Planning Proposal
Tallowood Ridge,Mullumbimby

A Plan to Protect the Forested areas of the Land

Bayview Land Development Pty Ltd
January 2014

EXECUTIVE SUMMARY

This Planning Proposal relates to land at the Tallowood Ridge Estate, Mullumbimby. The Land at the Site is currently partly zone 2(a) and partly zone 1(a) under the Byron Local Environmental Plan, 1988.

The fundamental idea behind this Planning Proposal is to relocate an area of residential zoning currently approved for residential development to a more suitable, alternative location within the site to provide statutory planning protection, care and management of the part of the land known to provide habitat for a number of animal species.

Council, at its meeting on 14th March 2013, invited the developers of the Tallowood Ridge Estate to submit a Planning Proposal to provide for alteration of the zoning boundaries to facilitate setting aside the forested areas of Tallowood Ridge Estate as habitat.

The Tallowood Ridge Estate rezoning proposal includes both environmental protection zonings and landowner initiatives.

The Planning Proposal is consistent with the Sustainability Criteria set out in the Far North Coast Regional Strategy.

The Planning Proposal achieves key outcomes sought under Council's Environment Community Strategic Plan and is also consistent with the relevant State Environmental Planning Policies.

The Planning Proposal does not conflict with any of the Ministerial Directions issued pursuant to section 117 of the Environmental Planning and Assessment Act.

Open Land in Northwest corner of Site proposed to be rezoned from 1(a) Rural to R2 Residential

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1 INTRODUCTION

1.1 PREAMBLE

This Planning Proposal relates to land locally referred to as the "Tallowood Ridge Estate" located within the town of Mullumbimby (the "Site"). The land within the Site is currently partly zoned 2(a) residential zone and partly zoned 1(a) general rural zone under the Byron Local Environmental Plan, 1988.

On 14 September 2010 the Land & Environment Court of NSW granted staged development approval for the whole of the 2(a)-zoned part of the land. In addition to this approval, a recreational grounds consent applies to the land North of the existing residential part of the estate, adjacent to Clays Road.

Stage 1, comprising 29 lots, has been developed. As part of the Stage 1 Conditions of Development Consent an overall *Biodiversity Conservation Management Plan* was prepared and that plan was approved by Council on 20 December, 2011.

Stage 2 of the Estate was granted Development Consent on 3 April 2012. Stage 2, providing 27 residential allotments, was registered on 5th December 2013.

The purpose of this Planning Proposal is to amend the current controls that apply to the undeveloped parts of the Site to:

- provide additional habitat for a variety of local species including transient koalas visiting the area; and
- provide housing that is more affordable than can currently be constructed on the steeply sloping 2(a) zoned part of the Site.

The intended outcome of the Planning Proposal is to amend the Draft Byron Local Environmental Plan 2012 to relocate residentially-zoned land away from land having the potential to provide habitat for a number of species by creating approximately 22 ha of new environmental protection zoning.

The Planning Proposal has been prepared in accordance with Section 55 of the *Environmental Planning & Assessment Act 1979* (EP&A Act). As required by Section 55, this Planning Proposal includes the following:

- a statement of the objectives or intended outcomes of the proposed instrument;
- an explanation of the provisions that are to be included in the proposed instrument;
- the justification for those objectives, outcomes and provision and the process for their implementation;
- plans of the intended amendments to the LEP zones, and
- details of community consultation.

The applicant consulted extensively with Byron Shire Council as to its preferred zonings, locations of boundaries between zonings, minimum lot sizes and planning controls. The proposed Plan accords with the requests and requirements of the Byron Shire Council and is submitted as an amendment to the Byron Shire Draft Local Environmental Plan 2012 currently under review by the Department.

It is the intention of the proponent and the Council that the areas proposed to provide habitat will be zoned an appropriate environmental protection zone at such time as the "E" zones are determined by the Department. In the absence of clarity as to the appropriate environmental protection zones to use, the zoning plan attached to this report shows these areas as RU1, RU2 and R5.

2 SITE DESCRIPTION

2.1 THE SITE

The site is located at Mullumbimby and is approximately 59.10 ha in area. The site is irregular in shape. A Site and location plan is shown at **Plan 2.1**.

The Site is described on Registered plan as Lot 57 in DP 1190345 and is held in the name of Gainsplay Pty Ltd. Gainsplay is the trustee company for the Tuckeroo Trust.

2.2 GENERAL DESCRIPTION OF CONSTRAINTS AND OPPORTUNITIES

Entry to Estate

Though a town of only 3,175 people (2011 Census), Mullumibmby is a sefl-sufficient town that provides an extensive range of goods, services, schools, churches and community infrastructure including numerous football fields, tennis courts and the Olympic-size Petria Thomas Swimming Pool. Mullumbimby is the seat of the Byron Shire Council. Woolworths completed construction of a large new outlet with onsite parking in 2011 to serve the needs of the towns of Mullumbimby, Ocean Shores, Brunswick Heads and the many rural properties scattered throughout the hills in the Northern half of the LGA.

Mullumbimby is located on the bank of the Brunswick River and sits on the flood plain at the base of the Koonyum Mountain range. Mullumbimby has experienced flooding in the town during peak floods of up to 1 metre in depth. Opportunities to expand the town on flood-free land are very limited. The Tallowood Ridge Site is located 3 minutes to the West of the Mullumbimby CBD. The land in the Northwest corner of the Site is considered to be "unconstrained" and the logical extension of services being constructed at the Site including:

- a dedicated sewage pumping station built at cost of $400,000 to pump sewage via a rising main under the Brunswick River;
- a 200mm water trunk main passing through the proposed area of expansion within the Site; and
- sports fields comprised of 2 football fields, a cricket pitch, 2 tennis courts and a basketball / netball court.

In 2011, Council completed construction of a new sewage treatment works for Mullumbimby, Brunswick Heads and Ocean Shores at a cost to the residents of the LGA of approximately $42 million. The substantial part of the funds required are borrowed funds. At present, the design capability of the STP is under utilised and places a significant financial burden upon the residents of the LGA that will persist for generations to come until a sufficient amount of development contributions are received from growth within the catchment of the STP.

Since the first Development Control Plan was prepared for Mullumbimby in 1988, the majority of the Northwestern part of Tallowood Ridge Estate site has been identified by Council as *"generally unconstrained land"*. The rural residue area of the land at elevation above the flood plain has consistently been nominated for *"Future Urban"* Purposes.

Further constraining use of the Site for residential purposes is the forested areas in the Southwest corner of the land.

The proponent has taken a fresh look at the Tallowood Ridge Estate to identify and set aside the areas of forest deserving of conservation and rehabilitation.

The various analyses completed indicate that land in the Northwest corner of the land is generally "unconstrained" by any of flooding, slope or being forested, whereas large parts of the existing 2(a)-zoned land are constrained by virtue of being forested, steep slope, flooding and riparian zone management considerations. The constraints relevant to the site are shown in **Plan 2.2.**

2.3 BRIEF DESCRIPTION OF INVESTIGATIONS COMPLETED FOR THE SITE

Assessment under SEPP 55 Remediation of Land

Simmonds & Bristow Pty Ltd, a NATA-accredited company recognised as experts in the subject of contaminated soils, was commissioned in January 2009 to complete an investigation of the potential for existence of contaminated soils and acid sulfate soils on the site as a whole in accordance with the requirements and guidelines of SEPP 55 (Simmonds & Bristow, 2009 – TAB 7 in the bundle of document approved pursuant to the Concept Approval issued by the Land and Environment Court).

Simmonds & Bristow concluded that the proposed land development is suitable in the context of SEPP55 because:

- There is no existing or increased risk to human health from the current soil quality of the subject land;
- There are no significant concentrations of heavy metals (with the exception of zinc) or metalloids (e.g. arsenic), organochlorine or organophosphorus pesticides or petroleum hydrocarbons based on the results of the soil samples tested;
- The environmental risks from high zinc concentrations for the entire site (detected in only three (3) samples out of a total of seventy-three (73) are low based on the frequency of exceedance;
- Zinc concentrations can be reduced if required by excavation and mixing in a bunded area;
- There is no particular pattern to the higher zinc concentrations measured and the soil results are considered to be isolated occurrences, and

View of Council chambers in the town centre.

- There are no detrimental effects on the biophysical environment that cannot be managed (e.g. avoiding disturbance of acidic soils).

Assessment of Site for cultural and European Heritage

Everick Heritage Consultants Pty Ltd completed an extensive search and investigation of the Site in June 2009. They found the subject land has historically been used for farming operations and there are no apparent items of early European or Aboriginal cultural significance which remain on the site.

View of Mount Chincogan leading in to the township.

A search of the AHIMS database on 15th June 2013 in relation to lat, long – 28.5735, 153.4539 to lat, long – 28.5527, 153.487 and a 50m buffer disclosed no known Aboriginal sites or places. That said, the locality of the ridgeline to the South of the site has been identified as a walking trail that may have been used by Aboriginal people prior to European settlement in the area.

The landscape down from the ridgeline and north of the southern road reserve where future dwellings are proposed to be located is not a landscape type referred to in Step 2b of the DECCW due diligence code (DECCW 2010). Accordingly, in accordance with the code it is concluded that there is a low probability of aboriginal objects occurring within the development area of Stage 4.

Assessment of Site for significant flora and fauna

Refer to flora and fauna report of Peter Parker Consultants at Annexure A.

Assessment of impact of flooding

Paterson Consultants Pty Ltd completed several assessments of the Site (for each stage of development) for impact of flooding under circumstances of extreme flood events, with the last of the reports completed at the direction of Commissioner Hussey of Land & Environment Court in the proceedings of September 2010. Section 18 "Drainage Strategy" of the Court-approved "Master Plan" contains the following excerpts:

> A large portion of the development site, primarily at the north extents, is affected by the 1% flood event. The extent of inundation during the 1% flood event, with allowance for 20% increase in stormwater flows from further up the river catchment basin due to climate change, is depicted in Plan 9.2.
>
> The flooding history of the development site, in so far as it is known, can be summarised as follows:
>
> - The Brunswick River Flood Study (Byron Shire Council) November 1986 flood investigations undertook flood modelling from Coral Avenue (upstream from the subject site) to Brunswick Heads. The study tabulated 46 historical flood heights in their flood study over the period 1954 to 1986. The only recorded flood height near the site was a recorded RL 6.93m AHD at Coral Avenue; and
> - The 1986 flood study identified the design flood levels at the site as:
>
> (a) 1% AEP flood level RL 6.8m AHD
>
> (b) 5% AEP flood level RL 6.2m AHD
>
> and
>
> - Inquiries by the proponent of the previous owner, who were owners of the land for more than 60 years prior to 2008, indicate that no part of the land had flooded at any time during their time of ownership.
>
> Having regard to these characteristics, there are 2 types of "storm events" that need to be considered as part of the drainage strategy:
>
> 1. The 1% storm event over the Brunswick River catchment area that will cause flooding along the Brunswick River and its floodplain. The flood water will initially flow back up the drainage channel from the north east of the site and will cover some of the low-lying rural and open space portions of the site. Towards the peak of the flood, the Brunswick River will break its banks inundating the site up to the "1% flood line" as shown in Plan 9.2.
> 2. Local storm events occurring within the catchment of the site. Based upon the results of computer modelling and calculations undertaken by LandPartners, the runoff from local storm events will behave and be managed in the following way:
>
> (a) stormwater flows will remain within the drainage channels on the development site and be conveyed to the Brunswick River by the east-west main drainage line; and
>
> (b) stormwater run off flows during storm events up to and including the 1% AEP local event will be detained in the stormwater detention basins so that the post-development run off flows will not exceed the pre-development run off flows (see Plan 10.2).
>
> Having regard to the detailed studies undertaken by Land Partners and Paterson Consultants of the above storm events, it is the assessment of Paterson Consultants Pty Ltd that it is predominantly the 1% flood event within the Brunswick River basin that creates flooding issues for this development site.
>
> The potential flooding of the development site by Brunswick River flooding has been modelled by Paterson Consultants. Flood modelling has been completed for:
>
> - the 1% flood event; and
> - the 1% year flood plus 20% additional rainfall (being an allowance for increased rainfall consistent with predictions about the anticipated effect of climate change).

The flood modelling of climate change has been undertaken relying on the recommendations of IPCC reports, CSIRO reports and DECC guidelines. In this Strategy, it is noted that the current modelling has adopted the 1% flood event plus 20% additional rainfall, being an allowance that is generally in accordance with these recommendations at the time of lodging the DA. The term "1% design event" is otherwise used in this Strategy to describe the assumptions that must be incorporated into modelling to take account of future recommendations that may be made by these authorities.)

The above modelling has been completed for…….whole development proposed under the Concept Proposals including the assessment of impacts of raising the level of the road adjoining and to the east of the sports fields area but excluding:

- the alternative flood access to Clays Road to the west of the site; and
- Filling of the large lot located off Tuckeroo Avenue, some 100 metres north of the Stage 1 development;
- partial filling only of two lots on the southern periphery of the floodplain under Stage 6.

The flood modelling concluded that, within the tolerances of the modelling, none of the Stage 1, Stage 2 or the whole site development would cumulatively increase flood levels for the design 1% AEP flood plus a 20% increase in rainfall intensity.

It was based on this modelling that the constraints on the development site, having regard to the flood characteristics, were identified and taken into account when the schematic subdivision layout was prepared. This addressed the interface of the residential land with the anticipated 1% flood event.

Other parts of the development site, as shown between the blue and purple lines on Plan 9.2, will be filled to bring the land to be developed out of the flood plain created during the design 1% flood event. There is sufficient open space in each location shown to provide a batter outside the area to be filled.

When each Stage is developed, the modelling that has been undertaken to date by Paterson Consultants will be updated to take into account the statutory provisions and climate change parameters with respect to flooding that are applicable at the time of assessment.

The infrastructure for the site – and particularly the roads – have been designed with regard to the flood characteristics of the site.

All of the extension to Tuckeroo Avenue and Road No. 2 will be flood-free in the design 1% flood event. Tuckeroo Avenue is the main access road for the development and the road will be engineered in order to ensure vehicles can safely travel this road and that the road will be flood free.

Tuckeroo Avenue crosses 2 drainage channels on the site. In order to preserve the environmental characteristics of the channel and maintain flood behaviour while providing flood free access, 2 large culverts within the drainage channels are proposed and these are depicted in the LandPartners Plans CU1 – CU6. The effect of these culverts is that floodwaters flowing into the development site can move relatively freely up and down the channel without being impeded by the infrastructure on the site.

The proposed subdivision, and the infrastructure that supports the estate, have been designed and located in a manner that has regard to the flooding impacts predicted by detailed modelling completed by Paterson Consultants. The development proposed has been designed to accord with the results of this modelling. The Drainage Strategy will guide future development while providing some flexibility to accommodate design changes as the design and development of the site proceeds.

Tallowood Ridge

LEGEND

- Residential area
- Open space area
- MD — Medium density
- Zone line
- 1% Flood line (proposed)
- 1% Flood line (existing)

North

0 100m

1 : 4000 @ A3
Source: Bayview Land Development (subd plan 10.04.10.pdf)
Date: 30 April 2010
1232-401 plan 9.2 subd

Plan 9.2

SCHEMATIC SUBDIVISION PLAN WITH FLOOD LINES

2.4 CURRENT PLANNING CONTROLS

Byron Local Environmental Plan 1988 is the principle planning instrument applying to the estate. Under the LEP 28.7 ha of the estate and adjoining roads are zoned 2(a) Residential zone and 40.1 ha are zoned 1(a) General Rural zone. This zoning pattern is illustrated in **Plan 2.3**.

The objectives of each of the above-mentioned zones are as follows:

Zone No 1 (a) General Rural Zone Objectives

(a) to encourage and permit a range of uses creating a pattern of settlement, at a scale and character that maintains or enhances the natural, economic, cultural, social and scenic amenity of the rural environment of the Shire of Byron,

(b) to encourage and permit a pattern of settlement which does not adversely affect the quality of life of residents and visitors and maintains the rural character,

(c) to ensure development only occurs on land which is suitable for and economically capable of that development and so as not to create conflicting uses,

(d) to allow the use of land within the zone for agricultural purposes and for a range of other appropriate purposes whilst avoiding conflict between other uses and intensive agriculture,

(e) to identify lands (shown hatched on the map) which in the opinion of the council possess a limited capability for more intensive uses or development,

(f) to restrict the establishment of inappropriate traffic generating uses along main road frontages other than in road side service areas,

(g) to ensure sound management of land which has an extractive or mining industry potential and to ensure that development does not adversely affect the potential of any existing or future extractive industry,

(h) to enable the provision of rural tourist accommodation and facilities only where such facilities are compatible with the form and density of the nature of the locality, and

(i) to permit the development of limited light industries which do not pose any adverse environmental impact, (e.g. software manufacture and film processing), and

(j) to ensure that the development and use of land shown cross-hatched on the map adjacent to areas of significant vegetation and wildlife habitat do not result in any degradation of that significant vegetation and wildlife habitat, and that any development conserves and protects and enhances the value of the fauna and flora.

Zone No 2 (a) Residential Zone Objectives

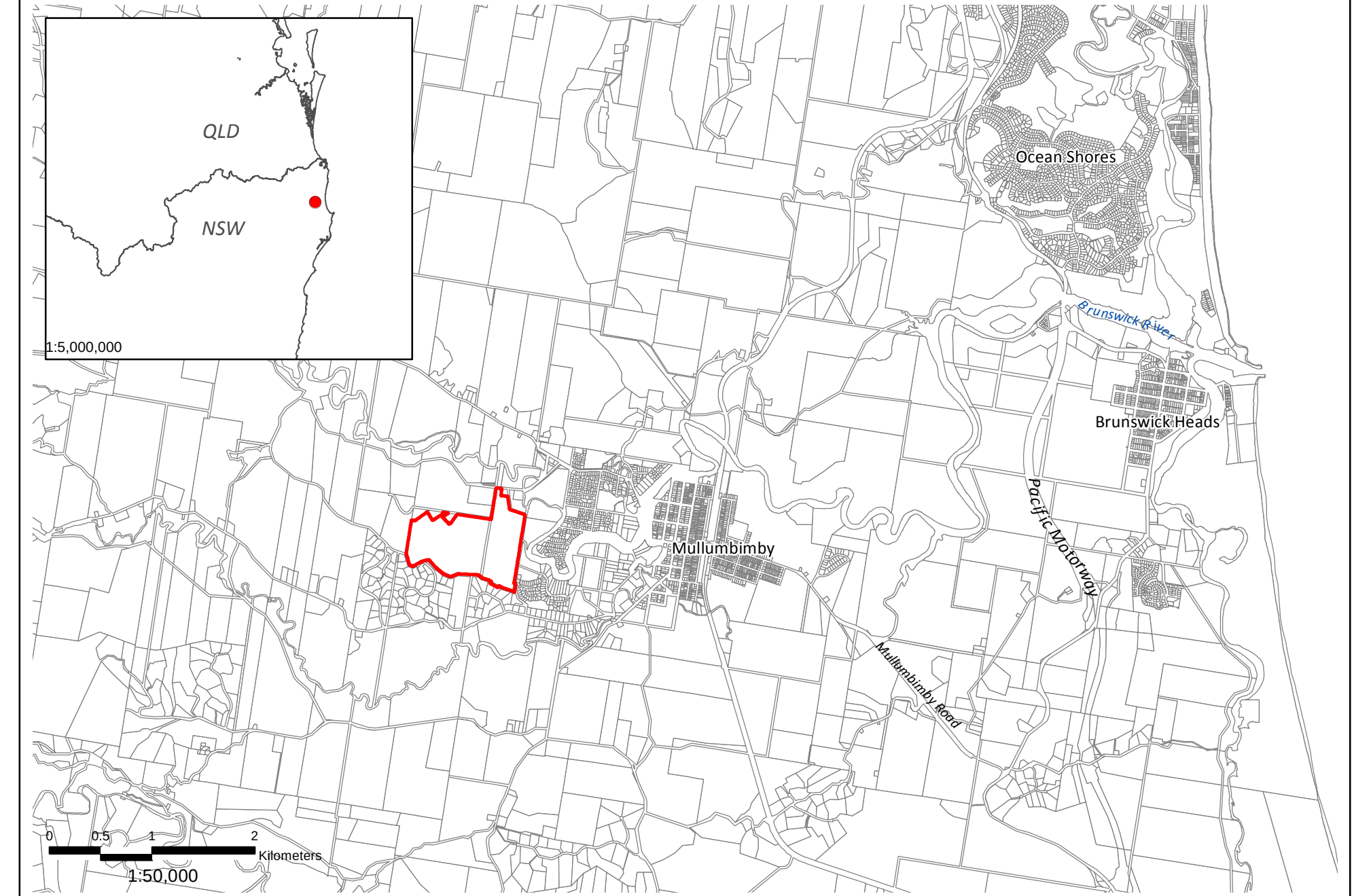
(a) to make provision for certain suitable lands, both in existing urban areas and new release areas, to be used for the purposes of housing and associated neighbourhood facilities of high amenity and accessibility,

(b) to encourage a range of housing types in appropriate locations,

(c) to enable development for purposes other than residential purposes only if it is compatible with the character of the living area and has a domestic scale and character, and

(d) to control by means of a development control plan the location, form, character and density of permissible development.

Tallowood Ridge, Mullumbimby



Legend

Tallowood Ridge Estate

Cadastre

PLANNERS NORTH

Plan 2.1 Site and Location Plan

N
W E
S

Legend

- Subject site
- High conservation vegetation
- Fauna habitat
- Riparian vegetation
- Court Approved Flood line
- Paterson 1% flood line
- Flood Planning Area
- 0.5m Contour intervals

CLAYS ROAD

CLAYS ROAD

STAGE 3

STAGE 2

STAGE 1

0 100m

1:4000 @ A3

Source: Tallowood Land Developments, Jan. 2014

Plan 2.2

SITE ANALYSIS

Tallowood Ridge, Mullumbimby

Legend

- Tallowood Ridge Estate
- Current Zones
- Cadastre Boundaries

N

0 50 100 200
Metres

1:7,500

Plan 2.3 Current Zoning

3 PLANNING PROPOSAL

3.1 OBJECTIVES

The objectives of this Planning Proposal are:

(a) to relocate part of the existing 2(a) Residential zoning to an un-used part of the Site that is better suited to creating affordable residential homesites; and

(b) to protect and implement care and management of 22 ha of new environmental protection zoned land.

3.2 INTENDED OUTCOMES

The Plan will re-allocate the land within the Site to achieve the following outcomes:

1) The Plan will provide affordable residential housing which accommodates contemporary lifestyles and suits household needs while delivering connectivity, safety and accessibility. This will be achieved by providing a range of housing types, with emphasis on providing a range of affordable housing options and a smaller percentage of lots in the premium category.

2) The Plan will increase the percentage of the Site set aside for environmental management under environmental protection zones and managed under the Site's *Biodiversity Conservation Management Plan.*

3.3 EXPLANATION OF THE PROVISIONS OF THE DRAFT PLAN

View of Mount Chincogan, entry into Mullumbimby

The Planning Proposal, if supported, will:

1) Amend the existing zoning pattern shown in **Plan 2.3** to the zoning pattern shown in **Plan 3.1**, thereby causing urban residential development in the remaining stages to occur only in those parts of the Site that are unconstrained;

2) Amend the existing zoning pattern shown in **Plan 2.3** to the zoning pattern shown in **Plan 3.1**, thereby setting aside areas of the land deserving of conservation under an arrangement with the future landowners of the lots created within the various environmental living / protection zones to implement:

- Rehabilitation of the forested areas by removing weed species and planting of indigenous trees; and

- maintenance of the forested areas in perpetuity, including maintenance of the Asset Protection Zones between the forests and urban residential development.

3) Impose Restrictions on Use of the land upon the future landowners of lots created within the environmental living / protection zones including:

   - Prohibition on clearing of native species of vegetation within the protected areas; and
   - Limitation on development of the lot that would create more than a single family dwelling; and
   - Prohibition on the conducting of activity of any kind that is not compatible with the land being a fauna habitat; and
   - prohibition on keeping of any wild or domestic animal including dogs and cats upon the lot.

4) The Plan places limitations upon the density of development of the following parts of the Site by application of a plan of Minimum Lot Size:

   - The part of the Site adjoining existing rural residential development (Clays Road area) by imposing a transition area of minimum lot sizes; and
   - The parts of the Site along the Southern boundary that adjoin the forested areas.

   Refer to **Plan 3.2**.

TALLOWOOD LAND DEVELOPMENT PTY LTD
TALLOWOOD RIDGE
MULLUMBIMBY, NSW

PLANNING PROPOSAL - ZONE PLAN

Plan 3.1

DATE:	SCALE:	DRAWN
01.12.2013	Use scale bar	EF
Dwg. No.		Issue
1002 - SK30		**B**

TALLOWOOD LAND DEVELOPMENT PTY LTD
TALLOWOOD RIDGE
MULLUMBIMBY, NSW

PLANNING PROPOSAL - MINIMUM LOT SIZE PLAN

Plan 3.2

DATE:	SCALE:	DRAWN
16.02.2014	Use Scale bar	EF

Dwg. No. **1002 - SK31** Issue **B**

4 JUSTIFICATION

4.1 NEED FOR THE PLANNING PROPOSAL

4.1.1 IS THE PLANNING PROPOSAL A RESULT OF ANY STRATEGIC STUDY OR REPORT?

Peter Parker Environmental Consultants has prepared a comprehensive flora and fauna survey of the forested areas in the Southwest corner of the Site that describes the environmental value of this area as habitat for a number of species. Details are provided in the report attached as **Appendix A.**

Council, in the preparation of the Development Control Plan for Mullumbimby (1988) identified the Northwest corner of the Site as "*future urban land*".

Council has advised the proponent it proposes that the Draft Local Environmental Plan 2012 currently under consideration by the Department will be amended to incorporate this Planning Proposal during the public exhibition period.

4.1.2 IS THE PLANNING PROPOSAL THE BEST MEANS OF ACHIEVING THE OBJECTIVES?

The changing of the zoning will permit the developer to proceed in an orderly and efficient way with the construction of the Tallowood Ridge Estate, but in a location better suited to residential development (especially affordable housing, which requires reasonably level ground), and which will, at the same time, preserve significant environmental habitat The rezoning process is the best way of achieving the intended outcome of protecting the forested areas of the Site, other than by public authority acquisition of the land generally.

4.1.3 ARE THERE ANY COMMUNITY BENEFITS?

The key community benefits from this Planning Proposal are:

1) Creation of additional affordable housing close to the town of Mullumbimby, which is known within the LGA as the least expensive town to live in within one of the most expensive LGA in the State; and
2) the protection, maintenance and enhancement of significant environmental habitat for all future generations.

4.2 RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

4.2.1 CONSISTENCY WITH RELEVANT SUB-REGIONAL AND METROPOLITAN PLANNING STRATEGIES

The regional strategic planning context for the consideration of this Planning Proposal is the Far North Coast Regional Strategy (FNCRS).

The FNCRS is an initiative of the NSW Government to guide sustainable growth across the Far North Coast Region. The aims of the Strategy particularly relevant to this Planning Proposal are to:

- Identify and protect important environmental assets, landscape and cultural values and natural resources.
- Limit development in places constrained by coastal processes, flooding, wetlands, important farmland, and landscapes of high scenic, cultural and conservation value.
- Encourage growth of non-coastal towns and villages by identifying potential lands for new housing and industry to boost local economies without compromising environmental values or quality of life.
- Contain areas for potential future development to within the Town and Village Growth Boundary.
- Require that any development proposals for greenfield sites west of the Coastal Area and outside of the Town and Village Growth Boundary be subject to satisfying the Sustainability Criteria.

A strong Sustainability Criteria was incorporated into the FNCRS to allow Governnment to take a strong position in relation to matters of urban settlement in the Far North Coast, confident in the knowledge that innovative development proposals could still be considered even though thay may be outside of the regional strategy process. The Government put forward the Sustainability Criteria to represent a clear, transparent list of matters that any new proposal could be assessed against. Comments by the writer in relation to each aspect of the sustainability Criteria are set out in Table 4.1 below.

TABLE 4.1 ASSESSMENT AGAINST SUSTAINABILITY CRITERIA

Threshold Sustainability Criteria for any proposed development site outside designated areas in regional strategies	**Measurable explanation of criteria**	**Comments**
1. Infrastructure Provision Mechanisms in place to ensure utilities, transport, open space and communication are provided in a timely and efficient way	• Development is consistent with the outcomes of Far North Coast Regional Strategy, any subregional strategy, regional infrastructure plan and relevant section 117 direction/s. • The provision of infrastructure (utilities, transport, open space, and communications) is costed and economically feasible based on Government methodology for determining infrastructure development contributions. • Preparedness to enter into development agreement	• The proposal is consistent. Refer to **Tables 4.2 and 4.3**. • There is no basic change to the provision of key infrastructure. The quantum of residential development is generally unchanged merely relocated; the main area of open space is retained in an identical position as currently approved. • There are no compelling reasons to enter into any development agreement in relation to the subject proposal.
2. Access Accessible transport options for efficient and sustainable travel between homes, jobs, services and recreation to be existing or provided	• Accessibility of the area by public transport and/or appropriate road access in terms of: > Location/land use – to existing networks and related activity centres. > Network – the area's potential to be serviced by economically efficient transport services.	• The efficiency of transportation is not overly changed. It is proposed to merely relocate zone land rather than create any additional zone land.

	> Catchment – the area's ability to contain, or form part of the larger urban area which contains adequate transport services. Capacity for land use/ transport patterns to make a positive contribution to achievement of travel and vehicle use goals. • No net negative impact on performance of existing subregional road, bus, rail, ferry and freight network.	• No negative impact in terms of road or bus networks.

3. Housing Diversity Provide a range of housing choices to ensure a broad population can be housed	• Contributes to the geographic market spread of housing supply, including any government targets established for aged, disabled or affordable housing.	• The fresh planning for the Tallowood Ridge Estate allows the proponent to look at providing a greater range of housing choice (with emphasis on affordable housing) to ensure the broad population can be satisfactorily provided for at this estate.
4. Employment Provide regional/local employment opportunities to support the Far North Coast's expanding role in the wider regional and NSW economies	• Maintain or improve the existing level of sub-regional employment self-containment. • Meets subregional employment projections. • Employment-related land is provided in appropriately zoned areas.	• Because the proposal merely relates to a relocation of zoning there is no impact (positive or negative) in terms of employment.
5. Avoidance of Risk	Land use conflicts, and risk to human health and life, avoided • No residential development within 1:100 floodplain. • Avoidance of physically constrained land, e.g. > High slope. > Highly erodible. • Avoidance of land use conflicts with adjacent existing or future land use as planned under relevant subregional or regional strategy. • Where relevant available safe evacuation route (flood and bushfire).	• All new development is located outside the DLEP flood plain. • All development is proposed well away from steep slopes. • There are no currently induced activities in the area that would cause particular land use conflict the related residential use. • Main arterial routes within the development are sized in a way that is suitable for evacuation in terms of both flood and bush fire.

6. Natural Resources Natural resource limits not exceeded/ environmental footprint minimised	• Demand for water within infrastructure capacity to supply water and does not place unacceptable pressure on environmental flows. • Demonstrates most efficient/suitable use of land > Avoids identified significant agricultural land > Avoids productive resource lands – extractive industries, coal, gas and other mining, and quarrying. • Demand for energy does not place unacceptable pressure on infrastructure capacity to supply energy-requires demonstration of efficient and sustainable supply solution.	• The proposal merely relocates the zoning of the land and accordingly there are no issues raised in relation to exceeding natural resource limits or minimising environmental footprint. The proposal will have a significant positive impact in terms of minimising the potential environmental impacts upon the local Koala population.
7. Environmental Protection Protect and enhance biodiversity, air quality, heritage, and waterway health	• Consistent with government-approved Regional Conservation Plan (if available).	• There are no regional conservation plans approved for the locality. However, the proposal meets and exceeds the aspirations in Council's conservation Planning Policies in terms of corridors and protection of important vegetation communities.
	• Maintains or improves areas of regionally significant terrestrial and aquatic biodiversity (as mapped and agreed by DEC). This includes regionally significant vegetation communities, critical habitat, threatened species, populations, ecological communities and their habitats.	• The proposal substantially improves the situation in relation to critical habitats and threatened species, in particular the Koala.
	• Maintain or improve existing environmental condition for air quality.	• No impact is anticipated in relation to air quality.
	• Maintain or improve existing environmental condition for water quality: > Consistent with community water quality objectives for recreational water use and river health (DEC and CMA).	• No impacts are anticipated in terms of water quality.
	> Consistent with catchment and	• The key Aboriginal

	stormwater management planning (CMA and council). • Protects areas of Aboriginal cultural heritage value (as agreed by DEC).	cultural element in the locality is the ridge line immediately to the south of the subject site. Zoning of this land for environmental protection will also protect the aboriginal cultural heritage values for the site.

8. Quality and Equity in Services Quality health, education, legal, recreational, cultural and community development and other government services are accessible	• Available and accessible services. > Do adequate services exist? > Are they at capacity or is some capacity available? > Has Government planned and budgeted for further service provision? > Developer funding for required service upgrade/access is available.	• The planning in relation to education community facilities and the like for Mullumbimby has been based on the orderly and economic development of the Tallowood Ridge Estate. This relocation of the residential zoning assists in achieving the objectives of a range of plans and programmes for government and community for services.

4.2.2 CONSISTENCY WITH COUNCIL'S COMMUNITY AND STRATEGIC PLANS

The Byron Community Strategic Plan

The Planning Proposal is consistent with the *Byron Community Strategic Plan 2020 (BSC 2012)* as it will allow for the sustainable development of the locality in accordance with the vision, community goals, community outcomes and proposed strategy/partnerships set out in the adopted plan. In particular, the Planning Proposal Outcomes bolster:

- Community Outcome EN1 *protect and enhance the natural environment.*
- Community Outcome EN2 *sustainable towns, villages and rural settlements that respect our environment, create an inclusive social environment and integrate harmoniously with the character of local areas*.

Local Planning Study

Council has two current planning documents relevant to the site. They are the *Development Control Plan for Mullumbimby (BSC 2010)* and the *Mullumbimby Settlement Strategy (BSC 2003)*.

Under the DCP the area proposed for the residential zoning relocation is nominated as "future urban" at pages 20 and 23.

Mullumbimby Settlement Strategy, Map 1 illustrates extensive "unconstrained land" within the Tallowood Estate. The proposed rezoning generally accords with the utilisation of this land in preference to the constrained land. The strategic recommendations indicate that "*area 7* (the southern part of which forms part of the rezoning application) *remain as it is. The area could be considered in a longer term (2008) structural review of the Byron Rural Settlement Strategy for Rural Settlement*". At the time of strategy development, access to "area 7" was contemplated mainly via Clays Road which would require a costly upgrade. The strategy was also concerned not to identify the land as suitable for residential use until a flood plain management plan had been prepared. Council has commissioned such management plan and in the interim, expert analysis (Patterson Consultants 2000) has provided a conservative flood mapping line for the land well in excess of that identified in Council's recent Draft LEP mapping (BSC 2012).

4.3 CONSISTENCY WITH STATE ENVIRONMENTAL PLANNING POLICIES

An assessment of the Planning Proposal against applicable State Environmental Planning Policies (SEPPs) is provided in **Table 4.2** below.

TABLE 4.2 – CONSISTENCY WITH RELEVANT SEPPS

State Environmental Planning Policies (SEPPs)	Consistent		N/A	Comment
	YES	NO		
SEPP No 1 Development Standards			✓	Unlikely to apply to future development of the site.
SEPP No 4 Development Without Consent and Miscellaneous Exempt and Complying Development			✓	Will apply to future development of the site.
SEPP No 6 Number of Storeys			✓	Byron LEP 1988 definitions apply.
State Environmental Planning Policy No 14—Coastal Wetlands			✓	Does not apply to land in the vicinity.
State Environmental Planning Policy No 15—Rural Landsharing Communities			✓	Potentially applies but not of any relevance.
SEPP No 19 Bushland in Urban Areas			✓	Not relevant to proposed amendment.
SEPP No 21 Caravan Parks			✓	Not relevant to proposed amendment.
SEPP No 22 Shops and Commercial Premises			✓	Not relevant to proposed amendment.
SEPP No 26 Littoral Rainforests			✓	Does not apply to the proposed amendment.
SEPP No 30 Intensive Agriculture			✓	Not relevant to proposed amendment.
SEPP No 32 Urban Consolidation (Redevelopment of Urban Land)			✓	This SEPP is not overly relevant in the context of Mullumbimby.

State Environmental Planning Policies (SEPPs)	Consistent		N/A	Comment
	YES	NO		
SEPP No 33 Hazardous and Offensive Development			✓	Not relevant to proposed amendment.
SEPP No 36 Manufactured Home Estates			✓	Not relevant to proposed amendment.
State Environmental Planning Policy No 44—Koala Habitat Protection	✓			SEPP 44 does not apply to any part of the Site, however, the forested part of the Site may occasionally be visited by koala.
SEPP No 50 Canal Estate Development			✓	Not relevant to proposed amendment.
State Environmental Planning Policy No 52—Farm Dams and Other Works in Land and Water Management Plan Areas			✓	Not overly relevant to this amendment.
SEPP No 55 Remediation of Land	✓			The site has been tested for contamination as part of the Staged Development Approval for the land. No remediation is required.
SEPP No 60 Exempt and Complying Development	✓			Will apply to future development of the site.
SEPP No.62 Sustainable Aquaculture			✓	Not relevant to proposed amendment.
SEPP No 64 Advertising and signage			✓	Not relevant to proposed amendment.
SEPP No 65 Design Quality of Residential Flat Development			✓	Unlikely to apply to any of the development of the land herein because residential development will not exceed two storeys in height.
SEPP No.70 Affordable Housing (Revised Schemes)			✓	Not relevant to proposed amendment.
State Environmental Planning Policy No 71—Coastal Protection	✓			The land is at the western limit of the coastal zone but the proposal has little if any impact in terms of coastal planning policy.
SEPP (Affordable Rental Housing) 2009	✓			May apply to future development of the site.
SEPP(BASIX) 2004	✓			Will apply to future residential development of the site.
SEPP (Exempt and Complying Development Codes) 2008	✓			May apply to future development of the site.
SEPP(Housing for Seniors or People with a Disability) 2004	✓			May, but unlikely to apply to future development of the site.
SEPP (Infrastructure) 2007	✓			May apply to future development of the site.

State Environmental Planning Policies (SEPPs)	Consistent		N/A	Comment
	YES	NO		
SEPP (Major Development) 2005	✓			With the demise of Part 3A of the Act very little development is now designated as Major Development.
SEPP (Mining, Petroleum Production and Extractive Industries) 2007			✓	Not relevant to proposed amendment.
State Environmental Planning Policy (Rural Lands) 2008	✓			One of the key planning principles of this SEPP is to balance the social economic and environmental interests of the community. This rezoning proposal, whilst seeking to convert rural land to urban, does balance the social, economic and environmental interests.
State Environmental Planning Policy (SEPP 53 Transitional Provisions) 2011			✓	Not overly relevant to this amendment.
State Environmental Planning Policy (State and Regional Development) 2011			✓	Not overly relevant to this amendment.
SEPP (Temporary Structures) 2007	✓			May apply to future development of the site.
Deemed SEPPs				
North Coast Regional Environmental Plan	✓			The Planning Proposal is not inconsistent with the relevant planning principles for the North Coast Regional Environmental Plan.

From the above table it is evident that Deemed SEPP North Coast Regional Environmental Plan is of relevance to this proposal. Further comment in relation to this SEPP is set out below.

Deemed SEPP North Coast Regional Environmental Plan (REP)

There are a number of clauses under the REP relevant to plan preparation. Clause 38 requires the Council programme of land release to be based on land use, population projections and having the character of a locality. Given that there is no material change in the area of the residentially zoned land under this Planning Proposal, this clause would not seem to be overly applicable.

It is intended to simply relocate the existing zone so no changes in terms of zone flexibility or the like which would be at odds with clause 40 of the REP are anticipated.

The proposal is consistent with clause 42 relating to land being made available for a large range of housing types and densities.

As illustrated in the site analysis, the provisions of Division 3 of the REP concerning hazards and flood liable land have been considered in the definition of the proposed residential zoning relocation.

Comment in relation to SEPP 44 – Koala habitat protection

Peter Parker Environmental Consultant completed numerous SAT surveys over a period of 4 years and completed an extensive assessment of the species found in the forests along the Southern boundary of the Site for the purpose of determining whether or not the provisions of SEPP 44 apply to the Site.

The flora and fauna report by Parker, attached as Annexure A, describes the results of those surveys and concludes that the provisions of SEPP 44 do not apply to the Site due to the limited amount of koala food trees on the Site, being less than 4% of all trees on the Site.

4.3.1 CONSISTENCY WITH APPLICABLE MINISTERIAL DIRECTIONS

A summary assessment of the Planning Proposal against the Directions issued by the Minister for Planning under Section 117 of the EP&A Act is provided in **Table 4.3** below.

TABLE 4.3 – ASSESSMENT against Section 117 Directions

Ministerial Directions	Consistent YES	Consistent NO	N/A	Comment
1. Employment and Resources				
1.1 Business and Industrial Zones			✓	
1.2 Rural Zones	✓			The objective of this Direction is to *"protect the agricultural production value of rural land".* The area proposed to be rezoned land is not rural production and is most unlikely to become in rural production in the forseeable future. This is mainly due to the dissected nature of the countryside. Further, the heavy clay soil conditions are not satisfactory for agriculture.
1.3 Mining, Petroleum Production and Extractive Industries			✓	
1.4 Oyster Aquaculture			✓	
1.5 Rural Lands	✓			The proposal is consistent with the rural planning principles set out in The State of Environmental Planning Policy (Rural Lands) 2008.
2. Environment and Heritage				
2.1 Environment Protection Zones	✓			This Planning Proposal has as one of its Objectives "*to protect and conserve environmentally sensitive areas*". This Plan proposes to zone the forest areas RU2, however, when the Department has settled the categories of "E" zones, Council proposes to apply the appropriate "E" zone to the forested areas prior to adopting Draft LEP 2010.
2.2 Coastal Protection			✓	

Ministerial Directions	Consistent YES	Consistent NO	N/A	Comment
2.3 Heritage Conservation	✓			Rezoning of the ridgeline along the Southern boundary of the property will have an ancillary benefit of protecting aboriginal cultural heritage values.
2.4 Recreation Vehicle Areas			✓	
3. Housing, Infrastructure and Urban Development				
3.1 Residential Zones	✓			The proposed rezoning Plan relocates an existing amount of 2(a)-zoned land without any material change in the size or any of the development controls applicable thereto.
3.2 Caravan Parks and Manufactured Home Estates			✓	
3.3 Home Occupations			✓	
3.4 Integrating Land Use and Transport			✓	
3.5 Development Near Aerodromes			✓	
3.6 Shooting Ranges			✓	
4. Hazard and Risk				
4.1 Acid Sulfate Soils			✓	
4.2 Mine Subsidence / Unstable Land			✓	
4.3 Flood Prone Land	✓			Part of the land is flood prone. Council's recent DLEP mapping is shown in the site analysis drawing. Further, more conservative flood estimation work completed by Patterson Consultants and approved by the Court is also shown in the site analysis drawing. All house envelopes are intended to be outside the major flood plain limit.
4.4 Planning for Bushfire Protection	✓			This Planning Proposal includes provision of a 40m wide firebreak in the gully in the Southwest corner of Site to protect the residential development from the bushfire hazard located to the West of the Site.

Ministerial Directions	Consistent YES	Consistent NO	N/A	Comment
5. Regional Planning				
5.1 Implementation of Regional Strategies	✓			As discussed in Section 4.2.1, the Planning Proposal is consistent with the Far North Coast Regional Strategy. Refer to the assessment pursuant to its Sustainability Criteria principles in Table 4.1.
5.2 Sydney Water Catchments			✓	
5.3 Farmland of State and Regional Significance on the NSW Far North Coast		✓		This Direction applies to Byron Shire Council except areas contained within the "town and village growth boundary" in the Far North Coast Regional Strategy. This boundary is proposed to be "adjusted" using the Sustainability Criteria set out in the FNCRS. The proposal is consistent with the Northern Rivers Farmland Protection Project – Final Recommendations because, whilst the soil types are appropriate for agriculture, the dissected nature of the countryside make it inappropriate for farmland production.
5.4 Commercial and Retail Development along the Pacific Highway, North Coast			✓	
5.8 Second Sydney Airport			✓	
6. Local Plan Making				
6.1 Approval and Referral Requirements	✓			There are no additional referral requirements.
6.2 Reserving Land for Public Purposes			✓	
6.3 Site Specific Provisions	✓			This proposal provides both rezoning and Site-specific planning controls by use of Minimum Lot size mapping and dwelling entitlement.
7. Metropolitan Planning				
7.1 Implementation of the Metropolitan Plan for Sydney 2036			✓	

4.4 Environmental, Social and Economic Impact

4.4.1 Impact on Critical Habitat, Threatened Species and Ecological Communities

Best practice methods in relation to the protection of habitat seek to set land aside and provide buffer where appropriate by controls implementing lower density The protection of identified habitat is one of the Objectives of this Planning Proposal. Rezoning of the land proposed is consistent with best planning practice in terms of the protection of the habitat, threatened species and ecological communities.

4.4.2 Social and Economic Impact

Maintenance of the existing social and economic environment will assist the continued orderly and economic development of the town of Mullumbimby with the added benefit that residential homesites will be able to be developed more affordably. Increased affordability of homesites is an objective of this Planning Proposal and achieved by relocation of residentially-zoned land to an area that is more level rather than "deletion" of 2(a)-zoned land to create a larger area of habitat.

The impact in terms of social and economic consequences should be beneficial to future residents by reduction of cost to establish a home. Reduction in percentage of income allocated to cost of dwelling leaves a higher percentage for expenditure on goods and services offered by the community at large.

4.5 State and Commonwealth Interests

Because this proposal does not involve any increase in zoned land, there are little or no additional pressures occasioned by the rezoning in terms of the provision of public infrastructure. The land is not mapped by any State Environmental Planning Policy (e.g. Rainforest or wetlands).

4.6 Community Consultation

The Planning Proposal has been aired in a number of arenas including:

- discussions with Councillors and Senior Officers of Byron Shire Council;
- consultation with existing residents of the Tallowood Ridge Estate;
- consultation with land owners immediately adjoining the Estate who potentially may be affected; and
- consultation with key objectors to the original staged Development Approval for the land.

A "meet the neighbours" event at the Estate.

To date all of the consultation has proved to be positive and Council, at its meeting of 14 March 2013, resolved to invite the proponent to lodge a Planning Proposal.

Council staff considered the Planning Proposal and made several recommendations to Council, which were accepted and, at its meeting of 19 September, 2013 resolved that after amendment of the original Planning Proposal by the proponent (now included in this report) that the Planning Proposal be forwarded to the Department for Gateway approval.

As part of the gateway application process, it is expected that this Planning Proposal will be publically exhibited and further community consultation will occur.

Community consultation would involve an exhibition period of 14 days. The community would be notified of the commencement of the exhibition period via a notice in a local newspaper and via a notice on the Council's website. The written notice would:

- Give a brief description of the objectives and intended outcomes of the Proposal;
- Indicate the land affected by the Proposal;
- State where and when the Proposal can be inspected;
- Give the name and address of the Byron Shire Council for the receipt of submissions; and
- Indicate the last date for submission.

During the exhibition period, the following material would be made available for inspection:

- The Proposal in a form approved for community consultation by the Director General of Planning;
- The Gateway determination; and
- Any studies relied upon by the Proposal

5 PROJECT TIMELINE

Council advised the proponent that this Planning Proposal is be incorporated into the Draft Byron Local Environmental Plan 2013 (DLEP 2013) during the period of exhibition of the final version of the DLEP 2013 in early to mid-2014. As a result, the timeline set out below will, to a large extent, be determined by the timeline for that process.

5.1 *Anticipated date of Gateway Determination:* 1 March 2014

5.2 *Anticpated Timeframe for Completion of Technical Information:* 1 April 2014, if required. (All studies of Site completed prior to Determination of Master Plan by NSW L & E Court.)

5.3 *Timeframe for Government Agency Consultation:* Not considered to be applicable.

5.4 *Commencement & Completion Dates for Public Exhibition Period:* 1 March – 21 March 2014 (14 days)

5.5 *Date for Public Hearing (if required):* 15 April 2014

5.6 *Timeframe for Consideration of Submissions:* 14 days

5.7 *Timeframe for Consideration of Proposal Post-exhibition:* 14 days.

5.8 *Date of Submission to Department to finalise LEP:*

Simultaneous with Byron Draft LEP 2012.

5.9 *Anticipated Date Council will make the Plan:*

To be advised by Council.

5.10 *Anticipated Date Council will forward to Department for Notification:*

To be advised by Council.

6 CONCLUSION

This Planning Proposal, which relates to land at the Tallowood Ridge Estate, Mullumbimby, seeks relocation of part of the existing 2(a) zoning while, at the same time, moving some of the residential zoned area out of environmentally significant forested areas and into an unconstrained area of the site. This proposal wll result in the creation of 22 hectares of new environmental protection zoning.

The Planning Proposal is consistent with the Sustainability Criteria set out in the Far North Coast Regional Strategy and achieves some of the key outcomes sought under Council's Environment Community Strategic Plan.

The Planning Proposal is also consistent with the relevant State Environmental Planning Policies and the Ministerial Directions issued pursuant to section 117 of the Environmental Planning and Assessment Act.

COMPLIANCE AND USAGE STATEMENT

This Planning Proposal has been prepared and submitted under Part 3 of the *Environmental Planning and Assessment Act 1979* by:

Preparation

Name:	Eric Freeman
Company:	Bayview Land Development Pty Ltd
Address:	P.O. Box 494 Byron Bay, NSW 2481
In respect of:	Tallowood Ridge Estate, Tuckeroo Avenue, Mullumbimby

Application

Proponent:	Tallowood Land Development Pty Ltd, ACN 160 101 879
Address:	P.O. Box 538, Lennox Head NSW 2478
Land to be rezoned:	Part Lot 57 in DP 1190345 and existing unmade Road Reserves
Proposal:	Relocation of the existing 2(a) zoning to a part of the Site more suitable for residential development and creation of 22 ha of new environmental protection zoning.

Certificate

I certify that I have prepared the content of this Planning Proposal and to the best of my knowledge:

- it is in accordance with the Act and Regulations, and
- it is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

Notice

The plans to this document were prepared for the exclusive use of proponent and are not to be used for any other purpose or by any other person or corporation. Bayview Land Development Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for purposes other than the proposed development.

Plans accompanying this document may not be reproduced, stored or transmitted in any form unless this note is included.

Bayview Land Development Pty Ltd declares that it does not have any reportable political donations to declare within the meaning of Section 147(3) of the Act.

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Ref: 1232-378
Date: January 2014

REFERENCES

DoPI, 2012 *A Guide to Preparation of Local Environmental Plans,* Department of Planning and Infrastructure, October 2012

DOP, 2009 *A Guide to Preparing Planning Proposals,* Department of Planning, July 2009

DOP, 2006 *Far North Coast Regional Strategy,* Department of Planning, December 2006

Wetland Care Aust, 2011 *Biodiversity Conservation Management Plan version 5 December 2011 Wetland Care Australia,* approved by Byron Shire Council on 20th December 2011

Biolink, 2012 *Byron Coast Koala Habitit Study,* Biolink Ecological Consultants, March 2012

BSC, 2010 *Byron Shire Development Control Plan Chapter 11 Mullumbimby*, *originally prepared c. August 1988* adopted by Byron Shire Council 4 March 2010

DOP 2005 *Northern Rivers Farmland Protection Project, final recommendations 2005.* Department of Planning, 2005

BSC, 2003 *Mullumbimby Settlement Strategy* 20331 adopted by Byron Shire Council 2 December 2003.

BSC 2012 *Byron Shire Council Community Strategic Plan 2022* endorsed on 28 June 2012 by Byron Shire Council.

Paterson Consultants 2009 *Proposed Residential Subdivision Lot 2 DP 785041, Mullumbimby – assessment of flood issues – Final Report,* May 2009 Paterson Consultants Pty Ltd.

BSC 2012 *Byron Draft Local Environmental Plan, 2012*, exhibited 24 September to 24 December 2012. Byron Shire.

ANNEXURE A – FLORA & FAUNA REPORT

Peter Parker

Environmental Consultants Pty Ltd

Broken Head Road, Broken Head, NSW, 2481

☎ 02 66853 148

ACN 076 885 704

FLORA AND FAUNA ASSESSMENT FOR THE CREATION OF 31 ALLOTMENTS IN LOT 36 AND LOT 57, DP1190345

TUCKEROO AVENUE, MULLUMBIMBY

PREPARED FOR

GAINSPLAY PTY LTD

18 DECEMBER 2013

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FIGURES

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GLOSSARY

Abundance: means a quantification of the population of the species or community

Affected species: means subject species likely to be affected by the proposal

Conservation status: is regarded as the degree of representation of a species or community in formal conservation reserves

Critical habitat: the area declared to be critical habitat under Part 3 of the *Threatened Species Conservation Act 1995*

Development: the erection of a building on that land, the carrying out of work in, on, over or under that land, the use of that land or of a building or work on that land, and the subdivision of that land

Ecological community: an assemblage of species occupying a particular area

Endangered ecological community: an ecological community specified in Part 1 of Schedule 1 of the *Threatened Species Conservation Act 1995*

Endangered population: a population specified under Part 1 of Schedule 1 of the *Threatened Species Conservation Act 1995*

Endangered species: a species listed under Schedule 1 of the *Threatened Species Conservation Act 1995*

EPA Act: *Environmental Planning and Assessment Act, 1979*

Habitat: an area or areas occupied, or periodically or occasionally occupied by a species, population or ecological community and includes any abiotic component

OEH: Office of Environment and Heritage

Primary koala habitat: Forest or woodland where primary koala food tree species comprise at least 50% of the over-story trees

SEPP: State Environmental and Planning Policy

Significant species: means species not listed under the *Threatened Species Conservation Act 1995* but considered to be of regional or local significance

Study area: is the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly

Subject site: the area which is proposed for development or activity

GLOSSARY

Subject species: those threatened species which are considered known or likely to occur in the study area

Threatened species: a species specified in Part 1 or 4 of Schedule 1 or in Schedule 2 of the *Threatened Species Conservation Act 1995*

Threatening process: means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities

TSC Act: *Threatened Species Conservation Act 1995*

Vulnerable species: a species listed under Schedule 2 of the *Threatened Species Conservation Act 1995* or when a fish, listed under the *Fisheries Management Act 1994*

SUMMARY

- This flora and fauna report accompanies a statement of environmental effects for the creation of 31 allotments, a bio-retention treatment facility, three new public roads and a sewer pump station in Lot 36 and Lot 57, DP 1190345 Tuckeroo Avenue, Mullumbimby.
- Consent was granted by the NSW Land and Environment Court on 14 September 2010 for the staged development of the site over seven stages. This application comprises the third stage of that process.
- Three vegetation associations, woodland, grassland and aquatic plants were recorded within the area proposed for subdivision and road construction. The proposed development will occur within the grassland association which is dominated by exotic grasses and scattered camphor laurel. However, Tuckeroo Avenue will cross a small creek containing aquatic plants dominated by the exotic species parrot's feather. These vegetation associations are of minimal conservation value.
- A systematic flora and fauna survey was undertaken at the Tallowood site in 2011. Subsequent koala surveys were undertaken in 2012 and 2013. A tree survey which includes details on tree species, size and diameter at breast height was undertaken in September and October 2013.
- The results of these surveys establish that the proposed development will not have a significant effect on threatened species, populations or ecological communities or their habitats.
- The results of three years of koala surveys and an analysis pursuant to State Environmental and Planning Policy No. 44 (Koala Habitat Protection) has established that potential koala habitat, within the meaning of SEPP 44, does not occur at the site.

Fig. 1: Location and proposed subdivision staging (Photo: Bill Mills, November 2013)

1.0 INTRODUCTION

This flora and fauna report accompanies a statement of environmental effects for the creation of 31 allotments within Lot 36 and Lot 57, DP 1190345 situated at Tuckeroo Avenue, Mullumbimby (Fig. 1).

Consent was granted by the NSW Land and Environment Court on 14 September 2010 for the staged development of the site over seven stages. This application comprises the third stage.

A systematic flora and fauna survey was undertaken in 2011 which included the site subject to this application and the land surrounding the site (Fig. 2 at page 12). This report documents the results of this survey together with three years of koala surveys and a tree survey of the whole site undertaken during September and October 2013. The tree survey collated the results of almost 10,000 trees into species, height, diameter at breast height and identified any koala food trees.

An analysis pursuant to State Environmental Planning Policy No. 44 (Koala Habitat Protection) was undertaken on the basis of the tree count. This exercise was warranted as confusion previously existed as to whether the tallowwood, *Eucalyptus microcorys*, was sufficient in number to warrant the site being considered as potential koala habitat within the meaning of SEPP 44.

Plate 1: The site (Stage 3A) illustrating grassed paddocks, camphor laurel and disused cattle yards in rear

Plate 2: Row of camphor laurel adjacent to site

Plate 3: Camphor laurel and cattle yards within site

Plate 4: Development of Stage 2 at the Tallowood Ridge estate

2.0 FIELD SURVEYS

A systematic flora and fauna survey along with a habitat assessment was conducted over three nights from 11 to 13 April 2011, inclusive (refer to Table 1: Survey Methods and Fig. 3 at page 21). Follow up surveys were undertaken for the koala in 2012 and 2013 and a tree survey, which included the whole of the site, was undertaken in September and October 2013. A vegetation and fauna habitat survey was undertaken for this proposal on 3 October 2013.

The fauna survey of 2011 adopted the techniques listed in Table 1. These included spotlighting, Elliott "A" traps, hair-tube traps, cage traps, ultrasonic detection devices (Anabat II combined with digital flash cards), harp nets, collections of scats (faecal pellets) and skeletons and the Spot Assessment Technique ("SAT") for the koala (Phillips and Callaghan 2011).

Table 1: Survey methods (refer to survey locations in Fig. 3)

Survey method	Survey effort
Bat acoustical	9 detector nights (records on digital flash
Bird play-back calls	40 minutes per night over 3 evenings/nights
Bird transects	40 minutes morning and evening, 3 days and
Cage traps	15 trap-nights
Elliott "A" traps	75 trap-nights
Frog call detection	Day and night, approximately 8 hours
Hair-tube traps	240 trap-nights
Harp net	2 nets on one night (2 net-nights)
Litter searches	2 hours
Scat analysis	Opportunistic throughout site
SAT koala survey	Targeted searches for koala scats, 2011-2013
Spotlighting	3 nights for approximately 2 hours per night
Tree survey	Tree identification of almost 10,000 trees

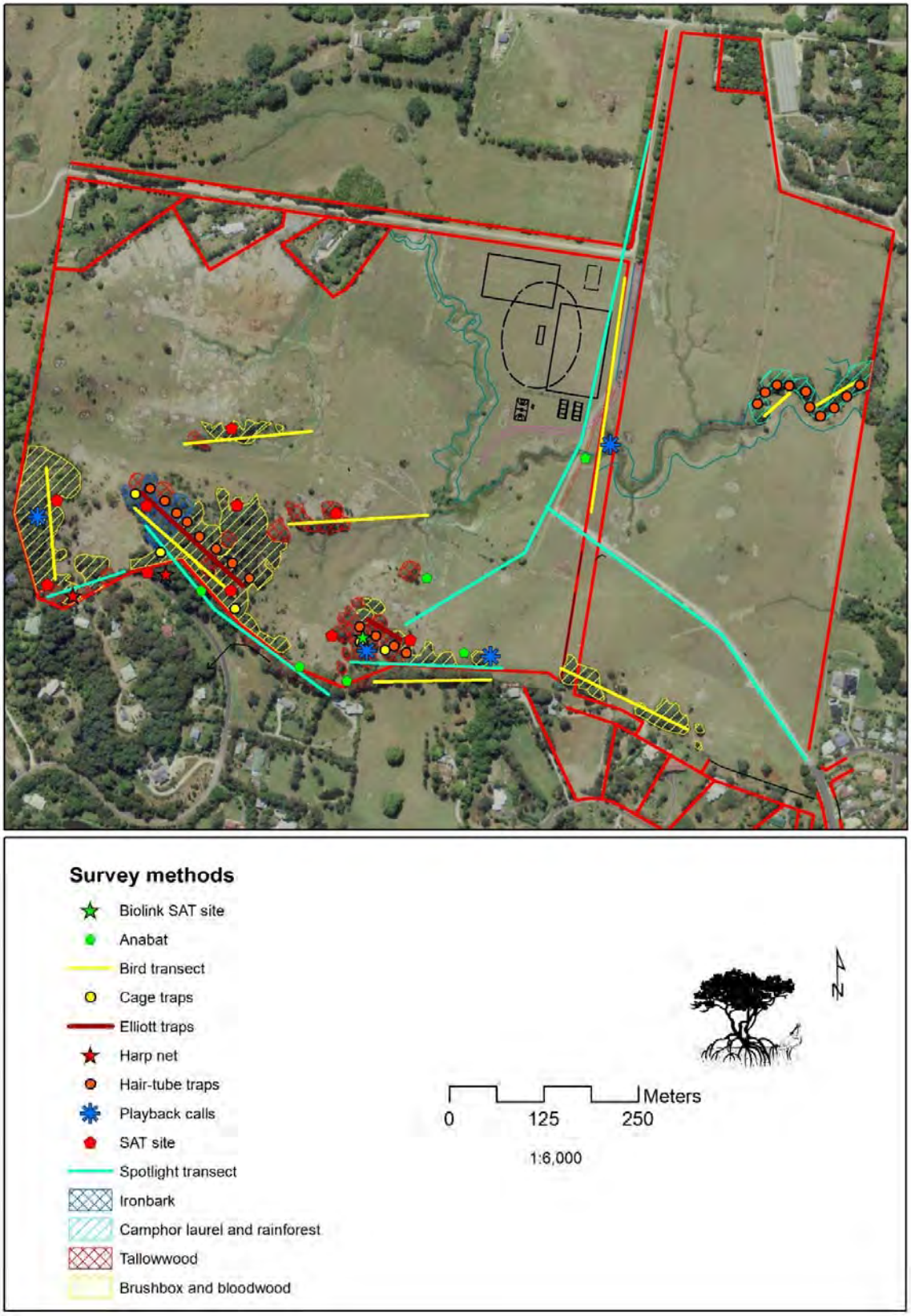


Fig. 2: Survey methods April 2011

2.1 Vegetation

2.1.1 Vegetation transects

The vegetation survey for the subdivision site was mapped over a geo-referenced coloured aerial photo supplied by Bill Mills and taken in November 2013. This photo was imported into ArcGis software (Fig. 1). Plants were identified during site inspections with the following features of the vegetation targeted:

- Dominant trees, shrubs and ground covers in each strata;
- Major plant species;
- Tree heights and foliage cover; and
- Any threatened species.

2.1.2 Vegetation classification, structure and floristics

The vegetation classification system adopted for the 2011 survey was based on Walker and Hopkins (1990).

Walker and Hopkins (1990) describes the components of the association in the following order:

- The first species is usually the most abundant in the tallest stratum;
- A second species is chosen when it is always present in the tallest stratum. In the absence of a tallest stratum species, the most abundant species in the next most conspicuous stratum is chosen. For those associations where several species dominate, these are listed in order of abundance;
- A third species is chosen from any stratum, usually a ground cover or shrub layer. It is used as an indicator species;
- The forest type refers to the distances between the crowns of adjacent trees (refer to Table 2); and

- The height of the tallest stratum is defined by the terms 'low', 'mid-high', or 'tall' (Table 3).

Table 2: Structural formation classes of vegetation defined by growth form and crown separation (after Walker and Hopkins 1990)

Crown Separation	Closed or dense	Mid-dense	Sparse	Very sparse	Isolated plants	Isolated clumps
Field criteria	Touching-overlapping	Touching-slight separation	Clearly separated	Well separated	Isolated	Isolated
Growth form						
Tree	Closed forest	Open forest	Woodland	Open woodland	Isolated trees	Isolated clumps of heath shrubs
Heath shrub	Closed heathland	Heathland	Open heath	Sparse heath	Isolated heath shrubs	Isolated clump of heath shrubs
Sedge	Closed sedgeland	Sedgeland	Open sedgeland	Sparse sedgeland	Isolated sedges	Isolated clump of sedges
Sod grass	Closed sod grassland	Sod grassland	Open sod grassland	Sparse sod grassland	Isolated sod grasses	Isolated clumps of sod grasses

Table 3: Height classes and names of various growth forms for non-rainforest vegetation associations (after Walker and Hopkins 1990)

Height (m)	Trees, vines	Shrubs, heath shrubs, chenopod shrubs, mallee (tree or shrub form)	Tussock and hummock grasses, forbs, rushes, sedges, ferns	Sod grasses, mosses, lichens, liverworts
20.01-35.01	Extremely tall	NA	NA	NA
12.01-20	Tall	NA	NA	NA
6.01-12	Mid-high	Extremely tall	NA	NA
3.01-6	Low	Very tall	Extremely tall	NA
1.01-3	Dwarf	Tall	Tall	Extremely tall
0.51-1	NA	Low	Mid-high	Tall
0.26-0.5	NA	Low	Mid-high	Tall
<0.25	NA	Dwarf	Low	Low

2.2 Fauna

2.2.1 Reptiles and amphibians

In the April 2011 fauna survey, reptiles and frogs were searched for opportunistically in suitable habitats (e.g., among leaf litter and under logs or along creeks in waterbodies and in soaks).

The site proposed for this subdivision application comprises of grazed grassland of little conservation value with a small woodland remnant situated on the Crown road reserve and within stage 3C.

The common eastern froglet, *Crinia signifera*, and the striped marsh frog, *Limnodynastes peroni*, have previously been recorded along creek lines and these were inspected with respect to this development application as Tuckeroo Avenue will be constructed over this creek.

2.2.2 Birds

Birds were identified visually and aurally during post-dawn and evening transects in 2011. Transects of approximately 30 minutes duration were undertaken during the mornings and evenings of 11 to 13 April 2011. Birds were also recorded during the vegetation survey and during the 2013 tree count survey.

Play-back calls were used to identify the presence of cryptic or nocturnal species. Calls of the Masked owl (*Tyto novaehollandiae*), Powerful owl *(Ninox strenua),* Barking owl (*Ninox connivens*), Bush hen (*Amaurornis olivaceus*) and Bush-stone curlew (*Burhinus grallarius*), were broadcast shortly after dusk on each of the April survey nights.

Calls were broadcast over a 10 minute period in sequences of approximately two minutes on and three minutes off. Bird surveys

with respect to this development application comprised of opportunistic sightings and habitat assessment.

2.2.3 Mammals

The 2011 mammal survey used the techniques listed in Table 1.

Elliott traps

Elliot "A" traps were set along the transect line as depicted in Fig. 2 at page 12. Twenty five traps were set out along an east-west transect over three nights. Traps were baited with a blend of peanut butter and oats mixed with vanilla essence and the traps were inspected daily.

Hair-tube traps

A total of 20 hair-tube traps was set out along the same transect as described for the Elliot "A" traps. An additional 12 traps were set along a watercourse in the far east of the site. Traps were set approximately 20 m apart for 10 nights which is equivalent to 320 trap-nights i.e. 32 traps x 10 nights.

Cage traps

Five treadle-type cage traps were set over three nights. These traps were set out as depicted in Figure 2. This trapping effort is equivalent to 15 nights i.e. 5 traps x 3 nights. Traps were baited alternatively with sardines and/or peanut butter and oats.

Spotlighting

Nocturnal sampling was undertaken by two to three persons using a hand-held 100 watt Faunatec spotlight supplemented by 50 watt spotlights. Spotlighting was undertaken over three nights as depicted in Fig. 2.

Day-time searching

Day-time litter searching for scats, skeletons, reptiles, frogs and skinks was undertaken opportunistically. Survey sites included the trap-line transects, roadside drains and soaks, under logs and litter and along tracks.

Koala surveys: 2011, 2012 and 2013

A grid, spaced at approximately 100 m centres, was laid out over an aerial photo of the site prior to commencement of the 2011 survey (Fig. 3 at page 21). A survey peg defining each SAT site was located using GPS. The nearest tree to the survey peg was then tagged to facilitate the counting of scats under this tree and the next nearest 29 trees.

Ten SAT sites were used resulting in 300 trees being inspected (Fig. 3). Scats were searched for under each tree in accordance with the SAT methodology (Phillips and Callaghan 2011).

A SAT survey undertaken on 28 and 29 May 2012 adopted a slightly different layout than that used in 2011 (Fig. 4 at page 27). This variation in survey design was based on previous survey results, including those obtained by Biolink (2011) in the Byron Coast Koala Habitat Survey.

An inspection for scats under 41 tallowwood trees was undertaken in May 2013 and a SAT survey was undertaken on 3 October 2013 at six sites (6x30 = 180 trees).

2.2.4 Database analysis

Fauna which may potentially use the site are listed in Table 4 at page 19. Predicted species are based on the nature of fauna habitats at and surrounding the site and local records extending for a distance of approximately 1 km (the “study area”). A 1 km study

area was considered appropriate for fauna and is in accordance with the *Threatened species assessment guidelines*[1] for the undertaking of the 7-part test. The Guidelines provide the following advice:

"The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions:

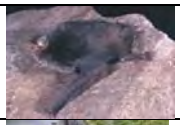
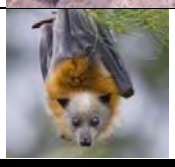
The local population of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.

The local population of resident fauna species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.

The local population of migratory or nomadic fauna species comprises those individuals that are likely to occur in the study area from time to time."

[1] *Threatened species assessment guidelines, the assessment of significance.* Publ. DECC 2007

Table 4: Threatened species recorded in northern NSW coastal locations (Source: personal and Council records)

Birds		**Typical habitat**
Glossy black cockatoo		Ranges the coast to the tablelands and as far west as the Riverina and Pilliga Scrub. Feeds on the seeds of mature casuarina trees
Masked owl		The masked owl frequents forest and woodland, but will also frequent treeless country where caves are available. Its' home range is between 500-1000 ha and it is known to take more ground-dwelling prey than arboreal species
Rose-crowned fruit-dove		The rose-crowned fruit-dove occurs mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful
Mammals		
Little bent-wing bat		The little bent wing bat frequents forests, woodlands and coastal heaths and roosts in caves, old mine shafts and railway tunnels
Grey-headed flying-fox		The grey-headed flying-fox frequents forests and woodlands, rainforest, mangrove swamps and swamp forests
Greater broad-nosed bat		The greater broad-nosed bat frequents forests, woodlands and coastal heathland
Eastern false pipistrelle		The eastern false pipistrelle prefers moist habitats, with trees taller than 20 m. It generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.
Koala		The koala occurs in forest and woodlands and feeds on a small group of eucalypt species. These include tallowwood, swamp mahogany, scribbly gum and grey gum

3.0 RESULTS

3.1 Vegetation associations and communities

Three vegetation associations, woodland, grassland and mixed aquatic plants were recorded at the site proposed for subdivision and road construction. These are described below:

3.1.1 Woodland

A small remnant of brushbox, *Lopohostemon confertus*, and pink bloodwood, *Corymbia intermedia*, occurs on the Crown Road which bisects the property and extends into the Stage 3A proposal (Fig. 1 at p. 7 and Fig. 4 at p. 27). This association supports some hollow-bearing trees, recruitment species[2] and is an important component of the ridge-top vegetation. It will not be impacted by the subdivision proposal.

3.1.2 Grassland

The development site is dominated by exotic grassland comprising of narrow-leaved carpet grass, *Axonopus fissifolius,* Parramatta grass, *Sporobolus indicus* var. *capensis*, kikuyu, *Pennisetum clandestinum,* fireweed, *Senecio lautus*, cuphea, *Cuphea carthagenensis,* with emergent camphor laurel, *Cinnamomum camphora* (Plates 1 and 3 at pages 9 and 10). This vegetation has little conservation value.

3.1.3 Aquatic

The extension of Tuckeroo Avenue to the sports field will cross a small unnamed creek. This creek is dominated by the exotic species parrot's feather. Other species include broad-leaved cumbungi, *Typha orientalis*, swamp water fern, *Blechnum indicum*, camphor laurel (on banks), umbrella sedge, *Cyperus eragrostis,* and tussock rush, *Juncus usitatus.* Livestock removal and the restoration work prescribed within the BCMP will result in this area being incorporated into a substantial riparian corridor.

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2 Recruitment trees are old trees which may not exhibit old growth features, such as tree hollows, but are expected to acquire these features within the next 10-20 years

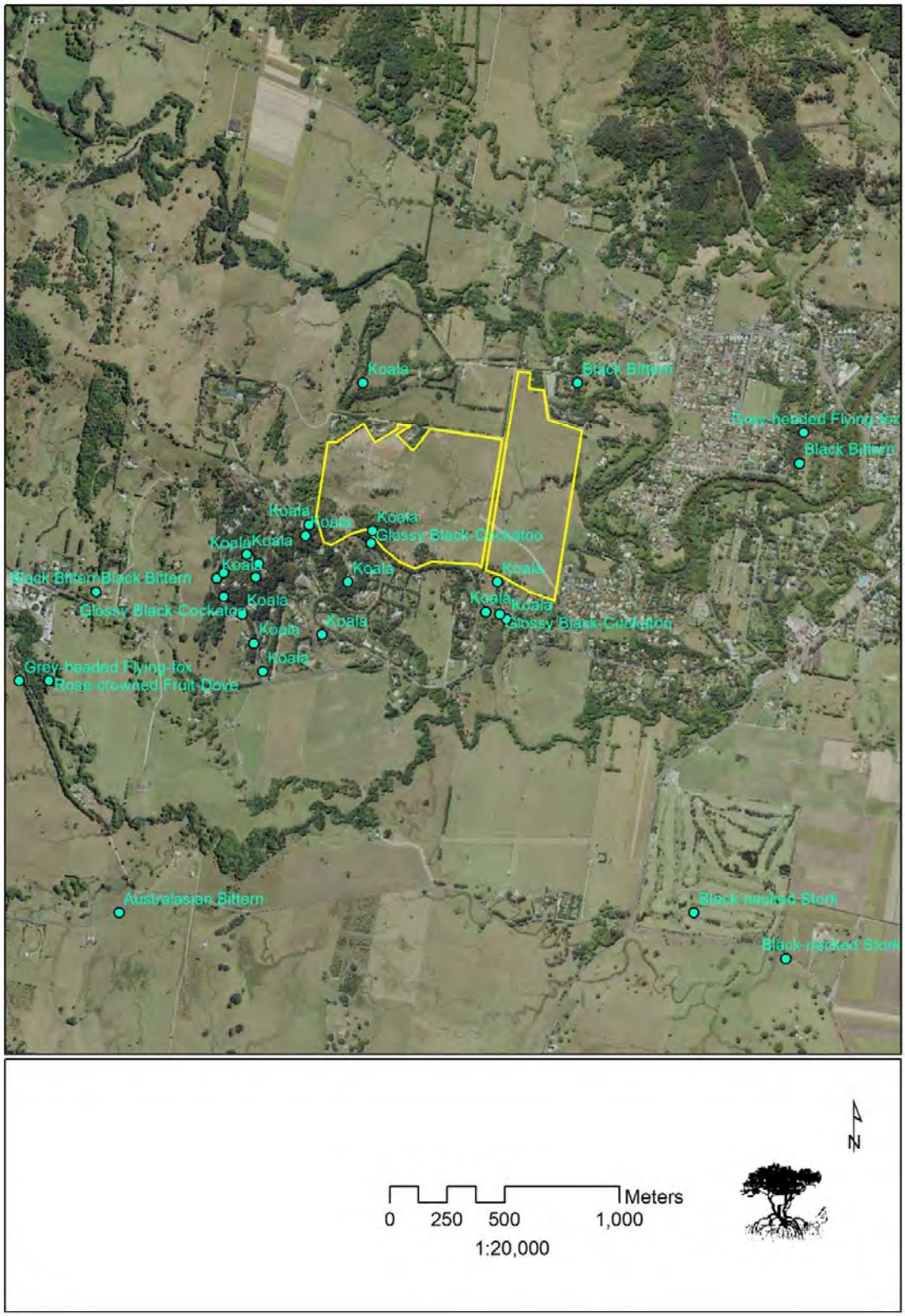

Fig. 3: Threatened fauna records in the locality (Source: Byron Shire Council)

Plate 5: Koala SAT survey 2011

Plate 6: Elliott trapping 2011

Plate 7: Harp net 2011

Plate 8: Koala SAT survey 2012

Plate 9: Koala SAT survey 2013 and tree marking

Plate 10: Lace monitor, 2013 survey

Plate 12: Tree survey 2013

Plate 13: Nest site, Australian magpie, 2013

3.2 Fauna

3.2.1 Reptiles and amphibians

Reptile species recorded included the lace monitor (*Varanus varius*), the eastern bearded dragon (*Pogona barbata*), and the eastern grass skink (*Lampropholis delicata*). The eastern brown snake (*Pseudonaja textilis*), carpet python (*Morelia spilota*), and the green tree snake (*Dendrelaphis punctulata*) are expected to occur along with species listed in Appendix 2: Fauna.

Four frog species were recorded in the 2011 survey. These were the common eastern froglet, *Crinia signifera*, the rocket frog, *Litoria nasuta*, striped marsh frog, *Limnodynastes peroni* and the cane toad, *Chaunus marinus.* The common eastern froglet and striped marsh frog were recorded in the creek line proximal to where it is proposed that a bridge be constructed to cross a waterway. Frog species expected to occur are listed in Appendix 2.

3.2.2 Birds

Few birds were encountered in the grassland area subject to this development application. This is not surprising as it was recently mown and few perching or nesting sites occur. However, the forested area along the ridge was frequented by species such as the laughing kookaburra (*Dacelo novaeguineae*), the eastern rosella (*Platycercus eximius*) and the dollarbird, *Eurystomus orientalis*.

Nocturnal species recorded in the 2011 survey included the tawny frogmouth, *Podargus strigoides*, the southern boobook, *Ninox boobook* and the masked owl. The masked owl was attracted using play-back calls over

two nights and this species may occasionally roost in the ridge-top tree canopy.

3.2.3 Mammals

A depauperate small mammal assemblage was recorded in the 2011 survey. This was comprised of two exotic species: the house mouse, *Mus musculus* and the black rat, *Rattus rattus*. The house mouse was captured in reasonably high densities in Elliott traps and the black rat was captured in both Elliott traps and in a cage trap.

Hair-tube traps recorded a wider diversity of species, including the long-nosed bandicoot, *Perameles nasuta*, the common brushtail possum, *Trichosurus vulpecular* and the swamp wallaby, *Wallabia bicolor* (Table 5).

The swamp wallaby and the common brushtail possum were recorded during spotlight transects.

Table 5: Hair-tube trap results (Identification by Barbara Triggs)

No.	Mammal ID - definite	Mammal ID - probable
1	*Trichosurus* sp.	*T. vulpecula*
2	*Trichosurus* sp.	*T. vulpecula*
3	*Trichosurus* sp.	*T. vulpecula*
4	*Rattus rattus*	
5	*Wallabia bicolor;*	
	few bandicoot hairs	*Perameles nasuta*
6	*Trichosurus* sp.; *Mus musculus*	
7	*P. nasuta*; few rodent hairs	*Rattus sp.*
8	*W. bicolor*; *R. rattus*	
9	*R. rattus*	
10	*R. rattus*	
11	*R. rattus*	

Bats

Harp-nets were unsuccessful in capturing microbats in the 2011 survey despite their presence being detected by ultrasound.

The grey-headed flying fox, *Pteropus poliocephalus,* was recorded flying over the site during each evening of the 2011 survey and nine microbat species were identified by their ultrasound (Table 6). The most abundant species recorded was the eastern forest bat.

Table 6: Bat species recorded, 2011 survey (# = vulnerable species)

Scientific name	Common name	Number of identifiable calls
Chalinolobus gouldii	Gould's wattled bat	5
Falsistrellus tasmaniensis#	Eastern false pipistrelle	11
Miniopteris australis#	Little bent-wing bat	27
Mormopterus sp. 2	A sheath-tail bat	2
Nyctophilus sp.	A long-eared bat	7
Pteropus poliocephalus#	Grey-headed flying-fox	>20 sightings
Rhinolophus megaphyllus	Eastern horse-shoe bat	23
Tadarida australis	White-striped mastiff bat	9
Vespadelus darlingtoni	Large forest bat	1
Vespadelus pumilus	Eastern forest bat	173

Koala

A total of 300 trees was inspected for koala scats in the 2011 SAT survey with only a single scat being recorded (Fig. 5). This activity was in the lowest category reported in Phillips and Callaghan (2011) and the koala was considered to be a transitory species i.e. a species which may move through the site opportunistically or infrequently.

This result contrasted with the 2012 survey results in which koala scats were recorded under 21 tallowwoods out of the 180 trees surveyed. These data suggests that koala(s) had recently visited the site and that tallowwood was the koala's preferred food tree (Fig. 6).

Medium scat activity levels ("ALs") of koala populations is defined by Phillips and Callaghan (2011) as a sedentary ranging pattern. Low, medium and high ALs are as follows:

- Low: SAT site activity level less than 22.52%;

- Medium to High: SAT levels greater than or equal to 22.52% but less than or equal to 32.84%; and
- High: SAT levels greater than 32.84%.

Two sites had ALs of 23%, three sites had ALs of 10% and one site had no activity (Fig. 5).

A scat survey under 41 tallowwoods was conducted on 25 April 2013 in an area identified as primary koala habitat in the 2012 survey. This survey was not based on the SAT methodology but targeted core koala food trees. It was expected to yield higher results than a SAT survey as it targeted only core koala food trees whereas the SAT methodology targets all trees. No koala scats or any other evidence of the koala was recorded.

A second koala survey was undertaken on 3 October 2013 using the SAT methodology (Fig. 6). Six sites were selected and 180 trees surveyed with koala scats being recorded under only one tree. This suggests that the 2011 and 2013 results, which showed that the koala is transitory, is the most likely scenario for the site. This accords with the lack of observations during SAT surveys or survey records during spotlighting.

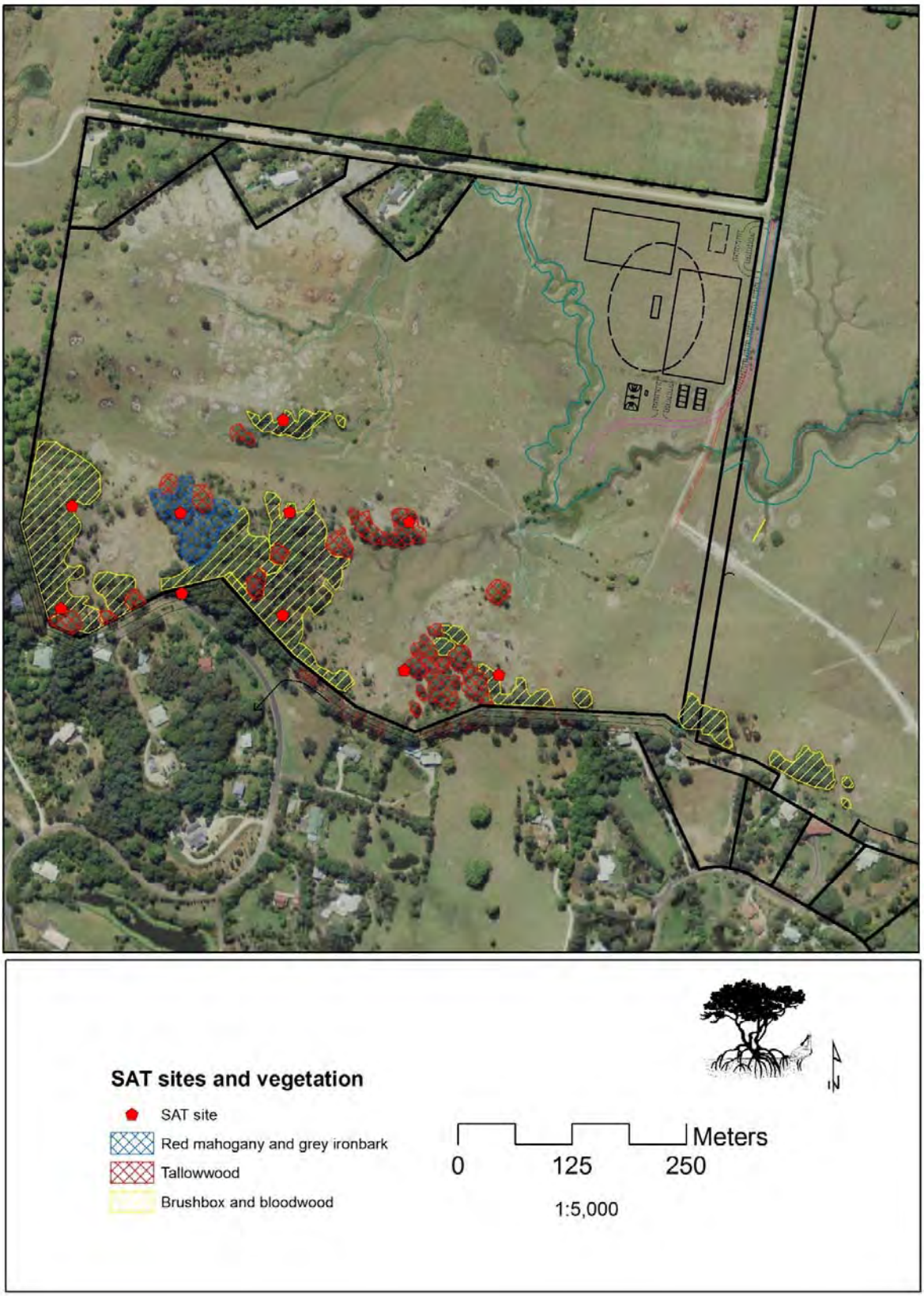

Fig. 4: SAT survey locations, April 2011

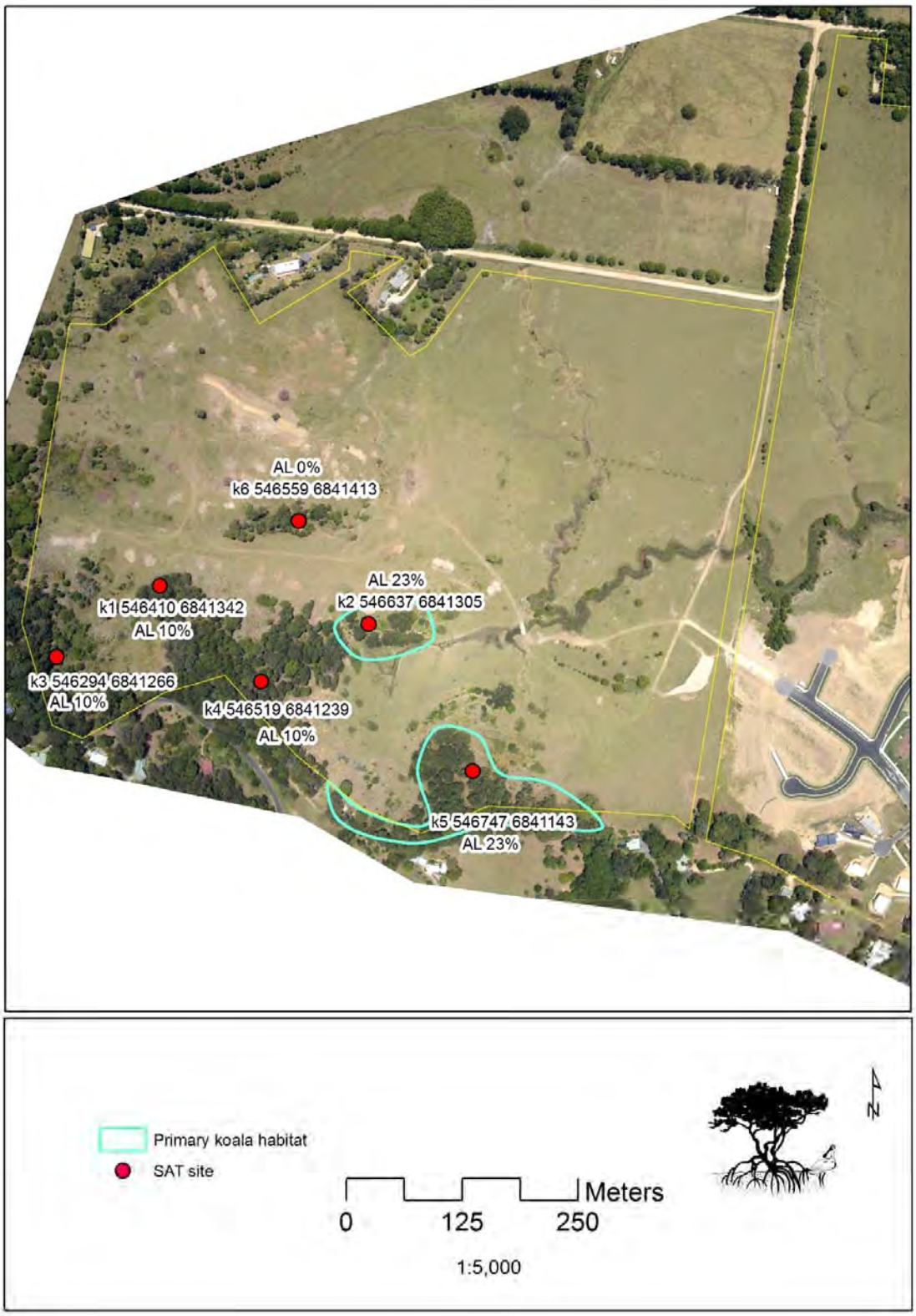

Fig. 5: SAT survey locations, May 2012 and primary koala habitat based on activity levels in accordance with Phillips and Callaghan (2011) (Photo Bill Mills November 2013)

Fig. 6: SAT survey locations, September 2013 including GPS plots of trees surveyed for scats (Photo: Bill Mills November 2013)

4.0 DISCUSSION

4.1 Bio-retention basins

The Statement of Environmental Effects ("SEE") includes a discussion on bio-retention basins with respect to discharge from treatment areas (CivilTech 2013). On the basis of CivilTech's (the civil engineering consultants) advice there will be a reduction in suspended solids, nitrogen, phosphorous and gross pollutants in downstream environments. Ecologically, this is important as substantial regeneration and restoration works are required in accordance with the approved Biodiversity Conservation Management Plan ("BCMP").

CivilTech states in the SEE that: "*The general stormwater quality concept is to install Ecosol Net Tech gross pollutant traps at all headwall outlets to the stormwater detention and treatment basin and to construct a bio retention basin with a minimum detention of 900m³ at the spillway level. The basin is to be located to the North of the proposed Stage 3 development and will discharge to an existing vegetated drainage line, which is to be reshaped, and will discharge into the existing creek".* Ecological advice to CivilTech was that the vegetated area should be retained and that the bio-retention basins moved westward into cleared land. The current development application reflects this amendment.

CivilTech also stated: "*with the use of gross pollutant traps and bioretention basins, will achieve a low level of output concentrations of all stormwater pollutants as specified by Council's Stormwater Quality Control DCP Section N7. MUSIC modelling shows that all pollutant targets will be achieved with the proposed stormwater quality devices. Overall, there is a:*

- *91.5% reduction in Total Suspended Solids;*

- *76.4% reduction in Total Phosphorus;*
- *47.5% reduction in Total Nitrogen levels; and*
- *91% reduction in Gross Pollutants.*

DRAINS modelling of the existing site comparing the proposed and existing development demonstrate that the combined use of the existing bio-retention basin and proposed bio-retention basin will provide sufficient detention storage for the development. The post development combined flow is reduced for all events except 50 and 100 year 3 hour events. The critical events (i.e. the storm duration that produces the largest runoff) are typically the 25 minute storms. The critical storm peak discharges will be reduced by 42-73%; other storm peak flows are reduced by 1-80% with an average reduction being around 51%".

4.2 Threated species, endangered ecological communities and the BCMP

One vulnerable bird, the masked owl, and four vulnerable mammals, the koala, the little bent-wing bat, the grey-headed flying-fox and the eastern false pipistrelle, were recorded during fauna surveys conducted over the past three years. These are fully addressed in Section 5: Statutory Considerations.

The consent granted by the NSW Land and Environment Court required the preparation and approval of a BCMP for the site. The BCMP was prepared by Wetland Care and has been approved by Council and works with respect to Stage one of this BCMP are substantially underway. These include fencing from livestock, camphor laurel control and plantings in riparian areas. These works will protect a number of threatened plant species and create habitat linkages along the creek lines. The only endangered ecological community at the site is a small remnant rainforest. The BCMP works have targeted this area with camphor laurel control and plantings.

This endangered ecological community is remote from the 31 allotment subdivision proposal subject to this development application.

4.3 Byron Shire Council Flora and Fauna Study

Council's flora and fauna study contains provisions with respect to planting native species. Appendix 12 of the study includes a list of known or potential environmental weeds, some of which are found at the site. The area subject to the 31 allotment subdivision is dominated by exotic vegetation of little conservation value.

4.4 Byron Biodiversity Conservation Strategy 2004

The Byron Biodiversity Conservation Strategy 2004 (Byron Shire Council 2004) advocates the conservation and restoration of high conservation vegetation along with the establishment and restoration of wildlife corridors. The Tallowood Ridge development is guided by an approved BCMP which is consistent with the objects of Council's Byron Biodiversity Conservation Strategy 2004. A considerable amount of progress has been made to date with respect to management works described in the BCMP.

5.0 STATUTORY CONSIDERATIONS

5.1 Koala habitat and State Environmental Planning Policy No. 44

State Environmental Planning Policy No. 44 - Koala Habitat Protection ("SEPP 44") commenced on 13 February 1995 with the aim to:

> *"Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline;*

(a) *"by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat;*

(b) *by encouraging the identification of areas of core koala habitat; and*

(c) *by encouraging the inclusion of areas of core koala habitat in environment protection zones."*

5.1.1 Definitions in SEPP 44

Various definitions are provided in SEPP 44. These are as follows:

"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;

"Potential koala habitat'' means areas of native vegetation where the trees of the types listed in Schedule 2 of the Policy constitute at least 15% of the total number of trees in the upper or lower strata of the tree component;

"Land to which the Policy applies" SEPP 44 applies to land for which a development application has been lodged for each local government area listed in Schedule 1 of the Policy. It does not apply to land dedicated or reserved under the *National Parks and Wildlife Act 1974* or to land dedicated under the *Forestry Act 1916* as a State forest or flora reserve.

SEPP 44 applies to land that:

- Has an area of more than 1 ha; or
- Has, together with any adjoining land in the same ownership, an area of more than 1 ha;
- Whether or not the development application applies to the whole, or only part, of the land.

5.1.2 Circular B35

Circular B35 dated 22 March 1995 assists in the interpretation of SEPP 44. The guidelines contained within Circular B35 must be considered by Council when determining a development application (S.2.0, P. 7).

Clause 5.1 of circular B35 provides clarification with respect to the application of SEPP 44 The clause includes the following:

> *"It is the intention of the policy that investigations for potential and core koala habitats be limited to those areas in which it is proposed to disturb habitat"*

5.1.3 SEPP 44 assessment

The subject land is greater than 1 ha, thus SEPP 44 applies to the land. For potential koala habitat to occur, koala food trees listed under Schedule 2 of the Policy need to comprise 15% or more of the total number of trees in the upper or lower strata of the tree component.

Surveys and analysis of aerial photography have not recorded koala food trees within the site proposed for subdivision and there was no evidence of koala presence (e.g., scats or scratches). Thus, potential koala habitat pursuant to SEPP 44 does not occur using the methodology described in Circular B35.

The issue of whether potential koala habitat occurs at the site was examined at the whole-of-property scale (that is all land within the ownership of Gainsplay Pty Ltd at Tallowood Ridge). Three teams of two people each (a team leader and tree marker) conducted tree surveys in September and October 2013 (30 person-days) within pre-defined vegetation polygons (Fig. 7 at page 37).

Team members had qualifications in biological science and thus were familiar with trees species and data collection methods (see acknowledgements). The team leader recorded tree data listed on the data sheet (Appendix 3) and confirmed species identifications. Trees in the "*upper or lower strata of the tree component*" were counted according to Step 1, section 1.5 of Circular B25. Only native plants were recorded while shrubs and ground covers were ignored.

Once trees were counted, non-koala food trees were marked with white paint and koala food trees were marked with orange paint. A GPS location was plotted for koala food trees and this was later downloaded into ArcGis software and superimposed over the aerial photo (Fig. 7).

Approximately 95% of trees at the site have been surveyed in this fashion with 265 Tallowwood being recorded (Table 7). Koala food trees (tallowwood) amount to 2.6% of the total trees in the upper or lower strata of the tree component at the site.

Sites 7 and 8 in Fig. 7 are the only sites for which trees remain to be counted and it is intended to complete this survey. However, it is likely that the percentage of core koala food trees will drop below 2.6% once this work is finalised as the habitat within sites 7 and 8 and along the creek line is unlikely to contain significant numbers of koala food trees.

Table 7: Records of tree counts at site (see Fig. 7 for recording sites)

Recorded by:	Peter Parker	David Sweet	Eli Dutton	Totals
Tallowwood site 1 koala food trees	35	11	35	81
All trees recorded (site 1)	434	163	230	827
%Koala food trees: site 1				9.7%
Tallowwood site 4, koala food trees	47	7	0	54
All trees recorded (site 4)	1,717	1,643	861	4,221
%Koala food trees: site 4				1.28%
Tallowwood site 2, koala food trees	34	23	0	57
All trees recorded (site 2)	314	206	0	520
%Koala food trees: site 2				10.96%
Tallowwood site 3, koala food trees	1	0	0	1
All trees recorded (site 3)	429	0	0	429
%Koala food trees: site 3				0.2%
Tallowwood site 5, koala food trees	0	6	0	6
All trees recorded (site 5)	1,060	2,079	0	3,139
%Koala food trees: site 5				0.19%
Tallowwood site 6, koala food trees	66	0	0	66
All trees recorded (site 6)	766	0	0	766
%Koala food trees: site 6				8.61%
%Koala food trees: all sites combined				265/9,902 x 100 = 2.68%

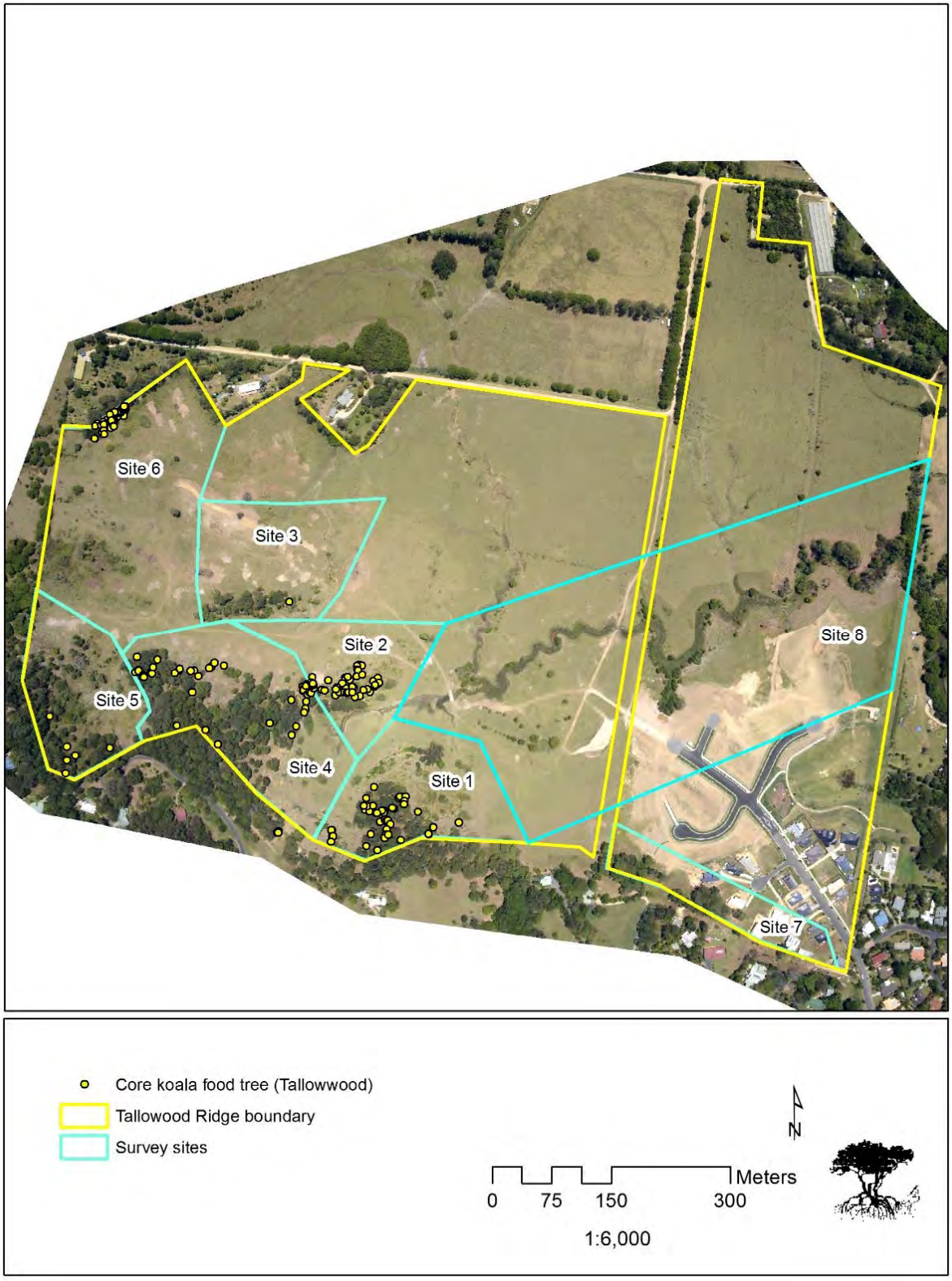

Fig. 7: Plots of tallowwood over the site (sites 7 and 8 have yet to be surveyed) (Photo: Bill Mills November 2013)

5.2 Section 5A *Environmental Planning and Assessment Act, 1979*

The *Threatened Species Conservation Act 1995* ("TSC Act") commenced on 1 January 1996. This Act, *inter alia,* amended s 4, s 110, s 111 and s 112 of the *Environmental Planning and Assessment Act*, 1979 ("EPA Act") with regard to the protection of plants and animals.

For the purposes of the EPA Act and, in particular, in the administration of sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

- Each of the factors is listed below under sections 5A a-g; and
- Any assessment guidelines[3].

S.5A (a)

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

In assessing the likelihood *that a viable local population of the species is likely to be placed at risk of extinction* from this proposal the following factors have been considered:

[3] For the purpose of this assessment the *Threatened species assessment guidelines, the assessment of significance.* Publ. DECC 2007 have been adopted

- the proposal's likely impact upon the key habitat components essential to the species' lifecycle; and
- the size of the local population in comparison with that which is proposed to be removed/modified.

A local population is considered to be the population contained within the study area.

Flora

No threatened plant species was recorded or would be likely to occur in the areas impacted by this development application. Thus, the development will not *have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

Fauna either recorded at the site or those species which have essential habitat components at the site

A number of vulnerable vertebrate species have been recorded at the site. However, these were all located in habitats quite remote from the area proposed for development and are discussed below:

Birds

Glossy black cockatoo

The glossy black cockatoo is a small blackish brown bird with a broad bulbous bill and a low round crest. The female is distinguished from the male by irregular yellowish patterns on the head, crest and/or neck. The female also has a red tail panel edged with yellow and is usually barred black.

The glossy black cockatoo occurs in the eastern part of Australia and ranges from Rockhampton, Queensland to southern Victoria. It has also been recorded at islands off the South Australian coast (RAOU Atlas Map 265).

The glossy black cockatoo lives in loose groups of two to 20 birds and appears to occupy areas permanently, although individuals and subgroups may move around within each area. It frequents open forests and woodlands extending into semi-arid areas.

This species feeds almost exclusively on the fruits of she-oaks.

There was no evidence of the glossy black cockatoo feeding at the site on its preferred tree species and no she-oak will be removed as part of this development application.

Masked owl

The masked owl closely resembles the more common barn owl, *Tyto alba.* It is readily distinguishable from the barn owl, however, by its distinctive screeching call. It is also larger and more robust than the barn owl with a rounder black-bordered facial disc. Its colour varies from white, similar to the barn owl, to blackish above and buff-chestnut below (Pizzey and Knight 1997).

The masked owl frequents forest and woodland, but will also frequent treeless country where caves are available. Its' home range is between 500-1000 ha and it is known to take more ground-dwelling prey than arboreal species (Schodde and Mason 1980 cited in State Forests 1996). Nesting sites include mixed-age or mid-successional stage dry sclerophyll forest (usually > 60 years old). The masked owl has been recorded at low densities throughout its' range. However, it is most numerous in coastal and near-coastal regions (Debus and Rose 1994).

This species is unlikely to be impacted as no habitat will be removed, it is highly mobile, has a large home-range and habitats

available at the site are well buffered from the proposed development.

Rose-crowned fruit dove

The rose-crowned fruit-dove is a small (22-24.5 cm) frugivorous bird that is largely confined to rainforest. Its' distinctive colouration includes a rose crown, a blue head, a dark green back and abdomen and a yellow tail-tip.

This species is an obligate frugivore of the rainforest canopy. It is usually encountered in pairs or small groups, with larger congregations being generally restricted to profusely fruiting trees (State Forests 1996).

The rose-crowned fruit-dove ranges from the Kimberly district in north-eastern Western Australia through Queensland and NSW, along the eastern coastline of Victoria and to Tasmania in the south (RAOU map 021). It frequents rainforests, monsoon and paperbark forests, eucalypt woodlands, vine groves, fruit orchids, camphor laurel and broad-leaved privet regrowth.

The rose-crowned fruit-dove migrates altitudinally, moving to coastal and near-coastal areas during the winter months (pers. obs.) and may potentially occur in the rainforest at the site. However, it is unlikely that the proposal will impact on this species as no potential habitat will be impacted.

Mammals

Little bent-wing bat

The little bent-wing bat occurs in a wide range of forest types ranging from rainforest to warm temperate wet and dry sclerophyll

forests along the coastal ranges of eastern Australia, from the central coast of NSW to Cape York.

It forages on small insects below the tree canopy and relies on a limited number of caves for maternity and hibernation roosts (Dwyer 1983). With the onset of spring, adult females move from widely scattered roosts to specific nursery caves. These sites are often shared with the common bent-wing bat. The little bent-wing bat relies on large numbers of common bent-wing bats to raise cave temperatures to that necessary to raise young (Dwyer 1983; Baudinette *et al.* 1994).

The proposal will not impact on breeding individuals as no maternity sites occur on or near the land. It is also unlikely to impact on foraging or roosting site as habitat removal is negligible.

Greater broad-nosed bat

The greater broad-nosed bat is a winged placental mammal with a broad squarish head and sparsely-haired muzzle with glandular swellings. This species has dark reddish-brown fur above and is slightly paler below (Cronin 1991).

The greater broad-nosed bat extends along the coast from Maryborough in Queensland to Orbost in Victoria (Klippel 1992). Its preferred habitat is along creek systems of the Border Ranges. However, it has been recorded in low numbers in near-coastal habitat. It is reasonably common in coastal northern NSW (Richards 1992) especially in the Richmond Range, Whian Whian State Forest and Mebbin State Forest (Martin Schulz cited in State Forests 1996).

It forages on slow-flying beetles and uses creeks or small rivers as corridors and tree hollows for diurnal roosting (Richards 1983). This bat is a large species requiring a greater feeding range than other insectivorous species.

The proposed development is unlikely to impact on this species due as no potential habitat will be impacted.

Grey-headed flying- fox

The grey-headed flying-fox feeds on the blossom of eucalypts, paperbarks, turpentine and native and introduced fruits. It is distributed along the eastern Australian coastline from Gladstone in Queensland to south Gippsland and Melbourne in Victoria. It rarely travels more than 200 km inland. The proposal is unlikely to impact on this species as no roosting or foraging sites will be removed or disturbed.

Eastern false pipistrelle

The eastern false pipistrelle is relatively large with a length of about 65 mm. It weighs up to 28 grams and is dark to reddish-brown above and paler grey on its underside. It has long slender ears set well back on the head and some sparse hair on the nose.

The eastern false pipistrelle ranges along the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. It prefers moist habitats, with trees taller than 20 m and generally roosts in eucalypt hollows, under loose bark on trees or in buildings. It hunts beetles, moths, weevils and other flying insects above or just below the tree canopy and hibernates in winter. This proposal will not impact on this species as no suitable habitat will be removed or disturbed.

Koala

The koala occurs in timbered habitats that contain its essential food needs which is comprised of a small guild of eucalypts (55 species). Other tree species are also utilised by the koala. These are of secondary nutrient value and do not replace eucalypts located on more fertile soils. Koalas have been recorded in regrowth forests, suggesting that young koalas may prefer the new foliage of rapidly growing trees. However, tree preferences are known to change throughout the year when koalas move to different sites (Lee and Martin 1988).

This species extends from coastal and central Queensland through eastern and central NSW, throughout Victoria and to eastern South Australia.

Koala scats were recorded in woodland west of the proposed subdivision site. However, the proposed development is unlikely to impact on this species as dogs will be retained in fenced yards (fence height minimum 1200 mm) and vehicle speeds will be less than 50km/hour which is managed through road design and signage.

S5A (a) conclusion

The development proposal is considered unlikely to *have an adverse effect on the life cycle of the* (threatened) *species such that a viable local population of the species is likely to be placed at risk of extinction.*

S.5A (b)

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle

of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

No endangered populations, listed under Part 2 of Schedule 1 of the TSC Act, occur within the vicinity of the site. Thus, the action proposed will not cause *a viable local population of the species to be placed at risk of extinction*.

S.5A (c)

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No Critically Endangered Communities occur at the site. Thus, the proposed development will not *have an adverse effect on the extent of the* Critically Endangered *ecological community such that its local occurrence is likely to be placed at risk of extinction* nor will any proposed action *substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

No clearing or modification of any endangered ecological community is proposed. Thus, the proposal is unlikely *to have an adverse*

effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction and nor will it *substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

S.5A (d)

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

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

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

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

With respect to s. 5A(d)(i), the proposal will not require the removal of trees. The extent of modification of threatened species habitat is negligible.

With respect to s. 5A(d)(ii), the proposal will not result in habitat fragmentation as no trees are proposed for removal.

With respect to s. 5A(d)(iii), the proposal is of no consequence to the long-term survival of a species, population or ecological community in the locality due the extent of habitat preserved at the site and the restoration works being undertaken in accordance with the approved BCMP.

S.5A (e)

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

The site does not contain any area which has been identified and declared as critical habitat under Part 3 of the TSC Act. Therefore, critical habitat will not be affected by the development of the site.

S.5A (f)

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

The NSW threatened species priority action statement (DECCW 2007) advises that:

- Habitat loss or modification for urban development and agricultural practices has been a major factor in the decline of many native plants and animals. Rehabilitation and regeneration of modified or lost habitat can help many threatened species continue to survive in the wild. Actions include planting local native plants to provide food, shelter and roosting sites, or bush regeneration to reduce the impact on native plants from weeds.

Actions being undertaken in accordance with the approved BCMP are consistent with this action statement and recovery plans generally.

S.5A (g)

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

Threatening processes gazetted pursuant to the TSC Act are as follows:

- Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, *Manorina melanocephala;*
- Alteration of habitat following subsidence due to longwall mining;
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands (as described in the final determination of the Scientific Committee to list the threatening process);
- Anthropogenic climate change;
- Bushrock removal;
- Clearing of native vegetation. Clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of a stand or stands;
- Competition and grazing by the feral European rabbit, *Oryctolagus cuniculus*;
- Competition and habitat degradation by feral goats, *Capra hircus;*
- Competition from feral honey bees, *Apis mellifera*;
- Death or injury to marine species following capture in shark control programs on ocean beaches;
- Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments;
- Forest eucalypt dieback associated with over-abundant psyllids and bell miners;
- Herbivory and environmental degradation caused by feral deer;
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition. High frequency fire is defined as two or more successive fires close enough together in

time to interfere with or limit the ability of plants or animals to recruit new individuals into a population, or for plants to build up a seed-bank of sufficient size to maintain the population through the next fire;

- Importation of red imported fire ants, *Solenopsis invicta*;
- Infection by Psittacine Circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Infection of frogs by amphibian chytrid causing the disease, chytridiomycosis;
- Infection of native plants by the fungus, *Phytophthora cinnamomi*;
- Introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae
- Introduction of the large earth bumblebee, *Bombus terrestris*;
- Invasion and establishment of exotic vines and scramblers;
- Loss or degradation (or both) of sites used for hill-topping by butterflies. Hill-topping in butterflies is a complex behaviour that often facilitates mating between sexes. Many butterfly species appear to congregate on hill-tops or ridges that are usually higher than the surrounding landscape. These sites may range in area from a few square metres to several hectares;
- Invasion and establishment of scotch broom, *Cytisus scoparius*;
- Invasion and establishment of the cane toad, *Bufo marinus;*
- Invasion, establishment and spread of lantana;
- Invasion of native plant communities by African olive, *Olea europaea* L. subsp. *cuspidate*;
- Invasion of native plant communities by bitou bush, *Chrysanthemoides monilifera*. The ability of bitou bush to become the overwhelming dominant in invaded ecological

communities threatens all plant communities within its distribution;

- Invasion of native plant communities by exotic perennial grasses;
- Invasion of the yellow crazy ant, *Anoplolepis gracilipes* into NSW
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants
- Loss of hollow-bearing trees;
- Predation by the mosquito fish, *Gambusia holbrooki*;
- Predation by the European red fox, *Vulpes vulpes*;
- Predation by the feral cat, Felix cattus. Predation by the feral cat has been implicated in the extinction and decline of many species of birds on islands around Australia and in the early extinction of up to seven species of small mammals on the Australian mainland;
- Predation by the ship rat, *Rattus rattus*, on Lord Howe Island; and
- Removal of dead wood and dead trees.

None of the above-listed threatening processes are likely to increase as a result of the proposed development.

5.3 Section 5C of the *EPA Act 1979* and 220ZZ of the Fisheries Management Act 1994

Section 220ZZ of the *Fisheries Management Act 1994* ("FMA") lists the matters which need to be taken into consideration with respect to whether a development is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats. The proposed development will require the crossing of a small unnamed creek. A fish survey within this creek was included in the 2011 flora and fauna survey and mosquito fish were prolific.

Other fish species expected to occur include ells, *Anguilla* spp. However, the habitat is degraded by cattle grazing, past land clearing and the introduction of exotic water weeds (e.g., parrot's feather, *Myriophyllum aquaticum)*. This introduced water plant forms dense mats of growth which impede the flow of creeks and waterways.

A review of the matters listed under S. 220ZZ of the FMA did not identify any issue of relevance to the site or to this development application.

6.0 REFERENCES

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- Sandra Karcher: BSc (Hons 1), field assistance for the 2013 tree counts.

APPENDIX 1:

VEGETATION

Scientific name	Common name	grassland	woodland	waterbody
** introduced or naturalised*				
FERNS				
BLECHNACEAE				
Blechnum indicum	swamp water fern			x
ANGIOSPERMS (Flowering plants)				
Monocotyledons				
ARACEAE				
Alocasia brisbanensis	cunjevoi		x	
ARECACEAE				
**Syagrus romanzoffianum*	queen or cocos palm		x	
ASPARAGACEAE				
**Protasparagus aethiopicus*	ground asparagus		x	
COMMELINACEAE				
Commelina cyanea	scurvy weed		x	
CYPERACEAE				
Carex appressa				x
Cyperus brevifolius	Mullumbimby couch			x
**Cyperus eragrostis*	umbrella sedge			x
Schoenoplectus mucronatus	a sedge			x
JUNCACEAE				
Juncus usitatus	tussock rush	x		x
LUZURIAGACEAE				
Geitonoplesium cymosum	scrambling lily		x	
PHORMIACEAE				
Dianella caerulea var *caerulea*	blue flax lily		x	
POACEAE				
**Andropogon virginicus*	whiskey grass	x		
**Axonopus fissifolius*	narrow-leaved carpet grass	x		
**Cenchrus clandestinum*	kikuyu	x		
**Chloris gayana*	Rhode's grass	x		
Digitaria didactyla	Queensland blue couch	x		
**Eragrostis curvula* (complex)	love-grass	x		
Imperata cylindrica var. *major*	blady grass	x		
Leersia hexandra	swamp rice grass			x
Oplismenus imbecillis	basket grass		x	
**Paspalum distichum*	water couch			x
**Paspalum urvillei*	paspalum	x		
**Paspalum mandiocanum*	broad-leaved paspalum (warrel grass)	x	x	
**Setaria sphacelata*	canary seed grass	x		
**Sporobolus indicus* var. *capensis*	Parramatta grass	x		
TYPHACEAE				
Typha orientalis	broad-leaved cumbungi			x
Dicotyledons				
APIACEAE				
**Hydrocotyle bonariensis*	hydrocotyle			x

Scientific name	**Common name**	grassland	woodland	waterbody
** introduced or naturalised*				
ARALIACEAE				
Schefflera actinophylla	umbrella tree	x	x	
ASCLEPIADACEAE				
**Asclepias curvassica*	redhead cotton bush	x		
**Gomphocarpus fruiticocus*	narrow-leaf cotton-bush	x		
ASTERACEAE				
**Ageratina adenophora*	crofton weed	x		x
**Ageratina riparia*	mist weed			x
**Ageratum houstonianum*	blue billygoat weed	x		
**Conyza albida*	tall fleabane	x		
**Senecio lautus*	fireweed	x		
DILLENIACEAE				
Hibbertia scandens	twining guinea flower	x	x	
ELAEOCARPACEAE				
Elaeocarpus obovatus	hard quandong		x	
EUPHORBIACEAE				
Macaranga tanarius	macaranga		x	
Mallotus philippensis	red kamala		x	
FABACEAE				
Subfamily FABOIDEAE				
**Trifolium repens*	white clover	x		
HALORAGACEAE				
Myriophyllum aquaticum	parrot's feather			x
LAURACEAE				
**Cinnamomum camphora*	camphor laurel	x	x	
LYTHRACEAE				
**Cuphea carthagenensis*	cuphea	x		
MALVACEAE				
**Sida rhombifolia*	Paddy's lucerne	x		
MIMOSOIDEAE				
Acacia maidenii	Maiden's wattle			
Acacia melanoxylon	blackwood	x	x	
MORACEAE				
Maclura cochinchinensis	cockspur thorn		x	
MYRTACEAE				
Corymbia intermedia	pink bloodwood	x	x	
Eucalyptus grandis	flooded gum		x	
Lopohostemon confertus	brushbox	x		
OLEACEAE				
**Ligustrum sinense*	small-leaved privet		x	

Scientific name	**Common name**	grassland	woodland	waterbody
** introduced or naturalised*				
PASSIFLORACEAE				
**Passiflora subpeltata*	white passionflower		x	
PITTOSPORACEAE				
Pittosporum undulatum	sweet pittosporum	x		
RHAMNACEAE				
Alphitonia excelsa	red ash		x	
RUBIACEAE				
Psychotria loniceroides	hairy psychotria		x	
RUTACEAE				
Ziera smithii	sandfly ziera		x	
SAPINDACEAE				
Cupaniopsis anarcardioides	tuckeroo		x	
Guioa semiglauca	guioa	x		
Jagera pseudorhus	foambark tree		x	
SOLANACEAE				
**Solanum mauritianum*	wild tobacco		x	
STERCULIACEAE				
Commersonia bartramia	brown kurrajong		x	
VERBENACEAE				
** Lantana camara*	lantana	x	x	
VIOLACEAE				
Viola banksii	native violet		x	
VITIDACEAE				
Cayratia clematidea	slender grape		x	

APPENDIX 2: FAUNA

(RECORDS OVER WHOLE OF GAINSPLAY LAND)

Scientific name	Common name	Recorded	Expected
* : introduced species; # threatened species			
MAMMALS			
CANIDAE			
*Canis familaris**	dog	x	
*Vulpes vulpes**	fox	x	
FELIDAE			
*Felis catus**	feral cat		x
LEPORIDAE			
*Oryctolagus cuniculus**	rabbit	scats	
MACROPODIDAE			
Wallabia bicolor	swamp wallaby	x	
MOLOSSIDAE			
Mormopterus sp. 1		x	
Austronomus australis	white-striped free-tail bat	x	
MURIDAE			
Hydromys chrysogaster	water rat		x
*Mus musculus**	house mouse	x	
*Rattus rattus**	black rat	x	
PERAMELIDAE			
Isoodon macrourus	northern brown bandicoot		x
Perameles nasuta	long-nosed bandicoot	x	
PETAURIDAE			
Petaurus breviceps	sugar glider		x
PHALANGERIDAE			
Trichosurus vulpecula	common brushtail possum	x	
PHASCOLARCTIDAE			
Phascolarctos cinereus #	koala	scats	
PTEROPODIDAE			
Pteropus alecto	black flying-fox		x
Pteropus poliocephalus #	grey-headed flying-fox	x	
RHINOLOPHIDAE			
Rhinolophus megaphyllus	eastern horse-shoe bat	x	
TACHYGLOSSIDAE			
Tachyglossus aculeatus	short-beaked echidna		x
VESPERTILIONIDAE			
Chalinolobus gouldii	Gould's wattled bat	x	
Chalinolobus morio	chocolate wattled bat		x
Falsistrellus tasmaniensis#	eastern false pipistrelle	x	
Miniopterus australis #	little bent-wing bat	x	
Nyctophilus sp.	a long-eared bat	x	
Scoteanax rueppellii#	greater broad-nosed bat		x
Scotorepens orion	eastern broad-nosed bat		x
Vespadelus darlingtoni	large forest bat	x	
Vespadelus pumilus	eastern forest bat	x	
Vespadelus vulturnus	little forest bat		x

Scientific name	Common name	Recorded	Expected
* : introduced species; # threatened species			
BIRDS			
ACANTHIZIDAE			
Gerygone olivacea	white-throated gerygone	x	
Sericornis frontalis	white-browed scrubwren	x	
ACCIPITRIDAE			
Accipiter novaehollandiae	grey goshawk	x	
Aquila audax	wedge-tailed eagle		x
Aviceda subcristata	pacific baza		x
Haliaeetus leucogaster	white-bellied sea-eagle	x	
Milvus sphenurus	whistling kite		x
AEGOTHELIDAE			
Aegotheles cristatus	Australian owlet-nightjar	nesting	
ALCEDINIDAE			
Alcedo azurea	azure kingfisher		x
Dacelo novaeguineae	laughing kookaburra	x	
Todiramphus macleayii	forest kingfisher		x
Todiramphus sanctus	sacred kingfisher	x	
ANATIDAE			
Anas superciliosa	pacific black duck	x	
Chenonetta jubata	maned duck	x	
APODIDAE			
Hirundapus caudacutus	white-throated needletail	x	
ARDEIDAE			
Ardea garzetta	little egret	x	
Ardea ibis	cattle egret	x	
Ardea intermedia	intermediate egret	x	
Ardea novaehollandiae	white-faced heron	x	
CAMPEPHAGIDAE			
Coracina novaehollindiae	black-faced cuckoo-shrike	x	
Coracina tenuirostris	cicadabird	x	
Lalage leucomela	varied triller	x	
CHARADRIIDAE			
Vanellus miles	masked lapwing	x	
CLIMACTERIDAE			
Cormobates leucophaea	white-throated treecreeper	x	
COLUMBIDAE			
Columba leucomela	white-headed pigeon	x	
Columba livia *	feral pigeon		x
Geopelia humeralis	bar-shouldered dove	x	
Geophaps lophotes	crested pigeon	x	
Leucosarcia melanoleuca	wonga pidgeon		x
Lopholaimus antarcticus	topknot pigeon	x	
Macropygia amboinensis	brown cuckoo-dove	x	
Ptilinopus regina#	rose-crowned fruit-dove		x
*Streptopelia chinensis**	spotted turtle-dove		x
CORACIIDAE			
Eurystomus orientalis	dollarbird	x	

Scientific name	Common name	Recorded	Expected
* : introduced species; # threatened species			
CORVIDAE			
Corvus orru	torresian crow	x	
CRACTICIDAE			
Cracticus nigrogularis	pied butcherbird	x	
Cracticus torquatus	grey butcherbird	x	
Gymnorhina tibicen	Australian magpie	nesting	
Strepera graculina	pied currawong	x	
CUCULIDAE			
Cacomantis flabelliformis	fan-tailed cuckoo	x	
Cacomantis variolosus	brush cuckoo	x	
Centropus phasianinus	pheasant coucal	x	
Chrysococcyx basalis	horsfield's bronze-cuckoo		x
Chrysococcyx lucidus	shining bronze-cuckoo		x
Chrysococcyx minutillus	little bronze-cuckoo		x
Cuculus pallidus	pallid cuckoo		x
Eudynamys scolopacea	common koel	x	
Scythrops novaehollandiae	channel-billed cuckoo		x
DICAEIDAE			
Dicaeum hirundinaceum	mistletoe bird		x
DICRURIDAE			
Dicrurus bracteatus	spangled drongo	x	
FALCONIDAE			
Falco peregrinus	peregrine falcon		x
HIRUNDINIDAE			
Hirundo ariel	fairy martin		x
Hirundo neoxena	welcome swallow	x	
Hirundo nigricans	tree martin		x
MALURIDAE			
Malurus cyaneus	superb fairy-wren		x
Malurus lamberti	variegated fairy-wren	x	
Malurus melanocephalus	red-backed fairy-wren		x
MEGAPODIIDAE			
Alectura lathami	Australian brush-turkey	nest	
MELIPHAGIDAE			
Anthochaera chrysoptera	brush (little) wattlebird	x	
Entomyzon cyanotis	blue-faced honeyeater		x
Manorina melanocephala	noisy miner	x	
Meliphaga lewinii	Lewin's honeyeater	x	
Myzomela sanguinolenta	scarlet honeyeater		x
Philemon citreogularis	little friarbird		x
Philemon corniculatus	noisy friarbird	x	
Phylidonyris nigra	white-cheeked honeyeater		x
MEROPIDAE			
Merops ornatus	rainbow bee-eater		x
MOTACILLIDAE			
Anthus novaeseelandiae	Richard's pipit		x
ORIOLIDAE			
Oriolus sagittatus	olive-backed oriole	x	

Scientific name	Common name	Recorded	Expected
* : introduced species; # threatened species			
Sphecotheres viridis	figbird	x	
ORTHONYCHIDAE			
Psophodes olivaceus	eastern whipbird	x	
PACHYCEPHALIDAE			
Colluricincla harmonica	grey shrike-thrush	x	
Colluricincla megarhyncha	little shrike-thrush		x
Eopsaltria australis	eastern yellow robin	x	
Monarcha melanopsis	black-faced monarch		x
Monarcha trivirgatus	spectacled monarch		x
Myiagra cyanoleuca	satin flycatcher		x
Myiagra inquieta	restless flycatcher		x
Myiagra rubecula	leaden flycatcher		x
Pachycephala pectoralis	golden whistler	x	
Pachycephala rufiventris	rufous whistler	x	
Rhipidura fuliginosa	grey fantail	x	
Rhipidura leucophrys	willie-wagtail	x	
Rhipidura rufifrons	rufous fantail	x	
PARDALOTIDAE			
Pardalotus punctatus	spotted pardalote		x
Pardalotus striatus	striated pardalote	x	
PLATALEIDAE			
Threskiornis molucca	Australian white ibis	x	
Threskiornis spinicollis	straw-necked ibis	x	
PODARGIDAE			
Podargus strigoides	tawny frogmouth	x	
PSITTACIDAE			
Alisterus scapularis	Australian king parrot		x
Cacatua galerita	sulphur-crested cockatoo	x	
Cacatua roseicapilla	galah	x	
Calyptorhynchus funereus	yellow-tailed black cockatoo		x
Calyptorhynchus lathami#	glossy black-cockatoo		x
Platycercus elegans	crimson rosella		x
Platycercus eximius	eastern rosella	x	
Trichoglossus chlorolepiotus	scaly-breasted lorikeet	x	
Trichoglossus haematodus	rainbow lorikeet	x	
RALLIDAE			
Gallinula tenebrosa	dusky moorhen		x
Porphyrio porphyrio	purple swamphen		x
SCOLOPACIDAE			
Gallinago hardwickii	Latham's snipe	x	
STRIGIDAE			
Ninox boobook	southern boobook	x	
Tyto alba	barn owl		x
Tyto novaehollandiae #	masked owl	x	
SYLVIIDAE			
Cisticola exilis	golden-headed cisticola		x
ZOSTEROPIDAE			
Zosterops lateralis	silvereye		x

Scientific name	Common name	Recorded	Expected
* : introduced species; # threatened species			
REPTILES			
AGAMIDAE			
Gemmatophora muricata	jacky lizard		x
Physignathus lesueurii	eastern water dragon	x	
Pogona barbata	bearded dragon	x	
BOIDAE			
Morelia spilota	carpet python		x
CHELIDAE			
Chelodina longicollis	long-necked tortoise		x
COLUBRIDAE			
Boiga irregularis	brown tree snake		x
Dendrelaphis punctulata	green tree snake		x
ELAPIDAE			
Rhinoplocephalos nigrescens	eastern small-eyed snake		x
Demansia psammophis	yellow-faced whip snake		x
Pseudechis porphyriacus	red-bellied blacksnake		x
Pseudonaja textilis	eastern brown snake		x
Tropidechis carinatus	rough-scaled snake		x
Vermicella annulata	bandy-bandy		x
SCINCIDAE			
Cryptoblepharus virgatus			x
Eulamprus quoyii	eastern water skink		x
Hemisphaeriodon gerrardii	pink-toungued skink		x
Lampropholis delicata	eastern grass skink	x	
Lampropholis guichenoti	garden skink		x
Saiphos equalis	three-toed skink		x
Saproscincus challengeri	challenger skink		x
Tiliqua scincoides	eastern blue-toungued lizard		x
TYPHLOPIDAE			
Ramphotyphlops nigriscens	a blind snake		x
VARANIDAE			
Varanus varius	lace monitor	x	
AMPHIBIANS			
BUFONIDAE			
*Chaunus marinus**	cane toad	x	
HYLIDAE			
Litoria caerulea	green tree frog		x
L. dentata	bleating tree frog		x
L. fallax	eastern dwarf frog		x
L. gracilenta	dainty green tree frog		x
L. nasuta	rocket frog	x	
L. peronii	Peron's tree frog		x
L. tyleri	laughing tree frog		x
L. verreauxii	Verreaux's tree frog		x
MYOBATRACHIDAE			
Crinia signifera	common eastern froglet	x	
Limnodynastes peronii	striped marsh frog	x	
L. tasmaniensis	spotted grass frog		x
Pseudophryne coriacea	red-backed toadlet		x

APPENDIX 3:

TREE COUNT DATA SHEET

Tree recording data sheet, Tallowood Ridge Estate 2013

Location (site no.):

Date: Recorded by:

TW=tallowwood, GIB = grey ironbark, BW=bloodwood, BB= brushbox, RM=red mahogany, FO= forest oak, FG= flooded gum, RF= rainforest tree, OTH = other

	Tree sp	Height m.	DBH < 50 mm	50-100mm	100 - 200mm	200-300mm	300-400mm	400-500mm	>500mm
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
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27									
27									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
Total food trees									