



NSW PLANNING ASSESSMENT COMMISSION

**The Proposed Riverside Development at Tea Gardens**  
**Concept Plan and Project Applications**  
**Review Report**

**by Dr Judy Smith**

**July 2009**

The Proposed Riverside Development at Tea Gardens Review Report© State of New South Wales through the NSW Planning Assessment Commission, 2009

NSW Planning Assessment Commission  
Address: Level 13, 301 George St Sydney NSW Australia  
Phone: (02) 9383 2100  
Email: [pac@pac.nsw.gov.au](mailto:pac@pac.nsw.gov.au)  
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## SUMMARY

Crighton Properties Pty Ltd is seeking Concept Plan approval for a residential, retail, tourist and commercial development at the Riverside at Tea Gardens site and approval of a Project Application for the initial stages of the development, including a residential subdivision, under Part 3A of the *Environmental Planning and Assessment Act 1979*. Environmental Resources Management Australia Pty Ltd has prepared an Environmental Assessment of the Concept Plan and Project Application on behalf of the proponent.

The Planning Assessment Commission has undertaken an expert review of the proposed development. Following consideration of all available information the Commission agreed that the site is substantially more ecologically constrained than the Environmental Assessment would suggest and that the potential impacts of the proposals in both the Concept Plan and Project Application should be regarded as unacceptable. The Commission has, however, been unable to reach a consensus position on how the development of this site should now be approached and thus two reports have been prepared. This minority report considers the ecological impacts of the proposal.

The Environmental Assessment identifies a large range and number of significant ecological constraints associated with the site. Government agency and community submissions have raised significant concerns in regard to the adequacy of ecological assessment; the nature and extent of ecological impacts; and the need for reconsideration of the ecological mitigation measures; and offsets.

Examination of a series of aerial photographs of the site dating back to 1963 indicated that since 1963 the site has supported predominantly native vegetation in the tree and shrub layer. When assessing the conservation significance of the vegetation the assemblage of plant species currently present on the site is of prime importance.

Accurate and comprehensive baseline ecological data is required in order to properly assess the direct and indirect impacts of the proposals on the biodiversity values of the site. There are numerous outstanding issues in relation to the adequacy and accuracy of the ecological assessment of the site. These issues constrain the Commission's ability to make a full and considered assessment of the ecological impacts associated with the proposed development.

The baseline data presented in the Environmental Assessment underestimates the ecological constraints of the site. However, even basing consideration on the current information in the Environmental Assessment leads to the conclusion that the potential impacts of the current proposals in both the Concept Plan and the Project Application are unacceptable. The 'improvement or maintenance' of biodiversity values is not achieved.

It is recommended that the proponent needs to reconsider the design of the project giving proper regard to the ecological constraints of the site. Significant changes to both the Concept Plan and the Project Application are required to address ecological impacts adequately. Significant reductions of both the extent and intensity of the proposed development are required.

It is recommended that any future design of the project needs to give careful consideration to the nationally listed Grey-headed Flying-fox. If there is a possibility of a significant adverse impact on the species then the matter will require referral to determine whether the approval of the Commonwealth Minister is required.

It is recommended that the baseline ecological data to support any revised proposals be of sufficient quality to enable the accurate assessment of the potential ecological impacts of any future proposed developments on the site.

I have dissented from the majority report because I do not believe that it is appropriate at this stage to indicate by way of a map the developable areas of the site. The draft map formulated did not take proper account of the ecological constraints of the site. An accurate understanding of the nature and extent of the ecological constraints of the site is lacking. It is thus not possible to substantiate the mapping of areas of the site which are deemed developable. Any future determination of developable areas within the site needs to be based on accurate baseline ecological data and also needs to take proper account of the identified ecological constraints of the site. A number of the conclusions and recommendations of the 'Ecological Constraints' chapter thus contradicted the draft 'Conclusions' chapter of the joint report.

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## 1. BACKGROUND TO REPORT

Crichton Properties Pty Ltd (the proponent) is seeking Concept Plan approval for a residential, retail, tourist and commercial development at the Riverside at Tea Gardens site and approval of a Project Application for the initial stages of the development, including a residential subdivision, under Part 3A of the *Environmental Planning and Assessment Act 1979*. The Riverside at Tea Gardens site (the site) is approximately 229 ha in area. The majority of the site is zoned Residential 2(f) – Mixed Residential-Commercial. Part of the site adjacent to the Myall River is zoned Environmental Protection 7(a) Wetlands and Littoral Rainforest and 7(b) Conservation. The site is within a ‘growth area’ identified by the Department of Planning’s Mid North Coast Regional Strategy. This Strategy covers the period 2006-31.

Environmental Resources Management Australia Pty Ltd (ERM) has prepared an environmental assessment of the Concept Plan and Project Application (ERM 2009) on behalf of the proponent. The *Riverside at Tea Gardens Concept Plan and Project Application Environmental Assessment Report* (EAR) describes the proposal, environmental considerations relating to the proposed development and identifies subsequent management or mitigation measures. The EAR comprises Volumes 1, 2, 3A, 3B and 3C.

In March 2009 the Minister for Planning issued a request to the Planning Assessment Commission for an expert review of the proposed development. For the purposes of this review, the Commission comprised the chair, Dr Neil Shepherd, and Ms Barbara Crossley, Mr Peter Dundon, and Dr Judy Smith.

The Terms of Reference for the expert review were:

1. Consider and advise on the:
  - a) Ecological impacts of the project including impacts on the SEPP 14 wetland, Myall River and the removal of vegetation and its location within a regionally significant habitat corridor;
  - b) Hydrological impacts of the project including:
    - i) whether the proposed water sensitive urban design measures will result in adverse impacts on groundwater and local surface hydrology, particularly on the SEPP 14 wetland and the Myall River; and
    - ii) whether the proposed water sensitive urban design measures will result in adverse impacts on flooding for the subject site and surrounding properties.
  - c) relevant issues raised in submissions in regard to the above impacts; and
  - d) adequacy of the proponent’s response to the issues raised in submissions.
2. Identify and comment on any other related significant issues raised in submissions or during the panel hearings.

The EAR was placed on public exhibition between 19 February 2009 and 20 March 2009. Written submissions to the Commission were received until 31 March 2009.

The Commission was briefed by the Department of Planning and the proponent and its consultants on 25 March 2009. Following the meeting a joint site visit was undertaken on 6 April 2009. The Commission held a public hearing on 7 April 2009. The Commission met with Mid Coast Water on 7 April 2009 and Department of Environment and Climate Change and Department of Water and Energy on 8 April 2009.

In conducting the review, the Commission has considered :

- The Environmental Assessment and its associated technical appendices (ERM 2009);
- Additional information provided by the proponent in response to the Department of Planning's and the Commission's requests;
- Written submissions from the public and government agencies to the Department of Planning and the Commission;
- Additional information provided by government agencies in response to the Commission's request; and
- Historical aerial photographs of the site.

Following consideration of the above information the Commission agreed that the site is substantially more ecologically constrained than the Environmental Assessment would suggest and that the potential impacts of the proposals in both the Concept Plan and Project Applications should be regarded as unacceptable. A draft report was prepared. The Commission has, however, been unable to reach a consensus position on how the development of this site should now be approached. It was thus decided that three Commission members, Ms Barbara Crossley, Mr Peter Dundon and Dr Neil Shepherd, would proceed to a final majority report and that Dr Judy Smith would produce a separate dissenting report. Having reached this position on 27 June 2009, it was decided by the Commission Chair, Dr Neil Shepherd, that preparation of the final reports should now occur separately, without exchanging further drafts.

The Commission's Terms of Reference require it to focus on issues relating to ecological impacts and hydrological impacts of the proposal as well as to identify and comment on any other related significant issues raised in submissions or during the public hearings. My role in the Commission has been to provide expert advice in relation to ecological matters. I am a qualified ecologist and have practised as such continuously and in a full-time capacity since 1985. I am not qualified to consider and advise on hydrological impacts. This report is thus restricted to consideration of ecological impacts of the proposal.

## 2. INTRODUCTION

This report addresses part 1(a) of the Ministerial Terms of Reference for the Planning Assessment Commission, that being to consider and advise on the:

*'Ecological impacts of the project including impacts on the SEPP 14 wetland, Myall River and the removal of vegetation and its location within a regionally significant habitat corridor.'*

In considering the ecological impacts of the project, this report takes into account the relevant issues raised in submissions in regard to the above impacts and any relevant parts of the proponent's responses to these issues.

The Director-General's Environmental Assessment Requirements for the project were issued in September 2008 (Annex C, Volume 1 of EAR). Section 9 of the Director-General's Environmental Assessment Requirements relate to flora and fauna. These include a requirement to:

- *Outline measures for the conservation of existing wildlife corridor values and/or connective importance of any vegetation on the subject land;*
- *Outline measures for the conservation of flora and fauna and their habitats within the meaning of the Threatened Species Conservation Act 1995, Native Vegetation Act 2003, and the Fisheries Management Act 1994 including, but not limited to Koala populations, and other Endangered Ecological Communities; and*
- *The EA must consider how the proposal has been managed to conserve flora and fauna habitats on the subject site and subject area. The measures proposed to mitigate any effects of the proposal must be provided, including any long term strategies to protect areas within the study area with threatened species. This may include elements that restore or improve habitats. Pre-construction monitoring plans or on-going monitoring of the effectiveness of the mitigation measures must be outlined in detail.*

The Director-General's Environmental Assessment Requirements refers the proponent to relevant technical and policy guidelines which may assist in the preparation of the Environmental Assessment. These include the *Draft Guidelines for Threatened Species Assessment* (Department of Environment and Conservation/Department of Primary Industries 2005) which provides the current guiding principles for threatened species assessment under Part 3A of the NSW *Environmental Planning and Assessment Act 1979*. According to these Guidelines, the objective of threatened species assessment is to ensure that developments meet the following environmental outcomes:

1. Maintain or improve biodiversity values (i.e. there is no net impact on threatened species or native vegetation).
2. Conserve biological diversity and promote ecologically sustainable development.
3. Protect areas of high conservation value (including areas of critical habitat).
4. Prevent the extinction of threatened species.
5. Protect the long-term viability of local populations of a species, population or ecological community.
6. Protect aspects of the environment that are matters of national significance.

The EAR, in response to the Director-General's Environmental Assessment Requirements, provides an Ecological Site Assessment (Threatened Species Assessment) prepared by Conacher Environmental Group and including a Koala Management Strategy and an Ecological Site Management Strategy, and a Wetlands Assessment prepared by Hunter Wetlands Research (Volume 3B of the EAR).

The Riverside site contains a large number of significant ecological constraints, as outlined in Section 3 below. Government agency and community submissions have raised significant concerns in regard to the adequacy of ecological assessment; the nature and extent of ecological impacts; and the need for reconsideration of the ecological mitigation measures including wildlife corridors; retention of individual feed, nest and roost trees; and offsets (see Section 5).

I have reviewed all available data provided in the EAR and have conducted a site inspection with the proponent's ecological experts on 6 April 2009. I have also inspected the site independently on 28 March 2009 between 1000hrs and 1700 hrs. On 27 May 2009 I inspected vegetation adjacent to the site between 1000 hrs and 1500 hrs. I confirm that there are substantial issues in regard to the adequacy and accuracy of baseline ecological data provided in the EAR (see Section 8).

The current development proposal entails the direct removal or modification of 126 ha of native or modified native vegetation. Approximately 70% of the site outside of the established conservation zones 'Zone 7(a) – Wetlands and Littoral Rainforest' and 'Zone



7(b) – Conservation' will be cleared. Additional areas of native vegetation have been designated as open space and drainage corridors, some of which will be subject to cut and fill and will thus also be modified by the proposed development.

There are likely to be substantial impacts on the ecological values of the site. The EAR notes (Page 17, Ecological Site Assessment, Volume 1 of EAR) that the proposed removal and modification of vegetation is likely to result in the following impacts on the biodiversity of the site and its immediate adjoining areas:

- i. removal of native vegetation;
- ii. removal and modification of fauna habitat;
- iii. fragmentation of habitat;
- iv. direct loss of flora and fauna species during site development stages through loss of habitat;
- v. ongoing disturbance to fauna species during site occupation; and
- vi. increased edge effects to adjoining vegetation (e.g. increased light penetration, changes to soil nutrient levels, changed hydrology of surface water flows, weed invasion and fauna predation etc.).

In order to properly consider and advise on the ecological impacts of the proposed development the Commission requires a full and accurate understanding of the ecological constraints of all areas likely to be impacted by the proposed development.

### **3. KNOWN ECOLOGICAL CONSTRAINTS OF THE SITE**

The EAR identifies a large number of ecological constraints associated with the site including:

#### **3.1 High biodiversity values and Key Habitat**

The EAR indicates that the site supports 16 native plant communities. It lists a total of 375 native flora taxa and 190 native fauna species (20 frog, 15 reptile, 122 bird and 33 mammal species) that have been recorded on the site during the current or previous surveys. The site is within an area mapped by the former NSW Department of Environment and Conservation as Key Habitat. Areas of Key Habitat are predicted to have high conservation value for fauna. Predictions are based on modelled fauna distributions that were developed for 122 priority fauna species in north-east New South Wales. As well as being important in their own right, the priority fauna species were also intended as planning surrogates for the overall conservation of biodiversity and ecological processes in the region. The modelled distributions were derived and refined using data from extensive field surveys within north-east New South Wales. Geographic information system analysis tools were used to identify and map regional Key Habitat areas (Scotts 2003, Scotts and Drielsma 2003). The very high number of native plant communities and flora and fauna species together with the very high number of threatened fauna species recorded on the site confirms the identification of the site as an area of Key Habitat.

#### **3.2 Regional Wildlife Corridor**

The site is within an area mapped by the former NSW Department of Environment and Conservation as a regional wildlife corridor. Regional corridors are primary landscape links designed to provide potential residential and dispersal habitat for certain species, and supplementary habitat for wide-ranging species. Corridors are not necessarily continuous;

they may be broken by currently degraded or cleared areas but must contribute to overall landscape connectivity, or have the potential to do so following restoration. The study by Scotts (2003) described in Section 3.1 also identified regional and sub-regional corridors linking the Key Habitats. The regional corridor that crosses the site connects Nerong and Pindimar and incorporates the Key Habitat area identified on the site.

### 3.3 Matters of 'National Environmental Significance'

Matters of 'National Environmental Significance' are listed in the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*. Relevant matters identified at the site are:

- Nationally listed threatened species and ecological communities - Grey-headed Flying-fox *Pteropus poliocephalus*
- Nationally listed migratory species
- Wetlands of international significance (Ramsar sites) – 'Myall Lakes' Ramsar wetland includes Corrie Island Nature Reserve which is located approximately 4 km downstream of the site.

### 3.4 Threatened species

Threatened species listed in the NSW *Threatened Species Conservation Act 1995* that have been recorded on the site during the current or previous surveys since 1992 include three endangered ecological communities, one endangered fauna population and twelve threatened (vulnerable) fauna species. These are:

- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (listed in the NSW *Threatened Species Conservation 1995* in 2005)
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions (listed in the NSW *Threatened Species Conservation 1995* in 2004)
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (listed in the NSW *Threatened Species Conservation 1995* in 2005)
- Hawks Nest and Tea Gardens Population of the Koala
- Wallum Froglet *Crinia tinnula*
- Squirrel Glider *Petaurus norfolcensis*
- Koala *Phascolarctos cinereus*
- Osprey *Pandion haliaetus*
- Barking Owl *Ninox connivens*
- Little Bentwing Bat *Miniopterus australis*
- Grey-headed Flying-fox *Pteropus poliocephalus*
- Eastern Freetail Bat *Mormopterus norfolkensis*
- Common Blossom Bat *Syconycteris australis*
- Large-footed Myotis *Myotis adversus*
- Greater Broad-nosed Bat *Scoteanax ruepellii*
- Eastern Bentwing Bat *Miniopterus schreibersii oceanensis*

### **3.5 Species with a Preliminary Determination to list as a threatened species**

In August 2008, prior to completion of the EAR, a Preliminary Determination was made under the NSW *Threatened Species Conservation Act 1995* to list the Little Lorikeet, which was recorded on site during the current survey, as a vulnerable species (NSW Scientific Committee 2008a). Since preparation of the EAR, the Little Eagle, which has been recorded near the site, has also been proposed for listing as a vulnerable species (NSW Scientific Committee 2009).

### **3.6 Potential habitat for additional threatened species**

Potential habitat occurs on site for a number of additional threatened species that have been recorded nearby (within 10 km) during recent surveys. These include, but are not limited to:

- Powerful Owl *Ninox strenua*
- Masked Owl *Tyto novaehollandiae*
- Eastern Chestnut Mouse *Pseudomys gracilicaudatus*
- Eastern Pygmy-possum *Cercatetus nanus*

### **3.7 Rare or Threatened Australian Plants (ROTAP)**

One species at the site, *Eucalyptus fergussonii* ssp. *fergussonii*, is listed on the national list of Rare or Threatened Australian Plants with a coding of 3KC- (Briggs and Leigh 1996).

### **3.8 State Environmental Planning Policy 14 – Coastal Wetlands**

The SEPP 14 Wetland No. 746 is located in the eastern portion of the site.

### **3.9 State Environmental Planning Policy 71 - Coastal Protection**

The site is within the Coastal Zone identified in SEPP 71. The site also contains 'sensitive coastal locations' as defined by SEPP 71. 'Sensitive coastal locations' on site are lands within 100 m of the SEPP 14 Wetland, within 100 m of the Myall River, and within 100m of Port Stephens/Great Lakes Marine Park. The Project Application indicates a number of residential lots and a community facility including a clubhouse and surrounding active and passive recreational areas forming part of Precinct 1 are located within a 'sensitive coastal location'. The Concept Plan indicates a future development site and foreshore park in the north-east of the site within a 'sensitive coastal location' (Areas 9 and 14 of Drawing No. R.C. -06 in Volume 2 of the EAR). The proposed development therefore is partly located within a 'sensitive coastal location'.

### **3.10 Marine Parks**

Port Stephens/Great Lakes Marine Park includes the Myall River immediately to the east of the site.

### **3.11 National Parks**

The site is approximately two kilometres downstream of the Myall Lakes National Park. Some areas of the Myall Lakes National Park are also located along the eastern shoreline areas of the Myall River within two kilometres of the site.

### 3.12 Groundwater-dependent ecosystems

Groundwater-dependent ecosystems are described in the NSW State Groundwater Dependent Ecosystems Policy prepared by the former Department of Land and Water Conservation in 2002. Ground water dependent ecosystems on the site include the SEPP 14 Wetland as well as other vegetation communities and habitats in low lying areas, for example the Swamp Sclerophyll Forest on Coastal Floodplains endangered ecological community and the habitat of the threatened Wallum Froglet.

### 3.13 Regionally significant vegetation communities

The Tea Gardens/Hawks Nest Conservation and Development Strategy (Great Lakes Council and Acacia Environmental Planning Pty Ltd 2003) includes a list of vegetation communities of special ecological significance. A number of these, for example the Swamp Mahogany, Red Bloodwood, Scribbly Gum and Blackbutt communities, occur on the site.

The Great Lakes Council Senior Ecologist (Memo from Council's Ecologist dated 19 March 2009) considers that, on the basis of available data, a number of vegetation communities on site, for example *Corymbia gummifera* open forest, *Eucalyptus resinifera* woodland and *Eucalyptus signata* woodland, have special conservation significance at regional level.

## 4. REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS

I have examined photocopies of the following aerial photographs of the site which were provided by the Department of Planning:

Date of photograph	Colour
1963	Black & white
1971	Black & white
1972	Black & white
1974	Black & white
1976	Black & white
1979	Black & white
1984	Black & white
1993	Colour
1996	Colour
1998	Colour
2001	Colour
2003	Colour

I have also examined the originals of the following aerial photographs:

Date	Run no.	Photo no. (s)	Scale	Colour
August 1963	4P	5118-5119	Not stated	Black & white
September 1971	3	5121-5123	Not stated	Black & white
June 1979	3	106-108	1:40 000	Black & white
May 1984	3	99-100	1:40 000	Black & white
October 1998	2	98-100	1:50 000	Colour
January 2001	4	142-143	1:25 000	Colour
September 2003	4	146	1:25 000	Colour

Apart from the 2003 photograph the original photographs were examined stereoscopically using a 4X hand held stereoscope. Photographs or photocopies of photographs varied considerably in quality. Photographs or photocopies from the 1971, 1976 and 1993 years are particularly poor.

The aerial photographs indicate that the site has suffered various disturbances since 1963. There is a pattern of tracks and drains across the site which varies between photo years. Some disturbance may be due to fire. In 1963 the site appears to be vegetated but with some partial clearing in the north-west of the site and recently cleared areas outside of the site to the north-east and to the south-west. Since 1963 the density of vegetation at the site appears to have fluctuated. Over the years parts of the site appear to have been thinned and to have regenerated. There is no evidence in the photos of large scale clearing of vegetation on the site since 1963, nor of large scale pine plantations, but pines may have been present in small areas and as scattered individuals. Areas within the site may have been planted to pines prior to 1963 but this cannot be confirmed from the available photos.

Since 1963 the site has supported predominantly native vegetation in the tree and shrub layer. None of the photographs since 1963 indicate a widespread and established pine forest on the site. The site was acquired by the proponent in 1991. A vegetation map prepared by Roger Lembit Environmental Consultant (Lembit 1992) for Great Lakes Shire Council in 1992 indicates that there were no mappable areas of pines on the site at this time. Lembit (1992) stated that much of the site was previously cleared for pine plantation but does not indicate when this may have occurred. Lembit further states that in July 1992 "the natural vegetation has since recovered to the extent where it is essentially composed of natural plant communities in an advanced state of regeneration".

Pines appear to grow quickly in the area and the pines to the immediate south-west of the site have grown up since the 2001 photo was taken. Observations on site indicate that the pines self seed and establish readily and that pines are now an invasive weed in the area.

When assessing the vegetation of a site the history of disturbance helps to interpret the patterns in the vegetation. When assessing the conservation significance of the vegetation the assemblage of plant species currently present on the site, either as above ground individuals or represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers, is of prime importance.

## **5. ECOLOGICAL ISSUES RAISED IN SUBMISSIONS**

### **5.1 Government Agencies**

A number of government agency submissions raised concerns with the adequacy of the ecological assessment included in the EAR and the likely impacts of the proposed development on the ecological values of the site. An overview of the key issues raised is provided below:

#### *5.1.1 Department of Environment and Climate Change*

The Department of Environment and Climate Change (DECC) has provided detailed comments with respect to the proposal and has raised concerns regarding the adequacy of the submitted EARs dated November 2007 and November 2008 on a number of occasions including in February 2008, December 2008, March 2009 and April 2009.

DECC notes that the current EAR fails to adequately address DECC's concerns about survey data and threatened species assessment. DECC considers the flora survey component of the current EAR to be inadequate and not in accordance with DECC guidelines *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (Department of Environment and Conservation 2004). DECC raises concerns in relation to the ability of the proponent's ecologists to accurately map and describe vegetation given that, on site visits in February and December 2008, the site had been disturbed through slashing/mowing. DECC indicates that surveys should be conducted in conditions and during appropriate seasons when vegetation species can be readily identified and detected. DECC acknowledges that the proponent's consultants may have conducted part of the required methodology, such as quadrat sampling and to some level a stratification to inform the sampling intensity and location. However, DECC indicates that this must be supplemented by adequate ground truthing, remote sensing (e.g. aerial photographs) and quadrat analysis to ensure that all vegetation communities, their boundaries and structure, and their inherent characteristics are adequately sampled, delineated and described. DECC does not believe the current EAR achieves this. As such, DECC is unable to provide an appraisal of the proposal and accurately assess the likely impacts to threatened species, populations and ecological communities, and their habitats, given that the baseline data is poor and inaccurate.

DECC does not concur with the proponent's conclusions from the Ecological Site Assessment that the remedial measures proposed will mitigate against the loss of habitat features, including land clearance, indirect impacts due to changes in hydrology, and the removal of individual feed, nest or roost trees or other specific habitat components. DECC considers that the proposed vegetation clearing, including loss of hollow bearing trees, will likely significantly impact upon the movement, foraging and resident habitat of threatened species.

DECC notes a number of discrepancies within the Ecological Assessment and Ecological Site Assessment regarding the area of vegetation to be removed, which need to be clarified, particularly for the loss of vegetation identified as commensurate with any of the three endangered ecological communities on the site.

DECC notes that important issues concerning regional corridors and the provision of adequate biodiversity offsets remain outstanding. DECC has requested on a number of occasions, and still requires, that a suitable offset measure or compensatory habitat package be offered which compensates against the loss of biodiversity values, endangered ecological communities and native vegetation, as well as the potential impacts upon SEPP 14 wetlands and regional corridor linkages. DECC requires that offsets should take account of the DECC guidelines *Principles for the use of biodiversity offsets in NSW* (DECC 2008). DECC indicates that it is likely to suggest, if it supports future re-iterations of the proposal, the use of the Bio-Banking Tool to determine the adequate level of offset / compensatory habitat required.

### 5.1.2 Department of Water and Energy

The Department of Water and Energy (DWE) has maintained consistent objection to extension of the existing lake/waterbody and/or other excavations that intercept the groundwater table and provide for permanent connection to the aquifer (memoranda and letters dated December 2003, September 2004, August 2006 and December 2007 and submissions to Department of Planning and the Planning Assessment Commission dated March 2009 and April 2009).

Grounds for DWE's objection to the above components of the project proposal include inconsistency with principles of the NSW Groundwater Policy Framework Document –

General (1997), the NSW Groundwater Quality Protection Policy (1998) and the NSW Groundwater Dependent Ecosystems Policy (2002). In regards to ecological values of the site DWE has concerns that the current proposal provides no protection of the existing groundwater dependent ecosystems which include the SEPP 14 Wetland.

#### 5.1.3 *Hunter-Central Rivers Catchment Management Authority*

The Hunter-Central Rivers Catchment Management Authority (CMA) has raised concerns regarding the extent of removal of the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains (21 ha to be removed according to the current EAR) and of other native vegetation (approximately 100 ha to be removed) from the site. The CMA does not consider the 78 ha proposed conservation area will adequately offset this loss. The CMA recommends that a suitable offset be established to compensate for the loss of native vegetation, consistent with the 'improve or maintain' environmental outcomes principle, which also underpins the Hunter-Central Rivers Catchment Action Plan. The CMA notes that the assertion in the EAR that, at this stage (October 2008), there are no formal or established quantification methods or procedures to measure prospective gains and losses in biodiversity values is incorrect. The CMA points out that the Environmental Outcomes Assessment Methodology, as set out in the *Native Vegetation Regulation 2005*, and DECC's BioBanking Assessment Methodology are both available to the proponent. It recommends that either of these methodologies could be employed. The CMA has additional concerns with the narrowness and lack of continuity of proposed wildlife corridors. It notes that the relatively large area in the north-east of the site which is nominated for future development would form a significant barrier to the proposed corridors. The CMA recommends that this area should be considered for conservation as part of enhancement of the proposed offset for the current proposal. The CMA has further concerns regarding the loss of hollow bearing trees from the site. These trees are particularly important given the relatively low numbers of hollow bearing trees on the site.

#### 5.1.4 *Great Lakes Council*

The report to Great Lakes Council from Council's Ecologist (memo dated 19 March 2009) notes a number of previous communications including memos of July 2007, December 2007 and December 2008 in regards to concerns with the adequacy of the ecological assessment for this development proposal.

The March 2009 report raises a wide range of concerns in regard to ecological impacts of the proposal. Particular concerns include the depletion of foraging habitat for the nationally threatened Grey-headed Flying-fox; clearing within the Coastal Saltmarsh and Swamp Sclerophyll Forest on Coastal Floodplains endangered ecological communities; depletion of potential habitat for the endangered Koala population of Hawks Nest/Tea Gardens; loss of habitat for threatened species at the site including the Squirrel Glider, Eastern Freetail Bat, Greater Broad-nosed Bat, Large-footed Myotis, Little Bentwing Bat and Eastern Bentwing Bat; impacts on lands within the 7(a) and 7 (b) zones; significant undersizing of proposed wildlife movement corridors, which are also affected by their multi-use status; depletion and loss of regionally significant vegetation types; lack of conservation and management of ROTAP species; and potential impacts on the SEPP 14 wetland, Port Stephens/ Great Lakes Marine Park and SEPP 71 native coastal vegetation.

Concerns are raised in regard to the depletion of threatened species habitats, endangered ecological communities and regionally significant vegetation types in a manner that is not mitigated or compensated to the degree to which effects are benign. In the view of the Council Senior Ecologist the EAR understates the magnitude, significance and implications of the actual impacts on the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains; the Koala Management Strategy is inadequate and ineffective; the EAR

understates the magnitude, significance and implications of the development on the local Squirrel Glider population and does not deliver the outcomes and knowledge learned from the Squirrel Glider management program on nearby Myall Downs.

The report recommends a number of ecological conditions for consideration by the Department of Planning and Planning Assessment Commission for inclusion within the range of ecological conditions imposed should the development proposal be positively determined.

The Mayor of Great Lakes Council has indicated in a letter to the Planning Assessment Commission dated 1 July 2009 that Great Lakes Council is very supportive of development in the Tea Gardens area. After discussions with the proponent the Mayor's letter states that there are three areas where resolution of certain areas is required. They are ecology, water quality and road network (RTA submission). In regard to ecological issues, the Mayor notes that the applicant has made a number of amendments to the development proposal in response to the Council Ecologist's concerns. However, Council's Ecologist still has concerns in regard to the provision of adequate wildlife corridors which he believes should have a minimum rather than average width of 80 m and comprise intact functioning native vegetation. Council's Ecologist believes that the amended corridor layout remains inadequate generally with regard to wildlife movement corridors protected and restored across the site and significant further changes are still required. Council's Ecologist has recommended that the area specifically set aside for future development as a marine precinct (area 'F' in Annexure 'A') be revegetated with threatened species habitat and Swamp Sclerophyll Forest on Coastal Floodplains endangered ecological community. This recommendation has not been accepted by the proponent. Council's Ecologist remains adamant that offsets for the loss of threatened species habitat and endangered ecological community are required because of the significant nature of the loss of such from the development site. Council's Ecologist has also recommended that the blanket development of the area of the proposed Home Business Park (Area 'G' in Annexure 'A'), without either preservation or offset, remains inappropriate. Vegetation in this area has been identified in the EAR as Swamp Sclerophyll Forest on Coastal Floodplains endangered ecological community. Council's Ecologist is of the opinion that development in this area should be deleted or an adequate on or off-site offset of suitable ratio (say 10:1) should be sought, protected and restored and managed such that there is a real maintain and improve outcome of endangered ecological community in this area.

## **5.2 Community Submissions**

A total of some 30 submissions from members of the community or community organisations were received by the Planning Assessment Commission. Ten of these submissions supported the proposal and 20 objected to the proposal. Eighteen of the objectors raised concerns in relation to the ecological values of the site. These community concerns include and relate to removal of vegetation including endangered ecological communities, trees and native vegetation; adequacy of wildlife corridors in relation to size, edge effects, habitat quality, multi-use functions, location and proximity to a road (Toonang Drive); adequacy of fauna surveys; fragmentation of habitats; impacts on the Koala, other threatened species and other wildlife; impacts on SEPP 14 Wetland; adequacy of identification of wetland areas on site; suitability of site due to its location in a wetland/ swamp; impacts on Myall Lakes National Park; activation of acid sulphate soils; pollution and nutrification of waterways; impacts on fish and oysters in Myall River; lack of mitigation measures; weed invasion; requirements for landfill; flooding; climate change; edge effects; inadequate proposed planting list; destruction of part of the riverine corridor; increases in exotic bird species at the expense of smaller vulnerable species; Mosquito Fish; and domestic animals.



## 6. RESPONSE OF PROPONENT TO SUBMISSIONS

The proponent has provided a number of responses to issues raised in submissions. Such responses which deal with ecological issues include:

- **Coffey Geotechnics Riverside Estate Project Groundwater Response Summary – Draft for Comment dated 19 March 2009**

This document deals with groundwater dependent ecosystems included in SEPP 14 Wetland areas. It does not address issues related to other groundwater dependent ecosystems on the site which include, but are not limited to, the Swamp Sclerophyll Forest On Coastal Floodplains endangered ecological community and the threatened Wallum Froglet habitat. This document relies on the provision of a buffer to protect the adjacent SEPP 14 Wetland from impacts from the development. It does not take into account the fact that much of the proposed buffer is itself an Endangered Ecological Community.

- **Coffey Geotechnics Proposed Subdivision – Riverside Estate Project Application and Concept Plan Area, Tea Gardens Acid Sulfate Soil Management Plan dated 26 March 2009**

This document does not include an assessment of the direct and indirect impacts of proposed acid sulfate soil management measures on ecological values of the site.

- **Hunter Wetlands Research Wetlands Management Plan for Riverside, Tea Gardens dated March 2009**

This report has been prepared by Geoff Winning. It covers only wetland-specific matters and applies only to the areas of land identified as the 'wetland precinct' and the 'habitat conservation precinct' in Great Lakes Council's Development Control Plan No. 22 – Myall Quays Estate. Measures proposed to protect these wetlands from indirect impacts of the proposed development include a buffer between the wetlands and proposed residential areas and also a permanent fence at the wetland boundary.

The wetlands included in SEPP 14 do not include wet heaths and Swamp Mahogany *Eucalyptus robusta* communities. Winning (1991) has noted that both of these would be considered to be wetlands by most Australian scientists. Winning, in his mapping of the site's wetland has included *Eucalyptus robusta* open woodland/Leptospermum scrub and *Eucalyptus robusta* forest communities. While these communities may not be included in the SEPP 14 Wetland they do fall within the Swamp Sclerophyll Forest On Coastal Floodplains endangered ecological community. The proposed management measures take insufficient account of the fact that significant areas of wetland vegetation on the site adjoin and extend beyond the identified 'wetland precinct' and 'habitat conservation precinct'. The proposed buffer, which would be expected to degrade over time, would be composed of *Eucalyptus robusta* woodland/open forest, which as stated above, is part of the Swamp Sclerophyll Forest On Coastal Floodplains endangered ecological community. The proposed fence would divide this endangered ecological community. The proposed measures disregard the ecological values of a sizeable portion of the wetland.

Winning (1991) has argued that "The exclusion of wet heaths and Swamp Mahogany (*Eucalyptus robusta*) communities from SEPP 14 has particular significance for coastal wetland conservation. Both wetland types typically occur in coastal sand dunes, often as part of a complex mosaic with other wetland communities. Separation of wet heaths and Swamp Mahogany communities from other adjacent wetland communities can result in an artificial

division of an integrated wetland system. Extension of SEPP 14 to cover these wetland types would greatly enhance the effectiveness of the policy in conserving wetlands.”

- **Conacher Environmental Group Response to DECC Review Comments dated April 2009**

This response includes a discussion of offsets which provides only a superficial level of detail and does not demonstrate that ecological values will be ‘improved or maintained’. The response does not provide substantial new data. The response includes a series of “7 Part Tests” which are lengthy but lack substantive detail. They do not take proper account of the DECC (2007) *Threatened Species Assessment Guidelines*.

## **7. REQUIREMENT FOR ACCURATE AND COMPREHENSIVE BASELINE ECOLOGICAL DATA**

Accurate and comprehensive baseline ecological data is required in order to properly assess matters including, but not limited to:

- The likely extent of direct and indirect impacts on ‘matters of national environmental significance’
- The likely extent of direct and indirect impacts on threatened ecological communities, populations, species and their habitats
- The likely extent of direct and indirect impacts on the mapped Nerong-Pindimar regional wildlife corridor
- The likely extent of direct and indirect impacts on Groundwater Dependent Ecosystems
- Relevant final and draft threatened species recovery plans including those for the Wallum Froglet (Meyer *et al.* 2006); Hawks Nest and Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population (NSW National Parks and Wildlife Service 2003a); and Barking Owl (NSW National Parks and Wildlife Service 2003b)
- Relevant NSW Priority Action Statements
- Key Threatening Processes including ‘Loss of Hollow-bearing Trees’ (NSW Scientific Committee 2008b), ‘Clearing of Native Vegetation’ (NSW Scientific Committee 2001), ‘Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands’ (NSW Scientific Committee 2002) and ‘Predation by *Gambusia holbrooki* (Plague Minnow)’ (NSW Scientific Committee 1999)
- The nature, extent, and adequacy of any wildlife corridors proposed
- The nature, extent and adequacy of any buffers proposed to protect endangered ecological communities, threatened species and their habitats, SEPP 14 Wetland, SEPP 71 ‘sensitive coastal locations’ and wildlife corridors
- The likely extent of direct and indirect impacts on matters of regional conservation significance
- The degree to which ecological impacts are avoided by using prevention and mitigation measures
- The adequacy of any offsets proposed and therefore the extent to which biodiversity values are improved or maintained

## 8. ACCURACY AND ADEQUACY OF ECOLOGICAL ASSESSMENT

I have reviewed the EAR and subsequent submissions provided by the proponent. There are numerous outstanding issues in relation to the adequacy of the assessment, as outlined below. These issues constrain the Commission's ability to make a full and considered assessment of the ecological impacts associated with the proposed development.

### 8.1 Vegetation community mapping

An accurate appraisal of the current vegetation on site is essential to allow a proper assessment of ecological values and potential impacts. The appraisal must accurately document the vegetation communities present and their inherent condition. The Riverside site was inspected by the Commission on 6 April 2009. As a part of this site visit I, together with Department of Planning Senior Environmental Planner Mr Stuart Withington, and two ecologists for the proponent, Mr Phil Conacher and Mr Paul Shelley, inspected a number of locations of ecological interest on the site. I had also previously inspected vegetation on the site on 28 March 2009.

Following these site visits, I have concerns in respect to the adequacy and accuracy of the identification of vegetation communities, vegetation community mapping (Figure 2.1 *Vegetation Communities and Flora Survey Locations* of Appendix 1 Flora and Fauna Survey Report Riverside Tea Gardens) and groundcover vegetation mapping (Figure 2.1 *Proposed Development and Groundcover Vegetation Disturbances* in the Ecological Site Assessment – Riverside, Tea Gardens ) which are contained in Volume 3B the EAR. As discussed in Section 5.1.1, similar concerns have been raised by officers of the Department of Environment and Climate Change.

These concerns include:

#### 8.1.1 Identification of vegetation communities based on vegetation structure

The EAR states that descriptions of vegetation structure on the site are according to Specht (1995). The details of the Specht (1995) reference are not provided but presumably this refers to Specht *et al.* (1995). The identifications of woodland/forest vegetation communities based on vegetation structure are generally not according to Specht *et al.* (1995). For example, Vegetation Community 6 Open Forest (*Eucalyptus pilularis*) has a projected foliage cover which ranges from 10 - 65%. According to Specht *et al.* (1995) such a community includes woodland (projected foliage cover 10 – 30%) and open-forest (projected foliage cover 30 - 70%). Vegetation Community 3 Open Forest (*Corymbia gummifera*) has a projected foliage cover of 6 – 60%. According to Specht *et al.* (1995) such a community includes open-woodland, woodland and open-forest. Vegetation Community 1 Pasture with Scattered Trees has a projected foliage cover which ranges from 6 - 45%. According to Specht *et al.* (1995) such a community includes open-woodland (projected foliage cover < 10 %), woodland (projected foliage cover 10 – 30%) and open-forest (projected foliage cover 30 - 70%). Similar concerns apply to a total of seven vegetation communities. These discrepancies in vegetation structure classification raise concerns regarding the accuracy of vegetation community definitions and consequent vegetation mapping, further addressed below.

#### 8.1.2 Accuracy of vegetation community mapping

There are considerable discrepancies between mapped vegetation communities (Figure 2.1 *Vegetation Communities and Flora Survey Locations* in Appendix 1. Flora and Fauna Survey Report Riverside Tea Gardens in Volume 3B of the EAR) and vegetation as observed on the

ground during the site visits of 28 March 2009 and 6 April 2009. Examples of such discrepancies which were inspected by myself, Mr Phil Conacher, Mr Paul Shelley and Mr Stuart Withington on 6 April 2009 include:

- i. Areas to the north and south of the access track to the existing on-site dwelling which have been mapped as Vegetation Community 1 Pasture with Scattered Trees. These areas contain stands of mature trees of woodland to open-forest density. Vegetation quadrats 4 and 5 were undertaken in this area. Quadrat 4 contains the trees *Endiandra sieberi* (projected foliage cover 5-25%), *Angophora costata* (25-50%) and *Eucalyptus microcorys* (5-25%). Quadrat 5 contains the trees *Angophora costata* (25-50%), *Corymbia gummifera* (<5%, common), *Eucalyptus robusta* (25-50%) and *Eucalyptus umbra* (<5%, uncommon). Quadrat 4 contains 33 native understorey/ground layer species and Quadrat 5 contains 24 such species. Clearly not all of the area mapped here as Vegetation Community 1 constitutes "pasture with scattered trees".
- ii. Areas in the northern central portion of the site in the vicinity of Quadrat 15 which have been mapped as Vegetation Community 1 Pasture with Scattered Trees. Inspection of the aerial photograph in the EAR and tree densities observed on site indicates that not all of this area is "pasture with scattered trees". Quadrat 15 contains 37 species of which 34 species are native. The trees *Angophora costata* (25-50%) and *Corymbia gummifera* (5-25%) in the quadrat indicate open-forest density. Clearly not all of the area mapped here as Vegetation Community 1 constitutes "pasture with scattered trees".
- iii. Treeless areas in the south-west and central-west of the site which have been mapped as Vegetation Community 7 Woodland (*Eucalyptus resinifera*). Contrary to the mapping, the EAR describes this area as a low-lying area with several indistinct drainage lines where sedges constitute 60-70% of the ground layer and trees are lacking. The vegetation in this area lacks trees and does not constitute Woodland (*Eucalyptus resinifera*). Quadrat 20 is located in this treeless area. The occurrence of species such as *Leptospermum liversidgei*, *Callistemon pachyphyllus*, *Isolepis nodosa*, *Drosera peltata*, *Fimbristylis dichotoma* and *Hemarthria uncinata* in Quadrat 20 indicate swampy conditions. At the time of inspection (6 April 2009) this area had been recently slashed and vegetation consisted of regenerating wet heath.

Lembit (1992) mapped this area as Paperbark Low Forest Swamp (which is included within the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions).

The adjacent native vegetation within the Myall Road verge (which was not inspected in detail during the joint site inspection but was inspected in detail on 27 May 2009) has not been recently slashed and provides an indication of what the adjacent vegetation on site would be like if left unslashed and allowed to regenerate further. Along Myall Road, between approximately 150 m south of Toonang Road and the gated access track into the site, the adjacent roadside vegetation consists of dense Melaleuca (Paperbark) scrub with a ground layer dominated by sedges. Melaleucas present in this scrub include mainly *Melaleuca sieberi* and *M. nodosa* but also some *M. quinquenervia*, *M. ericifolia*, *M. styphelioides* and *M. thymifolia*. Occasional *Casuarina glauca* and a variety of Callistemons and Leptospermums are also present. The plant species composition suggests that this vegetation is a form of the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains. The adjacent slashed vegetation along the site's fenceline and on site is regenerating. Some weed species, particularly grasses, are present in the slightly elevated areas of ground but

appear to be largely absent from wetter, lower lying areas where sedges are dominant. This area currently supports the threatened Wallum Froglet.

- iv. Areas in the south-west of the site which are south-west of Quadrat 18 and have been mapped as Vegetation Community 7 Woodland (*Eucalyptus resinifera*). Some relatively low lying areas in this portion of the site support stands of *Eucalyptus robusta*. These stands constitute Vegetation Community 8 Woodland/Open Forest (*Eucalyptus robusta*) rather than Vegetation Community 7 Woodland (*Eucalyptus resinifera*). As such, they correspond to the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains.
- v. The EAR notes an area of 36.9 ha for the community Open Forest (*Angophora costata/Corymbia gummifera*). This community is not depicted in the EAR vegetation map and was not able to be located during the site visit.

The above mentioned discrepancies were verified by inspection together with the proponent's ecological consultants, who concurred with the above points.

Examples of discrepancies which were not inspected during the combined site visit due to time constraints include, but are not limited to:

- i. Areas in the south-west of the site which are north-west of Quadrat 18 and have been mapped as Vegetation Community 7 Woodland (*Eucalyptus resinifera*). Some relatively low lying areas in this portion of the site support stands of *Eucalyptus robusta* and *Melaleuca quinquenervia*. These stands constitute Vegetation Community 8 Woodland/Open Forest (*Eucalyptus robusta*) rather than Vegetation Community 7 Woodland (*Eucalyptus resinifera*). As such, they correspond to the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains.
- ii. Area in the south-east of the site on the western perimeter of existing development which is mapped as Open forest (*Corymbia gummifera*). The more southerly portion (extending for approximately 300 m) of this vegetation lacks *Corymbia gummifera* trees and is dominated by *Eucalyptus robusta* trees. This area is not Open forest (*Corymbia gummifera*) as mapped but corresponds to the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains. This vegetation is proposed to be removed to allow for construction of detention ponds.

These examples demonstrate inaccuracies in the vegetation mapping in the EAR, including significant misidentification and understatement of the extent of particular woodland/open forest communities, including endangered ecological communities.

## **8.2 Minimum vegetation mapping unit**

Vegetation mapping in the eastern portion of the site appears to have been undertaken at a much finer scale than that in the west of the site. The size of the minimum mapping unit employed is not stated in the EAR. This is required in order to assess the adequacy of vegetation mapping across the site.

## **8.3 Groundcover vegetation mapping**

The groundcover vegetation mapping understates the quality of ground cover vegetation on site.

During the site visit of 28 March 2009 the site was being slashed. Inspection of areas in the central and north-western parts of the site which had then not yet been slashed and which are mapped as supporting "improved ground cover" were found to support a suite of native

ground and shrub layer plants as well as eucalypt and native shrub seedlings. Data from a number of quadrats undertaken in areas of “improved pasture groundcover” do not support the groundcover vegetation mapping. For example in the central-southern portion of the site, quadrat 19, which is in an area of Woodland/Open Forest (*Eucalyptus robusta*), is mapped as containing “improved pasture groundcover”. This quadrat contains 42 native ground or shrub layer species and only four exotic ground or shrub layer species. The quadrat data indicates that this area of Woodland/Open Forest (*Eucalyptus robusta*), which corresponds to the endangered ecological community, Swamp Sclerophyll Forest on Coastal Floodplains, is in good condition.

The EAR contains no explanation as to how the condition of the ground layer vegetation was assessed or mapped. The timing of the ground layer survey in relation to the slashing cycle at the site is not stated. The draft DECC *Threatened Biodiversity Survey and Assessment Guidelines* state, at 3.1.13, that potential constraints to the study should be recognised and dealt with by appropriate sampling design where possible. It is difficult, if not impossible, to reliably assess ground layer vegetation condition when the vegetation has been recently slashed. The site should have been surveyed when slashed areas had been allowed to regenerate.

#### **8.4 Aerial photograph interpretation details**

The EAR indicates that aerial photograph interpretation was used, in part, to prepare the vegetation map. The date of the aerial photography is not recorded in the EAR. Without this information it is not possible to fully assess the adequacy of the aerial photograph interpretation.

#### **8.5 Vegetation stratification details**

The EAR indicates that the vegetation mapping was undertaken using stratification units based on vegetation structure and floristic diversity. Details of the stratification units are not provided. It is not possible to assess the adequacy of stratification without this information.

#### **8.6 Flora species data**

The EAR lists a total of 375 native flora taxa (41 tree, 100 shrub, 208 ground layer, two epiphytes and 24 climbers). The EAR does not indicate which species were recorded in the current survey and which species were recorded in earlier surveys. A comprehensive list of the plant species recorded in each vegetation community is not provided. In accordance with the precautionary principle, as advocated in the EAR, it must be assumed that all listed taxa are present on the site. Species additional to those listed in Table 3.1 *Flora Species Observed on the Subject Site* in Volume 3B of the EAR may also be present on the site. It is noted in the EAR that tree hollows were recorded in *Eucalyptus fibrosa*. *Eucalyptus fibrosa* is not included in Table 3.1 of the EAR.

#### **8.7 Assessment of ‘Matters of National Environmental Significance’**

The Grey-headed Flying-fox has been recorded on the site and is listed as a vulnerable species in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. It is thus a ‘matter of national environmental significance’.

If there is a possibility of a significant adverse impact on this species then the matter requires referral to the Commonwealth Department of Environment, Water, Heritage and Arts to determine whether the approval of the Commonwealth Minister is required. Criteria to assess the likelihood of an action having a significant impact on a listed vulnerable species are contained in the Department’s *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of the Environment and Heritage 2006). The Guidelines state that

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

- Lead to a long-term decrease in the size of an important population of a species;
- Reduce the area of occupancy of an important population;
- Fragment an existing important population into two or more populations;
- Adversely affect habitat critical to the survival of the species;
- Disrupt the breeding cycle of an important population;
- **Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;**
- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- Introduce disease that may cause the species to decline; or interfere substantially with the recovery of the species.

According to the EAR, the site contains approximately 186 ha of suitable habitat for the Grey-headed Flying-fox. The proposal will require the removal of approximately 125 ha of that total. The site does not provide known roosting habitat for the species but it does provide known feeding habitat. Recent decline in the Grey-headed Flying-fox population has been primarily attributed to the loss of feeding habitat (Tidemann *et al.* 1999; Dickman & Fleming 2002). Selective clearing of coastal areas and fertile valleys has left Grey-headed Flying-foxes with seasonal periods of food shortage (Eby 1995). Law *et al.* (2002) have identified Spring and Winter food shortages as having the greatest impact on the species. They provide a list of key tree species which provide food for flying-foxes in the critical winter and spring period. The list includes *Eucalyptus tereticornis*, *Banksia serrata*, *E. fibrosa*, *E. paniculata*, *E. resinifera*, *E. siderophloia*, *E. pilularis*, *Melaleuca quinquenervia*, *Banksia integrifolia*, *Corymbia maculata* and *E. robusta*, all of which have been recorded on the site. The Final Determination for listing of the Grey-headed Flying-fox as a vulnerable species under the NSW *Threatened Species Conservation Act 1995* (NSW Scientific Committee 2001) states that "The main threat to Grey-headed Flying-foxes in NSW is clearing or modification of native vegetation. This removes appropriate camp habitat and limits the availability of natural food resources, particularly winter-spring feeding habitat in north-eastern NSW".

The EAR states that the Grey-headed Flying-fox will also forage beyond the site and that "it is expected that the proposed development will not have a significant impact on the Grey-headed Flying Foxes foraging habitat within the local area". This expectation is not substantiated by any data. A large amount of suitable habitat will be removed and there is a real chance or possibility that the proposed development will:

- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

A referral to the Commonwealth Department of Environment, Water, Heritage and Arts is warranted.

## 8.8 Fauna survey

The EAR indicates that the fauna survey was undertaken sporadically between 2004 and 2009. There is no evidence of systematic seasonal surveys. In 2008, for example, the "winter bird survey" was undertaken on one day in May. As is the case with all such limited fauna surveys, it cannot be assumed that all fauna species that use the site, on a regular or occasional basis, have been detected. It must be assumed that the site contains habitat for all species that have been recorded on the site in previous surveys. The EAR documents fauna species known to occur locally and for which suitable habitat is present on the site. It

must be assumed that the site may be utilised, at least occasionally, by these species. No indications of the relative abundance of species are provided in the EAR.

## 8.9 Fauna habitat assessment and mapping

It is not possible to accurately assess and map areas of potential suitable fauna habitat if the baseline vegetation communities and baseline groundlayer vegetation condition are not accurately described and accurately mapped.

The EAR does not contain fauna habitat mapping for all threatened fauna species that are known or likely to use the site on a regular or occasional basis. For example, there is no fauna habitat mapping for the Osprey, Eastern Chestnut Mouse or Regent Honeyeater.

The existing fauna habitat mapping is inaccurate in its representation of the distribution and extent of fauna habitat for some threatened species, for example the Squirrel Glider, the Koala and the Wallum Froglet:

- Mapped Squirrel Glider habitat includes areas of *Melaleuca ericifolia* scrub. *Melaleuca ericifolia* scrub does not constitute Squirrel Glider habitat in the Tea Gardens area (Smith 2003). During the site visit on 6 April 2009 it was agreed with the proponent's ecologists that areas of wooded habitat in the north-east of the site which have not been mapped as Squirrel Glider habitat are in fact suitable Squirrel Glider habitat.
- Mapped Koala habitat does not include favoured food trees in the western portion of the site. For the Koala the most important factor influencing Koala occurrence in an area is the suite of tree species available as habitat. Of primary importance in the Hawks Nest/Tea Gardens area are *Eucalyptus robusta* and *Eucalyptus microcorys*, both of which are relatively common on the site. Also important and on the site are *Melaleuca quinquenervia*, *Eucalyptus pilularis*, *Corymbia gummifera*, *Angophora costata* and *Eucalyptus tereticornis* (NSW National Parks and Wildlife Service 2003a). Schedule 2 of SEPP 44 - Koala Habitat Protection lists two additional eucalypts which occur on the site, *Eucalyptus punctata* and *Eucalyptus signata*, as major Koala feed trees. These important Koala feed trees extend across the site well beyond the areas mapped as Koala habitat in the EAR. The Koala Management Strategy provided lists the vegetation communities mapped on site which contain Koala feed trees. The listed communities do not include Woodland (*Eucalyptus resinifera*), Woodland (*Eucalyptus signata*) and Open Forest (*Eucalyptus umbra*), all of which contain important Koala feed trees. All Koala feed trees on the site need to be documented and mapped as potential Koala habitat.
- The area of Wallum Froglet habitat in the south-west of the site extends much further north than is mapped in the EAR. All of the "low-lying area with several indistinct drainage lines where sedges constitute 60-70% of the ground layer and trees are lacking" constitutes Wallum Froglet habitat. On 27 May 2009 Wallum Froglets were calling inside the site and over 130 m to the north of the nearest mapped Wallum Froglet habitat.

The existing threatened fauna habitat mapping does not differentiate between areas of low and high habitat value. It does not indicate which areas of mapped habitat are used for movement and which are used for feeding, nesting etc. In general, the value of fauna habitat across such a large site is not uniform. For example, in the Tea Gardens area, *Corymbia gummifera* trees can provide high value habitat for Squirrel Gliders since they are a source of sap which is a critical food resource in the periodic short times when nectar is unavailable (Smith 2003, Goldingay and Sharpe 2006). In the current proposal all of Vegetation Community 3 Open Forest (*Corymbia gummifera*), which provides potential high quality



Squirrel Glider habitat, will be cleared. Without a proper appraisal of the value of threatened fauna habitat it must be assumed that all mapped fauna habitat is of high quality.

### **8.10 Proposed wildlife corridors**

The proposed development will result in habitat loss and fragmentation and thus reduced habitat connectivity. Loss of habitat connectivity is a matter of concern for all species known or likely to use the site. One species of particular concern is the Koala. The Koala has not been recorded on the site since 1995 but may still utilise or move across the site occasionally. The Koala has been recorded more recently about Tea Gardens to the south of the site and in the Shearwater rural development to the north of the site. The site provides suitable habitat and is a potential movement corridor for this species. Such movement corridors are essential in order to allow for the recovery of the endangered Hawks Nest and Tea Gardens Population of the Koala.

The proposed wildlife corridors consist of a north-west running corridor in the east of the site and an east-west running corridor at the northern boundary of the site. Retention of wetland vegetation communities in the east of the site will, according to the EAR, retain any current north-south connectivity through the site. In order to delineate wildlife corridors a number of factors need to be considered including plant species, habitats and habitat condition within corridors, and the configuration, continuity and width of corridors. The criteria used to delineate and determine the adequacy of the proposed corridors are not fully elucidated in the EAR.

To be fully functional corridors should retain vegetation cover and structure including groundcovers, shrub layer and canopy species (Department of Environment and Conservation 2004). The ideal condition is a corridor consisting of native vegetation that is structurally complete, contains a diversity of vegetation communities and plant species, and includes trees with hollows suitable as nesting and denning sites (Hussey *et al.* 1991, Lindenmayer and Nix 1993). The EAR does not demonstrate that the proposed corridors contain suitable habitats to allow them to support the range of animals likely to need to move within and across the site. The SEPP 14 Wetland, which forms a major part of the proposed north-south corridor in the east of the site, does not provide suitable habitat for a substantial number of species, including the Koala and other threatened species, on the site. A number of the proposed wildlife corridors will contain water management structures, including bodies of open water, and are also expected to provide open space and recreational opportunities. Areas of the site such as the proposed eco-tourist area, which will retain trees but not understorey vegetation, cannot be expected to function adequately as a wildlife corridor.

With regard to configuration of corridors, no east-west corridors are provided in the south of the site. The connectivity of the low lying habitats on the site, including the endangered Swamp Sclerophyll Forest, with other low lying habitats to the south-west of the site will be greatly reduced. The Concept Plan indicates an area proposed as a future development site in the north-east of the site (Area 14 of Drawing No. R.C. -06 in Volume 2 of the EAR). Future development of this area would terminate the north-south wildlife corridor which is located adjacent to the Myall River. The effects of the proximity of the east-west running corridor at the northern boundary of the site to a roadway (Toonang Drive) have not been assessed. Wildlife deaths as a result of roads are well documented (see for example Lunney *et al.* 2008).

Proposed corridors are narrow and vary in width from 60 to 120 m. It is generally agreed that the wider the corridor, the more effective it will be in promoting movement of fauna including both edge and interior species. Opinions differ on what is an appropriate minimum width for a corridor. However, as a guide, the NSW Department of Environment and Climate Change's Biometric biodiversity assessment tool (Gibbons *et al.* 2005), which reflects

current scientific knowledge, assesses corridors 5-30 m wide as low connectivity value, corridors 31-100 m wide as moderate connectivity value, and corridors over 100 m wide as high connectivity value. The impacts of edge effects on the narrow corridors proposed have not been assessed. Edge effects to a distance of 60 m are not uncommon (Smith and Smith 1997, 2009 in prep.).

The EAR does not demonstrate that the proposed corridors achieve high connectivity within and across the site or that these corridors can effectively provide for the long term movement of the range of species, including the Koala, that are likely to need to move through the site in order to maintain or recover their populations.

### **8.11 Description of proposal in EAR**

A number of aspects of the proposed development are dealt with in insufficient detail to allow proper assessment of their impacts on ecological values of the site. For example:

- Asset protection zones – the EAR does not provide details of vegetation management regimes that will be implemented in proposed Asset Protection Zones.
- Areas of cut and fill –the site cut-fill plan in the EAR contains the categories “-1m to 0m” and “0m to 0.5m”. It is unclear which, if any areas of the site, will not be subject to cut or fill, that is, support a “0” value. The impacts of extensive areas of cut and fill on the site’s flora and fauna have not been adequately assessed.
- Construction of a 770 m long swale along the eastern edge of the proposed development to distribute runoff from the north to areas currently zoned 7(a) and 7(b). The potential impact of this construction on the 7(a) and 7(b) lands is far from clear.
- Construction of footpaths is proposed adjacent to the wetland buffer land. These will be within the Swamp Sclerophyll Forest Endangered Ecological Community and their impact is unclear.
- Treatment of Acid Sulphate Soils – it is understood that acid sulphate soils will be treated on site. Sandy soils are to be spread and limed and clayey soils buried. The EAR does not provide sufficient details of where these activities will be located and the likely impacts on flora and fauna.
- Assessments of impacts on groundwater dependent ecosystems are not supported by adequate groundwater monitoring data.

## **9. REQUIREMENTS TO ALLOW FOR PROPER ASSESSMENT OF THE PROPOSAL**

In order to allow proper assessment of the proposal accurate baseline ecological data and assessment of that data is required. In particular, the following are required:

- Accurate identification of all vegetation communities on the site. Identification of communities should be based on floristics and structure of the vegetation. Assessment of structural values should take proper account of Specht *et al.* (1995).
- Accurate identification of all endangered ecological communities on site. In determining the extent of the Swamp Sclerophyll Forest on Coastal Floodplains endangered ecological community on site regard needs to be given to the NSW Scientific Committee’s (2005) Final Determination for this community. The Final Determination notes that “The structure of the community is typically open forest, although partial clearing may have reduced the canopy to scattered trees. In some areas the tree stratum is low and dense, so that the community takes on the structure of scrub. The community also includes some areas of fernland and tall reedland or

sedgeland, where trees are very sparse or absent". Further, "The species composition of a site will be influenced by the size of the site, recent rainfall or drought conditions and by its disturbance (including fire, grazing, flooding and land clearing) history. The number and relative abundance of species will change with time since fire, flooding or significant rainfall, and may also change in response to changes in grazing regimes" and "The composition and structure of the understorey is influenced by grazing and fire history, changes to hydrology and soil salinity and other disturbance, and may have a substantial component of exotic grasses, vines and forbs". In effect, the Determination makes it very clear that all areas of this ecological community, whether in pristine or degraded condition, fall within the definition of this endangered ecological community.

- Accurate mapping of all vegetation communities identified on the site. It is expected that the existing vegetation mapping would be revised. Any new mapping should be undertaken in accordance with guidelines contained within the DECC publication *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC – November 2004). The size of the minimum mapping unit should be stated and should be consistent across the site. The minimum mapping unit achieved in the existing mapping in the east of the site should be considered as a guide. The date of all aerial photography used needs to be stated. The original field data sheets filled out by the botanist who undertook the original quadrat and transect surveys on site should be provided. Field data sheets for any additional quadrats or transects deemed necessary should also be provided. It should be noted that 'Annexure 1 – 2008 Flora Survey Data' in Volume 1 of the EAR does not constitute 'field data sheets'.
- Accurate and comprehensive descriptions of all mapped vegetation communities.
- Detailed, accurate and concise description of methods used to achieve the vegetation community map.
- Accurate assessment and mapping of groundlayer vegetation condition. Since a large portion of the site has been recently slashed (the site was being extensively slashed on 28 March 2009) it is likely that any full reassessment of ground and shrub layer vegetation could not be undertaken effectively until after the vegetation has been allowed to regenerate (which is unlikely to be before late Spring). If it is not possible to accurately assess ground layer condition across the site then the precautionary principle, as advocated in the EAR, dictates that unless shown otherwise, the ground layer vegetation must be assumed to be in good condition.
- Detailed, accurate and concise description of methods and criteria used to achieve the groundlayer vegetation map.
- Accurate mapping of habitats of all threatened fauna species known or likely to use the site. Unless shown otherwise it must be assumed that all mapped habitat is of high quality.
- Detailed, accurate and concise description of criteria used to determine suitable threatened fauna habitat and habitat quality. Assessments of habitat quality in the EAR are subjective. Data are required to substantiate statements such as "It is considered that the retained vegetation and habitats are of sufficient size and quality to support the long term viability of threatened species and endangered ecological communities known to occur within the site" (p. 58 Ecological Site Assessment – Riverside, Tea Gardens in Volume 3B of the EAR).
- Accurate assessment of wildlife corridor values on the site and provision of corridors which provide high connectivity between habitats both within and beyond the site. Corridors need to take account of the range of species likely to move through them. The criteria used to delineate and determine the adequacy of corridors need to be

justified and documented. The long term effectiveness and viability of proposed corridors must be demonstrated.

- Documentation of how losses of biodiversity are to be offset. Losses of biodiversity must be fully offset in accordance with the Department of Environment and Climate Change's *Principles for the use of biodiversity offsets in NSW* (Department of Environment and Climate Change 2008).

## 10. PROPOSED OFFSETS

Details of proposed offsets in the EAR are consistently scanty. The effectiveness and adequacy of proposed offsets is not substantiated. There is insufficient evidence in the EAR to indicate that proposed on-site conservation measures will compensate for the proposed removal of flora, including endangered ecological communities, and fauna habitats, including the habitats of threatened species. Neither is there sufficient evidence to indicate that the increased pressures (edge effects) on the retained ecological values of the site as a consequence of the proposed development will be adequately compensated.

The scale of the potential impacts from the proposal needs to be considered. As outlined in Section 3, the site contains many significant ecological constraints. According to information provided in the EAR, losses, in terms of ecological value, will be substantial. Figures A6.1 to A6.8 in Appendix 6 – 'Threatened Fauna Species – Improve or Maintain Assessment' and Figure 2.1 'Vegetation Communities and Flora Survey Locations' of Volume 3B of the EAR, show that all areas of the site provide habitat for endangered ecological communities and/or threatened fauna species. Figures A6.1 to A6.8 indicate that, outside of the SEPP 14 Wetland, all parts of the site, except for an area of some 50 ha in the western portion of the site, provide habitat for at least three threatened species. The SEPP 14 Wetland provides habitat for threatened microbats but no other threatened species. The proposal will result in the direct removal or modification of native vegetation from approximately 126 ha of land. Only 23% of the terrestrial communities and 55% of the wetland fringing communities will be retained compared to 99% of the wetland communities. Impacts on certain vegetation communities will be high, for example, all of the *Corymbia gummifera* Open Forest, all of the *Eucalyptus signata* Woodland and 94 % of the *Eucalyptus resinifera* Woodland, all of which have been identified as regionally significant communities, will be removed. Of particular concern is the removal or "modification" of 21 ha, or 56%, of *Eucalyptus robusta* Woodland/Open Forest, which forms part of the Swamp Sclerophyll Forest on Coastal Floodplains endangered ecological community. The EAR does not define "modification" but in areas subject to cut and fill modifications are likely to be substantial. Impacts on fauna habitats are also likely to be substantial, for example, 126 ha of the identified habitat of the nationally threatened Grey-headed Flying-fox will be developed. Such an amount of habitat is likely to be significant to the Grey-headed Flying-fox in the region. Over one half of the mapped habitat of the threatened Koala, Barking Owl, Grey-headed Flying-fox and microbat species will be removed. The Barking Owl has been identified in the Department of Environment and Climate Change's BioBanking Threatened Species Database as one of six species which, in the Hunter/Central Rivers CMA, cannot withstand the further loss of any individuals. Any loss of Barking Owl habitat from the site is thus of particular concern. One threatened species on the site, the Common Blossom Bat, is at the limit of its distribution (Churchill 2008). The proposal will result in the removal of a large number of individual feed, nest and roost trees. The value of the mapped regional corridor which crosses the site will be diminished.

Consideration in the EAR of offsets for the loss of biodiversity value on the site lacks objectivity. The assertion in the EAR that, at this stage (October 2008), there are no formal

or established quantification methods or procedures to measure prospective gains and losses in biodiversity values is incorrect. As raised in submissions by the Department of Environment and Climate Change and the Hunter-Central Rivers Catchment Management Authority, the Environmental Outcomes Assessment Methodology, as set out in the *Native Vegetation Regulation 2005*, and the Department of Environment and Climate Change's BioBanking Assessment Methodology (Department of Environment and Climate Change July 2008) are both available to the proponent but have not been utilised. The Department of Environment and Climate Change's BioBanking Assessment Methodology assesses a range of biodiversity values, including the composition, structure and function of ecosystems, and threatened species, populations and ecological communities, and their habitats, to calculate required offsets. The methodology uses a rules-based approach and objectively determines what impacts the development will have on biodiversity values, and hence what offsets are required to meet the 'improve or maintain' test. It is recommended that if offsets are required then the BioBanking Assessment Methodology, which can be used in the assessment of Part 3A projects for which a biobanking statement has not been obtained (Department of Environment and Climate Change July 2008), be employed to determine the level of offset required and the adequacy of the offset to be provided.

## 11. CONCLUSIONS AND RECOMMENDATIONS

The Riverside site is within the area to which the Department of Planning's Mid North Coast Regional Strategy applies. The Strategy covers the period 2006-31. The Strategy supports the maintenance and enhancement of the Region's biodiversity. It states that:

"Urban development will be directed away from areas of known or likely conservation importance, including corridors which allow wildlife to connect with or migrate to other habitat areas and climatic zones".

Although the site is within an identified 'growth area', development of the site needs to be in keeping with the aims of the Mid North Coast Regional Strategy. Aims of the Strategy include the protection of high value environments, including significant coastal lakes, estuaries, aquifers, threatened species, vegetation communities and habitat corridors by ensuring that new urban development avoids these important areas and their catchments. The growth area maps in the Strategy include enough land to accommodate the expected population, plus an additional capacity to assist with matters including the avoidance of constraints within identified growth areas. In nominating the growth areas, the Strategy acknowledges that

"not all land identified within the growth areas or local growth management strategies will be developed for urban uses. The rezoning of land or the development of existing zoned land within the growth areas for urban, commercial or industrial uses will be subject to more detailed investigations to determine capability and future yield. Land that is subject to significant natural hazards and/or environmental constraints will be excluded from development."

The majority of the site is zoned Residential 2(f) – Mixed Residential-Commercial and the development proposed within this zoning is permissible with consent. However the granting of consent needs to be conditional upon the proposal resulting in acceptable ecological impacts.

The site is within the area to which State Environmental Planning Policy No 71 – Coastal Protection applies. One of the aims of this Policy is to 'protect and preserve

native coastal vegetation'. The areas of proposed development within 'sensitive coastal locations', as identified by this Policy, are of particular concern.

The EAR indicates that the site supports a great diversity of flora and fauna species and habitats. The EAR also identifies a large range and number of significant ecological constraints associated with the site. Government agency and community submissions have raised significant concerns in regard to the adequacy of ecological assessment; the nature and extent of ecological impacts; and the need for reconsideration of the ecological mitigation measures including wildlife corridors; retention of individual feed, nest and roost trees; and offsets.

Examination of a series of aerial photographs of the site dating back to 1963 indicated that since 1963 the site has supported predominantly native vegetation in the tree and shrub layer. None of the photos since 1963 indicated a widespread or established pine forest on the site. Undoubtedly the site has suffered habitat degradation in the past. However, the site should be assessed on its current environmental attributes. When assessing the conservation significance of the vegetation the assemblage of plant species currently present on the site is of prime importance.

The baseline ecological data in the EAR contains substantial inaccuracies, including significant misidentification and understatement of the extent of particular woodland/open forest communities, including endangered ecological communities. Without accurate baseline data it is not possible to fully assess the extent of direct and indirect impacts of the proposal on the biodiversity values of the site. It is not possible to fully assess the degree to which impacts are avoided or mitigated or the adequacy of proposed offsets.

The baseline data presented in the EAR underestimates the ecological constraints of the site. However, even basing consideration on the current information in the EAR leads to the conclusion that the potential impacts of the current proposals in both the Concept Plan and the Project Application are unacceptable. Large areas of endangered ecological communities and threatened species habitat will be destroyed and other areas will be subject to indirect impacts that have not been adequately assessed. The current value of the site as a regional wildlife corridor will be greatly diminished.

The lack of adequate and accurate baseline data means that, at this stage, it is not possible to properly indicate by way of a map which areas of the site could be appropriately developed in accordance with the ecological constraints of the site and current standards of assessment. It is not appropriate to constrain a possible future revision of the proposal by putting lines on maps that are not able to be properly substantiated and may later be misinterpreted. When accurate baseline data is available any map to indicate areas which might be appropriately developed would need to take account of the extent of endangered ecological communities on the site, the provision of effective buffers for areas of retained endangered ecological communities, the extent of threatened species habitats, the requirement for wildlife corridors which can be properly demonstrated to be functional in both regional and local context, the presence of "sensitive coastal locations" and any other significant ecological constraints identified on the site.

The EAR makes some attempt to address the question of offsets but does not demonstrate that the 'improvement or maintenance' of biodiversity values is achieved. However, it is unlikely that it will be possible to offset large losses of high conservation significance communities, such as endangered ecological communities and threatened species habitats. The local endangered population of the Koala is likely to become extinct if positive actions are not undertaken to aid its recovery. The Barking Owl is a species which has been deemed unable to withstand any further loss in the region. Proper regard needs to be given

to the first principle for the use of biodiversity offsets in NSW (Department of Environment and Climate Change 2008) which states that:

- Impacts must be avoided first by using prevention and mitigation measures.

Undoubtedly any future development of the site will result in impacts on biodiversity. In order to counterbalance this offsets will be required on and/or off-site. It is recommended that the Department of Environment and Climate Change's BioBanking Assessment Methodology be employed to objectively determine the level of offset required and the adequacy of the offset provided.

It is recommended that the proponent needs to reconsider the design of the project. The impacts of the current proposal on the ecological values of the site are unacceptable. Significant changes to both the Concept Plan and the Project Applications as presented in the EAR are required to address ecological impacts adequately. Significant reductions of both the extent and intensity of development are required.

In reconsidering the future design of the project, regard needs to be given to:

- (i) avoidance, minimisation and mitigation of direct impacts (clearing) on endangered ecological communities;
- (ii) avoidance, minimisation and mitigation of indirect impacts on endangered ecological communities noting that all endangered ecological communities on the site are groundwater dependent ecosystems;
- (iii) avoidance, minimisation and mitigation of direct and indirect impact on threatened species and their habitats;
- (iv) avoidance, minimisation and mitigation of direct and indirect impact on regionally significant vegetation types;
- (v) Provision of effective and well justified buffers (which do not include endangered ecological communities or asset protection zones) to all retained areas of endangered ecological communities and other significant vegetation;
- (vi) Provision and protection of well justified and adequate wildlife corridors; and
- (vii) Demonstrated improvement or maintenance of biodiversity values, including provision of a reasonable and well justified level of offset. Any losses of biodiversity value must be fully offset in accordance with the DECC 'Principles for the use of biodiversity offsets in NSW'.

It is recommended that any future design of the project needs to give careful consideration to the nationally listed Grey-headed Flying-fox. If there is a possibility of a significant adverse impact on the species then the matter will require referral to determine whether the approval of the Commonwealth Minister is required. The currently proposed removal of 126 ha of Grey-headed Flying-fox habitat is likely to result in a significant adverse impact.

It is recommended that the baseline ecological data to support any revised proposals be of sufficient quality to enable the accurate assessment of the potential ecological impacts of any future proposed developments on the site. In this regard the deficiencies outlined in Section 8 above concerning the information for the current proposals, and the suggestions in Section 9 concerning the standards required for information in any future revision of those proposals, will need to be addressed.

I have dissented from the majority report because I do not believe that it is appropriate at this stage to indicate by way of a map the developable areas of the site. The draft map formulated did not take proper account of the ecological constraints of the site. An accurate understanding of the nature and extent of the ecological constraints of the site is lacking. It is

thus not possible to substantiate the mapping of areas of the site which are deemed developable. Any future determination of developable areas within the site needs to be based on accurate baseline ecological data and also needs to take proper account of the identified ecological constraints of the site. A number of the conclusions and recommendations of the 'Ecological Constraints' chapter thus contradicted the draft 'Conclusions' chapter of the joint report.

Dr Judy Smith



10 July 2009

**Name of report author**

**Signature**

**Date**



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