1.6 Objectives of this Koala Management Strategy

The following objectives are listed within the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population (NPWS 2003):

- To co-ordinate the recovery of the Hawks Nest and Tea Gardens Koala Population;
- To identify and map the distribution of koala habitat in the Hawks Nest and Tea Gardens area;
- To conserve the Hawks Nest and Tea Gardens Population in its existing habitat;
- To incorporate Koala conservation into planning processes;
- To rehabilitate and restore Koala habitat in the Hawks Nest and Tea Gardens area;
- To ensure the broader community has access to information about the distribution, conservation and management of Koalas;
- To manage sick, injured or orphaned Koalas with a consistent and high standard of care.

The majority of these objectives and actions provided in the Recovery Plan refer to implementation by NPWS, Great Lakes Council and the formation of the Koala Working Group. The following objectives have been developed for this Koala Management Strategy for the management of Koalas and their habitats within the subject site. Where appropriate these objectives have been developed to be consistent with the relevant objectives and management actions of the NSW *Department of Environment and Climate Change* and *Great Lakes Council* as part of the Recovery Plan for the Hawks Nest and Tea Gardens Endangered Koala Population referred to above.

- Maintenance of areas of potential Koala habitat;
- Rehabilitation of potential Koala habitat;
- Provision of safe movement areas for Koalas through the site;
- Protection of potential Koala habitat areas;
- Maintenance/improvement of current Koala population size;
- Community education in relation to the Koala
- Monitoring for effectiveness of Koala management measures and decisions.

1.7 Format of this Plan of Management

No Koalas have been recorded within the site since 1995 (unconfirmed NPWS). While the site does not constitute Core Koala Habitat (as discussed in Section 1.2), this Koala Management Strategy has been developed in accordance with guidelines within State Environmental Planning Policy (SEPP) 44 Koala Habitat Protection to provide contingency for the occurrence of the Koala within the local area and potential for future use of the site by this species. The following considerations form the basis of management strategies and decisions to be implemented within this plan:

- Estimation of Koala population size;
- Identification of preferred feed tree species for the locality and the extent of the resource available;
- Assessment of the regional distribution of Koalas and the extent of alternative habitat available to compensate for that to be affected by the actions;
- Identification of linkages of potential Koala habitat to adjacent areas and movement of Koalas between habitat areas. Provision of strategies to enhance and maintain these corridors;
- Identification of major threatening processes and provision of methods to alleviate impacts;

- Provision of detailed proposals for amelioration of impacts on Koala populations from any anticipated development within zones of potential Koala habitat;
- Identification of any opportunities to increase size or improve condition of existing core habitat;
- Provisions for long term monitoring, review and regular reporting.

The area to which this plan applies is the area bound by Lots 10 and 34 DP 270100 known as Riverside at Tea Gardens.

SECTION 2

KOALAS WITHIN THE SITE AND LOCAL AREA

Given the lack of evidence of use of the site by the Koala during recent (2007, 2008) surveys an estimate of population size cannot be made. The most recent sighting of the Koala within the site is from1995 (DECC 2008). There are records for the Koala from recent surveys within land to the north-west of the site that have apparently yielded significant activity levels (*M. Bell pers. comm*. 2007).

The endangered population of the Koala in the Hawks Nest Tea Gardens area has been listed as 12 individuals. This consists of 2-3 in the Tea Gardens area and the remainder in the Hawks Nest area (NSW Scientific Committee 2000).

In terms of this species occurrence within the locality the Koala has been recorded within land north of Hawks Nest on the eastern side of Mungo Brush Road and at Limestone. There are also records for the Koala as part of the endangered population within land north of Hawks Nest on the eastern side of Mungo Brush Road, the sewage treatment works, reserve at Kingfisher Avenue, Yacaaba Head, Hawks Nest, Tea Gardens, Jimmys Beach and land south of Lime Kilns Road (DECC 2008).

The *Friends of the Koala* (Great Lakes) were contacted previously to source local area information and observations of the Koala within the Tea Gardens and Hawks Nest area (*Myall Koala and Environmental Support Group* 2006). The following is a summary of the information supplied to *Conacher Travers* under agreement from the Friends of the Koala on Koala observations between 1996 and 2006: Tea Gardens 102 observations, Winda Woppa 66 observations, Swan Bay 431 observations, Central Hawks Nest 492 observations, Hawks Nest Beach 1266 observations. There are only occasional recent sightings (6) for the Koala within the Tea Gardens area from Jan 2004 to Feb 2006.

The above are observation records only and not indicative of the number of individuals or population size. It is considered that these repeated observations of several individuals are part of that population estimated by the NSW Department of Environment and Climate Change as 12 individuals and as recorded periodically throughout the Tea Gardens / Hawks Nest area by the Friends of the Koala. The larger number of records in the Hawks Nest area compared to the Tea Gardens area reflects the larger population size estimated by the NSW Department of Environment and Climate Change in Hawks Nest in comparison to Tea Gardens.

At this stage it is considered that the absence of recent records or signs of recent use of the site by the Koala indicates the Koala may be a rare visitor to the site and may be present periodically, probably from vegetation to the north-west of the site. According to the Spot Assessment Technique (Phillips and Callaghan 1995), the absence of any scats indicates that the current level of use of the site by the Koala is unlikely to be significant.

SECTION 3

KOALA HABITAT WITHIN THE SUBJECT SITE AND LOCALITY

The subject site contains suitable foraging and refuge habitat for the Koala. Four Koala food tree species listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection was observed within the subject site. These species are:

- *Eucalyptus robusta* (Swamp Mahogany);
- *Eucalyptus microcorys* (Tallowwood);
- *Eucalytptus punctata* (Grey Gum);
- *Eucalyptus signata* (Scribbly Gum).

The Recovery Plan for the endangered population of the Koala lists Swamp Mahogany (*Eucalyptus robusta*) as being of primary importance locally. Other species including Broad-leaved Paperbark (*Melaleuca quinquinervia*), Blackbutt (*E. pilularis*), red Bloodwood (*Corymbia gummifera*) and Smooth-barked Apple (*Angophora costata*) are also utilised by the local population but to a lesser extent (NPWS 2003).

These tree species occur in varying proportions and densities within the following vegetation communities mapped on the site:

- Pasture with Scattered Trees;
- Acacia / Melaleuca Regrowth Scrub;
- Open Forest (*Corymbia gummifera*);
- Open Forest (*Eucalyptus microcorys*);
- Open Forest (*Eucalyptus pilularis*);
- Woodland / Open Forest (*Eucalyptus robusta*);
- Paperbark Forest (*Melaleuca quinquenervia*).

The vegetation communities within the site show moderate to high disturbance levels and as such are of decreased quality for the Koala in comparison to vegetation to the north and north-west. The subject site has been extensively grazed and the understorey and groundcover has been regularly maintained (slashed/pasture improved). The highest quality, less disturbed vegetation for the Koala is within the wetland fringing communities including the *Eucalyptus robusta* dominant communities.

The vegetation within the subject site is part of a fragmented local landscape that provides some potential connectivity to other vegetated areas to the north, north-east, north-west and west. The area to the north of the site consists of bushland of higher habitat quality due to decreased levels of disturbance. Vegetation to the east of the site is isolated by the Myall River. While some scattered urban trees are present within the Tea Gardens township to the south it is considered that this urban landscape is generally of low quality for the Koala. The site shows some connectivity to similar, larger areas of vegetation and habitat to the west, including lands within Myall River Downs. This area shows connectivity to large areas of vegetation to the north-west of the subject site.

No mapping of Koala habitats within the Tea Gardens/Hawks Nest area has been completed by Great Lakes Council.

SECTION 4

THREATENING PROCESSES

A number of Key Threatening Processes are listed within the *Threatened Species Conservation Act* (1995) for the Koala. The Koala is listed within the TSC Act (1995) as Vulnerable and is also listed as an Endangered Population for the Hawks Nest Tea Gardens Endangered Koala Population.

A Draft Recovery Plan for the Koala within NSW (NPWS 2003) has been released for public comment. The Draft Recovery Plan for the Koala (NPWS 2003) lists the following as threatening processes:

- Habitat loss and fragmentation;
- Habitat degradation;
- Road kills;
- Dog attacks;
- Fire;
- Logging;
- Disease;
- Severe weather conditions;
- Swimming pools;
- Overbrowsing.

The Department of Environment and Climate Change (DECC 2008) have listed the following as threats to the Koala in NSW:

- Loss, modification and fragmentation of habitat;
- Predation by feral and domestic dogs;
- Intense fires that scorch or kill the tree canopy;
- Road kills.

Of these threats it is considered that habitat loss, habitat degradation, road kills and dog attacks are potential threats posed by the development.

The *TSC Act* (1995) identifies “Clearing of native vegetation”, “high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition” and “invasion of native plant communities by *Chrysanthemoides monilifera* (Bitou Bush)” as Key Threatening Processes for the Hawks Nest Tea Gardens Endangered Koala Population. The proposed development is not likely to affect this species conservation status at a local level. The occurrence of this species and suitable habitat for this species within local reserves and lands zoned for environmental protection indicates that this species local conservation status is not likely to be negatively affected by any potential impacts of development within the subject site.

The Recovery Plan for the Hawks Nest Tea Gardens Endangered Koala Population (NPWS 2003) lists the following as threatening processes for:

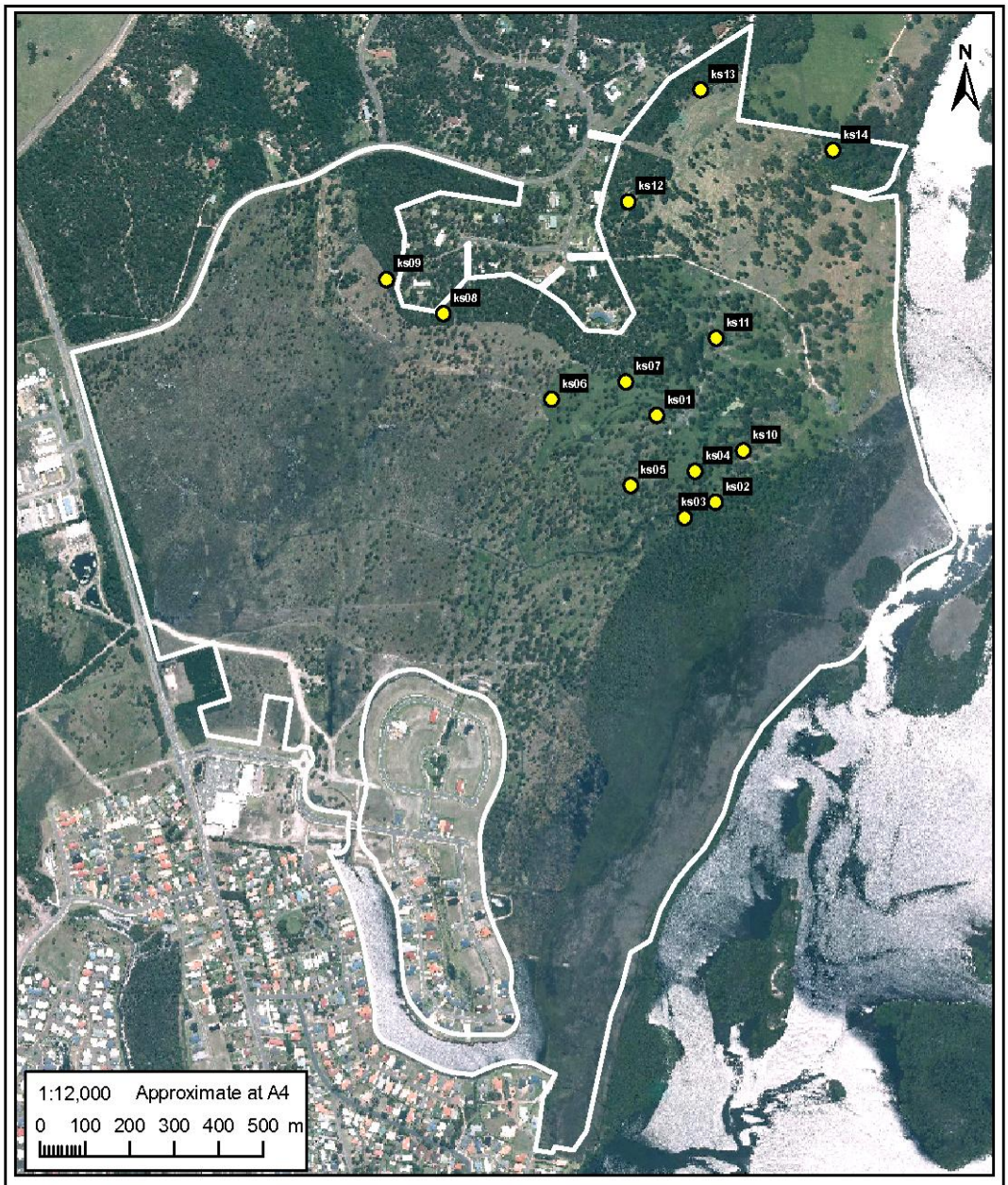
- Habitat loss and fragmentation;
- Habitat degradation;
- Dog attacks;
- Road kills;
- Fire.

The Department of Environment and Climate Change (DECC 2008) have listed the following as threats to the Hawks Nest Tea Gardens Endangered Koala Population:

- Habitat destruction and fragmentation;
- Mortalities from vehicle collisions;
- Attacks by domestic dogs and wild dogs.

Disease and swimming pools are also listed as potential threats (NPWS 2003).

Of these threats it is considered that habitat loss, habitat degradation, road kills, dog attacks and construction of swimming pools are potential threats posed by the development.



Original plan produced in A4 colour. Plan for indicative purposes only. Not for detailed measurement.
Survey locations are approximate and have not been fixed by land survey. *Subject Site boundary subject to final survey.

Legend

ks 04

Property Boundary — Koala Scat Search Location 2007 (numbered)

conacher environmental group
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Gosford NSW 2250
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Figure A3.1
Koala Survey Locations
Myall Rd, Tea Gardens

Source: DLWC 1:25,000 Aerial Photograph,

SECTION 5

PROPOSED MANAGEMENT ACTIONS

The following Koala habitat management strategies will be implemented for the long term management of the Koala within the subject site. These broad management strategies have been identified and developed based on maximising opportunities for the protection of Koala habitat within the site and minimising the potential impacts of the proposed development and occupation.

These are:

- Habitat protection requirements;
- Habitat restoration requirements;
- Traffic management requirements;
- Dog management requirements;
- Bushfire management;
- Koala welfare public education;
- Monitoring and reporting requirements.

5.1 Habitat Protection

Objectives:

- Provide for retention of preferred feed trees within the subject site;
- Provide for retention area of potential shelter and refuge trees within the subject site within drainage corridors;
- Maximise the retained vegetation within the proposed wildlife corridor as a movement area for the Koala.

Actions:

The development will require the removal of trees as part of preparation for construction of residential areas. As part of the development a number of areas will be retained to provide continued access to potential foraging and refuge resources and movement areas through the post development landscape. These will consist of reserve and corridor areas and provide for the interconnectivity of currently connected vegetation and habitats within the local landscape. The location of these reserve areas are shown in the Concept Masterplan information.

During construction temporary fencing will be used to protect all those areas to be retained. All site contractors will be notified of their responsibilities in regards to tree protection during construction.

Signs will be placed at suitable locations along the length of the reserve areas notifying residents of restrictions to access and occurrence of potential Koala habitat.

Other protective measures that will be implemented as part of the proposal include:

- Protective covenants on trees;
- Long term tree protection measures;
- Monitoring of tree health/condition and use.

5.2 Habitat Restoration

Objectives:

- Restore habitat within corridors and reserve areas;
- Restrict access to reserve areas to aid restoration/revegetation process;
- Monitor and maintain restored/revegetated areas;
- Increase local awareness of importance of corridors and regeneration areas.

Actions:

Areas of the site will be retained and restored as part of corridor and reserve areas. The higher quality, less disturbed vegetation types in the north and east of the site will be retained as part of the proposal. Corridor or "greenway" areas containing preferred feed tree species will also transect development areas to allow for provision of habitat and movement through the site.

These reserve and corridor areas will be managed to allow for natural regeneration of the tree species within those areas, particularly those Koala feed tree species. Where Koala feed tree densities or numbers are sparse, contingency will be made for replanting areas with preferred feed tree species including Swamp Mahogany, Tallowood and Grey Gum.

An Ecological Site Management Strategy has been prepared for the site that details the rehabilitation and vegetation protection strategies for those retained bushland areas. This includes details on tree protection and ongoing weed removal in maximising the vegetation and potential habitat quality for the Koala.

All vegetation and habitat restoration measures completed within retained vegetation will be carried out by a licensed Bushland Regenerator, engaged by the Community Association.

All retained vegetation will be signposted at regular intervals to indicate the sites access restrictions and function.

The results of detailed local area vegetation community mapping have been provided to Great Lakes Council to aid in the local area koala habitat mapping as per the Recovery Plan for the endangered population.

5.3 Traffic Management

Objectives:

- Minimise the risk of injury to Koalas posed by local traffic;
- Increase driver/resident awareness of the risk vehicles pose to Koalas.

Actions:

Traffic speed will be limited to 50km/h along boundary and internal roads of the proposed development. This will be indicated by speed limiting signs. The decrease in speed will minimise the chances of vehicle strike upon Koalas and decrease chance or severity of injuries.

The road construction will also include the provision of Koala warning signs to raise awareness of potential of Koalas to cross roads.

The roadside edges will be regularly maintained to increase driver visibility of Koalas potentially crossing roads associated with the proposed development.

5.4 Dog Management Requirements

Objectives:

- Decrease risk of injury/mortality posed by domestic dogs to Koalas;
- Increase resident awareness of the risk unrestrained dogs pose to Koalas and local wildlife.

Actions:

Any dogs kept within the proposed development will be restricted to fenced yards around dwellings. Yards will be fenced to contain dogs and restrict access to the other areas, particularly reserve areas within the site.

All dogs must be kept restrained on a leash if outside of designated yards.

Council contact details will be supplied to residences to provide information to Council on incidence of dog attacks on Koalas or dogs roaming unrestrained.

The control of dogs is in accordance with the *Companion Animals Act* (1998) and relevant objectives of the Recovery Plan endangered population of the Koala.

5.5 Bushfire Management

Objectives:

- To design/maintain areas within the site so as not to pose a bushfire hazard to adjacent development;
- To design/maintain areas within the site so as to integrate bushfire protection zones while maximising Koala habitat areas.

Actions:

Areas of the site will be periodically maintained for bushfire hazard protection. APZ Management and Bushfire Protection Zones are proposed to be integrated within the site design. As part of bushfire protection measures the understorey will be periodically maintained however no tree removal will be required.

All slashing of the bushfire protection areas will be carried out using a rear mounted slasher on a rubber tyred tractor in a manner that does not damage recruitment seedlings or retained trees.

No hazard reduction burning will be undertaken as part of bushfire management.

5.6 Koala Welfare and Public Education

Objectives:

- To provide ongoing protection to Koalas within the local area
- To increase local awareness of Koalas and Koala welfare in the local area
- Promote positive attitude toward protection of the Koala within the local area
- Increase community awareness of Koala interest groups such as the Koala Preservation Society of NSW and Friends of the Koala
- Increase provision of information from residents to Council regarding Koala observations within the area

Actions:

In accordance with increasing community awareness the distribution of pamphlets to residents providing information relating to the Koala within the local area will be implemented. This pamphlet is to include as a minimum:

- general information on the Koala
- information on the local population
- information on risks to Koalas
- information on local community interest groups (Friends of the Koala)
- Emergency contact details such as Council, FAWNA and Koalas in Care Inc.

Signage will provided within the site identifying Koala habitat areas and Koalas within the area.

Other initiatives will also include the provision of signage within the site and local area that contain information on the importance and vulnerability of the local Koala population with the objective of raising local awareness and promoting a positive local attitude toward the protection of the Koala locally.

The care of Koalas and community education programs are in accordance with the relevant objectives of the Recovery Plan endangered population of the Koala.

5.7 Monitoring and Reporting

Objectives:

- To implement an ongoing survey and monitoring program that will determine use of the area by Koalas;
- To record and report on results of the Koala monitoring program;
- To report on all other actions implemented as part of the Management Plan.

Actions:

A report detailing the ongoing management and restoration activities being carried out within the site is to be submitted to the relevant consent authority detailing the results of vegetation and habitat restoration and protection. This report is to be provided by a qualified ecologist and is to cover:

- Results of tree regeneration within the regeneration areas;

- Details of vegetation management actions;
- Records of observations of Koalas on the site;
- Any other relevant information in regards to Koalas and the proposed development.

A bi-annual Koala survey for ten years following the approval of the various stages of the proposal will be undertaken. Surveys will consist of spotlighting and call playback for two nights during each bi-annual survey period. The Spot Assessment Technique will also be carried out at standard survey locations within those areas to be reserved. A report will be supplied to Council at the completion of each bi-annual monitoring period.

The results of monitoring will be made available to the Koala Working Group as referred to in the Recovery Plan for the endangered population.

SECTION 6

TIMING OF WORKS

The following table outlines the timing of works proposed as part of this Koala Plan of Management.

TABLE A3.1
TIMING OF KOALA HABITAT MANAGEMENT WORKS

	Pre-construction	Construction	Occupation
Habitat Protection			
Identification of protection areas	√		
Erection and maintenance of temporary protection fencing	√	√	
Establishment of reserve areas	√		
Protective covenants on trees	√		
Long term tree protection measures	√		
Monitoring of trees	√		√
Habitat Restoration			
Establishment of corridor and reserve areas	√		
Ecological Site Management Plan	√		
Vegetation management	√	√	√
Signage	√	√	
Traffic Management			
Speed limit traffic (signs)		√	
Speed limit traffic (speed bumps)		√	
Signage		√	
Slashing roadside areas			√
Dog Management			
Dog walks on leash only			√
Council contact details to residences			√
Bushfire Management			
Tree protection measures	√		
Periodic slashing	√	√	√
Prohibit reduction burning	√	√	√

TABLE A3.1 (Cont.) TIMING OF KOALA HABITAT MANAGEMENT WORKS			
	Pre-construction	**Construction**	**Occupation**
Koala Welfare and Public Education			
Pamphlet distribution			√
Signage			√
Monitoring and Reporting			
Bi-annual Koala surveys			√
Habitat and regeneration area monitoring	√	√	√
Annual reporting to relevant consent authority		√	√

SECTION 7

FUNDING OF WORKS

All costs of the implementation of the management strategies detailed within this plan will be met by the applicant, future landowners or the Community Association. Where reserved lands are handed back to public ownership the relevant statutory authority will assume responsibility for any ongoing works.

SECTION 8

CONCLUSION

While there are no recent records for the Koala within the area to be developed and no evidence of recent use of the site has been detected, the potential of the Koala to occur within the site indicates the requirement for suitable Koala and habitat management strategies to be implemented for the planning, developmental and occupational phases of the proposed development. The presence of the Hawks Nest and Tea Gardens Endangered Koala (*Phascolarctos cinereus*) Population within the area increases the importance of the management of the Koala in future planning decisions within the local area.

This report has been prepared as a strategic approach to guide future planning and management decisions in relation to the Koala within Riverside. This Koala Management Strategy may be used as a guide in developing specific management planning reports, decisions and actions for various future stages of the Riverside proposal. It is considered that the works and measures detailed in this plan provide for a high level of consideration of Koala management within the site. These measures have been developed to provide for persistence of the Koala in the area and maintenance of Koala populations, habitat and connectivity within the locality.

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APPENDIX 4

ECOLOGICAL SITE MANAGEMENT STRATEGY

ECOLOGICAL SITE MANAGEMENT STRATEGY

RIVERSIDE
TEA GARDENS

AUGUST 2008
(REF: 8020)

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ECOLOGICAL SITE MANAGEMENT STRATEGY

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AUGUST 2008

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PREFACE

This Ecological Site Management Strategy (ESMS) has been completed to provide a range of ecological management strategies in protecting the long term environmental and ecological values of lands within the proposed development for Riverside at Tea Gardens.

This report has been prepared to accompany an Environmental Assessment to be submitted as part of a development application for the "Riverside" lands known as Lots 10 and 34 DP 270100 Myall Road Tea Gardens. The Environmental Assessment has been prepared in accordance with the Director Generals Environmental Assessment Requirements (DGEAR's). These DGEARs have been provided in accordance with Part 3A Major Infrastructure and Other Projects of the *Environmental Planning and Assessment Act* (1979).

The ESMS has been prepared to specifically address the following:

- Vegetation and Bushland Management
- Bushfire Management
- Fauna and Habitat Management
- Provision and Establishment of Environmental Corridors
- Provision of Environmental Buffers
- Erosion and Sediment Control
- Stormwater Quality and Management
- Cultural Values and Management
- Community Education, Vigilance and Reporting
- Access, Signage and Fencing
- Prohibited Use Identification and Management
- Feral Pest Species
- Monitoring and Reporting Regime

This ESMS uses the site and local area information collected across a large number of studies in recommending suitable environmental management objectives and actions in the long term protection of the environmental values of the area proposed to be developed.

Report compiled by:

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SECTION 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Ecological Site Management Strategy (ESMS) has been completed to provide a range of environmental management strategies for protecting the long term environmental and ecological values of lands within the proposed development area and associated retained natural areas herein known as Riverside at Tea Gardens.

This report has been prepared to accompany an Environmental Assessment to be submitted as part of a development application for the Riverside site. The Environmental Assessment has been prepared in accordance with the Director Generals Environmental Assessment Requirements (DGEAR's). These DGEARs have been provided in accordance with Part 3A Major Infrastructure and Other Projects of the *Environmental Planning and Assessment Act* (1979).

Conacher Environmental Group have been engaged by *Crighton Properties* as proponents of the application for the development of Riverside to prepare this ESMS.

The land subject to the provisions of this ESMS consists of those areas bound by Lots 10 and 34 DP 270100 Myall Road Tea Gardens and herein known as Riverside.

1.2 BACKGROUND

The Riverside estate is bound by Toonang Drive in the north, the Myall River in the east, Shearwater Estate in the south and Myall Road to the west. The subject site area is approximately 230 hectares in size.

The proposed development is for a mixed use commercial, industrial and residential development. According to the Concept Masterplan the proposal will include the following:

- Residential lot development as Community Title;
- Proposed home based business precinct (approximately 50 allotments);
- Conference and Clubhouse facilities and low rise Townhouse accommodation;
- Low density "Lodge Houses" associated with Conference facilities;
- Wildlife movement corridors;
- Water management corridors;
- Open space corridors;
- Sporting ovals and tennis courts;
- Lake areas for water quality management;
- Public Reserve areas incorporating sporting ovals and tennis courts;
- Community parks incorporating walking trails, gazebo and other facilities.

The Masterplan design includes the retention of large areas of the site for the purposes of environmental protection. These areas include:

- SEPP 14 Wetlands;
- Conservation zoned lands;

- Asset Protection Zones and environmental buffers;
- Wildlife Corridors;
- Drainage Corridors;
- Open Space areas.

The possible future ownership of these areas and the responsibility of management of these areas is outlined in Section C of this Strategy.

1.3 PROCEDURES FOR THE PREPARATION OF THE MANAGEMENT STRATEGY

This ESMS has been prepared using information obtained from a range of sources including the following:

- Ecological Site Assessment for Riverside at Tea Gardens (*Conacher Environmental Group* 2008);

- Local Environmental Study – Myall Quays (and related Supplementary Reports) (Gardner Browne Planning Consultants, Resource Planning, Patterson Britton and Partners 1991, 1992);

- Flora and Fauna Assessment Report – Myall Quays Estate (*Conacher Travers* 2002);

- Local Environmental Study – Myall River Downs (PPK Environment and Infrastructure 2000);

- Local Environmental Study – North Hawkes Nest (ERM Mitchell McCotter 1997);

- Species Impact Statement – Myall River Downs (*Conacher Travers* 2007);

- Recovery Plan – Hawkes Nest Tea Gardens Endangered Koala Population (Department of Environment and Conservation 2003);

- Ecological Studies of the Squirrel Glider Myall River Downs (D. Sharpe and R. Goldingay 2006);

- Draft Environmental Site Management Plan Rural Residential Subdivision Myall River Downs (*Conacher Travers* 2007).

This Ecological Site Management Strategy details the strategies and measures to be implemented in protecting the natural values of the post development landscape at Riverside at Tea Gardens. In particular the Ecological Site Management Strategy provides information on the following:

- Vegetation and Bushland Management;
- Bushfire Management;
- Provision and Establishment of Environmental Corridors;
- Provision of Environmental Buffers;

- Erosion and Sediment Control;
- Cultural Values and Management;
- Community Education, Vigilance and Reporting;
- Access, Signage and Fencing;
- Prohibited Use Identification and Management;
- Fauna and Fauna Habitat Management;
- Feral Pest Species;
- Monitoring and Reporting Regime.

Each of the above issues is addressed separately in Part B through the process outlined below:

i) Identification of objectives to be achieved for each issue;

ii) A statement of the proposed actions to be implemented to address each issue and the objectives provided;

iii) More detailed information on methods, procedures or quantifying information supporting proposed actions is to be provided as operational or works plans prepared to meet the objectives and requirements identified in the strategy.

1.4 AREA TO WHICH THIS MANAGEMENT STRATEGY APPLIES

The area to which this Management Strategy applies is the area bound by the Concept Masterplan for the proposed development and known as Riverside at Tea Gardens. The area bound by the Masterplan is detailed in the Masterplan by ERM. This area consists of Lots 10 and 34 DP 270100 Myall Road Tea Gardens.

1.5 LIFESPAN AND REVIEW OF THE MANAGEMENT STRATEGY

The ESMS will be implemented for ten years following the date of sign-off of the plan by the Department of Planning. The plan will be reviewed at Year one, Year two and Year five to assess the adequacy of implementation of the management actions.

Those areas within the Riverside Masterplan area that are proposed to be managed under Community Title will have the management actions provided in this ESMS to be included in the Community Management Statement for the Community Title areas. However this will require a full review and amendment of the ESMS at the ten year period. This process may require individual management plans to be prepared to accompany individual Development Applications as part of the development staging process.

1.6 FORMAT OF THE MANAGEMENT STRATEGY

The overall Management Strategy is provided as a single document separated into several sections as outlined below.

SECTION 1 Introduction and Background

Outlines the purpose/ objectives and procedures for preparing this Management Strategy.

SECTION 2 Management Objectives and Proposed Actions

This part identifies the various management objectives and Management Actions to achieve the objectives of the Management Strategy.

SECTION 3 Implementation of Management Actions

This part details how the Management Strategy will be implemented, who is responsible for implementing various actions and provides details on the monitoring and reporting for the life of this management strategy.

1.7 ENVIRONMENTAL MANAGEMENT OBJECTIVES

The environmental management objectives for the areas covered within this Management Strategy are:

i) Protection of the environmental and ecological values of the retained and conserved areas of the site.
ii) Minimisation of the impacts of development within adjacent land upon the retained vegetation and habitat areas during construction and occupation phases of adjoining residential areas.
iii) Maintenance of biodiversity and protection of native flora and fauna species and their habitats (including threatened species) within the area.
iv) Increased awareness and promotion of a culture of protection of the environmental values of the retained and conserved areas of the site by the community.
v) Long term monitoring of the area to determine changes (if any) to flora and fauna, particularly threatened species, and vegetation communities and recommend corrective actions if required.

1.8 SITE DESCRIPTION

Landform Features

Topography and slopes

The topography of the site consists predominantly of flat land of negligible slope and less than 5 metres AHD. In the north of the site a small ridge with a southerly aspect rises to approximately twenty metres.

Drainage

Drainage from the site is via overland flow and through small drainage channels into the Myall River. Areas of the site drain into SEPP 14 Wetland No. 746 on the shores Myall River in the east of the site.

Soils

Two soil landscapes occur within the subject site. These are the Tea Gardens and Pindimar Road Soil Landscapes (Murphy 2002).

The majority of the site consists of soils of the Tea Gardens soil landscape. These soils are found in local relief usually less than 1 metre and elevation 5-8 metres. Soils consist of deep (<300 cm) imperfectly drained Humus Podzols on ridges with poorly drained Peaty Humus Podzols in swales. The soils are prone to seasonal and permanent waterlogging, ground water pollution hazards and are of very low fertility.

The soils associated with the upslope and ridge areas in the north of the site are within the Pindimar Road soil landscape. These soils are found locally on undulating to rolling hills to local relief 30-60m. Soils consist of Brown and Yellow Podzolic soils and Soloths in poorly drained areas. These soils are of low fertility and exhibit high erosion, strong acidity and seasonal waterlogging.

Vegetation

The subject site is bounded to the west by the Myall Road, disturbed grasslands with scattered trees, industrial and residential development; to the south, by predominately existing residential and commercial development; to the east, by the Myall River; and to the north, by a mixture of open forest vegetation communities, areas of rural residential development and agricultural lands.

The majority of the vegetation of the site forms a mosaic of highly disturbed vegetation with scattered trees and woodland/open forest communities. However, the eastern portion of the Riverside site is dominated by a remnant of naturally vegetated Swamp Forests, Heathlands and Estuarine vegetation communities associated with the low lying areas adjoining the Myall River. This remnant is largely isolated from adjoining vegetation to the south by exiting residential development and to the north by an area of cleared agricultural land.

The northern boundary of the subject site is largely dominated by a mixture of open forest vegetation communities and areas of rural residential development. Connectivity exists between the sites eastern remnant vegetation and the areas of remnant open forest to the north, via a mosaic of disturbed woodland and open forest vegetation communities occupying the north eastern areas of the site. These vegetation communities have been impacted by a history of agricultural land use and grazing, resulting in a sparse understorey layer. Continued habitat fragmentation has also resulted from the development of the rural residential areas of Shearwater Estate to the north of the site.

Fauna

Surveys within the subject site and the local area have recorded a range of fauna species. These fauna observations consisted of bird species, mammal species, frog species and reptile species.

During the fauna surveys of the subject site the following threatened fauna species were observed. These species are:

- Osprey (*Pandion haliaetus*);
- Barking Owl *(Ninox connivens);*
- Wallum Froglet (*Crinia tinnula*);
- Squirrel Glider (*Petaurus norfolcensis*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*).
- Little Bentwing-bat (*Miniopterus australis*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*);
- Greater Broad-nosed Bat (*Scoteanax rueppellii*);
- Large-footed Myotis (*Myotis adversus*);

A number of other threatened fauna species have been observed within the Tea Gardens area as the result of past local area surveys. These are:

- Black-necked Stork (*Ephipiorhynchus asiaticus*);
- Powerful Owl (*Ninox strenua*);
- Masked Owl (*Tyto novaehollandiae*);
- Koala (*Phascolarctos cinereus*);
- Eastern Chestnut Mouse (*Pseudomys gracilicaudatus*);
- Eastern Pygmy-possum (*Cercatetus nanus*);
- Eastern Blossom-bat (*Synconycterus australis*);
- Eastern Freetail-bat (*Mormopterus norfolkensis*).

Habitats

A range of fauna habitats are present within the subject site reflecting the diversity in the vegetation communities present. The majority of the site is of decreased habitat quality due to the large amount of disturbance through removal and modification of the groundcover and shrublayer through grazing, slashing and previous clearing for pine plantations.

The following fauna habitats are present on the site and on land adjacent to the site:

- Flower, nectar, fruit and seed producing tree and shrub species;
- Hollow-bearing trees;
- Cleared pasture;
- Aquatic areas associated with permanent farm dams and water courses;
- Semi-aquatic habitats associated with low lying areas;
- Dense understorey areas;
- Leaf litter;
- Drainage depressions;
- Aquatic areas associated with the Myall River foreshore and wetland areas.

The flower, nectar, seed and fruit producing tree and shrub species within the site provide a seasonal foraging resource for a range of fauna species, particularly bird and arboreal mammal species. The site contains a relatively low number of hollow-bearing trees with mostly small hollows. These hollows contain potential den, roost and breeding hollows for bird, arboreal mammal, microchiropteran bat and reptile species.

The site consists predominantly of disturbed vegetation types with no shrublayer and a groundcover dominated by pasture grasses. As such the habitat values are decreased for small terrestrial mammal, bird and reptile species. The lack of cover however does increase foraging opportunities for raptorial and other bird species. The open grassed areas contain suitable habitat for macropod species, particularly the Eastern Grey Kangaroo and Red-necked Wallaby.

Areas of the subject site are prone to ponding after rain providing suitable habitat for a range of amphibian species. The drainage depressions associated with tracks and tree removal holes contain suitable foraging and breeding habitat for these locally occurring amphibian species.

The denser, less disturbed vegetation types associated with the Myall River foreshore provide higher quality habitat due to the increased density and diversity of the various structural layers. These less disturbed habitats provide increased foraging, refuge and breeding opportunities for

mammal, bird, reptile and amphibian species. This is reflected in the species richness of these vegetation types in comparison to the majority of the site containing the disturbed vegetation communities. These higher quality vegetation and habitat types will be retained as part of the proposed development.

The fauna habitats within the site are typical of those associated with low lying areas of the lower reaches and estuarine areas of the Myall River. The habitats are isolated to the south by Myall Quays estate and the Tea Gardens township and to the east by the Myall River. The highest degree of connectivity extends to the north of the subject site. The area to the north of the site consists of bushland of higher habitat quality due to decreased levels of disturbance. The site also shows some connectivity to similar, larger areas of vegetation and habitat to the west, including lands within Myall River Downs. This area shows connectivity via the slope and low ridgeland areas in the north of the site to large areas of vegetation to the north-west of the subject site.

SECTION 2

MANAGEMENT OBJECTIVES AND ACTIONS

The following section provides details on the objectives and actions of each broad management category. The responsibility and timing for each of the management actions is provided within Table 1 of Section C with each management action sub-heading corresponding with a similar action category within Table 1.

2.1 VEGETATION AND BUSHLAND MANAGEMENT

Objectives

- **Identify and protect vegetation to be retained within bushland and reserve areas**
- **Implement measures to reduce the extent of weed species within retained areas**
- **Improve the current bushland and biodiversity values of retained areas**
- **Implement measures to control the risk of weeds spreading from residential development**
- **Promote community involvement in the bushland management and improvement of bushland values**

Actions

i) Preparation of Vegetation Management Works Plan

Reserve and corridor areas within the site are to be targeted for weed removal and rehabilitation with native, provenance specific species. The rehabilitation of these areas will ultimately improve and restore the vegetation and habitat values of those reserve and corridor areas. A specific Vegetation Management Works Plan will be produced for those reserve and corridor areas to direct the specific management actions in relation to vegetation management. These Vegetation Management Plans will include information on:

- the use of provenance specific species in revegetation works
- lists of provenance specific species to be used for revegetation
- identification of key priority areas for works
- detailed weed removal and vegetation management/protection strategies
- inter-relationship of fuel and vegetation management
- timetable for works and details of implementation, responsibility, timing and funding of specific vegetation management works.

ii) Implementation of weed removal programs

All weed control and vegetation management works will be co-ordinated by the developer of the land or the Community Association who will engage the relevant bush regeneration contractors to complete works as per the Vegetation Management Works Plan for the site.

The majority of weeds occur outside and at the edges of the bushland areas and proposed reserves. However there are also disturbed areas within the site that contain high numbers of weeds.

Species targeted for control include:

- *Lantana camara* (Lantana);
- *Chrysanthemoides monilifera subsp. monilifera* (Bitou Bush);
- *Cinnamomum camphora* (Camphor Laurel);
- *Erythrina x sykesii* (Coral Tree);
- *Ligustrum lucidum* (Broad-leaved Privet);
- *Ligustrum sinense* (Small-leaved Privet);
- *Pinus ellolti* (Pine);
- *Rubus fruticosis* (Blackberry).

Where weeds are identified as occurring appropriate weed control will be undertaken. Weed control can be carried out either through the careful and localised use of chemicals or through physical control methods as outlined below:

- *Physical control methods* involve using physical means such as hand removal and the use of hand tools to remove either specific or broad ranges of weeds. A common physical method for weed removal and subsequent natural revegetation is the Bradley Method. This method involves hand removal and is best for small areas. The use of machinery such as Bobcats, Backhoes, Slashers, etc should not be used for weed removal due to the potential for large scale disturbance to result.

- *Chemical control methods* involve the use herbicides. These herbicides can be specific to a particular plant or more broad ranging types of chemicals. Problems with the use of herbicides include chemical residues affecting soils, herbicide runoff into waterbodies and the health and safety of the operator involved in the application of the herbicide. Advantages of herbicide use include the low time taken to spray weeds as opposed to physically removing them, especially for large infestations of weeds. Broad area spray application is considered inappropriate for this program. Herbicides will be applied by cut and paint or hand held application methods only. Suitable physical control methods are to be the preferred option.

Weed control in the reserve and corridor areas is to be carried out by professional bush regeneration contractors having TAFE qualifications in bushland regeneration (minimum Certificate 2) and under the supervision of a professional bush regenerator who is a member or is eligible for membership of the Australian Association of Bush Regenerators (AABR). Any individuals or groups undertaking weed removal or bush regeneration activities must currently possess or obtain a licence from the NSW Department of Environment and Climate Change.

iii) Rehabilitation of disturbed areas

In conjunction with weed removal programs, and as part of the Vegetation Management Works Plan, those disturbed areas identified within the site will be targeted for rehabilitation. The Vegetation Management Works Plan will detail strategies for those areas to be rehabilitated including the use of provenance specific species, long term protection of rehabilitation areas and monitoring and maintenance of rehabilitation areas.

iv) Erection of signage delineating protection areas

Signs will be erected throughout Riverside delineating corridor and reserve areas and identifying vegetation protection areas and strategies. This will include information discouraging residents from dumping lawn and garden waste that will have future impacts upon natural areas in terms of potential for weed infestation.

Signs, in conjunction with fencing, can also aid in restricting access to sensitive areas.

Further details on signage management actions are contained in Section B11.

v) Erection of fencing delineating protection areas

Fencing can be used to delineate vegetation and bushland protection areas, particularly those areas undergoing vegetation rehabilitation. Sensitive areas such as the SEPP 14 wetland area can also be fenced to restrict pedestrian and vehicular access.

Further details on fencing management actions are contained in Section B11.

vi) Monitoring of vegetation management areas

Full details of monitoring are included in Section B12.

vii) Encouragement of Landcare community initiatives

The encouragement and establishment of local community Landcare groups will aid in the organisation and carrying out of weed removal and vegetation rehabilitation programs will encourage partial ownership of the bushland values of Riverside by the community.

The establishment of site specific community Landcare groups should be developed as an initiative between the developers of the land and the Community Association.

2.2 BUSHFIRE MANAGEMENT

Objectives

- **Ensure all bushfire protection measures occur outside of retained bushland areas**
- **Maximise tree and habitat protection**
- **Ensure that bushfire protection measures are implemented to reduce the risk of bushfire from retained bushland areas upon adjacent property**

Actions

i) Review of Bushfire Protection Assessment detailing the requirements for bushfire protection measures

A Bushfire Protection Assessment has been prepared for the site. This Bushfire Protection Assessment identifies the bushfire protection strategies required to protect developed areas within Riverside. These strategies need to be incorporated into the vegetation management of the site.

ii) Identification of retained areas and Asset Protection Zone (APZ) boundaries prior to construction

Prior to construction commencing those areas to be retained as corridor and reserve and their adjacent APZ's are to be delineated on site plans and survey marked in the field. This will minimise the risk of damage to vegetation contained within retained areas and APZ's during construction.

iii) Maximise tree protection in APZ's

A discontinuous tree canopy is required as establishment of the Inner Protection Area of APZ's. It is considered that due to the relatively open nature of the vegetation communities present within that site that tree clearing required as part of the establishment of APZ's will be minimal.

iv) Monitor bushfire risk within retained bushland areas

While all hazard reduction is to occur outside of reserve and corridor areas the vegetation and accumulation of fuel and consequent bushfire risk over time within the reserve and corridor areas is to be monitored as a long term strategy. Full details of monitoring will be included within the Vegetation and Bushfire Management Plan.

iv) Implementation fire hazard reduction where considered necessary in accordance with vegetation management principles

This may require future ecological burn strategies to be implemented using a sector/mosaic burn plan based on best knowledge of appropriate regimes for the various vegetation communities present within the site. The results of monitoring will be used to plan for any subsequent fuel reduction operations carried out in conjunction with the RFS and other relevant statutory authorities such as the NSW Department of Environment and Climate Change.

2.3 PROVISION AND ESTABLISHMENT OF ENVIRONMENTAL CORRIDORS

Objectives

- **Protect the sites ecological value as a movement area for local fauna**
- **Minimise the impacts of development upon local fauna**
- **Provide green space for residents to maximise the sites aesthetic values and recreational opportunity**

- **Maximise environmental values of drainage and water management areas**

Actions

i) Establish Wildlife Corridors as key component of the concept design

The Wildlife Corridors areas have been provided within the proposal to retain connectivity within the post development landscape and provision for fauna movement through the area. These 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. These areas will allow movement through the site to greater areas of habitat to the north, particularly for arboreal and terrestrial fauna species. These areas will also provide a lesser open space/recreational role.

These Wildlife Corridors will provide continuity of habitat and movement areas for local fauna within the development and between habitat areas within the local landscape. This includes movement areas and habitats for threatened species including the Squirrel Glider, Koala and threatened microchiropteran bat species.

Vegetation and habitats within these areas will be managed under specific vegetation and habitat management planning proposed fro the site.

ii Establish Drainage Corridors as key component of the concept design

Drainage corridors have been proposed as part of the development concept layout for water/drainage management. These areas will serve a function in providing landscape linkage and providing habitat for semi-aquatic species within the site, particularly amphibian species, including the Wallum Froglet. These areas will also provide a lesser open space/recreational role.

2.4 PROVISION OF ENVIRONMENTAL BUFFERS

Objectives

- **Protect the values of retained vegetation and habitats within the site**
- **Reduce occurrence and severity of edge effects on retained vegetation**
- **Maximise use of Asset Protection Zones in acting as environmental buffers**
- **Maximise the opportunity for vegetation management within environmental buffers**
- **Protect sensitive environments including riparian, estuarine and wetland areas**

i) Establish buffer areas between development areas and environments associated with the Myall River

The less disturbed vegetation communities within the site associated with the Myall River will be retained as part of the concept development proposal. This includes the retention of Swamp Forest, Closed Heathland, Closed Rushland and Mangrove complex vegetation communities.

The retention of these communities will provide an approximately 150m to 500m buffer between the development edge and the banks of the Myall River. The establishment retention of these areas as buffers will provide for the protection of the Myall River from potential offsite and downstream impacts of adjacent development. This also includes the protection of areas of the endangered ecological community Coastal Saltmarsh. These buffers were identified and included in environmental protection zones as part of the outcomes of the rezoning process.

ii) Implement vegetation management strategies within buffer areas

The outer 20 metres of the buffer areas will be targeted for vegetation management. The implementation of vegetation management actions within buffer areas will increase these areas ability to protect vegetation and habitats from the impacts of development. These actions will include:

- weed removal
- replanting
- erosion and sediment control
- fencing
- monitoring
- ongoing maintenance

iii) Restrict vehicle access to buffer areas

Access to buffer areas by vehicles will be restricted and prohibited, other than for vegetation management purposes.

2.5 EROSION AND SEDIMENT CONTROL

Objectives

- **Protect the soil properties of the area during the construction and occupation phases of the development**
- **Minimise risk of sedimentation of downstream aquatic areas**
- **Maximise use for in-situ replacement and use of displaced topsoil**

Actions

i) Prepare an Erosion and Sediment Control Plan for the site

Development within the site is adjacent to sensitive areas including the Myall River and associated SEPP 14 wetlands. To minimise the impacts of downstream sedimentation to aquatic environments an Erosion and Sediment Control Plan will be prepared for the site.

The Erosion and Sediment Control Plan will detail the strategies required for the minimisation of erosion within the site and the control of potential sedimentation impacts likely as a result of any erosion. The Erosion and Sediment Control Plan will detail the strategies required for the construction and occupation phases of the development.

This plan is to be prepared by a qualified Engineer and in accordance with best practice industry standards and Great Lakes Councils Erosion and Sediment Control Policy. The plan will also consider Council's Port Stephens/Myall Lakes Estuary Management Plan.

ii) Provide erosion and sediment control devices in accordance with best practice industry standards

The Erosion and Sediment Control Plan will detail measures for the installation, ongoing use monitoring and maintenance of erosion and sediment control devices during all construction and occupation phases of development.

iii) Implement suitable protection measures for storing of topsoil and on-site re-use

All topsoil stripped from the site will be stored and re-used on site. Topsoil and spoil shall be stockpiled in non-hazard areas and protected from surface run-off by diversion drains or similar. Stockpiles are to be surrounded on down-stream sides by silt fencing and stockpiles shall be suitably compacted to inhibit erosion. Where the stockpiling period exceeds four (4) weeks, the stockpile shall be seeded to encourage vegetation growth and reduce further loss due to water/wind erosion.

iv) Restrict access to disturbed areas during construction

Access to disturbed areas during construction will be restricted, particularly following rainfall.

v) Rehabilitate disturbed areas immediately upon the cessation of construction activities

All disturbed areas will be rehabilitated according to actions detailed within the Erosion and Sediment Control Plan and Vegetation Management Plan immediately following the completion of site construction activities.

vi) Monitor erosion and sediment control devices and downstream and aquatic areas for evidence of soil loss and sedimentation

2.6 STORMWATER QUALITY AND MANAGEMENT

Objectives

- **Provide suitable stormwater control devices that maximise habitat opportunities for flora and fauna**
- **Provide suitable stormwater control devices that maximise passive recreational opportunities**
- **Locate and design stormwater structures within the development in accordance with the conservation and protection principles of this Management Strategy to minimise environmental impacts**

Actions

i) Integrate landscape design initiatives into stormwater control structures that maximise benefits to local aquatic and semi-aquatic flora and fauna species

Measures are to include promotion of growth of native fringing vegetation, monitoring of water quality, weed removal and monitoring for presence of predatory *Gambusia holbrooki.* Design of detention and sedimentation structures will incorporate features to facilitate *Gambusia* eradication. These measures may be addressed within individual habitat management plans for each proposed basin.

2.7 CULTURAL HERITAGE VALUES AND MANAGEMENT

Objectives

- **Protect the cultural heritage values of the local area**
- **Provide information to the community on the cultural heritage values of the Riverside area**

Actions

Consider the implementation of the recommendations of the Cultural Heritage Report by ERM Australia.

2.8 COMMUNITY EDUCATION, VIGILANCE AND REPORTING

Objectives

- **Promote ownership and appropriate use of the natural areas within Riverside by the community**
- **Promote community vigilance in reporting prohibited use**
- **Promote community involvement in wildlife observation and protection**
- **Encourage local involvement in bushland rehabilitation schemes**
- **Provide information to the community on the environmental, cultural and recreational values of the area**

Actions

i) Provide informative pamphlet to residents at point of sale and update/supply regularly

A pamphlet will be supplied to residents at the point of sale to supply information in regards to the sites natural area values. The pamphlet will include information on:

- The area covered by the Riverside development and the reserve and corridors within;
- History of the area;
- Access points and any walking trails;
- Prohibited uses and reasons for restricted use;
- Location of any facilities or important ecological/cultural features;
- Accepted passive recreational uses of the area;
- Significant flora and fauna (particularly threatened species) and habitats;

- Practices to reduce the impacts of adjacent use upon the corridor (eg. Use of locally occurring garden species, limited use of fertilisers, controlling pets, weed management, fauna monitoring, habitat creation);
- Contact details with regard to reporting prohibited use, fauna injuries;
- Landcare/Bush regeneration details;
- Sources of further information (e.g. Great Lakes Council, DECC websites);

ii) Provide interpretive signing around extent of retained reserve and corridor areas to inform community of values and appropriate use

Signage will include information on:

- Ownership and management of the land;
- Bushland values;
- Prohibited activities (eg: rubbish dumping, vehicular access, entry of cats, off lead dogs);
- Permitted activities;
- Contact/Reporting details;
- Penalties for misuse;
- Indicative map of natural areas within riverside.

iii) Encourage community and resident ownership and involvement through use of Community Title initiatives

Residential areas of the site are to be administered under the provisions of Community Title. This approach allows for ongoing regulation of activities, including maintenance within the entire development area, within individual allotments, within bushfire protection areas, vegetation retention areas and within common community association areas. This approach also provides substantial benefits in terms of regulating the impact of the development upon the natural environment into the future.

The Community Management Statement embodies the Legal Framework under which the Community Association operates defining its purpose, responsibilities, procedures and by-laws which regulate the association and its members. The Community Management Statement, by definition, places the burden of ongoing environmental management works upon the landholders thus ensuring the implementation of these works in perpetuity.

2.9 PROHIBITED USE IDENTIFICATION AND MANAGEMENT

Objectives

- **Identify likely uses of the natural areas within the Riverside development that may have impacts upon ecological and environmental values**

- **Encourage appropriate uses of the natural areas within Riverside by the community**
- **Promote community awareness and vigilance of reporting of prohibited uses**

- **Implement mechanisms for penalties for mis-use of natural areas**

Actions

i) Erect prohibited use signage

Expected uses of the natural areas of Riverside to be identified as prohibited uses are:

- Rubbish dumping;
- Vehicular (4WD and trail bike) access;
- Off-leash dogs;
- Flora/fauna harm or removal;
- Horse riding;
- Dead wood removal.

ii) Create system or framework for the imposition of fines and penalties for any incidences of improper or prohibited use of natural areas

A legal framework whereby penalties, including fines, can be imposed for improper use of the site can be developed. Signs indicating prohibited uses and the penalties for these are to be placed throughout the Riverside area. Information on prohibited uses is to be included in the pamphlet to be circulated to residents.

iii) Implement community education programs to encourage the appropriate low impact, passive use of reserve and corridor areas

Community education material (pamphlets/signage) will include information on appropriate use of the natural areas within the site. Passive use of the site will be encouraged with activities such as walking, fauna observation to have facilities provided for (eg. walking trails, boardwalks, viewing platforms). Those recreation al activities likely to cause will be discouraged (walking off set trails, trailbiking, horse riding, unleashed dog walking, camping).

iv) Restrict access to reserve and corridor areas, particularly to vehicles, trail bikes and horses

The recreational opportunities and use of the site will be controlled by the provision of services and access to those services. Access to reserve areas and the facilities within those areas will be restricted to service vehicles and pedestrian traffic only.

Access to walking/service trails will be restricted by locked gates or bollards. Unauthorised vehicular access will not be permitted and identified as a prohibited use.

2.10 NATIVE FAUNA, HABITAT AND FERAL PEST SPECIES MANAGEMENT

Objectives

- **Provide suitable strategies for the protection of native fauna species within the post development landscape**

- **Provide adequate protection and habitats for threatened species known from the area**

- **Provide compensatory habitat for native fauna**

- **Minimise human related impacts upon local native fauna**

- **Protect key den, nest, roost and foraging resources by establishing adequate bushland reserves**

- **Remove pest fauna species from the site**

- **Reduce the risk of damage to native flora and fauna resulting from the occurrence of pest species related to human occupation**

Actions

i) Provide compensatory habitat within retained areas, particularly nest and roost boxes

a. Nest Boxes

Relative low densities of hollow-bearing trees have been recorded within the subject site. These hollows ranged in size from small to medium (<5cm to 30cm) suitable for a number of hollow dependent fauna species observed during surveys. These include:

* Green Tree Snake
* Galah
* Scaly-breasted Lorikeet
* Eastern Rosella
* Common Brushtail Possum
* Microchiropteran bat species
* Rainbow Lorikeet
* Musk Lorikeet
* Squirrel Glider
* Feather-tail Glider
* Common Ringtail Possum

As part of the Master planning process it is proposed to retain all hollow-bearing trees within the undeveloped areas of the site. However, in the interests of providing net gains in habitat nest and roost boxes are proposed to be erected within trees in those reserve and corridor areas to be retained by the development.

It is considered that 2-3 nest boxes per hectare of current suitable habitat to be cleared will be erected as compensatory habitat within the retained and protected reserve and corridor areas. This equates to between 200-300 replacement nest boxes. This will consist of a mix of Squirrel Glider, possum, micro chiropteran bat, small and large parrot boxes.
The following specific management strategies are to be carried out in relation to nest boxes:

- All replacement nest boxes are to be secured to trees at a minimum height of four metres above ground level facing the east to north east direction. An experienced arborist is required to install the nest boxes. Nest boxes and re-erected limbs are not to be placed near locations where public access is planned along entrance points or tracks. All nest boxes and re-erected limbs will be inspected annually and any damaged, or in danger of falling, are to be repaired or replaced. The locations of each of the erected nest boxes or re-erected hollows will be mapped for later reference.

- A fauna ecologist (Project Ecologist) is to co-ordinate the construction and erection of nest boxes and locate appropriate trees and locations for installing the nest boxes. The locations of all nest boxes and re-erected hollows are to be included on plans provided

with annual progress reports. Each box is to be identified with a readable, weather resistant number (75mm) in size for identification and recording purposes.

- All nest boxes will be inspected regularly for the life of this plan. Any damaged or dangerous boxes will be replaced. Any boxes seen to contain exotic fauna (Indian Myna, European Bees) will have fauna removed or the nest box replaced.

- The locations of all nest boxes will be fixed by GPS as part of ongoing monitoring strategies.

- All nest boxes will be constructed of a durable marine ply material and fixed to trees by qualified climbers using stainless steel bolts. Boxes will be hinged for ease of future monitoring.

The habitats within the reserve and corridor areas will be enhanced by the implementation of vegetation management strategies. The removal of weeds and rehabilitation of disturbed areas and community involvement has been discussed within Section B1.

ii) Supervise clearing works during construction

The removal of hollow bearing trees will occur as part of this development. To minimise the impact on hollow dependant fauna during tree felling operations the following measures will be used were considered appropriate:

- Identification and marking of hollow bearing trees required to be cleared;

- Inspection of tree hollows by spotlight survey and appropriate bat detection methods immediately prior to clearing to determine if hollows are being utilised by tree dwelling fauna, including threatened species;

- Implementation of a trapping program prior to tree clearing to trap any mammal fauna within areas proposed for staged clearing. Any trapped animals will be released into appropriate areas on dusk;

- Inspection of hollow bearing trees marked for clearing. Trees will be felled in sections of approximately one-metre lengths. Inspections of hollow sections prior to felling will be undertaken to determine if fauna is present within hollows. Fauna occupying hollows will be carefully removed by an experienced and licensed fauna expert and relocated to another tree away from the area of clearing;

- Restriction of clearing hollow bearing trees during the breeding season for microchiropteran bats and Squirrel Glider (September-March);

- Implementation of hollow log salvage and re-erection program in order to retain roosting and nesting opportunities for hollow dependent fauna, including Owls, Squirrel Gliders and threatened bat species;

Two options are available for removing tree hollows or felling hollow bearing trees. These are:

i) Hollow bearing trees containing fauna are to be sectionally dismantled. This will involve an arborist / tree climber to hand removal hollow limbs into one metre lengths. Each hollow length will be inspected for fauna occupation. Once all hollow limbs are dismantled the tree can be felled by machine. Fauna occupying hollows will be carefully removed by the Project Ecologist and relocated to adjoining corridor or reserve areas.

ii) Where machinery is required to fell hollow trees, the blade or bucket of the machinery will be tapped against the base of the tree to disturb any fauna present. The tree will then be felled as gently as possible. All hollow limbs will be inspected after felling for occupation by fauna. Any fauna will be removed and relocated to adjoining bushland.

Any felling of hollow bearing trees will be supervised by a qualified fauna ecologist (Project Ecologist).

All hollow limbs will be removed from those trees felled by a licensed contractor. These hollow limbs will be returned to the Project Ecologist for re-use at a later date.

iii) Provide information within community education material encouraging the provision of habitat for native fauna species within residential allotments

Information will be included within interpretive material on the importance of providing suitable landscape initiatives within residential areas for the provision of habitat for native species within urban areas.

iv) Implement suitable initiatives to control impacts of domestic pets upon local fauna

The following will form part of strategies in minimising the risks posed to native wildlife of domestic animals:

- All domestic pets kept within fenced yards
- Covenants restricting cat ownership
- Curfews on cats
- All dogs to be kept on leash when out of yards and in open space areas
- Penalties for unrestrained animals

v) Implement feral pest control programs, particularly for rabbits, foxes, Mosquitofish and Noisy Miner

Suitable management strategies will be implemented for the control of feral animals, particularly the fox, rabbits, Mosquito fish and Noisy Miner. This will include engaging a licensed pest controller to carry out regular programs, when required, within the site, particularly those corridor and reserve areas.

vi) Monitor distribution and abundance within the site of threatened species, native fauna and pest species

Regular monitoring will be implemented to gather information on the occurrence of native fauna, particularly threatened species, and pest species within the site. Full details are provided within Section B12.

2.11 ACCESS, SIGNAGE AND FENCING

Objectives

- **Protect the environmental values of natural areas throughout the Riverside development through appropriate signage and fencing**
- **Protect environmentally sensitive areas through restriction of access**
- **Increase community awareness of environmental values of natural areas through appropriate signage**

Actions

i) Erect interpretive signing around corridor and reserve areas providing community and residents with information on access restriction, appropriate use, prohibited use and environmental values

Interpretive signing will be erected around the boundaries and within reserve and corridor areas. This will include information on:

- Location of reserve and corridor areas (site plan);
- Prohibited uses;
- Natural features of the site (flora/fauna/habitats/wetlands etc);
- Recreational opportunities;
- Contact details;
- "No go" areas;
- Penalties for misuse.

ii) Erect fencing during construction to protect individual trees

Where trees are identified for retention and are in areas adjacent to construction areas tree protection fencing will be erected to eliminate risk of damage during construction. Fencing will be erected to adequately protect the root zone of trees from excavation or compaction damage.

iii) Erect fencing during construction to protect reserve and corridor areas

Where corridor or reserve areas are adjacent to construction areas temporary fencing will be erected to indicate these no go areas. This will be supported by site contractor inductions notifying personnel of protection areas and restricted access to these.

iv) Erect bollards or fencing to restrict access to environmentally sensitive areas

Bollards or fencing will be erected to control access to environmentally sensitive areas within the site such as SEPP 14 Wetland areas and conservation zones. Temporary fencing will also be erected to protect areas that are undergoing vegetation management to protect juvenile plants.

v) Monitor signage and fencing and repair/replace when necessary

The management program will include monitoring of condition of signs, fencing and bollards to allow for damaged structures to be relaced or repaired. Full details of monitoring are included within Section 2.12.

2.12 MONITORING AND REPORTING REGIME

Objectives

- **Collect long term information on the environmental and ecological quality of natural areas and impacts of development within the Riverside development**
- **Collect long term information on impacts of the development upon reserve and corridor areas and make contingency for the implementation of appropriate rehabilitative and compensatory measures**
- **Collect long term information on the success of ameliorative measures introduced as part of this management strategy**
- **Collect information on the occurrence of threatened species, native fauna and condition of vegetation within reserve and corridor areas**
- **Provide regular meaningful reports to statutory authorities on the results of monitoring and other ongoing issues and make these available to the Community Association and other local interest groups**

Actions

The monitoring program will be designed to collect information over the long term on key environmental and ecological parameters to provide information on the long term environmental health of the reserve and corridor areas. These consist of the following:

- Threatened species:
  - Wallum Froglet;
  - Osprey;
  - Barking Owl;
  - Squirrel Glider;
  - Koala;
  - Grey-headed Flying-fox;
  - Greater Broad-nosed Bat;
  - Eastern Bentwing-bat
  - Little Bentwing-bat;
  - Large-footed Myotis.
- Native fauna
- Native vegetation and bushland
- Weeds
- Rubbish

- Nest boxes
- Pest species

i) Monitor occurrence and persistence of threatened species

Wallum Froglet

The Wallum Froglet has been recorded within a number of locations within the site. The monitoring program is to be designed so as to detect the continued presence of this species within those suitable habitat areas retained within the site. Surveys are to be completed bi-annually and annually and consist of call detection and call playback, particularly during times of peak detection (i.e. after rain April-Nov).

Osprey

The Osprey was been recorded within the subject site during surveys conducted in February 2008. This species was observed roosting in trees on the shoreline of the Myall River. Monitoring programs are to be designed so as to detect the continued presence of this species within the area. Bi-annual surveys are to be carried out to detect the continued presence of this species within the subject site and to record any nesting activity that may occur. Surveys are to consist of diurnal observation surveys.

Barking Owl

The Barking Owl was been recorded calling in areas to the north of the subject site during nocturnal owl call playback surveys conducted in February 2008. Monitoring programs are to be designed so as to detect the continued presence of this species within the area. Bi-annual surveys are to be carried out to detect the continued presence of this species within the subject site and to record any nesting activity that may occur. Surveys are to consist of nocturnal call playback and spotlighting surveys.

Squirrel Glider

The Squirrel Glider has been recorded within vegetation near the northern boundary of the site. Monitoring programs are to be designed so as to detect the continued presence of this species within the area. Bi-annual surveys are to be carried out to detect the continued presence of this species within reserve and corridor areas. Surveys are to consist of arboreal Elliott trapping, spotlighting and nest box inspection.

Koala

There are no recent local records for the Koala within the subject site; however it is known to occur within the local area. The site contains suitable foraging and refuge habitat for this species. Monitoring is to be carried out bi-annually for this species to detect any future use of the site. Monitoring is to consist of Spot Assessment Techniques, spotlighting and call playback. Full details of the monitoring program are included within the Koala Management Strategy prepared for the site.

Grey-headed Flying-fox

The Grey-headed Flying-fox was been recorded within the subject site during nocturnal surveys conducted in February 2008. This species was observed foraging in flowering eucalypt trees within the subject site. Monitoring programs are to be designed so as to detect the continued presence of this species within the area. Bi-annual surveys are to be carried out to detect the continued presence of this species within the subject site and to record any roosting camp activity that may occur. Surveys are to consist of nocturnal spotlighting surveys.

Microchiropteran Bat Species (Greater Broad-nosed Bat, Little Bentwing-bat, Eastern Bentwing-bat. Large-footed Myotis)

Four threatened microchiropteran bat species have been recorded within the site during previous surveys. The area contains foraging, roosting and breeding habitat for these species. Monitoring programs are to be designed so as to detect the continued presence of this species within the area. Surveys for these species are to be carried out biannually and consist of Anabat echolocation recording.

ii) Monitor abundance and diversity of native fauna species

The monitoring program is to include collection of information on the diversity of fauna species within the site. Standard fauna survey methods targeting vertebrate groups (mammals, birds, reptiles, amphibians) is to be completed seasonally and bi-annually to gather information on the diversity of fauna species within the site for year to year comparison and also comparison against baseline data.

iii) Monitor condition of native vegetation and bushland including rehabilitation areas

The monitoring program will include monitoring the condition of vegetation within those areas undergoing vegetation management works within the site, particularly those rehabilitation areas. Monitoring is to be carried out annually to assess the condition of rehabilitation areas and make contingency for additional rehabilitation and protection works if the results of monitoring indicate the need.

iv) Monitor occurrence and extent of weeds and rubbish

The extent of weeds within the retained areas are to be monitored annually. Where weeds are observed to be increasing removal programs will be carried out. This could be implemented as part of community initiatives as discussed in Section B8.

Monitoring for incidences of rubbish dumping will be carried out regularly. Where build up of rubbish is observed removal programs are to be carried out. This could also be implemented as part of community initiatives as discussed in Section B8.

vi) Monitor occurrence of pest fauna species

Monitoring will include gathering information on the presence of the following pest species:

- Foxes;
- Rabbits;

- Gambusia;
- Common Myna;
- Cats;
- Dogs.

The collection will allow for the occurrence of pest species to be recorded and provision made for their removal from those retained areas.

Any signs of predation by foxes, dogs or cats will also be monitored and reported on.

vii) Produce regular meaningful reports on results of surveys and provide analysis against baseline information

Reports will be supplied regularly to the Community Association and relevant statutory authorities in conjunction with the end of each monitoring period.

At the completion of each monitoring period an assessment report will be completed detailing all methodologies used and results gained during surveys for that monitoring period. The report is included as a minimum:

- details on survey methods;
- results of surveys;
- comparison between monitoring/reporting periods;
- management issues;
- any suggested amendments to management plan.

viii) Make contingency for review of management actions where monitoring identifies significant impacts

Management actions will be reviewed regularly as part of the monitoring and reporting process. Where impacts are identified that indicate the failure of management actions or the requirement for new management actions contingency will be made for these to be addressed within the ongoing environmental management framework.

SECTION 3

IMPLEMENTATION OF MANAGEMENT ACTIONS

3.1 IMPLEMENTATION OF MANAGEMENT ACTIONS

It is envisaged that the management strategies included within this plan will be enforced as conditions of consent for various stages of approval for the development application. Following review of the application by the various authorities it is considered that further refinement of the management actions and implementation will be required for the various stages of the approved development. This may be achieved by the preparation of individual Management Plans for the various development stages with this Ecological Site Management Strategy to form the basis of the objectives, actions and implementation strategies of those plans.

The actions detailed within this Management Strategy will be implemented over a minimum ten year period following signoff of the plan by the Department of Planning. The long term timing, implementation and responsibility of those actions will ultimately depend upon the development of the various stages of the development and the title on the land

The following table (Table 1) provides details on the implementation of management actions contained within Section B. Each of the actions relates to a Management Area within the Riverside area. These areas have been identified to ensure that only those actions relevant to certain areas are applied to the relevant area. These Management Areas have been separated as per the following:

- Management Area A – SEPP 14 Wetlands;
- Management Area B – Conservation Zoned Lands;
- Management Area C – Asset Protection Zones and Environmental Buffers;
- Management Area D – Wildlife Corridors;
- Management Area E – Drainage Corridors;
- Management Area F – Developable Area.

Management Area A – SEPP 14 Wetlands
The area within Management Area A is that low-lying land associated with the Myall River and bound by State Environmental Protection Policy No. 14 Coastal Wetlands known as wetland number 746. This area corresponds with an area mapped as 7(a) Wetlands and Littoral Rainforest Zone within the Great Lakes LEP. This area will be wholly retained as part of the proposed development. The SEPP 14 Wetland will also be buffered by the retention of vegetation communities between the wetland boundary and the development edge. Management within this area will primarily consist of weed management via regular inspections, and low impact weed control works where and when necessary.

Management Area B – Conservation Zoned Land
This area consists of land zoned 7(b) Conservation Zone and contains land of conservation and environmental significance. This area is adjacent to the land within SEPP 14 wetlands and serves a buffer function in protecting the wetland area from adjacent use. The vegetation within this land zoned for conservation consists of relatively high quality Closed Heathland and Swamp Forest vegetation. Management within this area will primarily consist of weed management via regular inspections, and low impact weed control works where and when necessary.

Management Area C – Asset Protection Zones and Environmental Buffers
These areas consist of those areas adjacent to development that are retained as buffer areas to adjacent reserved lands or are retained and modified as part of Asset Protection Zones (APZs). These areas serve as the interface between developed lands and those areas of native vegetation retained due to high conservation value, environmental significance or habitat and landscape function. These areas will contain a reduced amount of vegetation within semi-natural areas. Areas designated as bushfire APZs will be managed in accordance with the requirements for APZs in Planning for Bushfire Protection (RFS 2006). It is likely that some of these areas will incorporate grassy swale / nutrient sinks, some stormwater management areas, ephemeral drainage lines and parklands.

Asset Protection Zones and Environmental Buffers are located within or adjacent to a large number of habitat types across the site. Replanting zones labelled A to G having different treatment requirements have been created to better define the species to be used and the densities required to be planted (See Figures A4.1 and A4.2 and Table 2). This is to ensure that future revegetated areas are consistent with the habitat and existing vegetation types within or adjacent to the replanting zones. Where revegetation is required within these areas species to be planted and the densities of plantings required are shown in Table 2. The location of zones (labelled with a prefix of A to G) that may require replanting is shown in Figure A4.2 - Re-vegetation Zones.

Management Area D – Wildlife Corridors
These Wildlife Corridor areas have been provided to retain connectivity within the post development landscape and provision of fauna movement through the area. These 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. Management within these areas will primarily consist of weed management via regular inspections, and low impact weed control works where and when necessary.

These areas will allow movement through the site to greater areas of habitat to the north, particularly for arboreal and terrestrial fauna species. Those other areas retained in Management Areas A and B will also function in a landscape connectivity capacity.

The Wildlife Corridors will be consolidated / augmented by replanting within existing disturbed areas. Areas of replanting works are shown in Figure A4.2 – Re-vegetation Zones which designates zones with a prefix between A and G. The species and the densities to be replanted within the specific zones are shown in Table 2.

Management Area E – Drainage Corridors and Open Space Areas
The lands contained within Management Area E consist of areas set aside for water/drainage management. These areas will also serve a function in providing landscape linkage and providing habitat for semi-aquatic species within the site, particularly amphibian species. These areas will also provide a lesser open space/recreational role.

The drainage corridors will contain a number of habitat types such as Parkland, Freshwater Edges, Fresh Waterbodies and Saline Shores. Areas of replanting works are shown in Figure A4.2 – Re-vegetation Zones which designates zones with a prefix of G for the Drainage Corridor areas. The species and the densities to be replanted within the G zones are shown in Table 2.

Management Area F – Developable Area

This area consists of the land to be developed for residential and commercial purposes. The management actions to be implemented within Management Areas A to E are ultimately as a result of the activities that are to be carried out within Management Area F.

TABLE 1 APPLICATION OF MANAGEMENT STRATEGY ACTIONS TO VARIOUS MANAGEMENT AREAS WITHIN RIVERSIDE									
		APPLICABILITY OF MANAGEMENT ACTION FOR MANAGEMENT AREA							
SITE ISSUE	**ACTION**	**A**	**B**	**C**	**D**	**E**	**F**	**RESPONSIBILITIES**	**TIMING**
B1. Vegetation and Bushland Management	i) Prepare Vegetation Management Plan	√	√	√	√	√		Applicant	Pre-construction
	ii) Weed removal programs	√	√	√	√	√		As part of Development Consent Contractor	Pre-construction, construction and ongoing through occupation
	iii) Rehabilitate disturbed areas	√	√		√	√		As part of Development Consent Contractor	Pre-construction, construction and ongoing through occupation
	iv) Erect signage	√	√	√	√	√	√	Contractor	Pre-construction
	v) Erect protective fencing		√	√	√	√	√	Contractor	Pre-construction
	vi) Monitor vegetation management areas	√	√	√	√	√		Project Ecologist	Construction and ongoing through occupation
	vii) Encourage Landcare initiatives	√	√	√	√	√	√	Project Ecologist	Occupation
B2. Bushfire Management	i) Prepare Bushfire Protection Assessment			√	√	√	√	Applicant	
	ii) Identify APZ's prior to construction			√	√	√	√	Project Ecologist	
	iii) Maximise tree protection in APZ's			√	√	√	√	Contractor	
	iv) Monitor bushfire risk	√	√					Project Ecologist	
	v) Fire hazard reduction	√	√	√	√	√		Contractor	

TABLE 1 (Cont.) APPLICATION OF MANAGEMENT STRATEGY ACTIONS TO VARIOUS MANAGEMENT AREAS WITHIN RIVERSIDE									
		APPLICABILITY OF MANAGEMENT ACTION FOR MANAGEMENT AREA							
SITE ISSUE	**ACTION**	**A**	**B**	**C**	**D**	**E**	**F**	**RESPONSIBILITIES**	**TIMING**
B3. Provision &Establishment of Environmental Corridors	i) Establish Wildlife Corridors				√			Applicant Consent Conditions	Pre-construction and ongoing through occupation
	ii) Establish Drainage Corridors					√		Applicant Consent Conditions	Pre-construction and ongoing through occupation
B4. Provision of Environmental Buffers	i) Establish buffer areas between development and Myall River	√	√	√				Applicant Consent Conditions	Pre-construction and ongoing through occupation
	ii) Implement vegetation management strategies	√	√	√				Applicant Consent Conditions	Pre-construction and ongoing through occupation
	iii) Restrict vehicle access	√	√	√				Applicant Consent Conditions	Pre-construction and ongoing through occupation
B5. Erosion and Sediment Control	i) Prepare Erosion and Sediment Control Plan						√	Contractor	Pre-construction and ongoing through occupation
	ii) Provide erosion and sediment control devices				√		√	Contractor	Pre-construction, operational through construction
	iii) Implement topsoil storage and re-use methods						√	Contractor	Construction
	iv) Restrict access to disturbed areas						√	Contractor	Construction
	v) Rehabilitate disturbed areas						√	Contractor	Construction
	vi) Monitor erosion and sediment control devices/effectiveness						√	Project Ecologist	Construction

TABLE 1 (Cont.) APPLICATION OF MANAGEMENT STRATEGY ACTIONS TO VARIOUS MANAGEMENT AREAS WITHIN RIVERSIDE									
		APPLICABILITY OF MANAGEMENT ACTION FOR MANAGEMENT AREA							
SITE ISSUE	**ACTION**	**A**	**B**	**C**	**D**	**E**	**F**	**RESPONSIBILITIES**	**TIMING**
B6. Stormwater Quality Management	i) Landscape/habitat design initiatives in structures				√		√	Applicant	Pre-construction
	ii) Advice from qualified ecologists				√		√	Applicant/Consultant	Pre-construction
	iii) Landscape and habitat design plans				√		√	Applicant/Consultant	Pre-construction
	iv) Locate structures in appropriate areas				√		√	Consent Conditions	Pre-construction
B7. Cultural Heritage Values and Management	i) Identification and protection of sites	√	√	√	√	√	√	Consent Conditions	Pre-construction
	ii) Provision of information to community	√	√	√	√	√	√	Applicant	Occupation
B8. Community Education, Vigilance and Reporting	i) Informative pamphlet to residents						√	Applicant	Occupation
	ii) Interpretive signage	√	√	√	√	√	√	Applicant/Consultant	Construction
	iii) Encourage community and resident ownership	√	√	√	√	√	√	Applicant	Occupation
B9. Prohibited Use Identification and Management	i) Erect prohibited use signage	√	√	√	√	√	√	Contractor	Construction

TABLE 1 (Cont.) APPLICATION OF MANAGEMENT STRATEGY ACTIONS TO VARIOUS MANAGEMENT AREAS WITHIN RIVERSIDE									
		APPLICABILITY OF MANAGEMENT ACTION FOR MANAGEMENT AREA							
SITE ISSUE	**ACTION**	**A**	**B**	**C**	**D**	**E**	**F**	**RESPONSIBILITIES**	**TIMING**
	ii) Create fines/ penalties system	√	√	√	√	√	√	Consent Conditions	Occupation
	iii) Promote low impact/passive use	√	√	√	√	√	√	Applicant	Occupation
	iv) Restrict access to reserve areas	√	√	√	√	√		Consent Conditions	Construction
B10. Native Fauna, Habitat and Feral Pest Species Management	i) Provide compensatory habitat (nest boxes)		√		√	√		Applicant/Consent Conditions	Pre-construction
	ii) Supervise clearing works					√	√	Project Ecologist	Construction
	iii) Protection of threatened species	√	√	√	√	√	√	Contractor	Construction
	iv) Community education material	√	√	√	√	√	√	Applicant Conditions of Consent	Occupation
	v) Domestic pet control						√	Community Title Plan	Occupation
	vi) Feral pest control	√	√	√	√	√	√	Community Title Plan	Pre-construction to ongoing works during occupation
	vii) Monitor fauna distribution and abundance	√	√	√	√	√	√	Project Ecologist	Pre-construction to ongoing works during occupation
B11. Access, Signage and Fencing	i) Erect interpretive signing	√	√	√	√	√	√	Contractor	Construction

TABLE 1 (Cont.) APPLICATION OF MANAGEMENT STRATEGY ACTIONS TO VARIOUS MANAGEMENT AREAS WITHIN RIVERSIDE									
		APPLICABILITY OF MANAGEMENT ACTION FOR MANAGEMENT AREA							
SITE ISSUE	**ACTION**	**A**	**B**	**C**	**D**	**E**	**F**	**RESPONSIBILITIES**	**TIMING**
	ii) Erect tree protection fencing			√	√	√	√	Contractor	Pre-construction
	iii) Erect fencing corridor/reserve protective fencing		√	√	√	√		Contractor	Pre-construction
	iv) Erect fencing/bollards for environmentally sensitive areas	√	√	√	√	√		Contractor	Pre-construction
	v) Monitor signage and fencing	√	√	√	√	√		Project Ecologist	Construction to ongoing works during occupation
B12. Monitoring and Reporting Regime	i) Monitor threatened species	√	√	√	√	√	√	Project Ecologist	Pre-construction to ongoing works during occupation
	ii) Monitor native fauna	√	√	√	√	√	√	Project Ecologist	Pre-construction to ongoing works during occupation
	iii) Monitor native vegetation condition	√	√	√	√	√		Project Ecologist	Pre-construction to ongoing works during occupation
	iv) Monitor weeds and rubbish	√	√	√	√	√		Project Ecologist	Pre-construction to ongoing works during occupation
	v) Monitor pest species	√	√	√	√	√		Project Ecologist	Pre-construction to ongoing works during occupation
	vi) Produce regular meaningful reports	√	√	√	√	√	√	Project Ecologist	Pre-construction to ongoing works during occupation

TABLE 1 (Cont.) APPLICATION OF MANAGEMENT STRATEGY ACTIONS TO VARIOUS MANAGEMENT AREAS WITHIN RIVERSIDE									
		APPLICABILITY OF MANAGEMENT ACTION FOR MANAGEMENT AREA							
SITE ISSUE	**ACTION**	**A**	**B**	**C**	**D**	**E**	**F**	**RESPONSIBILITIES**	**TIMING**
	vii) Review management actions	√	√	√	√	√	√	Project Ecologist Community Title Plan Council	Pre-construction to ongoing works during occupation
Management Area A – SEPP 14 Wetland Management Area B – Conservation zoned lands Management Area C – Asset Protection Zones/Buffers Management Area D – Wildlife Corridors Management Area E – Drainage Corridors Management Area F – Development Area									

TABLE 2 SPECIES TO BE USED IN REVEGETATION WORKS		
REVEGETATION AREAS "A-PREFIX" Open Forest *(Angophora costata, Corymbia gummifera)*		
Species		**Total Number of Plants***
Trees	**Plantings per 100m^2 = 5**	
Angophora costata (Smooth-barked Apple)	1.6	816
Corymbia gummifera (Red Bloodwood)	1.6	816
Eucalyptus microcorys (Tallowwood)	1.6	816
Shrubs	**Plantings per 100m^2 = 10**	
Melaleuca nodosa (Ball Honey Myrtle)	3.3	1683
Leptospermum polygalifolium (Yellow Tea Tree)	3.3	1683
Leucopogon lanceolatus	3.3	1683
Groundcovers	**Plantings per 100m^2 = 15**	
Lomandra longifolia (Spiky-headed Mat Rush)	3.75	1912
Themeda australis (kangaroo Grass)	3.75	1912
Microlaena stipoides (Weeping Rice Grass)	3.75	1912
Entolasia stricta (Wiry Panic)	3.75	1912
REVEGETATION AREAS "B-PREFIX" Open Forest *(Eucalyptus microcorys)*		
Species		**Total Number of Plants***
Trees	**Plantings per 100m^2 = 5**	
Eucalyptus microcorys (Tallowwood)	1.6	230
Angophora costata (Smooth-barked Apple)	1.6	230
Eucalyptus resinifera (Red Mahogany)	1.6	230
Shrubs	**Plantings per 100m^2 = 10**	
Leptospermum polygalifolium (Yellow Tea Tree)	2.5	360
Acacia longifolia var. longifolia (Sydney Golden Wattle)	2.5	360
Breynia oblongifolia (Coffee Bush)	2.5	360
Callistemon salignus (Willow Bottlebrush)	2.5	360

TABLE 2 (Cont.) SPECIES TO BE USED IN REVEGETATION WORKS		
REVEGETATION AREAS "B-PREFIX" (Cont.) Open Forest *(Eucalyptus microcorys)*		
Species		**Total Number of Plants***
Groundcovers	**Plantings per 100m^2 = 15**	
Entolasia stricta (Wiry Panic)	3.75	540
Lomandra longifolia (Spiky-headed Mat Rush)	3.75	540
Imperata cylindrica var. *major* (Blady Grass)	3.75	540
Entolasia stricta (Wiry Panic)	3.75	540
REVEGETATION AREAS "C-PREFIX" Open Forest *(Eucalyptus pilularis)*		
Species		**Total Number of Plants***
Trees	**Plantings per 100m^2 = 5**	
Eucalyptus pilularis (Blackbutt)	1	28
Angophora costata (Smooth-barked Apple)	1	28
Banksia serrata (Old-man Banksia)	1	28
Corymbia gummifera (Red Bloodwood)	1	28
Eucalyptus robusta (Swamp Mahogany)	1	28
Shrubs	**Plantings per 100m^2 = 10**	
Monotoca elliptica (Tree Broom-heath)	3.33	94
Pultenaea villosa	3.33	94
Notolaea longifolia (Large Mock Olive)	3.33	94
Groundcovers	**Plantings per 100m^2 = 15**	
Imperata cylindrica var. *major* (Blady Grass)	5	140
Lomandra longifolia (Spiky-headed Mat Rush)	5	140
Baloskion tetraphyllum subsp. *meiostachyum*	5	140

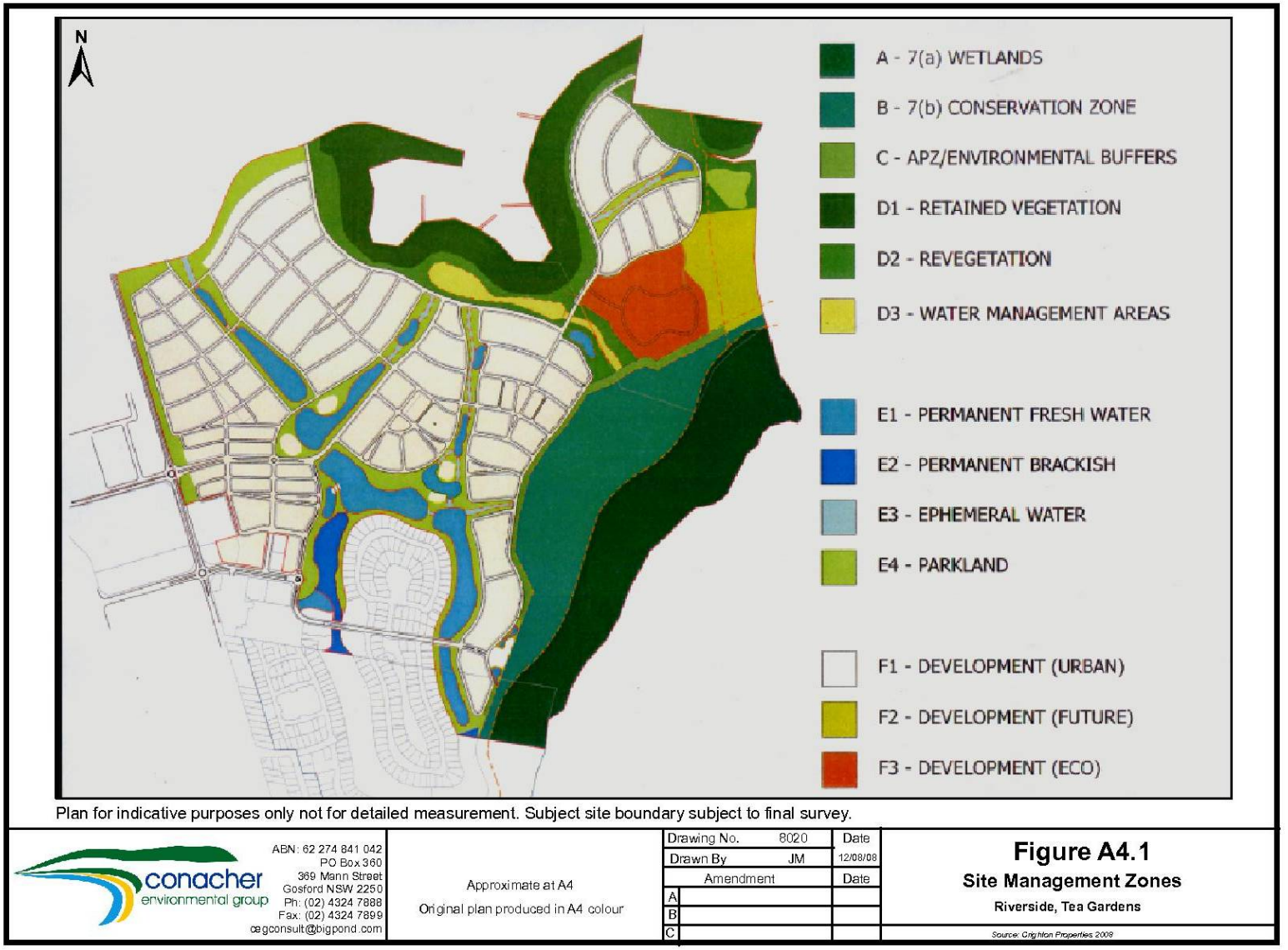
TABLE 2 (Cont.) SPECIES TO BE USED IN REVEGETATION WORKS		
REVEGETATION AREAS "D-PREFIX" Woodland *(Eucalyptus resinifera)*		
Species		**Total Number of Plants***
Trees	**Plantings per 100m^2 = 5**	
Eucalyptus resinifera (Red Mahogany)	1.25	473
Eucalyptus robusta (Swamp Mahogany)	1.25	473
Angophora costata (Smooth-barked Apple)	1.25	473
Eucalyptus signata (Scribbly Gum)	1.25	473
Shrubs	**Plantings per 100m^2 = 10**	
Melaleuca sieberi	2	756
Leptospermum polygalifolium (Yellow Tea Tree)	2	756
Melaleuca thymifolia	2	756
Leptospermum liversidgei	2	756
Callistemon pachyphyllus (Wallum Bottlebrush)	2	756
Groundcovers	**Plantings per 100m^2 = 15**	
Entolasia stricta (Wiry Panic)	3	1134
Hemarthria uncinata (Matgrass)	3	1134
Lepyrodia scariosa (Scale Rush)	3	1134
Xanthorrhoea latifolia subsp. *latifolia*	3	1134
Aristida benthamii	3	1134
REVEGETATION AREAS "E-PREFIX" Woodland / Open Forest *(Eucalyptus robusta)*		
Species		**Total Number of Plants***
Trees	**Plantings per 100m^2 = 5**	
Eucalyptus robusta (Swamp Mahogany)	2.5	1083
Melaleuca linifolia (Snow in Summer)	2.5	1083
Shrubs	**Plantings per 100m^2 = 10**	
Melaleuca nodosa (Ball Honey Myrtle)	3.33	1442
Pultenaea villosa	3.33	1442
Epacris pulchella (NSW Coral Heath)	3.33	1442

TABLE 2 (Cont.) SPECIES TO BE USED IN REVEGETATION WORKS		
REVEGETATION AREAS "E-PREFIX" (Cont.) Woodland / Open Forest *(Eucalyptus robusta)*		
Groundcovers	**Plantings per 100m^2 = 15**	
Entolasia stricta (Wiry Panic)	3	1300
Imperata cylindrica var. *major* (Blady Grass)	3	1300
Lomandra longifolia (Spiky-headed Mat Rush)	3	1300
Dianella caerulea var. *producta* (Blue Flax Lily)	3	1300
Baloskion tetraphyllum subsp. *meiostachyum*	3	1300
REVEGETATION AREAS "F-PREFIX" Woodland / Open Forest *(Eucalyptus umbra)*		
Species		**Total Number of Plants***
Trees	**Plantings per 100m^2 = 5**	
Eucalyptus umbra (Broad-leaved White Mahogany)	1	347
Eucalyptus globoidea (White Stringybark)	1	347
Angophora costata (Smooth-barked Apple)	1	347
Corymbia gummifera (Red Bloodwood)	1	347
Eucalyptus microcorys (Tallowwood)	1	
Shrubs	**Plantings per 100m^2 = 10**	
Callistemon salignus (Willow Bottlebrush)	2.5	868
Leptospermum polygalifolium (Yellow Tea Tree)	2.5	868
Persoonia linearis (Narrow-leaved Geebung)	2.5	868
Lomatia silaifolia (Crinkle Bush)	2.5	868
Groundcovers	**Plantings per 100m^2 = 15**	
Entolasia stricta (Wiry Panic)	3	1041
Imperata cylindrica var. *major* (Blady Grass)	3	1041
Lomandra longifolia (Spiky-headed Mat Rush)	3	1041
Microlaena stipoides (Weeping Rice Grass)	3	1041
Themeda australis (Kangaroo Grass)	3	1041

TABLE 2 (Cont.) SPECIES TO BE USED IN REVEGETATION WORKS		
REVEGETATION AREAS "G-PREFIX" Aquatic Corridor / Parkland		
PARKLAND		
Species		**Total Number of Plants**
Trees	**Plantings per 100m^2 = 1**	
Eucalyptus resinifera (Red Mahogany)	0.5	827
Eucalyptus robusta (Swamp Mahogany)	0.5	827
Shrubs	**Plantings per 100m^2 = 2**	
Melaleuca sieberi	0.5	827
Leptospermum polygalifolium (Yellow Tea Tree)	0.5	827
Melaleuca thymifolia	0.5	827
Leptospermum liversidgei	0.5	827
Groundcovers	**Plantings per 100m^2 = 150**	
Entolasia marginata (Bordered Panic)	50	82,700
Themeda australis (Kangaroo Grass)	50	82,700
Panicum simile (Two-coloured Panic)	50	82,700
FRESHWATER EDGE		
Species		**Total Number of Plants**
Trees	**Plantings per 100m^2 = 1**	
Eucalyptus resinifera (Red Mahogany)	0.5	145
Eucalyptus robusta (Swamp Mahogany)	0.5	145
Shrubs	**Plantings per 100m^2 = 15**	
Leptospermum polygalifolium (Yellow Tea Tree)	5	1445
Melaleuca thymifolia	5	1445
Leptospermum liversidgei	5	1445
Groundcovers	**Plantings per 100m^2 = 150**	
Paspalum distichum (Native Water Couch)	50	14,450
Themeda australis (Kangaroo Grass)	20	14,450
Lomandra longifolia (Spiky-headed Mat-rush)	20	14,450
Dianella caerulea (Blue Flax Lily)	20	14,450
Juncus usitatus (Common Rush)	40	14,450

TABLE 2 (Cont.) SPECIES TO BE USED IN REVEGETATION WORKS		
REVEGETATION AREAS "G-PREFIX" (Cont.) Aquatic Corridor / Parkland		
FRESHWATER BODY		
Species		**Total Number of Plants**
Waterplants	**Plantings per 100m^2 = 100**	
Eleocharis sphacelata (Tall Spike Rush)	20	23,540
Potamogeton crispus (Curly Pondweed)	20	23,540
Triglochin microtuberosum (Water Ribbons)	20	23,540
Ottelia ovalifolia (Swamp Lily)	20	23,540
Vallisneria gigantea (Ribbon Weed)	20	23,540
SALINE SHORE		
Species		**Total Number of Plants**
Halophiles	**Plantings per 100m^2 = 60**	
Juncus kraussii (Sea Rush)	20	670
Sarcocornia quinqueflora (Glasswort)	20	670
Spinifex sericeus	20	670

* Numbers may change subject to the existing on-ground presence of native trees, shrubs or groundcovers.



Plan for indicative purposes only not for detailed measurement. Subject site boundary subject to final survey.

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Approximate at A4

Original plan produced in A4 colour

Drawing No.	8020	Date
Drawn By	JM	12/08/08
Amendment		Date
A		
B		
C		

Figure A4.1

Site Management Zones

Riverside, Tea Gardens

Source: Crighton Properties 2009

Flora survey locations are approximate and have not been fixed by land survey. *Subject Site boundary subject to final survey.
Plan for indicative purposes only. Not for detailed measurement. Original plan produced in A3 colour

Legend

- Subject Site Boundary
- A — Pasture with Scattered Trees
- B — Open Forest (*E. microcorys*)
- C — Open Forest (*E. pilularis*)
- D — Woodland (*E. resinifera*)
- E — Woodland / Open Forest (*E. robusta*)
- F — Woodland / Open Forest (*E. umbra*)
- G — Aquatic / Dam Areas

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Figure A4.2
Re-vegetation Zones
Riverside, Teagardens

By:JM
12/08/08
Ref.No.8020

Source: Aerial © Department of Lands (2007)

References

Conacher Travers (2007) Species Impact Statement (SIS) – Proposed Rural Residential Subdivision Part Lot 404 Spinifex Avenue Tea Gardens.

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PPK Environment and Infrastructure Pty Ltd (2000). *Myall River Downs Local Environmental Study*. Great Lakes Council.

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Threatened Species Conservation Act (1995) New South Wales Government.

APPENDIX 5

ENVIRONMENTAL PROTECTON AND BIODIVERSITY CONSERVATION ACT ASSESSMENT

INTRODUCTION

The *Environment Protection and Biodiversity Conservation Act, (1999)* requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals system for actions that have a significant impact on matters of national environment significance (NES). These may include:-

- Wetlands protected by international treaty (the Ramsar Convention);
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species.

Actions are projects, developments, undertakings, activities, and series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Department of Environment, Water Heritage and Arts (DEWHA).

A protected matters search was undertaken on 8 May 2008 using a 10km search area centred on the subject site. The results of this search are provided as Attachment 5.1 within this Appendix.

Items listed within the search results require consideration or assessment under EP&BC Act (1999). An assessment of the matters raised by the 10km EPBC search are provided below:

Wetlands of International Significance (Ramsar Sites)
Myall Lakes are the only wetlands of international significance listed within the search. The subject site is situated near the lower reaches of the Myall River approximately two kilometres from the southern most extent of Myall Lakes National Park. The subject site is located downstream from this wetland area on the western bank of the Myall River which is tidal. Incoming tidal flows pass the shores of the subject site on the way into the lake system. The proposed development has incorporated large areas of native foreshore and swamp vegetation to be retained along the riverbank. These areas of retained native vegetation are expected to act as a natural buffer between the proposed development and the river, therefore it is considered that the proposed action is not likely to have any detrimental impact on any Wetlands of International Significance.

Threatened Species
The 10km search results list 18 threatened bird species, 2 threatened frog species, 4 threatened terrestrial mammal species and 6 threatened plant species as occurring within 10km of the subject site. Species that are wholly marine are not assessed as there is no suitable habitat within the subject site and the proposed development is not expected to impact upon them. The subject site provides suitable habitat for the following EP&BC listed threatened species.

Species	Habitat Present	Found on-site
Swift Parrot	Foraging only	No
Regent Honeyeater	Foraging only	No
Green and Golden Bell Frog	Breeding & Foraging	No
Large-eared Pied Bat	Foraging only	No
Grey-headed Flying Fox	Foraging and Roosting	Yes

Cryptostylis hunteriana	Suitable Habitat	No
Eucalyptus parramattensis subsp. *decadens*	Sub-optimal habitat	No
Syzygium paniculatum	Sub-optimal habitat	No
Tetratheca juncea	Sub-optimal habitat	No

No threatened flora species as listed under EP&BC Act (1999) were observed on the subject site.

The Grey-headed Flying Fox was observed foraging within the subject site. It is expected that this species will use the wider locality for foraging and not the subject site exclusively. Therefore 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. Similarly, the proposed development is not expected to have a significant impact on any of the EP&BC listed threatened species that may occur in the local area.

Threatened Ecological Communities
No Threatened Ecological Communities listed in the EP&BC Act (1999) were identified on or within 10km of the subject site.

Migratory Species
The 10km search results lists 8 threatened migratory terrestrial bird species, 6 threatened migratory wetland bird species and 24 migratory marine birds which may potentially use the site for roosting, foraging or overflying.

Of the 8 threatened migratory terrestrial bird species listed in the 10km search, five species (White-bellied Sea-eagle, White-throated Needletail, Great Egret, Cattle Egret and the Rainbow Bee-eater) were observed on-site or in the local area. The proposed development is expected to decrease the area of suitable habitat for these species, however, large areas of suitable (and higher quality) habitat is to be retained within vegetated corridors and foreshore areas. As a result it is considered that the proposed development will not cause a significant decrease in habitat for these migratory terrestrial bird species within the local area.

Five (5) of the six threatened migratory wetland bird species known within 10km have been observed on or near the subject site. These species are the Great Egret, Cattle Egret, Latham's Snipe, Eastern Curlew and the Whimbrel. The proposed development is expected to remove or modify a small area of disturbed wetland habitat however, the development will also retain large areas of good quality wetland in the foreshore and lower elevated portions of the site.

Two of the 24 migratory marine birds listed within the 10km search have been recorded within the subject site. The two species observed were the Great Egret and the Cattle Egret. The subject site does not provide any strictly marine habitat. It is considered that the proposed development will not have any significant effect on the habitat for the Great Egret, the Cattle Egret or any other migratory marine birds within the local area.

Commonwealth Lands
There are two (2) Commonwealth Lands listed within the 10km search. These are:

1 - Communications, Information Technology and the Arts – Telstra Corporation Limited;
2 - Defence – Defence Housing Authority.

The subject site does not contain any of these two Commonwealth Lands. It is unknown if any of these lands are adjoining the subject site. It is expected that the proposed development will not have any effect on these Commonwealth Lands.

Places on the Register of National Estate
There are six (6) places listed on the RNE these are:

1 - Corrie Island NSW,
2 - Fly Point, Halifax Park Aquatic Reserve NSW,
3 - John Gould Island Nature Reserve NSW,
4 - Myall Lakes National Park NSW,
5 – Port Stephens Estuary NSW,
6 - Tomaree National Park NSW.

The subject site does not contain or adjoin any of these six Commonwealth Lands, therefore it is expected that the proposed development will not have any effect on these lands. The subject site is situated approximately 2km south of Myall Lakes National Park.

It is considered that a referral of this project to the Department of Environment, Water Heritage and Arts (DEWHA) is not required as it is not likely to impact on a significant population of nationally listed threatened species, any nationally listed endangered ecological community or on any nationally listed migratory or marine species.

ATTACHMENT 5.1

EPBC PROTECTED MATTERS SEARCH RESULTS

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Australian Government
Department of the Environment, Water, Heritage and the Arts

Skip navigation links About us | Contact us | Publications | What's new

Protected Matters Search Tool

You are here: Environment Home > EPBC Act > Search

8 May 2008 12:25

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

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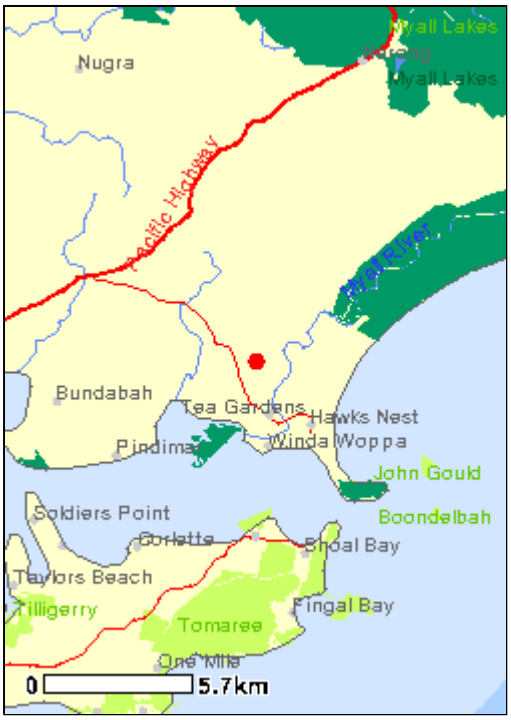

Search Type: Point

Buffer: 10 km

Coordinates: -32.64596,152.1552

Report Contents:

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	1
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	39
Migratory Species:	49

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area

you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits/index.html.

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Places on the RNE:	6
Listed Marine Species:	63
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	5
Other Commonwealth Reserves:	None
Regional Forest Agreements:	1

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]
(Ramsar Sites)

MYALL LAKES

Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
Diomedea amsterdamensis * Amsterdam Albatross	Endangered	Species or species habitat may occur within area
Diomedea antipodensis * Antipodean Albatross	Vulnerable	Species or species habitat may occur within area
Diomedea dabbenena * Tristan Albatross	Endangered	Foraging may occur within area
Diomedea exulans (sensu lato) * Wandering Albatross	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni * Gibson's Albatross	Vulnerable	Species or species habitat may occur within area
Lathamus discolor * Swift Parrot	Endangered	Species or species habitat may occur within area
Macronectes giganteus * Southern Giant-Petrel	Endangered	Species or species habitat may occur within area
Macronectes halli * Northern Giant-Petrel	Vulnerable	Species or species habitat may occur within area
*Pterodroma leucoptera leucoptera** Gould's Petrel	Endangered	Breeding known to occur within area
*Pterodroma neglecta neglecta** Kermadec Petrel (western)	Vulnerable	Species or species habitat may occur within area
Rostratula australis * Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri * Buller's Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) * Shy Albatross, Tasmanian Shy Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche impavida * Campbell Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris * Black-browed Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini * Salvin's Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi * White-capped Albatross	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia * Regent Honeyeater	Endangered	Species or species habitat may occur within area
Frogs		
Litoria aurea * Green and Golden Bell Frog	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus * Stuttering Frog, Southern Barred Frog (in Victoria)	Vulnerable	Species or species habitat likely to occur within area

Mammals

Balaenoptera musculus * Blue Whale	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri * Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
*Dasyurus maculatus maculatus (SE mainland population)** Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Endangered	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae * Humpback Whale	Vulnerable	Species or species habitat known to occur within area
*Potorous tridactylus tridactylus** Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus * Grey-headed Flying-fox	Vulnerable	Roosting known to occur within area

Reptiles

Chelonia mydas * Green Turtle	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth	Vulnerable	Species or species habitat may occur within area

Sharks

*Carcharias taurus (east coast population)** Grey Nurse Shark (east coast population)	Critically Endangered	Species or species habitat may occur within area
Carcharodon carcharias * Great White Shark	Vulnerable	Species or species habitat may occur within area
Pristis zijsron * Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable	Species or species habitat may occur within area
Rhincodon typus * Whale Shark	Vulnerable	Species or species habitat may occur within area

Plants

Cryptostylis hunteriana * Leafless Tongue-orchid	Vulnerable	Species or species habitat may occur within area
Diuris praecox * Newcastle Doubletail	Vulnerable	Species or species habitat likely to occur within area
*Eucalyptus parramattensis subsp. decadens** Earp's Gum, Earp's Dirty Gum	Vulnerable	Species or species habitat likely to occur within area
Prostanthera densa * Villous Mintbush	Vulnerable	Species or species habitat likely to occur within area
Syzygium paniculatum * Magenta Lilly Pilly, Magenta Cherry, Pocket-less Brush Cherry, Scrub Cherry, Creek Lilly Pilly, Brush Cherry	Vulnerable	Species or species habitat likely to occur within area

Tetratheca juncea *	Vulnerable	Species or species habitat likely to occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Merops ornatus * Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Monarcha trivirgatus Spectacled Monarch	Migratory	Breeding likely to occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Gallinago hardwickii * Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew	Migratory	Species or species habitat likely to occur within area
Numenius phaeopus Whimbrel	Migratory	Species or species habitat likely to occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift	Migratory	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Calonectris leucomelas	Migratory	Species or species habitat may occur

Streaked Shearwater		within area
Diomedea amsterdamensis Amsterdam Albatross	Migratory	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross	Migratory	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross	Migratory	Foraging may occur within area
Diomedea exulans (sensu lato) Wandering Albatross	Migratory	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross	Migratory	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel	Migratory	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel	Migratory	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel	Migratory	Breeding known to occur within area
Puffinus griseus Sooty Shearwater	Migratory	Breeding known to occur within area
Puffinus leucomelas Streaked Shearwater	Migratory	Species or species habitat may occur within area
Puffinus pacificus Wedge-tailed Shearwater	Migratory	Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater	Migratory	Breeding known to occur within area
Sterna albifrons Little Tern	Migratory	Breeding may occur within area
Thalassarche bulleri Buller's Albatross	Migratory	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross	Migratory	Species or species habitat may occur within area
Thalassarche chlororhynchos Yellow-nosed Albatross, Atlantic Yellow-nosed Albatross	Migratory	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross	Migratory	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross	Migratory	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross	Migratory	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross	Migratory	Species or species habitat may occur within area

Migratory Marine Species

Mammals

Balaenoptera edeni Bryde's Whale	Migratory	Species or species habitat may occur within area
Balaenoptera musculus * Blue Whale	Migratory	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale	Migratory	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale	Migratory	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin	Migratory	Species or species habitat may occur within area
Megaptera novaeangliae * Humpback Whale	Migratory	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca	Migratory	Species or species habitat may occur within area
Reptiles		
Chelonia mydas * Green Turtle	Migratory	Species or species habitat may occur within area
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth	Migratory	Species or species habitat may occur within area
Sharks		
Carcharodon carcharias Great White Shark	Migratory	Species or species habitat may occur within area
Rhincodon typus Whale Shark	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater	Listed	Species or species habitat may occur within area
Catharacta skua Great Skua	Listed	Species or species habitat may occur within area

Diomedea amsterdamensis Amsterdam Albatross	Listed	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross	Listed	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross	Listed	Foraging may occur within area
Diomedea exulans (sensu lato) Wandering Albatross	Listed	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross	Listed	Species or species habitat may occur within area
Eudyptula minor Little Penguin	Listed	Breeding known to occur within area
Gallinago hardwickii ***** Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor ***** Swift Parrot	Listed - overfly marine area	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel	Listed	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel	Listed	Species or species habitat may occur within area
Merops ornatus ***** Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Monarcha trivirgatus Spectacled Monarch	Listed - overfly marine area	Breeding likely to occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Numenius madagascariensis	Listed	Species or species habitat likely to

Eastern Curlew		occur within area
Numenius phaeopus Whimbrel	Listed	Species or species habitat likely to occur within area
Pelagodroma marina White-faced Storm-Petrel	Listed	Breeding known to occur within area
Puffinus griseus Sooty Shearwater	Listed	Breeding known to occur within area
Puffinus pacificus Wedge-tailed Shearwater	Listed	Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater	Listed	Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Sterna albifrons Little Tern	Listed	Breeding may occur within area
Thalassarche bulleri Buller's Albatross	Listed	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross	Listed	Species or species habitat may occur within area
Thalassarche chlororhynchos Yellow-nosed Albatross, Atlantic Yellow-nosed Albatross	Listed	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross	Listed	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross	Listed	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross	Listed	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross	Listed	Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal	Listed	Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal	Listed	Species or species habitat may occur within area
Ray-finned fishes		
Acentronura tentaculata Hairy Pygmy Pipehorse	Listed	Species or species habitat may occur within area
Festucalex cinctus	Listed	Species or species habitat may occur

Girdled Pipefish		within area
Filicampus tigris Tiger Pipefish	Listed	Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish	Listed	Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish	Listed	Species or species habitat may occur within area
Hippocampus abdominalis Eastern Potbelly Seahorse, New Zealand Potbelly, Seahorse, Bigbelly Seahorse	Listed	Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse	Listed	Species or species habitat may occur within area
Histiogamphelus briggsii Briggs' Crested Pipefish, Briggs' Pipefish	Listed	Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish	Listed	Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish	Listed	Species or species habitat may occur within area
Notiocampus ruber Red Pipefish	Listed	Species or species habitat may occur within area
Phyllopteryx taeniolatus Weedy Seadragon, Common Seadragon	Listed	Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse	Listed	Species or species habitat may occur within area
Solenostomus cyanopterus Blue-finned Ghost Pipefish, Robust Ghost Pipefish	Listed	Species or species habitat may occur within area
Solenostomus paradoxus Harlequin Ghost Pipefish, Ornate Ghost Pipefish	Listed	Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish	Listed	Species or species habitat may occur within area
Stigmatopora nigra Wide-bodied Pipefish, Black Pipefish	Listed	Species or species habitat may occur within area
Syngnathoides biaculeatus Double-ended Pipehorse, Alligator Pipefish	Listed	Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bend Stick Pipefish, Short-tailed Pipefish	Listed	Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish	Listed	Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish	Listed	Species or species habitat may occur within area
Reptiles		
Chelonia mydas ***** Green Turtle	Listed	Species or species habitat may occur within area

Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth	Listed	Species or species habitat may occur within area
Pelamis platurus Yellow-bellied Seasnake	Listed	Species or species habitat may occur within area
Whales and Other Cetaceans [Dataset Information]	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale	Cetacean	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale	Cetacean	Species or species habitat may occur within area
Balaenoptera musculus * Blue Whale	Cetacean	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale	Cetacean	Species or species habitat may occur within area
Delphinus delphis Common Dolphin	Cetacean	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale	Cetacean	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus	Cetacean	Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin	Cetacean	Species or species habitat may occur within area
Megaptera novaeangliae * Humpback Whale	Cetacean	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca	Cetacean	Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin	Cetacean	Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Cetacean	Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin	Cetacean	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Communications, Information Technology and the Arts - Telstra Corporation Limited

Defence - Defence Housing Authority

Places on the RNE [Dataset Information]
Note that not all Indigenous sites may be listed.

Natural

Corrie Island NSW

Fly Point, Halifax Park Aquatic Reserve NSW

John Gould Island Nature Reserve NSW

Myall Lakes National Park NSW

Port Stephens Estuary NSW

Tomaree National Park NSW

Extra Information

State and Territory Reserves [Dataset Information]

Corrie Island Nature Reserve, NSW

Fly Point Aquatic Reserve, NSW

John Gould Nature Reserve, NSW

Myall Lakes National Park, NSW

Tomaree National Park, NSW

Regional Forest Agreements [Dataset Information]
Note that all RFA areas including those still under consideration have been included.

Lower North East NSW RFA, New South Wales

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgments

This database has been compiled from a range of data sources. The Department acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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APPENDIX 6

THREATENED FAUNA SPECIES
IMPROVE OR MAINTAIN ASSESSMENT

THREATENED FAUNA SPECIES – IMPROVE OR MAINTAIN ASSESSMENT

The following assessments have been completed for each of the threatened species identified as occurring on the site due to the presence of suitable habitat and known local occurrence of that species. These assessments have been completed to determine the areas of suitable habitats to be removed or modified and areas to be maintained or improved. Vegetation communities were used as indicators of suitable habitat type. The site masterplan was overlain on habitat maps for each species and the areas to be removed, modified or maintained/improved determined.

1. Wallum Froglet (*Crinia tinnula)*

This species was observed calling within a number of areas of the subject site during all surveys. It is considered that this species would use a range of locations within the subject site periodically for foraging, breeding, shelter/refuge and dispersal. The Wallum Froglet is likely to disperse from the core habitat areas (located in the eastern part of the site) into suitable microhabitat locations within the lower quality Disturbed/Cleared Land and Woodland/Open Forest habitat types following rain and during periods of inundation.

The higher quality, less disturbed vegetation and habitat types (wetland variant vegetation communities) for this species within the subject site will be retained by the proposed development. The Ecological Site Management Plan for the site details strategies for the control of water quality and maintenance of hydrological conditions for those areas to be protected and retained.

TABLE A6.1
WALLUM FROGLET HABITAT – IMPROVE OR MAINTAIN

Habitat Area	Existing Habitat (ha)	Removed (ha)	Maintained (ha)	Improved (ha)
Suitable Habitat	37.2	13.4	23.8	5.0

A further 12.73 hectares of suitable habitat will be created in the form artificial water management areas within drainage corridors. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Strategy.

Those areas to be removed, modified and created for the Wallum Froglet are shown in Figure A6.1.

These areas will be protected, conserved and managed as part of ecological management planning strategies developed for the site and to be implemented in the long term. It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

2. Pied Oystercatcher (*Haematopus longirostris*)
Sooty Oystercatcher (*Haematopus fuliginosus*)

The subject site contains areas of suitable habitat for the Pied and Sooty Oystercatcher. These species were not detected within the subject site during surveys. The higher quality vegetation and habitat types for this species along the shores of the Myall River and within the Saltmarsh vegetation communities will be protected and retained as part of the concept

proposal. The local area provides extensive areas of suitable habitat for these species within the SEPP 14 foreshore areas associated with the Myall River, including those lands reserved within Myall Lakes National Park and other local reserves.

There are approximately 25 hectares of suitable habitat present within the subject site for the Pied Oystercatcher and Sooty Oystercatcher. These habitats are restricted to areas within the Rushland (*Baumea juncea*), Mangrove and Saltmarsh (*Juncus krausii*) vegetation communities. The proposal will not require the removal of a significant area of suitable or sub-optimal habitat for the Pied Oystercatcher or Sooty Oystercatcher.

With the exception of the area of saltmarsh required to be removed for enlargement of the lake outlet channel, suitable, higher quality habitat will be conserved and maintained as part of the offset strategies developed for the concept plan. These areas will be protected, conserved managed as part of ecological management planning strategies developed for the site and to be implemented in the long term. It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

3. Black-necked Stork (*Ephipiorhynchus asiaticus*)

The subject site contains areas of suitable habitat for this species within ephemerial ponds and drains within the site and along the tidal edges of the Myall River. This species was not detected within the subject site during surveys. The higher quality vegetation and habitat types for this species will be protected and retained as part of the concept proposal. The local area provides extensive areas of suitable habitat for this species within the SEPP 14 foreshore areas associated with the Myall River, including those lands reserved within Myall Lakes National Park and other local reserves.

4. Osprey (*Pandion haliaetus*)

The subject site contains areas of suitable roosting and nesting habitat for this species within the trees fringing the Myall River and within several of the larger trees within the Swamp Forest vegetation. This species was detected flying over the subject site during surveys. The higher quality vegetation and habitat types for this species will be protected and retained as part of the concept proposal. The local area provides extensive areas of suitable habitat for this species within the SEPP 14 foreshore areas associated with the Myall River, including those lands reserved within Myall Lakes National Park and other local reserves.

All of the suitable, higher quality habitat will be protected, conserved and managed as part of ecological management planning strategies developed for the site.

5. Swift Parrot (*Lathamus discolour*)

The subject site contains areas of suitable habitat for the Swift Parrot. This species was not detected within the subject site during surveys.

Table A6.2 provides details on suitable habitats within the site based upon habitat attributes within each suitable vegetation community type.

TABLE A6.2 SWIFT PARROT HABITAT –IMPROVE OR MAINTAIN				
Vegetation Community	**Existing Habitat (ha)**	**Removed (ha)**	**Maintained (ha)**	**Improved (ha)**
Pasture with Scattered Trees	50.4	33.8	-	16.6
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	-
Woodland / Open Forest (*Eucalyptus robusta*)	37.4	21.0	16.4	-
Paperbark Forest	1.5	0.0	1.5	-
TOTAL	97.7	56.9	24.2	16.6

The subject site contains approximately 97.7 hectares of suitable habitat for the Swift Parrot. The proposal will require the removal of approximately 60 hectares.

A further 16.6 hectares of suitable habitat will be improved/created in the form parklands and enhanced vegetation. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Plan.

Those areas to be removed, modified and offset for the Swift Parrot are shown in Figure A6.2.

It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

6. Large Forest Owls - Barking Owl (*Ninox connivens*), Masked Owl (*Tyto novaehollandiae*) and Powerful Owl (*Ninox strenua*)

The Barking Owl was heard calling within the north-east of the site during surveys in 2008. The site contains suitable habitat for the Powerful Owl and Masked Owl however these species have not been recorded on the site.

Table A6.3 provides details on suitable habitats within the site based upon habitat attributes within each suitable vegetation community type.

TABLE A6.3 LARGE FOREST OWLS HABITAT – IMPROVE OR MAINTAIN				
Vegetation Community	**Existing Habitat (ha)**	**Removed (ha)**	**Maintained (ha)**	**Improved (ha)**
Pasture with Scattered Trees	50.4	33.8	16.6	11.0
Acacia / Melaleuca Regrowth Scrub	2.0	0	2.0	0
Open Forest (*Corymbia gummifera*)	11.0	11.0	0	0
Open Forest (*Corymbia maculata, Eucalyptus paniculata*)	7.7	0.1	7.6	0
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	0
Open Forest (*Eucalyptus pilularis*)	11.5	6.6	4.9	4.0
Woodland / Open Forest (*Eucalyptus robusta*)	37.4	21.0	16.4	0
Woodland (*Eucalyptus signata*)	1.1	1.1	0	0
Woodland / Open Forest (*Eucalyptus umbra*)	2.6	0.1	2.5	0
TOTAL	132.1	75.8	56.3	15.0

Approximately 56.3 hectares of suitable, habitat will be conserved and improved as part of the offset strategies developed for the concept plan. A further 15 hectares of suitable habitat will be managed within parklands and enhanced/regeneration areas. These areas will be revegetated with site specific flora species and habitat enhancement works as detailed in the Environmental Site Management Strategy.

Areas of habitat to be removed, retained and improved for the Large Forest Owls are shown in Figure A6.3.

The proposal also includes the retention of hollow trees on site. It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of these species within the local area such that a viable local population is likely to be placed at risk of extinction.

7. Koala (*Phascolarctos cinereus*)

The subject site contains areas of suitable foraging and refuge/shelter habitat for this species however it was not detected during surveys. The most recent record for this species within the subject site is from 1995 (NPWS 2006). The higher quality vegetation and habitat types for this species will be retained within the subject site. There are larger areas of higher quality habitat available for this species within the local area. A report on Koala Habitat Management has been prepared for the site and proposed development (*Conacher Environmental Group* 2008).

Table A6.4 provides details on suitable habitats within the site based upon habitat attributes within each suitable vegetation community type.

TABLE A6.4 KOALA HABITAT – IMPROVE OR MAINTAIN				
Biodiversity Component Vegetation Community	**Existing Habitat (ha)**	**Removed (ha)**	**Maintained (ha)**	**Improved (ha)**
Pasture with Scattered Trees	50.4	33.8	-	16.6
Open Forest (*Corymbia gummifera*)	11.0	11.0	0	0
Open Forest (*Corymbia maculata, Eucalyptus paniculata*)	7.7	0.1	7.6	0
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	0
Open Forest (*Eucalyptus pilularis*)	11.5	6.6	4.9	4
Woodland / Open Forest *Eucalyptus robusta*)	37.4	21.0	16.4	1
Woodland (*Eucalyptus signata*)	1.1	1.1	0	0
Woodland / Open Forest (*Eucalyptus umbra*)	2.6	0.1	2.5	0
Paperbark Forest (*Melaleuca quinquenervia*)	1.5	0.0	1.5	0
TOTAL VEGETATED AREA	131.6	75.8	39.2	21.6

Approximately 39.2 hectares of suitable habitat will be conserved with 21.6 hectares improved as part of the offset strategies developed for the concept plan. A further 16 hectares of suitable habitat will be created in the form of parklands and enhanced vegetation within corridor areas. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Strategy.

Those areas to be removed, modified and offset for the Koala are shown in Figure A6.4

8. Spotted-tailed Quoll (*Dasyurus maculatus*) and Eastern Pygmy-possum (*Cercatetus nanus*)

The subject site contains areas of suitable foraging and den habitat for these species however they were not detected within the subject site during surveys. Table A6.5 provides details on suitable habitats within the site based upon habitat attributes within each suitable vegetation community type.

TABLE A6.5 EASTERN PYGMY POSSUM AND SPOTTED-TAILED QUOLL HABITAT – IMPROVE OR MAINTAIN				
Vegetation Community	**Existing Area (ha)**	**Removed (ha)**	**Maintained (ha)**	**Improved (ha)**
Acacia Regrowth	2.0	0	2.0	0
Open Forest (*Corymbia maculata, Eucalyptus paniculata*)	7.7	0.1	7.6	0
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	0
Open Forest (*Eucalyptus pilularis*)	11.5	6.6	4.9	4
Pasture with Scattered Trees	0	0	0	11
Woodland / Open Forest (*Eucalyptus robusta*)	37.4	21.0	16.4	1
Woodland / Open Forest (*Eucalyptus umbra*)	2.6	0.1	2.5	0
Open Forest (*Corymbia gummifera*)	11.0	11.0	0	0
Scrub (*Melaleuca ericifolia*)	9.5	0	9.5	0
Paperbark Forest (*Melaleuca quinquenervia*)	1.5	0	1.5	0
TOTAL	91.6	40.9	50.7	16

Approximately 51 hectares of suitable habitat will be conserved as part of the conservation strategies developed for the concept plan. A further 16 hectares of suitable habitat will be created in the form parklands and enhanced vegetation. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Strategy.

Those areas to be removed, modified and offset for the Eastern Pygmy-possum and Spotted-tailed Quoll are shown in Figure A6.5.

It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

9. Squirrel Glider (*Petaurus norfolcensis*)

The Squirrel glider was recorded within the subject site during surveys. There are a number of records for this species within the local area. The subject site contains suitable foraging, den and refuge habitat for the Squirrel Glider.

Table A6.6 provides details on suitable habitats within the site based on habitat attributes within each suitable vegetation community type.

TABLE A6.6 SQUIRREL GLIDER HABITAT – IMPROVE OR MAINTAIN				
Vegetation Community	**Existing Area (ha)**	**Removed (ha)**	**Maintained (ha)**	**Improved (ha)**
Pasture with Scattered Trees	0	0	0	11
Acacia / Melaleuca Regrowth Scrub	2.0	0	2.0	0.0
Open Forest (*Corymbia gummifera*)	11.0	11.0	0	0.0
Open Forest (*Corymbia maculata, Eucalyptus paniculata*)	7.7	0.1	7.6	0.0
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	0.0
Open Forest (*Eucalyptus pilularis*)	11.5	6.6	4.9	6
Melaleuca scrub	9.5	0.0	9.5	-
Woodland / Open Forest (*Eucalyptus robusta*)	37.4	21.0	16.4	2
Woodland (*Eucalyptus signata*)	1.1	1.1	0	0.0
Woodland / Open Forest (*Eucalyptus umbra*)	2.6	0.1	2.5	0.0
Paperbark	1.5	0.0	1.5	0.0
TOTAL	92.7	42.0	50.7	19

Approximately 50.7 hectares of suitable habitat will be conserved as part of the offset strategies developed for the concept plan. A further 19 hectares of suitable habitat will be created in the form parklands and enhanced vegetation. This includes areas reserved within corridors designed to maintain habitat connectivity for the local population within the site and surrounding vegetation. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Strategy. These actions include nest boxes as supplementary habitat, retention of hollow trees and revegetation using preferred foraging plants and trees.

Those areas to be removed, modified and offset for the Squirrel Glider are shown in Figure A6.6.

All retained habitat areas will be protected, conserved and managed as part of ecological management strategies developed for the site. It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

10. Grey-headed Flying-fox (*Pteropus poliocephalus*)

The subject site provides suitable foraging habitat for this species, however no colonies or camp sites were located on the subject site during surveys. The Grey-headed Flying-fox has been detected within the vicinity of the subject site on several occasions. There are extensive areas of foraging habitat for this species within the local area including those lands contained within Myall Lakes National Park and other local reserves.

Table A6.7 provides details on suitable habitats within the site based upon habitat attributes within each suitable vegetation community type. Areas for each as they relate to the masterplan details are also included.

TABLE A6.7
GREY-HEADED FLYING-FOX HABITAT - IMPROVE OR MAINTAIN

Vegetation Community	Existing Area (ha)	Removed (ha)	Maintained (ha)	Improved (ha)
Pasture with Scattered Trees	50.4	33.8	-	11
Acacia / Melaleuca Regrowth Scrub	2.0	0	2.0	0
Open Forest (*Corymbia gummifera*)	11.0	11.0	0	0
Open Forest (*Corymbia maculata, Eucalyptus paniculata*)	7.7	0.1	7.6	0
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	0
Open Forest (*Eucalyptus pilularis*)	11.5	6.6	4.9	4
Woodland (*Eucalyptus resinifera*)	52.9	49.9	3.0	0
Woodland / Open Forest (*Eucalyptus robusta*)	37.4	21.0	16.4	0
Woodland (*Eucalyptus signata*)	1.1	1.1	0	1
Woodland / Open Forest (*Eucalyptus umbra*)	2.6	0.1	2.5	0
Paperbark Forest (*Melaleuca quinquenervia*)	1.5	0	1.5	0
TOTAL	186.5	125.7	44.2	16

The subject site contains approximately 186 hectares of suitable habitat for the Grey-headed Flying-fox. The proposal will require the removal of approximately 125 hectares of that total.

Approximately 44.2 hectares of suitable habitat will be conserved as part of the offset strategies developed for the concept plan. A further 16 hectares of suitable habitat will be created in the form parklands and enhanced vegetation. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Strategy.

Those areas to be removed, modified and offset for the Grey-headed Flying Fox are shown in Figure A6.7.

All retained habitat areas will be protected, conserved and managed as part of the ecological management strategies developed for the site. It is considered that the proposed

development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

12. Microbats – Little Bentwing-bat (*Miniopterus australis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), Large-footed Myotis (*Myotis adversus*) Greater Broad-nosed Bat (*Scoteanax rueppellii*) and Eastern Freetail-bat (*Miniopterus australis*)

Table A6.8 provides details on suitable habitats for the microbats within the site based upon habitat attributes within each suitable vegetation community type and known occurrence of specific species.

TABLE A6.8
MICROBATS HABITAT – IMPROVE OR MAINTAIN

Vegetation Community	Existing Habitat (ha)	Removed (ha)	Maintained (ha)	Improved (ha)
Pasture with Scattered Trees	50.4	33.8	-	11
Acacia / Melaleuca Regrowth Scrub	2.0	0	2.0	0.00
Open Forest (*Corymbia gummifera*)	11.0	11.0	0	0.00
Open Forest (*Corymbia maculata, Eucalyptus paniculata*)	7.7	0.1	7.6	0.00
Open Forest (*Eucalyptus microcorys*)	8.4	2.1	6.3	0.00
Open Forest (*Eucalyptus pilularis*)	11.5	6.6	4.9	4
Woodland (*Eucalyptus resinifera*)	52.9	49.9	3.0	0.04
Woodland / Open Forest (*Eucalyptus robusta*)	37.4	21.0	16.4	1
Woodland (*Eucalyptus signata*)	1.1	1.1	0	0.00
Woodland / Open Forest (*Eucalyptus umbra*)	2.6	0.1	2.5	0.00
Pine Forest (*Pinus eliottii*)	0.3	0.1	0.2	0.00
Disturbed Estuarine Vegetation	0.2	0.0	0.2	0.00
Casuarina Forest (*Casuarina glauca*)	1.2	0.0	1.2	0.00
Mangroves (*Avicennia marina*)	0.3	0.0	0.3	0.00
Saltmarsh (*Juncus krausii*)	17.2	0.1	17.1	0.00
Rushland (*Baumea juncea*)	7.7	0.0	7.7	0.00
Scrub (*Melaleuca ericifolia*)	9.5	0.0	9.5	0.00
Paperbark Forest (*Melaleuca quinquenervia*)	1.5	0.0	1.5	0.00
Total	222.18	125.81	80.2	16

Approximately 80 hectares of suitable habitat will be conserved as part of the offset strategies developed for the concept plan. A further 16 hectares of suitable habitat will be created in the form parklands, water bodies and enhanced vegetation. These areas will be managed as part of habitat enhancement works detailed in the Environmental Site Management Strategy.

Those areas to be removed, modified and offset for the threatened micro-bat species are shown in Figure A6.8

All retained habitat areas will be protected, conserved and managed as part of the ecological management strategies developed for the site. It is considered that the proposed development is not likely to have an adverse effect on the life cycle or habitats of this species within the local area such that a viable local population is likely to be placed at risk of extinction.