly affected by the site disturbance as a result of the proposal. Over time, plantings in the Estate will provide a greatly improved habitat/food substrate for many species.

There were no other locally or regionally rare species detected, nor are any likely to occur.

ix) The vegetation to be removed/impacted upon on the *Site* is not a remnant as such. Retention of most vegetation (97%) is likely.

x) The dams on the *Site* are almost certain to be retained - and possibly others constructed with development.

xi) Generally, the vegetated areas on the *Site* do not provide connectivity between the disparate minor habitat areas within, or any nodes adjoining the *Site*. However, it is desirable that a link be retained/improved between the 47 ha of Area 1 (that also adjoins about 250 ha of forested vegetation to the north-east), and the forested areas south of Sancrox Road (see Attachments 1–5 and SEPP 44 Assessment). Recommendations provide for this to occur and include enhancement of this corridor. Hence any tree and other vegetation loss will not have a major impact on connectivity in relation to fauna movement. Most species likely to occur are highly mobile birds.

xii) Recommended Conditions to be applied to the proposal will be considered for inclusion as development consent conditions. These will ensure the identified values of the *Site* (and adjacent areas) are protected to the extent possible. In the case of Lowland rainforest, full protection is required.

xiii) Incremental loss of habitat is relatively minor.

xiv) No fragmentation or isolation of a significant habitat or area of habitat will occur.

xv) Assessment of impact under the provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act's provisions found that the proposal will not have a significant impact on any matter of national environmental significance, nor on any Commonwealth Land.

b) Protection and management of critical habitats, threatened species, populations, ecological communities or their habitats.

Addressed essentially in SEPP 44, Section 5A Assessments above, in this Assessment and in the Recommendations. Provided consideration is given to adopting the main Recommendations in this Report, impact should be at acceptable levels (ie not significant). Certainly in the case of the small areas of the endangered community present (Lowland Rainforest) there will not be any impact as a result of the proposal. However, in c) below, flora and plant communities not necessarily threatened (under TSC Act) but inadequately/poorly conserved will be addressed.

c) Protection and management of other protected species

Flora

i) Protected Plants (Sch 13 NP&W Act)

None occur on the *Site*. However, the mangroves adjacent the *Site* whilst not protected under the NP&W Act are protected by the Fisheries Act and the Native Vegetation and Conservation Act. There will not be any impact on these as a result of the proposal. Normally, listing under Schedule 13 is moreso a means to prevent commercial exploitation of these species - rather than an indication of conservation value.

ii) Rare or Threatened Australian Plants (ROTAP) species

No ROTAP flora species (Briggs and Leigh 1995) have been detected on the *Site*. Whilst it is possible that listed species may occur in the rainforest occurrences – there will not be any disturbance to this vegetation. Impact on all potentially occurring Commonwealth listed threatened species has been assessed under the provisions of the Commonwealth Environment Protection and Biodiversity Act's provisions (see **Part D** below).

iii) Conservation status of Communities

Firstly, with some exceptions, the vegetation present cannot be logically titled as Communities - and hence no consideration is possible of potential listing in Schedules 1 or 2 of the TSC Act (threatened and vulnerable). An important exception is the small remnant area (0.7 ha) of Lowland Rainforest on the *Site,* and that on the adjacent Reserve (also a combination of Rainforest/Estuarine Community comprising a Mangrove Shrubland).

The Lowland rainforest is an endangered Community (see above). The Estuarine Community comprising a Mangrove Shrubland (whilst no significant disturbance is proposed), is a community protected by a range of consent measures and legislation.

Secondly, within the vegetation occurrences to be partly cleared none are defined "Old Growth", ie *"an old growth forest is an ecologically mature forest where the effects of disturbance are now negligible".* Similarly, it is not candidate old growth forest, ie *"forests where the late mature trees comprise greater than 10% relative crown cover projection (RCCP) and there is generally negligible regrowth (less than 10% of RCCP)".*

Thirdly, flora of regional and local significance were considered. These include flora species with limited distribution and/or are at the limits of distribution. Whilst not threatened or ROTAP species, such individuals or populations should be protected to the extent possible. No known species was identified on the *Site* – certainly not within the vegetation that is proposed to be cleared. An exception is the adjacent Coastal Lowland rainforest/Mangroves – no disturbance proposed.

Fauna

Although one threatened species was detected (and few protected native species) - other threatened and non threatened species could occur. These species will not be impacted upon significantly by the proposal - see SEPP 44 and Section 5A Assessments for threatened fauna - which would equally apply to other (Protected) species. This conclusion is based on the main Recommendations being adopted.

Whilst some displacement of individuals must occur, some will relocate to retained or adjacent areas of similar or better habitat.

Fauna of regional and/or local significance were considered – these are species of limited distribution and/or are at the limits of distribution. Whilst such species are not threatened species, any individuals or populations occurring should be protected to the extent possible. None were detected on the *Site.*

d) Protection and management of adjacent wilderness areas and national parks

None adjacent. Nor are areas under a Conservation Agreement known to be nearby.

e) Wildlife corridors and remnant vegetation

Wildlife corridors

This issue was discussed above in the SEPP 44 and Section 5A Assessment (habitat values).

Essentially the *Site* and the general area in the *Locality* is mainly developed, ie cleared. The *Site* itself (particularly the areas to be developed) is mainly cleared/abandoned vineyards. It adjoins a 30 m Crown Reserve adjacent the Hastings River for about 1300 m and adjacent Haydons Creek for 2200 m. This Reserve contains a narrow fringe of riparian vegetation as well as cleared adjacent land. Rural residential development occurs mainly to the south, south-west and south-east, on both sides of Sancrox Road – these areas are variously forested. Some undeveloped forested lands occur to the west and north-east. The latter are mainly lowlands - unlikely to be disturbed (by this or future proposals), whilst the western vegetation is dry sclerophyll forest that could be developed over time (see Attachments 1 - 5).

Hence the *Site* has minimal value in providing a connection either between the minimal habitat areas found on the *Site*, nor in the broader locality between the depleted habitat nodes that occur. This value will largely be maintained by maximising retention of trees and replacement plantings with development. Generally, birds are the only fauna group likely to traverse the *Site* - and these are highly mobile species, some with a large home range.

An exception is the disturbed/undisturbed Swamp Forest/Swamp Oak component of about 50 ha (most not proposed for disturbance), in Area I that could be considered as a part of an identifiable significant habitat node (for koalas). Therefore, it is desirable that a link be retained/improved between the 50 ha described above and the forested areas south of Sancrox Road (see Attachments 1 - 5). The Recommendations provide for this and include enhancement of this corridor.

Remnant vegetation

No old growth remnant occurs (see above). However, the remaining areas of Coastal Lowland Rainforest could be regarded as remnants. These remnants have high conservation value and will be totally protected. Several small dry sclerophyll patches occur but these are primarily regrowth.

f) The relationship of vegetation to soil erosion/stability and the water cycle

Provided adequate revegetation and ground cover practices eg, sealed roads etc are undertaken, the proposal will have negligible impact on soil erosion and stability. Pollution of adjacent waterways and dams by any pollutant should not occur, provided adequate controls are imposed by Council on the development. In particular, full consideration to adoption of appropriate sewage disposal systems is essential.

g) Weeds, feral animal activity, vermin and disease

See d) above. Any increase in weeds, feral animal or vermin could only be marginal – if at all. On the *Site* these will be eliminated. The occurrence of some feral animals, eg foxes, could be expected to decrease by the development.

Some of these potential impacts can be minimised by application of the relevant recommendations.

h) Disturbance to native fauna and habitats

Addressed in b) and c) above.

i) The amount and location of vegetation disturbance and clearance

The location and relevance of this vegetation has been addressed previously.

j) New vegetation – species selection, placement and purpose

None proposed. Normally amenity plantings around development often provide habitat for a range of fauna. This habitat could well be more suitable than that naturally occurring – and it will be permanent. In addition, over 59 ha of the 61 ha of vegetation occurring on the *Site* will be retained.

2 CONCLUSION AND RECOMMENDATIONS

Given these considerations the proposal should not have a significant impact on flora, fauna and biodiversity. However, impacts will occur and these should be managed and reduced by adoption of the Recommendations (and others as developed). Recommendations are found in PART E.

PART D

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT ASSESSMENT

1 REQUIREMENTS OF THE ACT

The Environmental Protection and Biodiversity Conservation Act (EPBC Act) came into force on 16 July 2000. This Commonwealth Act provides for actions that are likely to have a significant impact on matters of national environmental significance to have a rigorous referral, assessment, and approval process. Actions include a project, development undertaking, activity or series of activities.

The Act currently identifies six matters of national environmental significance. These are:

- World Heritage properties;
- Ramsar wetlands of international significance;
- listed threatened species and ecological communities;
- listed migratory species;
- Commonwealth marine area; and
- nuclear actions (including uranium mining).

In addition, the Act's assessment and approval provisions also apply to actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land) and actions taken by the Commonwealth that will have a significant impact on the environment anywhere in the world.

Any activity (referred to as a "controlled action" in this Act) determined to significantly impact on any of the above listed matters of national environmental significance, must have the Commonwealth Minister of Environment's approval prior to undertaking such an activity.

Environment Australia's latest database was accessed to obtain the appropriate listings within each matter of national environmental significance.

2 ASSESSMENT OF IMPACT

Environment Australia has published Administrative Guidelines on the determination of whether an action has, will have, or is likely to have a significant impact on a matter of national environmental significance. These guidelines have been adopted to assess determination of significance and impact. The guidelines set out criteria which are intended to assist in determining whether the impact of an action on any matter of national environmental significance is likely to be significant. Criteria are provided for each matter of national environmental significance.

In order to decide whether an action is likely to have a significant impact, it is necessary to take into account the nature and magnitude of potential impacts.

In determining the nature and magnitude of an action's impact, it is important to consider matters such as:

- all on-site and off-site impacts,
- all direct and indirect impacts,
- the frequency and duration of the action,
- the total impact which can be attributed to that action over the entire geographic area affected, and over time,
- the sensitivity of the receiving environment, and
- the degree of confidence with which the impacts of the action are known and understood.

2.1 World Heritage Properties

2.1.1 Occurrence

None of the four World Heritage Areas listed for NSW occur on the *Site* or adjoin the *Site*.

2.1.2 Impact Assessment

Not required.

2.2 Ramsar Wetlands of International Significance

2.2.1 Occurrence

The list contains 23 NSW North Coast nationally important wetlands. Of these nine are declared Ramsar wetlands. None of these occur on or adjacent the *Site*.

2.2.2 Impact Assessment

Not required.

2.3 Listed Threatened Species and Ecological Communities

2.3.1 Occurrence

2.3.1.1 Species

Analysis of listed species was undertaken in the following categories:

- extinct in the wild - none of the 117 listed species in Australia (54 fauna and 63 flora) occur or are likely to occur,
- critically endangered or endangered - of the 510 listed species in Australia, 6 species (4 fauna and 2 flora) occur or may occur within Hastings LGA (Marine species/marine birds excluded),
- vulnerable - of the 821 listed species in Australia, 12 species (6 fauna and 6 flora) occur or may occur within Hastings LGA (Marine species/marine birds excluded).

These species are as follows (list includes all species – except marine species/marine birds, that may occur within the boundaries of Hastings Council):

Fauna

Common Name	Scientific Name	Status
TS Brush-tailed Rock-wallaby	*Petrogale penicillata*	Vulnerable
TS Giant Barred Frog	*Mixophyes iteratus*	Endangered
TS Green & Golden Bell Frog	*Litoria aurea*	Vulnerable
TS Hastings River Mouse	*Pseudomys oralis*	Endangered
TS Long-nosed Potoroo	*Potorous tridactylus*	Vulnerable
TS Regent Honeyeater	*Xanthomyza phrygia*	Endangered
TS Southern Brown Bandicoot	*Isoodon obesulus*	Endangered
TS Spotted-tailed Quoll	*Dasyurus maculatus*	Vulnerable
TS Stuttering Frog	*Mixophyes balbus*	Vulnerable
TS Swift Parrot	*Lathamus discolor*	Endangered

Flora

Common Name	Scientific Name	Status
	TS *Acacia courtii*	Vulnerable
	Callistemenon pungens	Vulnerable
Leafless Tongue-orchid	TS *Cryptostylis hunteriana*	Vulnerable
White-flowered Wax Plant	TS *Cynanchum elegans*	Endangered
	TS *Hakea sp.* (Manning River SF – Broken Bago SF)	Vulnerable
	TS *Parsonsia dorrigoensis*	Endangered
	Pultenaea cambellii	Vulnerable
Toadflax	TS *Thesium australe*	Vulnerable

TS Threatened Species (Threatened Species Conservation Act 1995)

2.3.1.2 Ecological Communities

Analysis of listed endangered ecological communities was undertaken. None of the 6 listed communities for NSW occur on or adjacent the *Site*.

Note that other categories of communities, eg critically endangered, are not yet listed.

2.3.2 Impact Assessment

2.3.2.1 Species

The administrative guidelines on significance provide for assessment of the following criteria to determine significance. These are:

a) **Extinct in the wild**

List of criteria and assessment of impact not required.

b) **Critically Endangered and Endangered**

Criteria

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

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

- reduce the area of occupancy of the species, or
- fragment an existing population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of a population, or
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat, or
- interfere with the recovery of the species.

Assessment

The above criteria were assessed in relation to the species listed above. It was determined that the proposal would not have a significant impact on any of these species. Essentially this determination was based on the fact that these species were not detected on *Site* and are unlikely to occur and/or critical habitat does not occur and/or only a minor area of potential habitat will be affected and/or ameliorative measures are proposed to minimise impact. In addition, all species listed as threatened under the NSW Threatened Species Act have been considered under impact assessments previously undertaken. Whilst the list adopted may not be totally inclusive of all possible species that may occur, any additional species would be unlikely to be significantly impacted upon as a result of the proposal.

c) **Vulnerable**

Criteria

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

- lead to a long-term decrease in the size of an important population of a species (one that is necessary for a species' long-term survival and recovery), or
- reduce the area of occupancy of an important population, or
- fragment an existing important population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or

- disrupt the breeding cycle of an important population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat, or
- interferes substantially with the recovery of the species.

Assessment

The above criteria were assessed in relation to the species listed above. It was determined that the proposal would not have a significant impact on any of these species. Essentially this determination was based on the fact that these species were not detected on the *Site* and are unlikely to occur and/or critical habitat does not occur and/or only a minor area of potential habitat will be affected and/or ameliorative measures are proposed to minimise impact. In addition, all species listed as threatened under the NSW Threatened Species Act have been considered under impact assessments previously undertaken.

Whilst the list adopted may not be totally inclusive of all possible species that may occur, any additional species would be unlikely to be significantly impacted upon as a result of the proposal.

2.3.2.2 Ecological Communities

No assessment of impact required (no listed Community occurs).

2.4 Listed Migratory Species

2.4.1 Occurrence

Of the 343 listed species, 33 are known to occur (or may occur) in the general locality (Hastings LGA). Marine species were excluded. Of these species, none were detected on the *Site*. These species are:

COMMON NAME	SCIENTIFIC NAME
Bar-tailed Godwit	*Limosa lapponica*
Black-faced Monarch	*Monarcha melanopsis*
$_{TS}$Black-tailed Godwit	*Limosa limosa*
$_{TS}$Broad-billed Sandpiper	*Limicola falcinellus*
Cattle Egret	*Ardea ibis*
Common Sandpiper	*Actitis hypoleucos*
Crested Tern	*Sterna bergii*
Eastern Curlew	*Numenius madagascariensis*
Eastern Reef Egret	*Ardea sacra*

Species (Cont'd)

COMMON NAME	SCIENTIFIC NAME
Fork-tailed Swift	*Apus pacificus*
Glossy Ibis	*Plegadis falcinellus*
Great Egret	*Egretta alba*
TSGreat Knot	*Calidris tenuirostris*
TSGreater Sand Plover	*Charadrius leschenaultii*
Greenshank	*Tringa nebularia*
Japanese Snipe	*Gallinago hardwickii*
TSLesser Sand Plover	*Charadrius mongolus*
TSLittle Tern	*Sterna albifrons*
TSMasked Booby	*Sula dactylatra*
TSPainted Snipe	*Rostratula benghalensis*
Red Knot	*Calidris canutus*
TSRegent Honeyeater	*Xanthomyza phrygia*
Rufous Fantail	*Rhipidura rufifrons*
TSSanderling	*Calidris alba*
Satin Flycatcher	*Myiagra cyanoleuca*
Sharp-tailed Sandpiper	*Calidris acuminata*
Spectacled Monarch	*Monarcha trivirgatus*
TSTerek Sandpiper	*Xenus cinereus*
Wedge-tailed Shearwater	*Puffinus pacificus*
Whimbrel	*Numenius phaeopus*
White-bellied Sea-Eagle	*Haliaeetus leucogaster*
White-throated Needletail	*Hirundapus caudacutus*
Wood Sandpiper	*Tringa glareola*

TS Threatened Species (Threatened Species Conservation Act 1995)

2.4.2 Impact Assessment

Criteria

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

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

Assessment

The above criteria were assessed in relation to the species listed above. It was determined that the proposal would not have a significant impact on any of these species. Essentially this determination was based on the fact that these species were not detected on the *Site* and are unlikely to occur, and important habitat does not occur. Whilst important habitat is adjacent, there will not be any significant impact on this habitat. Further, impact on potential habitat will be minimal and ameliorative protective measures have been recommended. In addition, all species listed as threatened under the NSW Threatened Species Act have been considered under impact assessments previously undertaken. Whilst the list adopted may not be totally inclusive of all possible species that may occur, any additional species would be unlikely to be significantly impacted upon as a result of the proposal.

2.5 Commonwealth Marine Area

2.5.1 Occurrence

The *Site* is not a Commonwealth Marine Area nor does it adjoin a listed Area.

2.5.2 Impact Assessment

Not required.

2.6 Nuclear Actions

2.6.1 Occurrence

The proposal does not involve nuclear actions of any description.

2.6.2 Impact Assessment

Not required.

2.7 Impact on Commonwealth Land

2.7.1 Occurrence

The *Site* is not Commonwealth land nor is it adjacent any Commonwealth Land.

2.7.2 Impact Assessment

Not required.

3 CONCLUSION

It has been determined that the proposal will not have a significant impact on any matter of national environmental significance nor on any Commonwealth Land.

Therefore the Commonwealth Minister of Environment's approval to undertake the activity is not required.

To mitigate impacts some recommendations have been made for consideration (See Part E).

PART E

RECOMMENDATIONS

Following the conclusions made after each of the Assessments undertaken – it can be concluded overall that the proposal will not have significant impacts on the biota of the *Site* nor on adjacent areas – particularly not on threatened species. Neither therefore, are impacts on biodiversity significant.

The following Recommendations are made to assist in ensuring (to the extent feasible and practicable) that the development is undertaken in an environmentally sensitive manner in accordance with sound ecological principles. Consideration of the following Conditions at the design stage and at rezoning (and incorporation of appropriate conditions attached to consents, approvals and determinations) will contribute to ensuring that potential adverse impacts do not occur on threatened species, populations - and their habitats, ecological communities and biodiversity in general.

As stated in my Report, following close analysis and consideration, the proposal should not have a significant impact on threatened species (nor their habitats).

The following Recommendations are made:

Rezoning

1. There is no ecological reason that rezoning can not occur and the *Site* be rezoned Rural Residential. An exception could be the connective link of dry sclerophyll/Swamp Oak at the rear of proposed Lots 103-105 and most of proposed Lot 106. These areas should mostly be permanently retained as a connection corridor. This can be achieved by rezoning, a Covenant on Title, or use of the TPO. Revegetation of this area with koala feed tree species, eg Forest Red Gum, Swamp Mahogany should occur. Note that the building envelope proposed in the south-eastern corner of Lot 106 needs to be excluded from this corridor.

   Rezoning to Environment Protection is not the only means to protect this corridor – but probably it is the most secure means.

2. The remnant rainforest (Area B) requires total protection. Exclusion from rezoning is not the means to achieve this. Protection can be achieved at the time of subdivision.

Subdivision

Recommendations and/or considerations as a basis for subdivision (by imposition of development consent conditions) are:

1. Any major variation to the Concept Plan assessed (particularly if it includes additional vegetation removal) as a result of review of layout (or rezoning) should result in a review of these Assessments to ensure continued relevance.

2. Of paramount importance is that the occurrence of Coastal Lowland Rainforest both on and adjacent the *Site* should not be disturbed in any manner. This recommendation extends to the Mangroves located immediately adjacent the Hastings River and Haydons Creek. Whilst no disturbance is proposed, close consideration needs to be given to the technical capacity of any proposed sewage disposal system to ensure no pollution to these waterways occurs.

   Permanent protection of the small area on the *Site* can hopefully be achieved by the TPO and/or NVC Act and/or a Covenant.

3. Clearing should be minimised to the extent possible. Particularly, large trees that have potential for nests for the [TS]Osprey or [TS]Square-tailed Kite should be retained to the extent possible, eg in proposed Lot 106.

4. As a condition to undertaking clearing, all trees to be cleared should be closely inspected immediately prior to clearing to ensure that a [TS]Koala is not resident. If a [TS]Koala should be found, clearing within 100 m should be delayed until the [TS]Koala leaves the area, and if not within three days the animal(s) can be captured and relocated by an appropriately qualified person.

5. At the time of clearing it would be desirable if a representative from FAWNA could be contactable to collect any injured fauna for rehabilitation and subsequent release nearby. Injured koalas (most unlikely to occur if Condition 4 is implemented) should be taken to the Koala Protection Society.

6. To the extent reasonably practicable, the vegetation adjoining the development envelopes should not be damaged by any clearing or burning undertaken as a result of the development.

7. Later construction of a boat ramp and jetty will need to be taken with sensitivity and in the location shown in this proposal. Any variation will require review of the conclusion of these assessments that construction will not have a significant impact. A parking bay should be included away from retained vegetation to prevent compaction/damage to this vegetation.

8. The connective link of dry sclerophyll/Swamp Oak adjacent the eastern boundaries of proposed lots 103-105 and most of proposed Lot 106 (as well as maximising retention of disturbed Swamp Oak adjacent - some minor removal may be required for bushfire protection) should be conserved. Most of this area should be permanently retained as a connection corridor. If not achieved by rezoning, a Covenant on Title, or use of the TPO will be required. Revegetation of this area with koala feed tree species, eg Forest Red Gum, Swamp Mahogany should occur. Note that the building envelope proposed in the south-eastern corner of Lot 106 can be excluded from this corridor.

9. Clearing for development on proposed Lot 106 should be constrained to the south-east corner to the extent possible. This should be undertaken by retaining koala feed trees where possible and as well the two identified habitat trees on the northern edge of the development envelope.

Hence Council is not prevented by the provisions of SEPP No 44, nor Sections 5A or 79C of the EP&A Act from granting consent to the development application. Nor is it considered the applicant needs to seek Commonwealth approval to undertake the proposal as provided for by the Environment Protection and Biodiversity Conservation Act. Neither is a Section 91 nor a Section 120 Licence required from the NP&WS (provided consent is issued).

PART F
ATTACHMENTS

Attachment 1 – Location Map (General)

Attachment 2 – Concept Proposal - subdivision and roads

Attachment 3 - Concept Proposal – subdivision (Air Photo)

Attachment 4 – Vegetation Map

Attachment 5 – Photos

Attachment 6 – Wildlife Map

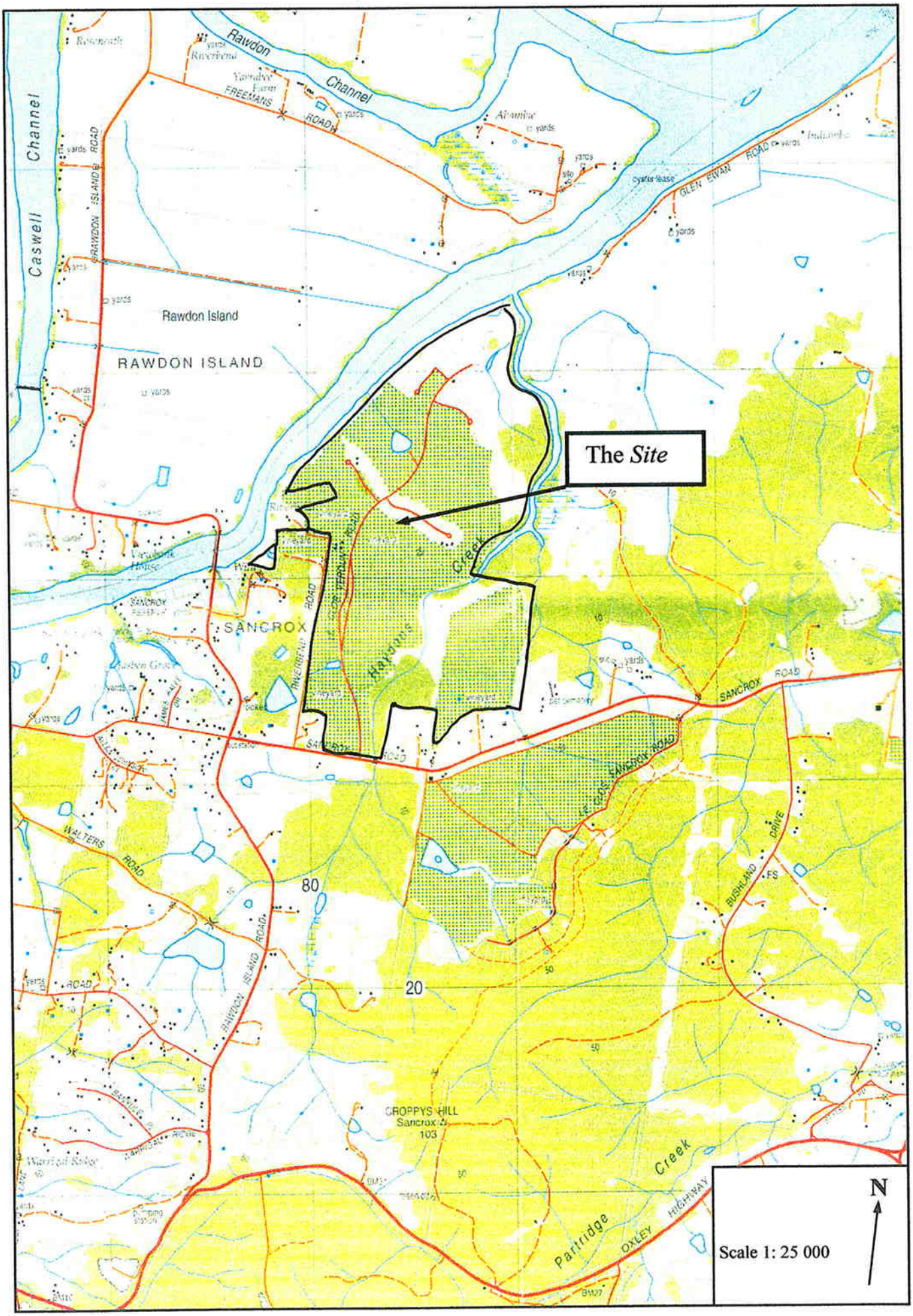
Attachment 7 – Section 5A (Eight Part Test) Assessments

Attachment 8 – References and Bibliography

Attachment 9 – CV of B J Salter

ATTACHMENT 1

LOCATION MAP (General)


Caswell Channel
Rawdon Channel
Rawdon Island
RAWDON ISLAND
The *Site*
SANCROX
SANCROX ROAD
RAWDON ISLAND ROAD
WALTERS ROAD
GLEN EWAN ROAD
Creek
Partridge Creek
OXLEY HIGHWAY
CROPPYS HILL
Sancrox
103
80
20
Scale 1: 25 000
N

ATTACHMENT 2

CONCEPT PROPOSAL –
SUBDIVISION AND ROADS

Proposed Le Clos
Verdun Estate

Rawdon Island

Version:Jan04
BushFire/Flora & Fauna

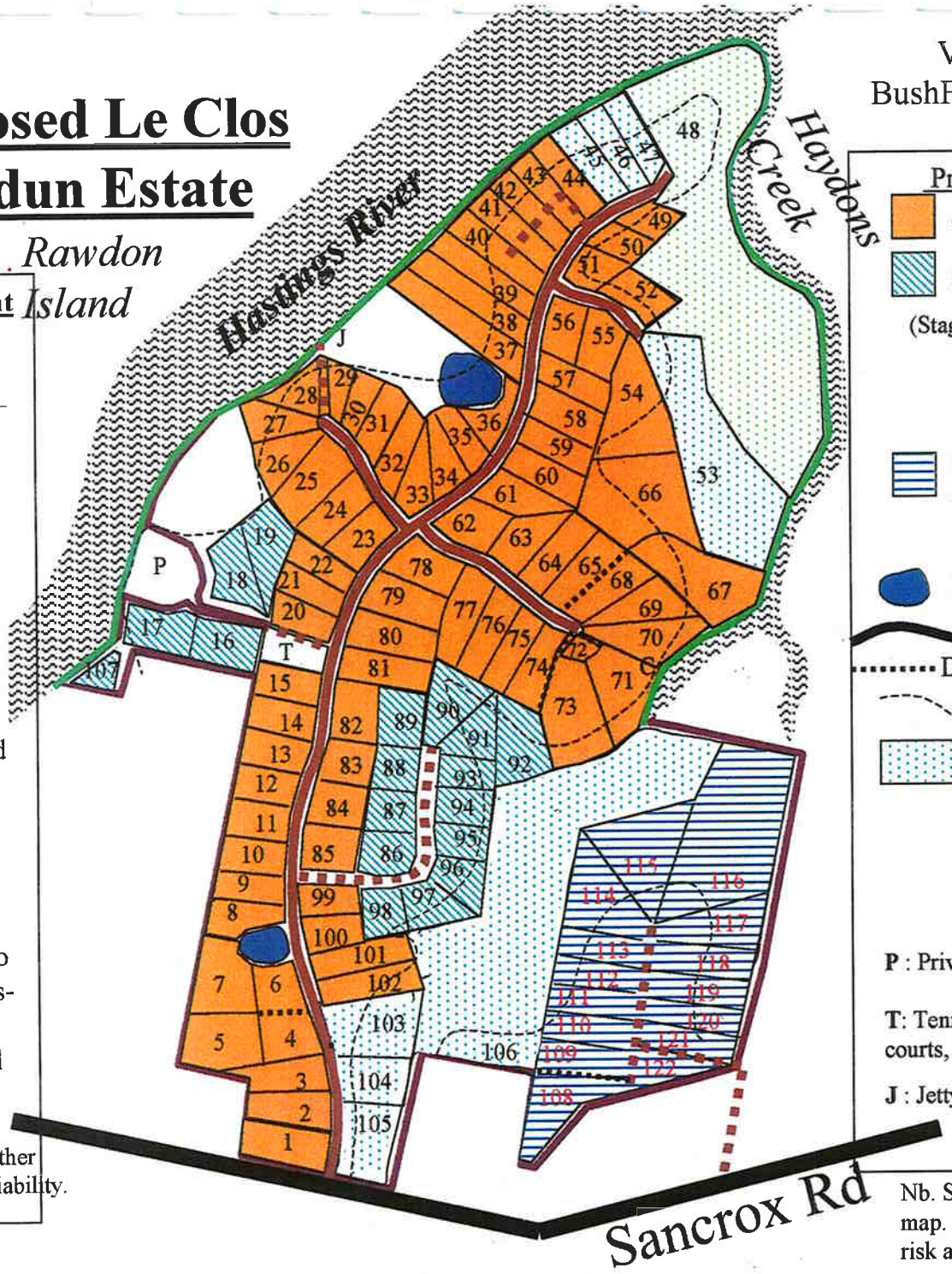
Summary of Redevelopment

- ❑Vineyards all removed
- ❑Split lot concept reversed – ie vineyard lot & house lot combined into one large house lot & spread out along the existing roads.
- ❑Average lot size

  0.8 - 1.0 hect.

  (2.0 – 2.5 acres)
- ❑Roads repaired and handed back to council or kept as a private development.
- ❑Surplus land to become parklands & walking trails
- ❑Redevelopment possibly to include recreational facilities- tennis court, squash court, picnic areas, community hall & public jetty & boat ramp.

Nb. Proposal subject to council & other department approvals & financial viability.



Proposed house lots

- Stage 1
- Stage 2 –new road & services

(Stages 1 & 2 done together)

- Stage 3 – proceeds go to farm owners

Other Features

- Lakes
- Roads
- Driveway to battle-axe blocks
- 1 in 100 year flood level
- Smiths/Freemans Land

P : Private Residence

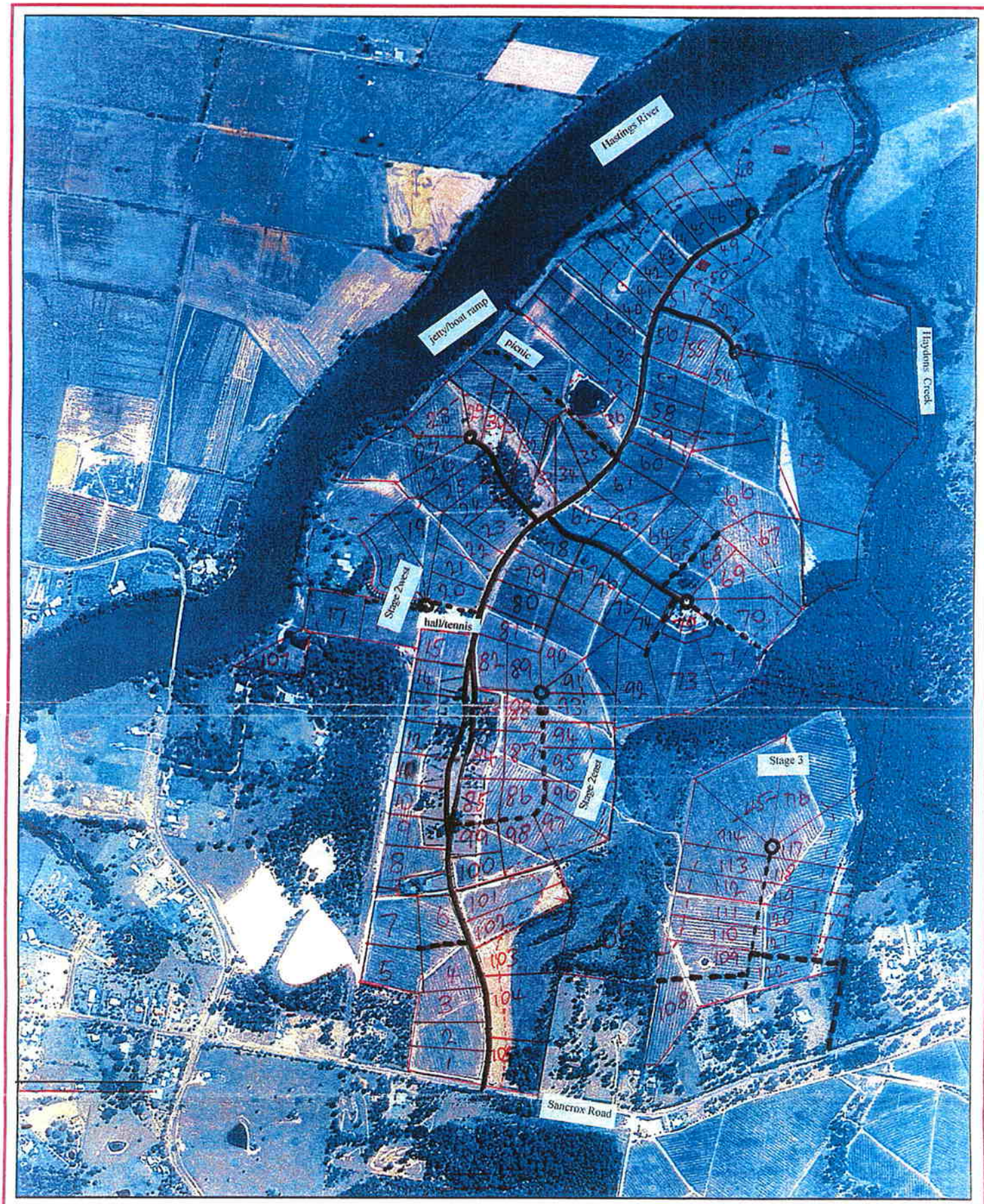
T: Tennis courts, Community hall, squash courts,

J : Jetty, Boat Ramp & picnic grounds

Nb. Scale not accurate Refer to contour map. Lot size & position subject to bushfire risk assessment & Geotech. Studies.

ATTACHMENT 3

CONCEPT PROPOSAL –
SUBDIVISION (AIR PHOTO)



Le Clos - Ver Dun

February 1997 Aerial Photography

1:8,000

0 100 200 400 600 800

Metres

N W E S

HASTINGS

Printed on 22-1-04

DISCLAIMER

This map was produced by the Geographic Information Services section of the Hastings Council using information available to Hastings Council and the Department of Lands, Bathurst. The data was captured at a scale of 1:25000 for rural areas and 1:4000 for urban areas.
The positional accuracy of plots becomes less reliable when viewed at scales greater than the capture scale. Hastings Council accepts no responsibility either in contract or tort (and particularly in negligence) for any errors, omissions or inaccuracies whatsoever contained within or arising from this map. NOTE: Cadastral information outside the Hastings LGA not updated.

Proposed Redevelopment
Feb 2004

Roads

New Roads/driveways

Lot Boundaries

1:100 Flood level

ATTACHMENT 4

VEGETATION MAP

N
W E
S

HASTINGS

Printed on 22-1-04

Le Clos - Ver Dun

February 1997 Aerial Photography

1:8,000

0 100 200 400 600 800

Metres

DISCLAIMER
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Proposed Redevelopment
Feb 2004

Vegetation (Area) boundary

Roads

New Roads/driveways

Lot Boundaries

1:100 Flood level

ATTACHMENT 5

PHOTOS

See pages 14 & 15 for description


AREA A


AREA B


AREA F


AREA G


AREA C

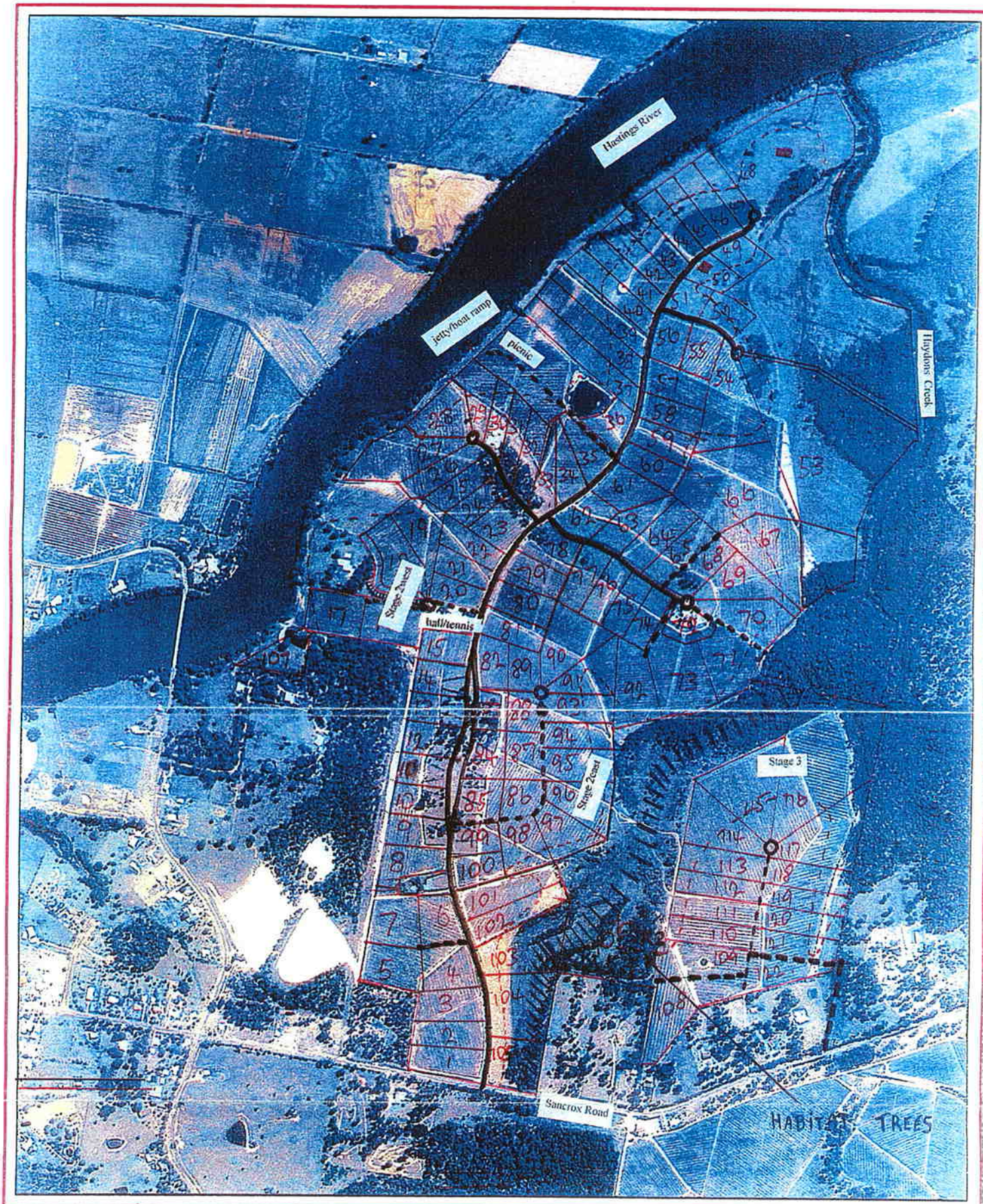

AREA D


AREA I


AREA I

ATTACHMENT 6

WILDLIFE MAPS
(A) Air Photo
(B) Diagram



N
W E
S

HASTINGS

Printed on 22-1-04

Le Clos - Ver Dun

February 1997 Aerial Photography

1:8,000

0 100 200 400 600 800

Metres

DISCLAIMER
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Proposed Redevelopment
Feb 2004

IIII Connective Corridor

Roads

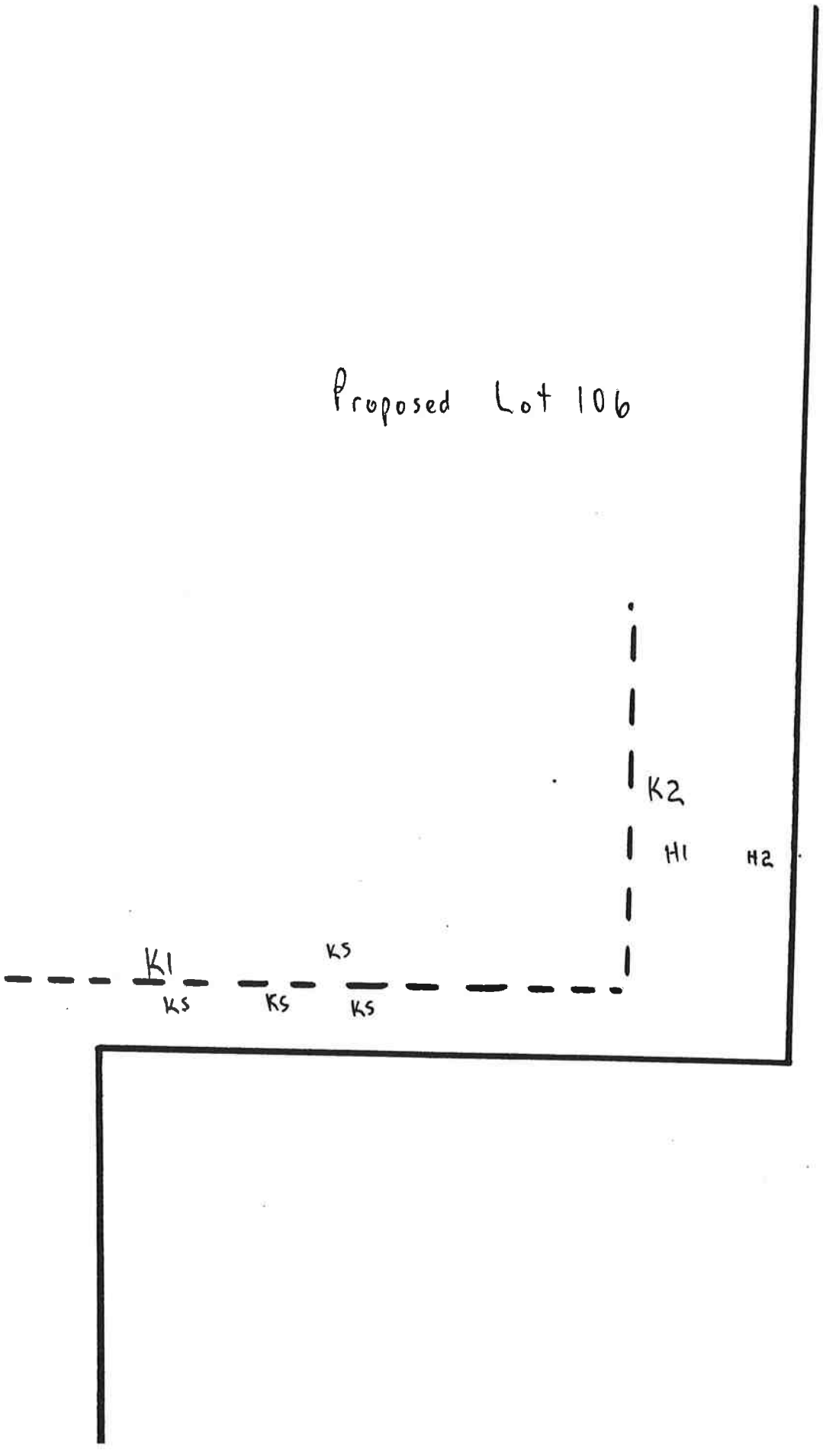
New Roads/driveways

Lot Boundaries

1:100 Flood level

K - Koala Scats

K1 - Koala Vegetation Transect



LEGEND

Scale 1:2000

K – Koala vegetation Transect

KS – Koala scats

H1 – Habitat Tree

ATTACHMENT 7

SECTION 5A (Eight Part Test) ASSESSMENTS

TABLE OF CONTENTS

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

EIGHT PART TESTS

Requirements of this test are to assess potential impact utilising the following considerations:

a) *in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction,* Note: NPWS (1996) defines local viable population as " the population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary of the study area can be demonstrated."

b) *in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised,* Note: NP&WS (1996) define significant as " important, weighty or more than ordinary".

c) *in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed,* Note: NP&WS (1996) define habitat as " an area or areas occupied, or periodically or occasionally occupied by a species, population or ecological community and includes any biotic or abiotic component".

d) *whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community,*

e) *whether critical habitat will be affected,*

f) *whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region,*

g) *whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process,*

h) *whether any threatened species, population or ecological community is at the limit of its known distribution."*

In addition, 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 eight part test format listed above. 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

4.1.2 Threatened species recorded within 10 km

4.1.3 Threatened species not recorded within 10 km - but which may occur

4.1.4 General eight part test

4.1.5 Fish and marine vegetation

4.2 FLORA

4.2.1 Threatened species detected

4.2.2 Threatened species recorded within 25 km

4.2.3 Threatened species not recorded within 25 km - but which may occur

Assessments are as follows:

4.1 FAUNA

4.1.1 Threatened species detected (on the *Site)*

4.1.1.1 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. Adjacent neighbours though have detected koalas over at least the past 12 years.

Eight Part Test:

a) 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. Therefore, whilst development will remove up to 0.5 ha (in Area I), of forested vegetation - this will likely be in the south-east corner adjacent cleared land on two sides. Minimal numbers of feed trees occur in this envelope – and feed tree species will be retained to the extent feasible (see Recommendations). 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 this minor impact of vegetation removal would not have a significant 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 one dwelling is proposed, and very few koalas are likely to occur – this additional impact is likely to be negligible.

   Hence it can reasonably be concluded there will be no impact on life cycle.

b) None of the threatened populations gazetted as at 12 December 2003 occur on the site. No known "local" population occurs, although koalas are found sparsely in the locality. As detailed in (a) above, habitat removal is minor hence the proposal will not disrupt the viability of a population.

c) An area of up to 0.5 ha will be removed. Regional distribution of the habitat for this species is extensive. The site is not the location for any endangered populations as gazetted 12 December 2004. Habitat occurring is similar to that occurring on adjacent land and National Park. Note that it is understood that all but 0.5 ha of the adjacent 47 ha of forested land will not be developed – hence this habitat should remain.

d) 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 Lots 103-105 (some is dry sclerophyll) and/or through the adjacent lot to the south. In this 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).

e) Critical habitats (as per TSC Act) are yet to be defined. In this case no population is evident, habitat is not core habitat, nor is area of potential habitat to be removed significant in size (0.5 ha). Extensive, similar or preferred habitat occurs on adjacent lands and in National Park. Critical habitat is likely to be vegetation utilised by a breeding population and/or vegetation used as a connection corridor between distinctive habitat nodes. In this case neither occur.

f) More relevant to flora. As species requires large areas, all habitat is likely and necessarily utilised – not just reserves. To maintain biodiversity all populations should be protected to the extent possible. Koalas and their habitats are widespread in the region. The National Parks, Reserves, State Forests and larger undeveloped areas along the coast provide similar habitat. In this case it is certain that nearly all of the adjacent 47 ha will not be developed and this habitat will therefore remain.

g) Predation by the European Red Fox is the only listed and relevant (as at 12 December 2003) threatening process which could impact on koalas. In this case a decrease in predation is a possibility following development and associated human and domestic animal presence.

Whilst "clearing" is a listed process, the potential impacts of removal of vegetation have been addressed elsewhere in the eight 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. Whilst large scale clearing may be a threatening process, removal of a small area would not be a threatening process, and koalas will not be significantly impacted upon by the proposal.

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.

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.

h) Species is well within known area of distribution - both geographically and in habitat type. No listed population or ecological community (as at 12 December 2003) will be affected.

Conclusion: There will be no significant impact on koalas from this proposal subject to the adoption of the Recommendations.

4.1.2 Threatened species recorded within 10 km

A list of these species has been provided in **PART B Section 2.4** and is repeated below. This list also includes any species detected (see above) – even though assessment is not required in this Section. Species are:

Reptiles

Nil

Amphibians

Green-thighed Frog *(Litoria brevipalmata)*

Birds

Black Bittern (*Ixobrychus flavicollis*)
Black-necked Stork *(Ephippiorhynchus asiaticus)*
Eastern Grass Owl (*Tyto longimembris)*
Glossy Black-Cockatoo *(Calyptorhynchus lathami)*
Masked Owl *(Tyto novaehollandiae)*
Osprey *(Pandion haliaetus)*
Powerful Owl *(Ninox strenua)*
Sooty Owl *(Tyto tenebricosa)*
Square-tailed Kite *(Lophoictinia isura)*
Swift Parrot *(Lathamus discolor)*

Mammals

Common Bent-wing Bat *(Miniopterus schreibersii)*
Common Planigale *(Planigale maculata)*
Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*
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-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*
Squirrel Glider *(Petaurus norfolcensis)*
Tiger Quoll *(Dasyurus maculatus)*
Yellow-bellied Glider *(Petaurus australis)*

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 an eight part test is required.

The following species have been excluded from further consideration of undertaking an eight part test due to either total lack of habitat, obvious nil disturbance/impact, or both:

SPECIES	HABITAT REQUIREMENTS	Habitat Occurrence & Disturbance	Impact	8 Part Test Yes/No
Amphibians				
Green-thighed Frog *(Litoria brevipalmata)*	Lagoons adjacent forest	Does not occur	Nil	No
Reptiles				
Nil				
Birds				
Eastern Grass Owl (*Tyto longimembris)*	Dense swathes of grassland	Does not permanently occur	Nil	No
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

The remaining species have been considered further (list below):

Reptiles

Nil

Amphibians

Nil

Birds

Black Bittern (*Ixobrychus flavicollis*)
Black-necked Stork *(Ephippiorhynchus asiaticus)*
Masked Owl *(Tyto novaehollandiae)*
Osprey *(Pandion haliaetus)*
Powerful Owl *(Ninox strenua)*
Sooty Owl *(Tyto tenebricosa)*
Square-tailed Kite *(Lophoictinia isura)*
Swift Parrot *(Lathamus discolor)*

Mammals

Common Bent-wing Bat *(Miniopterus schreibersii)*
Common Planigale *(Planigale maculata)*
Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*
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-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*

Birds

4.1.2.1 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 Haydons Creek.

Likelihood of species occurrence: High

Eight Part Test: Whilst more than 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 under **4.1.4 general eight part test** (see under).

4.1.2.2 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 Haydons Creek.

Likelihood of species occurrence: High on adjacent habitat.

Eight Part Test: Whilst more than 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 under **4.1.4 general eight part test** (see under).

4.1.2.3 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.

Eight Part Test: See **4.1.4 general eight part test**

4.1.2.4 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.

Eight Part Test:

a) Life cycle of this species can either be protected, or impact will be so minimal (if at all), so that a viable local population (none evident) is not placed at the risk of extinction.

As the proposal does not include disturbance to the riparian vegetation and generally only small areas of mainly regrowth vegetation may require removal over five disparate areas, no impact on this species is likely. The need for retention of large trees within 1-2 km of waterways is desirable – at least for replacement nest trees in the future (see Recommendations). No current nest tree will be removed and trees proposed for removal are not the classic dead tree used by this species. No impact on connectivity between feeding areas will occur - regardless, lack of direct connectivity is not so significant to a species capable of flight. Many of these species are known to co-exist with human development, hence the disturbance of human presence nearby is unlikely to adversely affect the species.

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 the species survival.

b) None of the endangered populations gazetted as at 12 December 2003 occur on the *Site*. No known "local" endangered population occurs (closest sighting of species 3 km distant). Provided the individual species life cycle is not significantly impacted upon (so determined above), then any population (none listed as endangered) should not be significantly impacted upon.

c) No potential habitat (ie nesting or perching near water) will be removed. Similar habitat occurs elsewhere in the locality. As species is widely distributed (but sparse in occurrence), known habitat used by known populations should be protected (this does not mean total protection of all habitat). This *Site* is not the location for any endangered populations as gazetted 12 December 2003 – hence no impact on populations either.

d) Retention of most (if not all) larger trees will enable connectivity between similar habitats to continue. Regardless, this is not so critical for a species capable of flight.

e) Critical habitats (as per TSC Act) are yet to be defined, hence no impact can be assessed. However, critical habitat for this species would be large dead trees for nesting near waterways and perch trees.

f) More relevant to flora. All areas of habitat are likely and necessarily utilised – not just reserves. To maintain biodiversity all populations should be protected to the extent possible. Similar habitat occurs on other freehold lands in the locality. Most species have been recorded in many National Parks in the Region. In this case there will be no impact on any listed population. Species are variously known (not extensively) from conservation reserves in the NSW Biogeographical Region (perhaps moreso due to lack of surveys). Hence it is difficult to state that these species are inadequately represented in Conservation Reserves. For those species capable of flight, this criterion is of lesser importance.

g) None of the gazetted Schedule 3 threatening processes that may occur will significantly impact on the species as a result of this proposal. Other non "key" processes are unlikely to be caused – and therefore these species will not be significantly impacted upon by undertaking the proposal. No recovery Plan has been prepared.

h) Species are within known distribution range. No listed populations as at 12 December 2003.

Conclusion: Subject to the adoption and implementation of the Recommendations made in this report (See PART E), it is considered that there will be no significant impact on these species as a result of the proposal.

4.1.2.5 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.

Eight Part Test: See **4.1.4** general eight part test

4.1.2.6 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.

Eight Part Test: See **4.1.4** general eight part test

4.1.2.7 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.

Eight Part Test: See **4.1.4** general eight part test

4.1.2.8 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: Possible

Likelihood of species occurrence: Low.

Eight Part Test: See **4.1.4** general eight part test.

Mammals

4.1.2.9 Grey-headed Flying-Fox *(Pteropus poliocephalus)* – Sch 2 Vuln

Habitat Requirements: Occurs on the coastal belt from Rockhampton to Melbourne (Strahan, 1995). Known as a Flying Fox this fruit bat belongs to a group of nectar and fruit feeding bats. They are migratory to various degrees depending on seasonal and permanent camps. The same camp sites are used year after year. (Strahan 1995 states that camps are commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy). Camps are located in rainforest remnants, often in gullies, and riparian situations, mangroves, melaleuca swamps, or casuarina stands in riparian areas (Eby 1995). Camps appear to be located to enable access to food resources. Leave their daytime camps about 20 mins after sunset and fly up to about 30 km to feed (whilst others claim up to 50 km – Strahan 1995). The population is most nomadic in winter, leaving their camps and following the sequential flowering of eucalypts. In Spring they return to the camps on the coastal lowlands.

The species follow the flowering and fruiting of preferred tree species. The species are important pollinators of forest trees and make a significant dietary contribution to Powerful Owls. During the night an individual may travel almost 100 km, feeding in many different patches of trees, whilst others spend the entire night in the same Fig Tree. Their diet is from two sources in the forest: nectar and pollen from flowers and the flesh of rainforest fruits such as native figs and palms. They feed from the flowers of 30 species of eucalypts as well as Turpentine, Callistemon, Melaleuca, Angophora, Firewheel Tree, Coast Banksia and Silky Oak. In a study in northern NSW this species was found to feed on the fruit of 32 species of 19 plant families. Also eat introduced fruits such as mangoes, peaches, plums and mulberries. (NP&WS - Biology and Management of *Pteropus* in NSW).

Habitat occurrence: Eucalypt trees/Paperbark are minimal but could provide a seasonal food source – particularly when species is in transit. Numerous fruiting coastal rainforest species would attract the species. No camp occurs on the *Site*.

Likelihood of species occurrence: Not detected but certain to occur seasonally. Nil impact likely.

Eight part test: Whilst more than a low possibility of occurrence on adjacent habitat, due to the virtual total lack of disturbance/impact to potential habitat as a result of the proposal, this species will be assessed under **4.1.4 general eight part test** (see under).

4.1.2.10 Micro bats

Common Bent-wing Bat *(Miniopterus schreibersii)*
Eastern Freetail-bat *(Mormopterus norfolkensis)* (also Eastern Little Mastiff Bat)
Greater Broad-nosed Bat *(Scoteanax rueppellii)*
Large-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*

Habitat requirements (all bats):

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 removal. Also lack of hollows and 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.

Eight part test (for all bat species listed above): Whilst more than a low possibility of occurrence on adjacent habitat, due to the virtual total lack of disturbance/impact to potential habitat as a result of the proposal, these species will be assessed under **4.1.4 general eight part test**.

4.1.2.11 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: None within areas proposed for development within the *Site*. Could occur in Swamp Oak/Swamp Forest – but lack of groundcover could preclude occurrence.

Likelihood of species occurrence: Nil on development *Site* – low to moderate on remainder of *Site.*

Eight Part Test: See **4.1.4** general eight part test.

4.1.3 Threatened species not recorded within 10 km - but which may occur

A list of these species has been provided in **PART B Section 2.5** and is repeated below. Species are:

Reptiles

Nil

Amphibians

Nil

Birds

Australasian Bittern *(Botaurus poiciloptilus)*
Mangrove Honeyeater*(Lichenostomus fasciogularis)*
Marbled Frogmouth *(Podargus ocellatus)*
Painted Snipe *(Rostratula benghalensis)*
Rose-crowned Fruit-dove *(Ptilinopus regina)*
Superb Fruit Dove *(Ptilinopus superbus)*
Terek Sandpiper *(Xenus cinerus)*
Wompoo Fruit-dove *(Ptilinopus magnificus)*
Yellow-eyed Cuckoo-sshrike (*Coracina lineata)*

Mammals

Queensland (Common) Blossom-bat *(Syconycteris australis)*
Eastern False Pipistrelle *(Falsistrellus tasmaniensis)*
Large-eared Pied Bat *(Chalinolobus dwyeri)*
Queensland Tube-nosed Bat *(Nyctimene robinsoni)*
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)*

Analysis follows:

Birds

Australasian Bittern *(Botaurus poiciloptilus)*
Mangrove Honeyeater*(Lichenostomus fasciogularis)*
Marbled Frogmouth *(Podargus ocellatus)*
Painted Snipe *(Rostratula benghalensis)*
Rose-crowned Fruit-dove *(Ptilinopus regina)*
Superb Fruit Dove *(Ptilinopus superbus)*
Terek Sandpiper *(Xenus cinerus)*
Wompoo Fruit-dove *(Ptilinopus magnificus)*
Yellow –eyed Cuckoo –shrike (*Coracina lineata)*

Habitat requirements (all birds):

These species included as both costal lowland rainforest and/or mangroves, mudflats are potential habitat. With some minor exceptions this habitat either does not occur on the *Site*, or there will no disturbance to the habitat occurring. Habitat is immediately adjacent.

Some species are found in rainforest – although in this case the extent and disposition of the rainforest occurrence is such that it may include all but a possible transient occurrence. Others are specialist inhabitants of mudflats, swamps, sandbars and similar habitat – there will be no disturbance to this habitat (all in Reserve), and no indirect impact is likely.

Habitat occurrence (for all birds): Both coastal lowland rainforest and/or mangroves, mudflats occur – but with some minor exceptions this habitat either does not occur on the *Site* or there will be no disturbance to the habitat occurring. Occurrence is mainly confined to the adjacent Reserve.

Likelihood of species occurrence (for all bird species listed above): Low to moderate. Could occur transiently.

Eight part test (for all bat species listed above): **See 4.1.4** general eight part test.

Mammals

4.1.3.1 Bats

Queensland (Common) Blossom-bat *(Syconycteris australis)*
Eastern False Pipistrelle *(Falsistrellus tasmaniesis)*
Large-eared Pied Bat *(Chalinolobus dwyeri)*
Queensland Tube-nosed Bat *(Nyctimene robinsoni)*
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)*

Habitat requirements (all bats):

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. Blossom-bat feeds on flowering plants including the Banksias, Callistemons and Pink Bloodwood. Coast Banksia appears to be the most important. Roosts in sub-canopy of rainforest where there is little variation in temperature and humidity. It is a strict nectarivore and rarely forages more than a few km from roost areas (Law B S 1993).

Others 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 removal. Also lack of hollows and 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 and provide a food substrate for mega bats.

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

Eight part test (for all bat species listed above): Whilst more than a low possibility of occurrence and mostly on adjacent habitat, due to the virtual total lack of disturbance/impact to potential habitat as a result of the proposal, these species will be assessed under **4.1.4 general eight part test**.

4.1.4 General eight part test

A species specific eight part test was undertaken for species that **occur** on the *Site* (one - see **4.1.1)** and species with a high likelihood of occurrence (one - see **4.1.2**).

In addition, a general eight part test has been undertaken for all other species listed in **4.1.2** and **4.1.3** above, that have a **low or low to moderate** likelihood of species occurrence (31).

Whilst a large number of species have been included in this analysis, given the low possibility of occurrence, and/or obvious likely minimal impact, and/or small area of habitat to be removed - a combined assessment is considered to be an adequate analysis of potential impact.

Species include:

Reptiles

Nil

Amphibians

Nil

Birds

Australasian Bittern *(Botaurus poiciloptilus)*
Black Bittern (*Ixobrychus flavicollis*)
Black-necked Stork *(Ephippiorhynchus asiaticus)*
Mangrove Honeyeater*(Lichenostomus fasciogularis)*
Marbled Frogmouth *(Podargus ocellatus)*
Masked Owl *(Tyto novaehollandiae)*
Painted Snipe (Rostratula benghalensis)
Powerful Owl *(Ninox strenua)*
Rose-crowned Fruit-dove *(Ptilinopus regina)*
Superb Fruit Dove (Ptilinopus superbus)
Sooty Owl *(Tyto tenebricosa)*
Square-tailed Kite *(Lophoictinia isura)*
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)*
Eastern Chestnut Mouse *(Pseudomys gracilicaudatus)*
Eastern False Pipistrelle *(Falsistrellus tasmaniesis)*
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)*
Large-footed Mouse-eared Bat *(Myotis adversus)*
Little Bent-wing Bat *(Miniopterus australis)*
Queensland (Common) Blossom-bat *(Syconycteris australis)*
Queensland Tube-nosed Bat *(Nyctimene robinsoni)*
Yellow-bellied Sheathtail-bat *(Saccolaimus flaviventris)*

Eight Part Test is as follows:

a) Life cycle of these species can either be protected, or impact will be so minimal (if at all), so that a viable local population (none evident) is not placed at the risk of extinction.

Given that 67% of the *Site* is cleared, and that only 3% (2 ha) of the remaining vegetation will be removed, and that vegetation to be removed has minimal habitat values - it is obvious that impact will be minimal. Significantly, the habitat of many of the species listed is either rainforest or riparian/mudflat - none of this habitat will be removed or indirectly impacted upon. Plantings associated with development will provide both food source and protection. The minor removal of vegetation from five disparate locations will not create a significant barrier to the movement of any listed fauna – most are highly mobile species capable of flight (lack of direct connectivity is not so significant to those species capable of flight). Many of these species are known to co-exist with human development, hence the minor disturbance is unlikely to adversely affect any species.

It can therefore be reasonably concluded that loss of potential food substrate as occurs on the *Site* will not be significant - given the highly disturbed nature of the *Site*.

No trees with habitat value (trees with hollows) will be removed. Logs on the ground do not occur. Although non threatened species occur (and are prey for some threatened species), they appear to be minimal and it is not considered that the development will impact significantly on numbers of prey species available in the locality. In fact over time plantings will increase habitat.

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 the species survival.

b) None of the endangered populations gazetted as at 12 December 2003 occur on the *Site*. No known "local" endangered population occurs. Provided the individual species life cycle is not significantly impacted upon (so determined above), then any population (none listed as endangered) should not be significantly impacted upon.

c) Minor area of low potential habitat will be removed. This area is not considered to be a significant area regionally. Similar habitat occurs elsewhere on lands on the *Site* and in the locality. As most species are widely distributed (but sparse in occurrence), known habitat used by known populations should be protected (this does not mean total protection of all habitat). This *Site* is not the location for any endangered populations as gazetted 12 December 2003 – hence no impact on populations either.

d) The *Site* is largely cleared and most vegetation occurring will be retained undisturbed. The general area in the *Locality* is variously developed. The *Site* adjoins a 30 m reserve adjacent the Hastings River for about 1300 m and adjacent Haydons Creek for 2200 m. This reserve contains the narrow fringe of riparian vegetation as well as cleared adjacent land. Rural residential development occurs mainly to the south, south-west and south-east, on both sides of Sancrox Road – these areas are variously forested. Some undeveloped forested lands occur to the west and north-east. The latter are lowlands - unlikely to be disturbed, whilst the western vegetation is dry sclerophyll forest that could be developed over time (see Attachments 1, 2 and 3). Vegetation removal over five disparate areas will not impact on connectivity for any species. Connectivity is not so relevant to species capable of flight (most species with potential to occur). Regardless, at least for species such as the koala, a connection corridor has been recommended for retention along the eastern boundary of Lots 103-105 linking Area I with forested vegetation south of Sancrox Road.

e) Critical habitats (as per TSC Act) are yet to be defined, hence no impact can be assessed. However, critical habitat for many species would be vegetation comprising large trees with hollows and connective links. Rainforest and riparian/mudflats would also be critical habitats for some species – no disturbance proposed.

f) More relevant to flora. All areas of habitat are likely and necessarily utilised – not just reserves. To maintain biodiversity all populations should be protected to the extent possible. Similar habitat occurs on other freehold lands in the locality. Most species have been recorded in many National Parks in the Region. In this case there will be no impact on any listed population. Species are variously known (not extensively) from conservation reserves in the NSW Biogeographical Region (perhaps moreso due to lack of surveys). Hence it is difficult to state that these species are inadequately represented in Conservation Reserves. For those species capable of flight, this criterion is of lesser importance.

g) None of the gazetted Schedule 3 threatening processes that may occur will significantly impact on the species as a result of this proposal. Whilst "clearing" is a listed process, the potential impacts of removal of vegetation have been addressed elsewhere in the eight 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. Other non "key" processes are unlikely to be caused – and therefore these species will not be significantly impacted upon by undertaking the proposal.

h) Species are within known distribution range. No listed populations as at 12 December 2003.

Conclusion: Subject to the adoption and implementation of the Recommendations made in this report (See PART E), it is considered that there will be no significant impact on these species as a result of the proposal.

4.1.5 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. The only aquatic habitat on the *Site* is three small dams and the dry headwaters of Haydons Creek. There are no other drainage lines of any consequence. The principal aquatic habitat occurs adjacent - being the Hastings River and Haydons Creek. Based on the following considerations, it was concluded that neither declared fish nor marine vegetation could occur on the *Site*, nor could indirect impacts occur and therefore the proposal could not possibly have an impact on threatened aquatic fauna or flora.

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,* ie minor ephemeral drainage lines and dams
- there are no permanent streams on the *Site*.
- no removal of dams or disturbance to head of Haydons Creek is proposed
- no disturbance (direct or indirect) is proposed to the Hastings River, Haydons Creek or the immediate areas adjoining these. Construction of a boat ramp/jetty will not involve significant disturbance.
- mitigation measures would be required as a component of approval to minimise movement of sediment/pollutants. In particular, close consideration to disposal systems for sewage is required (see Recommendations)

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

Therefore an eight part test is not required. Measures are proposed to mitigate potential impact (see Recommendations).

4.2 Flora

4.2.1 Threatened species detected

No threatened species detected – neither are any likely to occur on the areas to be developed. Many of the species listed would not occur in such a site as they have specific niches that do not occur. Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any species, if present, was not detected.

However an endangered community occurs (Coastal Lowland Rainforest) on the *Site* and on adjacent land. Earlier assessment determined that there would not be any impact on this vegetation as a result of undertaking the proposal.

Therefore an eight part test is not required. Measures are proposed to mitigate potential impact (see Recommendations).

4.2.2 Threatened species recorded within 25 km

A review of possible TSC Act Schedule 1 & 2 species which could occur on or in the vicinity of the study area was undertaken - see **Part B, Section 2.4**.

No threatened species detected. Many of the species listed would not occur in such a site as they have specific niches that do not occur. Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any species, if present, was not detected.

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 amendments dated 12 December 2003 occur or are likely to occur.

Therefore an eight part test is not required. Measures are proposed to mitigate potential impact (see Recommendations).

4.2.3 Threatened species not recorded within 25 km - but which may occur

In **Part B, Section 2.5** it was determined that none of these species were detected on site. Further, virtually all species occurring have been identified. As most species occur in populations rather than single plants – it is most unlikely that any species, if present, was not detected.

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 amendments dated 12 December 2003 occur or are likely to occur.

Eight part test: Not required.

ATTACHMENT 8

REFERENCES AND BIBLIOGRAPHY

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ATTACHMENT 9

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Principal

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CV Dated 1.12.02 - BRIAN SALTER

Education & Qualifications

Primary - East Kempsey Primary. Secondary - Kempsey High School/Farrer Agricultural High School. Tertiary - Sydney University/Australian National University (B Sc For).
Other Training - Courses in wildlife identification & survey techniques, aerial photo interpretation, road location and construction, Management Plan preparation, safety, communications, herbicide use, meteorology, media skills, staff selection, fire control, managing for change, motivation and leadership, motivation in the workplace, staff selection and other in-service courses. Qualified Work Place Trainer Category 1. Statement of Competency in a wide field of activities (NSW Forest Industries Training Board).

Appointments

1992 to present - Principal, North Coast Forestry and Ecology Services.
1989/92 - Regional Forester, Forestry Commission of NSW, Port Macquarie. 1986 - Acting Mng Officer Head Office 3 mths. 1979/1989 Deputy Regional Forester Newcastle (Act Reg For for 12 mths). 1969/79 District Forester, Kempsey, Batemans Bay and Eden. 1968/69 Assistant Forester Narrabri & Kempsey. 1961/67 NSW Forestry Commission Trainee (University/Field Year).

Positions Held & Professional Memberships

Currently member of Institute of Foresters of Aust, Assn of Consulting Foresters of Aust, Ecological Consultants Assn of NSW. Previously Pres Forestry Students Assn, Sec NSW Div Inst of Foresters, Apex Board member & President, delegate to Putty & Central Coast Bush Fire Prevention Assn, Member Lake Macquarie City Council Planning & Advisory Committee, Sec Newcastle Timber Industry Golf Committee, Snr Vice Pres & Exec member Forestry Field Officers Assn, member Hunter Institute of the Environment, member Newcastle Industrial Safety Assn, member District Bush Fire Committee & Chief Co-Ordinators Primary Nominee for emergency fire fighting in 4 shires, alternate delegate to Northern Reg Fire Assns, member Manning Total Catchment Management Committee, rep on local Co-ordinators' State Administrators' Scheme.

Experience

a) As a consultant - projects include:-

- Forest Management Plans preparation for three large and several smaller timbered properties.
- Environmental assessment of forestry activity (Review of Environmental Factors).
- Development Applications preparation for forestry and submissions for Exemptions from Consent based on Existing Use.
- Timber volumation and valuation for several properties.
- Harvesting Plan preparation, oversight of Fauna Impact Statement preparation.
- Located and evaluated land for exchange purposes (dam and landfill purposes).
- Planned and supervised establishment of eucalypt plantation.
- For State Forests of NSW:-
  - prepared Annual Management Reports, Fire Reports, Fire & Fuel Management Plans
  - appointed Operations Manager for Emergency Fire Control Centre
  - reviewed EIS on proposed export of woodchips from silvicultural residues
  - undertook review of Contractor Management Systems for introduction in NSW
  - conducted training for Log Grading & Segregation, Soil & Water Protection (TAFE course)
  - reviewed suitability of private properties for possible purchase for euc. plantation establishment
  - project manager for resources review Manning Region
- Fauna and environmental - undertaken numerous (100) SEPP 44, EP&A Act (Sect 5A and 79C), EPBC Act Assessments, managed fauna survey program for EIS/FIS, fauna prescriptions for Management and Harvesting Plans. Prepared Koala Management Plans. Acting Ecologist Nth Reg SFNSW 3 months.
- For the NSW Forest Products Association:-
  - reviewed draft endangered fauna legislation
  - reviewed and critically analysed wilderness proposals
  - reviewed potential to allocate sawlogs to sawmiller from State Forest

- Legal matters:-
  - reviewed worker's compensation claim against State Forests for GIO of NSW
  - prepared affidavits on tree damage to property (caravan and house)
  - prepared report on cause of tree health decline
  - prepared affidavit in relation to civil action to recover unpaid royalty (two cases)
  - investigated and prepared affidavit in relation to cause and responsibility for bushfire damage
  - prepared bushfire protection measures for proposed Estate and defended in Land & Environment Court
  - engaged by GIO to investigate fire cause and damage and attended Court
  - investigated and prepared review of ecological impacts of gravel trucks using roads in national parks for Supreme Court damages claim
  - investigated, prepared report and attended Land Board hearing in relation to action over fencing
- Prepared submission for landholders opposing amendments to a Tree Preservation Order.
- Prepared applications under SEPP 46 - Native Vegetation Conservation Act, to undertake clearing and forestry activities.
- Prepared Bushfire Risk Assessments and Management Plans for a range of development proposals.
- Prepared two Review of Environmental Factors for road widening on behalf of Hastings Council and another for Country Energy for an underground power cable.
- Extractive industries:-
  - prepared EISs and SEEs for various quarry operations including sand, ridge gravel and river gravel extraction and crushing under SEPP 37 provisions and Schedule 3 of EPA Act regulation.
  - prepared Quarry Management Plan for gravel quarry and Rehabilitation Plan for sand quarry.
  - reviewed adherence to rehabilitation requirements in relation to several quarries on behalf of Nambucca Council.

(b) With NSW Forestry Commission

- 26 Years practical experience including: Regional Forester for 3 yrs (Port Macquarie), Deputy Regional Forester for 10 years (Newcastle), District Forester for 10 years (Kempsey, Batemans Bay, Eden), Assistant Forester for 2 years (Narrabri and Kempsey).
- Extensive North Coast experience and contacts, including: all forests, geography and land tenures, local Govt., MPs, media, unions, environmental groups, Govt Depts, Industry (timber) and Trade Associations, markets and environmental issues.
- Wide experience in;
  Forest Management: All aspects of north coast/hinterland native hardwood and rainforest forestry in particular; management practices, silviculture, protection, road location and construction, multiple use management, eucalypt plantation management, regrowth forestry, old growth harvesting, Management Plan preparation and inventory.
  Environmental: Legal and other challenges on forestry activities, injunctions, preparation of affidavits and evidence, public meetings, forest protests and closures, media, police liaison, negotiations etc. Oversight of EIS preparation, compliance with EP&A Act and other legislation eg Clean Waters Act, Forestry Act, Timber Industry Protection Act, Endangered Fauna Interim Protection Act, Standard Erosion Mitigation Conditions and harvesting planning controls eg Codes of Logging Practice and Licence Conditions. Local Govt. LEPs and REPs in relation to forestry.
  Marketing Harvesting: All aspects of sale to industry of a wide range of forest products ($9 mil pa revenue in PM Region). Preparation of Operational Plans, Tenders and Wood Supply Agreements. Extensive knowledge of markets and influencing factors, establishing prices. Close involvement in the establishment of the hardwood/pulpwood industry on the North Coast - integrated logging, product segregation, thinning of regrowth and plantations for pulp and small logs.
  Operational: Oversight and approval of expenditure eg PM region $6 mil pa. Responsible for works program compilation and budget control. Long experience in road location and construction, eucalypt plantation establishment and silviculture of native forests, fire control, safety, training and land matters (Crown Lands Act, land studies and assessments, mining, access arrangements).
  Industrial: Negotiations with Unions, award and industrial/employee issues, disputes and appeals.
  Public Relations/Media/Corporate Administration: Dealing with all forms of media, interviews, tours and inspections. Prepared Ministerial briefing and responses, liaison with industry, government, environmental groups etc. Familiar with all strategic documents relating to forestry, eg RAC, PAC, ESD, NFI etc. As Regional Forester represented the Forestry Commission in the field.

Referees

- Brian Lidbury, Manager Degotardi Smith and Partners (Surveyors) Forster Phone 6554 7988.
- Mark Farrell, Managing Director, P J Farrell Pty Ltd (property owner), Stroud. Phone (02) 4929 2926.
- John Mills, Regional Manager, Mid North Coast Region, State Forests of NSW, Wauchope. Phone (02) 65853744.

A detailed CV is available on request, including additional information on consulting projects undertaken.

ADDENDUM TO CV B J SALTER – 7.10.02
(AS RELATES SPECIFICALLY TO FAUNA SURVEYS AND WILDLIFE MANAGEMENT, FLORA SURVEYS AND FLORA PROTECTION)

Professional Qualifications

- B Sc (Forestry) 1967 - 5 Year course at Sydney/ANU universities which included units in biology, botany, ecology and zoology. This provided a basic background in botanical, biological and zoological disciplines. Forestry is a multi-discipline activity with flora and fauna identification and wildlife management being principal components. Whilst my title may be "Forester" this does not constrain activities to trees and associated flora matters. I consider myself to be an environmental scientist with qualifications and experience in a wide field of activities, particularly biological and ecological matters.
- Certificate of Wildlife Survey Techniques (1995 SFNSW)
- Certificate of Wildlife Identification Skills (1995 SFNSW)
- Certificate of Frog and Bat Identification and Survey Skills (1998 SFNSW)
- Inservice SFNSW courses over a period of 27 years
- Leading Professional Stage 3 (Australian Institute of Agricultural Science and Technology)

Professional Affiliations

- Institute of Foresters of Australia
- Association of Consulting Foresters of Australia
- Australian Institute of Agricultural Science & Technology
- Australian Register of Agricultural Consultants
- The Ecological Consultants Association of NSW

Other Relevant Qualifications

- Included on NP&WS List of Fauna Consultants. Note that a CV is required by the NP&WS in order to be listed.
- Hold Scientific Licence (No A 2259) under Sect. 120 and 130 of NP&W Act authorising the trapping of protected fauna.
- Licensed (Licence No CON 95010) by NP&WS to obtain information from the Atlas of NSW Wildlife.
- Hold an Animal Research Authority (issued by the Director-General of NSW Agriculture).
- Hold a Certificate of Approval (issued by Animal Care and Ethics Committee of the Director-General of NSW Agriculture.

- Possess extensive reference library on flora, fauna, wildlife management and have access to a complete library. Established herbarium of local flora.

- Well read and knowledgeable in flora and fauna surveys and wildlife management.

- Detailed knowledge of the requirements of the relevant Acts and Regulations including NP&W Act, EP&A Act, Native Vegetation Conservation Act, Threatened Species Conservation Act, Environment Protection and Biodiversity Conservation Act, SEPP 44 and other relevant SEPPs. Attended seminar conducted by NP&WS and DUAP on implementation of TSC Act.

- Have extensive range of fauna playback tapes and amplifying equipment, micro scales, spotlights, large cage traps, Type A and B Elliot traps, small and large hair tubes, Faunatech hair tubes and an Anabat bat detector.

- As per list of projects (available) have undertaken numerous (86) ecological studies - including SEPP 44 and Section 5A assessments within Pristine Waters, Coffs Harbour, Hastings, Bellingen, Nambucca, Kempsey, Taree, Port Stephens and Great Lakes Council areas.

- Regular assistant also has Certificates in Wildlife Survey Techniques and Identification (SFNSW !995) and 9 years experience.

- Have contact with and access to very experienced and competent wildlife researchers, ecologists and botanists for advice if necessary.

Experience/Projects

(a) With SFNSW

- 25 Years practical experience over a range of appointments with the majority being on the north coast.

- SFNSW is at the forefront of wildlife surveys, FISs and EISs and wildlife management in NSW. Survey techniques were developed by SFNSW/NP&WS for major projects. I have been associated with these developments for many years.

- Extensive fauna experience in relation to compilation and implementation of SEEs, EISs, FISs. These were major projects involving a comprehensive understanding of all matters relating to fauna survey and wildlife management. Subsequent Section 120 NP&WS Licences, EFIPA and EP&A Act Requirements - including injunctions and Court challenges particularly in relation to fauna matters - further enhanced this knowledge.

- Close association with research projects into wildlife matters and flora identification over many years.

- Prepared comprehensive harvesting plans including implementation and oversight -requiring detailed knowledge of flora habitat and wildlife management.

- Prepared forest management plans, implementation and oversight of all prescriptions - including flora and fauna prescriptions.

(b) As a Consultant

- Undertaken numerous (60) ecological assessments on a wide range of proposals (including all necessary flora and fauna surveys) in Kempsey, Bellingen, Port Stephens, Nambucca, Hastings, Taree and Great Lakes Council areas. Subsequently undertook assessments and prepared detailed reports on SEPP 44 Koala Habitat Protection and "8 point tests " (Section 5A - EP&A Act) for determination of significance of impact on threatened species. Prepared several koala management plans.
- Undertaken many Assessments of Impact on the Natural Environment as required by Section 79C (EP&A Act).
- Undertaken several impact assessments as required by the provisions of the Commonwealth's Environment Protection and Biodiversity Conservation Act.
- Project Manager for SFNSW for a proposed FIS for the Mid Coast Regrowth Forests EIS (125 000 ha of forest between Raymond Terrace and Kendall). Involved determining stratification, survey techniques and consultants' brief for fauna surveys. Prepared contracts and engaged consultants for amphibian surveys.
- Prepared three EISs, five REF's for extractive industries (SEPP 37/Schedule 3) including all studies and documentation relating to flora and fauna surveys and wildlife management. In all cases the flora and fauna component of these environmental impact assessments has been accepted by NP&WS and Councils.
- Prepared comprehensive management plans for four large forested properties (1 500 ha to 5 000 ha), which included all aspects relating to flora and fauna and wildlife management.
- Prepared several REF's for forest management proposals including all aspects of flora and fauna and wildlife management. Have had oversight in all aspects of harvesting, particularly in relation to meeting flora and wildlife prescriptions.
- Organised and had oversight over an FIS for a 2 000 ha timbered property. Included review of FIS, negotiations with NP&WS and Council regarding conditions and oversight of application of conditions since approval.
- Reviewed proposed Threatened Species Legislation on behalf of the Forest Products Association and prepared a draft report to the NSW Government on behalf of the Association.
- Addressed management options for several timbered properties in relation to meeting the requirements of the EFIPA/EP&A Act.
- Prepared draft report for SFNSW on monitoring undertaken in relation to Determination requirements of the Wingham MA EIS with emphasis on meeting relevant conditions set down by DUAP for wildlife management.
- Prepared harvesting plans for SFNSW that incorporated Conservation Protocols and specific species prescriptions for a range of species.
- Acted in the position of Ecologist for a period of 2 months for Mid North Coast Region SFNSW. Entailed planning and oversight of extensive flora and fauna surveys on State Forest.
- Reviewed and submitted comment on draft Vegetation Management Plan, Koala Management Plan and vegetation mapping within several Council areas.