CONACHER TRAVERS

environmental consultants

flora & fauna assessment

BEVIAN ROAD CONCEPT APPLICATION
BEVIAN ROAD, ROSEDALE

SEPTEMBER 2007

FLORA & FAUNA ASSESSMENT

BEVIAN RD CONCEPT APPLICATION
LOT 2 DP 627034, LOT 2 DP 623340, LOTS 11, 29, 32, 72, 102, 118, 119 & 213 DP 755902, BEVIAN RD, ROSEDALE

CONACHER TRAVERS

ENVIRONMENTAL CONSULTANTS
40 The Avenue, Mt Penang Parklands
Central Coast Highway, Kariong NSW 2250
Mail: PO Box 7128, Kariong NSW 2250
(ph: (02) 4340 0677 fax: (02) 4340 2367)
email: ecology@conachertravers.com.au

Reference	Issue	Description	Author	Director
6052F	September 2007	Final	MSR,JaT, AC	JT

EXECUTIVE SUMMARY

This Flora and Fauna Assessment Report has been prepared by *Conacher Travers Pty Ltd* on behalf of *Marsim (trading as Nature Coast Developments Pty Ltd)* to identify and assess any potential impacts on the flora and fauna characteristics of Lot 2 DP 627034, Lot 2 DP 623340 and Lots 11, 29, 32, 72, 102, 118, 119 and 213 DP 755902, Bevian Road, Rosedale. Figure 1 depicts the property location, whilst Figure 2 provides an aerial appraisal of the site.

The Bevian Road Concept Application seeks the approval of two specific plans referred to collectively as the 'Concept Approval Plans'. These are:

- A plan of the net developable area – referred to as 'The Constraints Map' (Figure 3 attached)
- An 806 lot residential subdivision and 15 community lots – referred to as 'The Plan of Subdivision' (Figure 4 attached). Note this plan is a concept layout only, a detailed DA will be lodged once the concept has been approved.

This document has been prepared in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI 2005) for applications assessed under Part 3A of the *Environmental Planning and Assessment Act 1979.*

In addition to the Part 3A assessment (Section 5 of this report), a 7 part test of significance under Section 5A of the *EP&A Act 1979* has been undertaken (Addendum 1). This provides a more comprehensive assessment of threatened species and endangered ecological communities recorded or considered likely to occur within the subject site.

This report has been prepared in accordance with the key ecological issues outlined within the Director Generals Requirements (DGRs), issued by the NSW Department of Planning (DoP) in December 2006. Specifically these issues are:

Table 1: Director General Requirements

No.	Director General Requirement	Relevant section of this report
4	**Environment Protection**	
4.1	*Address measures for the conservation of animals and plants and their habitat within the meaning of the Threatened Species Conservation Act (1995) having regard to the Draft Guidelines for Threatened Species Assessment (DEC & DPI July 2005). Address the measures for the conservation of aquatic species within the meaning of the Fisheries Management Act (1994)*	Addressed predominately within Section 5 of this report

Outcome of DGR Assessment

DGR 4.1
A maintained or improved result has been achieved for threatened flora, endangered ecological communities and a number of threatened fauna species known to occur or with the potential to occur within the site (Section 5). The loss of Grassland with Scattered Trees vegetation community is not considered to be significant to the lifecycle of any threatened species or endangered ecological community.

The implementation of the following mitigation measures will result in the protection of threatened flora and fauna species and endangered ecological communities known to occur or with the potential to occur within the site:

- Exclusion of existing cattle grazing
- Weed control
- Erosion control
- Installation of protective fencing and signage
- Stormwater Quality and Quantity Control (Bio-retention basins, bio-swales, gross pollutant traps, rainwater tanks and revegetation of watercourses)
- Retention of Dead Timber and Habitat Supplementation
- Prohibition of domestic animals with the exception of companion animals as defined under the *Companion Animals Act 1998*
- Retention of Regrowth
- Creation of vegetation corridors
- Retention or replacement of all hollow bearing trees
- Strategic Supplementary Planting

As such, the Bevian Road Concept Application adequately meets the requirements of the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI July 2005) and the provisions of the *Threatened Species Conservation Act 1995.*

Compliance with statutory requirements

- *Threatened Species Conservation Act 1995*

In respect of matters required to be considered under the *Threatened Species Conservation (TSC) Act* (1995), five (5) threatened fauna species were recorded by *Conacher Travers,* Powerful Owl (*Ninox strenua*), Glossy Black-Cockatoo (*Calyptorhynchus lathami*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Greater Broad-nosed Bat (*Scoteanax rueppellii*) and Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis).*

In addition, one (1) threatened fauna species, Yellow-bellied Glider (*Petaurus australis),* was recorded within the subject site by *Gunninah Environmental Consultants* (2002). Three (3) endangered ecological communities, Swamp Oak Floodplain Forest (SOFF), River Flat Eucalypt Forest on Coastal Floodplains (RFEFCF) and Freshwater Wetlands on Coastal Floodplains (FWCF) were also recorded within the subject site.

- *Fisheries Management Act 1994*

No threatened fauna species listed under this Act were recorded within the subject site. The subject site is considered to comprise of limited habitat for fish species within the dams and Bevian Swamp. Fish habitat will be improved through the revegetation of drainage lines.

- *Environmental Planning & Assessment Act 1979*

Part 3A maintain/improve assessment

Endangered Ecological Communities

The application of the maintain and improve assessment for Swamp Oak Floodplain Forest (SOFF), Riverflat Eucalypt Forest on Coastal Floodplains (RFEFCF) and Freshwater

Wetlands on Coastal Floodplains (FWCF), Tables 3-5 respectively, resulted in a maintained or improved outcome for all endangered ecological communities identified within the site. Specifically, an improvement in both the condition and overall extent will be achieved through the restoration and revegetation of endangered ecological communities SOFF and RFEFCF.

The total extent of SOFF will improve from 11.23ha to 14.46ha, whilst the total area of core condition vegetation will improve from 4.57ha to 12.41ha.

The total extent of RFEFCF will improve from 2.05ha to 2.43ha, whilst the total area of core condition vegetation will improve from 0ha to 1.61ha.

The total extent and condition of FWCF will be maintained at 5.94ha.

All endangered ecological communities recorded on site will be protected from indirect impacts such as stormwater runoff through the implementation of bio-swales along road sides, bio-retention basins, gross pollutant traps and the revegetation of watercourses.

As such it is considered that the Bevian Road Concept Application will result in a net improvement in the extent and condition of SOFF and RFEFCF and will maintain the extent and condition of FWCF endangered ecological communities recorded within the subject site.

Threatened Flora

The application of the maintain and improve assessment for *Aldrovanda vesiculosa* and *Correa baeuerlenii,* Tables 7 & 8 respectively, resulted in a maintained or improved outcome for all threatened flora species with the potential to occur within the site.

The total extent of suitable habitat for *Aldrovanda vesiculosa* will be maintained within the Bevian Wetland.

A significant improvement in overall extent of suitable habitat for *Correa baeuerlenii* will be achieved from the existing 18.68ha to 42.8ha. This is a result of the revegetation works across the site, which will create ecological corridors through the replanting of Spotted Gum/Ironbark Forest and Blackbutt Woodland.

As such, the Bevian Road Concept Application will result in maintained or improved suitable habitat for threatened flora species with the potential to occur within the subject site.

Threatened Fauna

The application of the maintain and improve assessment for threatened fauna, Tables 10-29, resulted in a maintained or improved outcome for all threatened fauna species known to occur or with the potential to occur within the site.

Habitat types used for the assessment were based on natural vegetation communities listed in Table 2 of this report, with the exception of the Grassland with Scattered Trees vegetation community.

The Grassland with Scattered Trees vegetation community, which covers approximately 78% (146.68 ha) of the site (Figure 6) has been excluded from the assessment based on its disturbed nature. 142.62 ha of this community will be removed as a result of the proposed development. This habitat is not considered to be significant to the lifecycle of any threatened fauna species for the following reasons:

- Grassland with Scattered Trees habitat is considered to be of low quality due to past agricultural associated clearing and current grazing by cattle. Weed incursions are extensive across the majority of this habitat.
- The Grassland with Scattered Trees habitat is considered to provide a limited foraging resource only and as such provides marginal habitat.
- The majority of the threatened fauna likely to utilise the Grassland with Scattered Trees habitat are considered to be highly mobile and would be unlikely to utilise the subject site exclusively.
- Surrounding farmlands to the north and west of the site provide similar cleared lands with scattered trees suitable for foraging.
- Any hollow bearing trees identified within the Grassland with Scattered Trees habitat will be retained within the post development landscape or replaced at a ratio of 2:1 in conservation zones within the subject site.
- Areas of cleared foraging land will be retained across the site in the form of open space/recreation areas and larger lots
- Compensatory habitat will be provided within the site including the revegetation of Ecological Corridors 1 & 2 (Schedule 1 - Restoration Management), which will create new vegetation linkages between remnants within the site and vegetation offsite and the retention and restoration of the Southern Conservation Zone (Schedule 1 - Restoration Management).

As such, the Bevian Road Concept Application will result in a net improvement in suitable habitat and vegetation connectivity for all threatened fauna species known to occur, and with the potential to occur, within the subject site. Any losses in Grassland with Scattered Trees habitat are considered to be insignificant.

Section 5(A) 7 part test of significance

An assessment under Section 5(A) of the *Environmental Planning & Assessment (EP&A) Act 1979* (Addendum 1 of this report) concluded that the proposed development will not cause a significant impact on threatened species, populations and endangered ecological communities.

- *State Environmental Planning Policy 44 – Koala Habitat Protection*

Based on the absence of SEPP 44 Potential or Core Koala habitat within the subject site, the results of the maintain or improve assessment in Section 5 of this report and the 7 part test of significance (Addendum 1 of this report), the subject site is not considered to be significant with regards to Koala habitat and as such the Bevian Road Concept Application is unlikely to have an impact on the Koala. Conversely, the future development may improve the potential habitat for this species through the creation of wildlife corridors between remnants within the site and vegetation off site.

This policy is specifically addressed in Section 4.11.1 – State Legislative Matters (Fauna) - of this report.

- *State Environmental Planning Policy 14 – Coastal Wetlands*

This policy is specifically addressed in Section 4.6.1 – State Legislative Matters (Flora) - of this report.

Key ecological aspects of this policy were considered within this report including: the growth of native plant communities, the survival of native wildlife populations, the provision and quality of habitats for both indigenous and migratory species, the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding area, including salinity and water quality. The Bevian Road Concept Application is considered to adequately meet each of these objectives through the protection and enhancement of native vegetation, revegetation of drainage lines and overall improvement in vegetation connectivity across the site and to vegetation off site.

- *State Environmental Planning Policy 71 – Coastal Protection*

This policy is specifically addressed in Section 4.6.1 – State Legislative Matters (Flora) - of this report.

The Bevian Road Concept Application meets the requirements of this state policy through the retention, protection and enhancement of vegetation within the site. As a result water quality within the site and reaching areas down stream of the site will be improved and native flora and fauna habitats will be enhanced.

- *Environment Protection and Biodiversity Conservation Act 1999*

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation (EPBC) Act* (1999), no threatened fauna or flora species were recorded within the subject site. One (1) preliminary listed Endangered Ecological Community (EEC), Dry Rainforest of South East Forests, was recorded within the north-west corner of the subject site. This vegetation community will not be impacted upon by the development.

Given that no threatened flora or fauna species listed under the *EPBC Act 1999* were identified within the site and that the EEC is currently only a preliminary nomination, a referral to the Department of Environment and Water Resources is not required.

John Travers B.App.Sc. / Ass. Dip.
(Parks & Wildlife)
Director
Conacher Travers Pty Ltd

Michael Sheather-Reid - B. Nat Res. (Hons.)
Senior Ecologist
Conacher Travers Pty Ltd

Alexander Cockerill – B. Sc (Hons)
Senior Botanist – Ecologist
Conacher Travers Pty Ltd

Jaci Tebb – B. Env. Sc. (Env. Mgt Major)
Project Ecologist
Conacher Travers Pty Ltd

Deborah Landenberger - B.Sc. (Hons)
Botanist
Conacher Travers Pty Ltd

Mathew Makeham - B. App. Sc. (Protected Area Mgt)
Fauna Ecologist
Conacher Travers Pty Ltd

Licences –

National Parks and Wildlife Service
Individual staff members are licensed under Clause 20 of the *National Parks and Wildlife (Land Management) Regulation 1995* and Section 120 & 131 of the *National Parks and Wildlife Act, 1974* to conduct flora and fauna surveys within service and non-service areas. NPWS Scientific Licence Numbers: S10359 & S10618.

Department of Agriculture
The staff of *Conacher Travers* are licensed under an Animal Research Authority issued by the Department of Agriculture. This authority allows *Conacher Travers* staff to conduct various fauna surveys of native and introduced fauna for the purposes of environmental consulting throughout New South Wales.

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FLORA AND FAUNA ASSESSMENT
BEVIAN ROAD, ROSEDALE

SECTION 1.0 – INTRODUCTION

Conacher Travers Pty Ltd has been engaged to carry out a Flora and Fauna Assessment of Lot 2 DP 627034, Lot 2 DP 623340 and Lots 11, 29, 32, 72, 102, 118, 119 and 213 DP 755902 within the Eurobadalla LGA. Figure 1 depicts the property location, whilst Figure 2 provides an aerial appraisal of vegetation and land uses within and adjacent to the subject site.

1.1 Aims of the Assessment

The aims of the flora and fauna assessment are to:

- Carry out flora and fauna survey to describe the vegetation communities, their condition and fauna habitats in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI 2005);
- Complete target surveys for threatened species, populations and ecological communities where required in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI 2005);
- Address key issues raised by the Department of Environment and Conservation (now the Department of Environment and Climate Change) based on the previous concept proposal for the subject site including; impacts on the SEPP 14 wetland – Bevian Swamp, impacts on endangered ecological communities and threatened fauna habitat impacts (with particular regard to the Yellow-bellied Glider and Eastern Bent-wing Bat). These issues have been reviewed and are addressed within the discussion of this report.

1.2 Information Collation

To achieve the above aims, *Conacher Travers Pty Ltd* carried out field surveys from the 14 - 17 and 20 - 22 March 2006. Targeted flora field survey was undertaken on the 3 and 4 July 2007.

A review of the relevant information pertinent to the subject site was undertaken prior to the initiation of field surveys as background to the study. Information sources reviewed include the following:

- Aerial photographs (scale 1:25000) and Topographical maps (scale 1:25000).
- The Atlas of NSW Wildlife (DECC 2007) - Batemans Bay 1:100,000 scale map sheet and Bionet (2007) for the Eurobodalla Local Government Area.
- The schedules of the *Threatened Species Conservation Act* (1995).
- The schedules of the *Fisheries Management Act* (1994).
- Lists of threatened species and communities in the *Environment Protection and Biodiversity Conservation Act* (1999).
- Previous reports and surveys within the local area.

1.3 Statutory Requirements

1.3.1 State

Threatened Species Conservation Act (1995)

The specific requirements of the *Threatened Species Conservation (TSC) Act* (1995) must be addressed in the assessment of flora and fauna matters. This requires the consideration of potential impacts on threatened species, populations and ecological communities.

The factors to be taken into account in deciding whether there is a significant effect on threatened species or endangered ecological communities are set out under the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI 2005) for Part 3A of the *EP&A Act 1979* applications.

Sections 4.6.1 and 4.11.1 of this report addresses this Act.

Fisheries Management Act (1994)

The *Fisheries Management Act* (1994) provides a list of threatened aquatic species, which require consideration when addressing the potential impacts of a proposed development.

Section 4.11.1 of this report addresses this Act.

State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP 14)

This planning policy identifies and maps important coastal wetlands throughout New South Wales, which require consideration when addressing the potential impacts of a proposed development.

Where a proposed development may have an impact on a defined SEPP 14 wetland, guidelines of this policy are followed to minimise the impact on water quality and quantity, native flora and fauna and provisions of safeguards and rehabilitation where necessary to protect the environment.

The aim of this policy is to ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of the State.

Specific areas of consideration are:

(a) the environmental effects of the proposed development, including the effect of the proposed development on:

  (i) the growth of native plant communities
  (ii) the survival of native wildlife populations
  (iii) the provision and quality of habitats for both indigenous and migratory species
  (iv) the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding area, including salinity and water quality

(b) whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment.

(c) whether carrying out the development would be consistent with the aim of this policy.

(d) the objectives and major goals of the "National Conservation Strategy for Australia" (as set forth in the second edition of a paper prepared by the Commonwealth Department of Home Affairs and Environment for comment at the National Conference on Conservation held in June, 1983, and published in 1984 by the Australian Government Publishing Service) in so far as they relate to wetlands and the conservation of "living resources" generally, copies of which are deposited in the office of the Department.

(e) whether consideration has been given to establish whether any feasible alternatives exist to the carrying out of the proposed development (either on other land or by other methods) and if so, the reasons given for choosing the proposed development.

(f) any representations made by the Director of National Parks and Wildlife in relation to the development application.

(g) any wetlands surrounding the land to which the development application relates and appropriateness of imposing conditions requiring the carrying out of works to preserve or enhance the value of those surrounding wetlands.

Section 4.6.1 of this report addresses this policy.

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

This planning policy aims to encourage the conservation and appropriate management of areas of natural vegetation with potential to provide habitat for Koalas. It outlines the procedures for the identification of core and non-core Koala habitat and provides for appropriate management.

Section 4.11.1 of this report addresses this policy.

State Environmental Planning Policy No. 71 – Coastal Protection (SEPP 71)

This planning policy aims to protect and manage the coastal zone in accordance with the principles of ecologically sustainable development. The matters for consideration include public access, suitability of the land for development, scenic qualities, wildlife corridors, significant loss of views, coastal hazards, cultural places and heritage. Issues that are required by SEPP 71 to be addressed include:

- Design principles drawn from analysis of the subject site and context
- Desired future locality character
- Location of any development, natural features including coastal processes and hazards
- Scale of development and integration with existing landscape
- Phasing of development
- Public access to and from coastal foreshore
- Pedestrian, cycle and road access and circulation networks
- Subdivision pattern
- Infrastructure provision
- Building envelopes and built form controls
- Heritage conservation
- Subject site remediation*
- Provision of public facilities and services
- Provision of open space, its function and landscaping
- Conservation of water quality and use*
- Conservation of animals, plants and their habitats*

- Conservation of fish and marine vegetation and their habitats*

* Denotes considerations that are relevant to the ecological features of the subject site and are in Section 4.6.1 of this report.

1.3.2 National

The *Environment Protection and Biodiversity Conservation (EPBC) 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 environmental 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, 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 Department of Environment & Water Resources.

Sections 4.6.2 and 4.11.2 of this report addresses this Act.

1.4 Development Proposal

The Bevian Road Concept Application seeks the approval of two specific plans referred to collectively as the 'Concept Approval Plans'. These are:

- A plan of the net developable area – referred to as 'The Constraints Map' (Figure 3 attached).
- An 806 lot residential subdivision and 15 community lots – referred to as 'The Plan of Subdivision' (Figure 4 attached). Note this plan is a concept layout only, a detailed DA will be lodged once the concept has been approved.

1.5 Site Description

Location

The subject site is located opposite Barlings Beach, on the northern side of George Bass Drive, approximately 1.5 km to the west of Rosedale and 1.5 km to the north-east of Tomakin. Approximate Australian Map Grid (AMG) coordinates of the study area are 247500E and 6033000N. The subject site is predominantly bounded by native vegetation, with fragmented areas of cleared vegetation for agricultural purposes. The subject site encompasses an area of approximately 173.59 hectares.

Geology

The geology of the floodplains surrounding the Bevian Swamp within the southern section of the subject site is characterised by alluvial soils which are derived from quaternary sediments. The soils consist of gravel, sands and silts and are moderately deep and clayey with no rock outcrops.

The upper slopes of the subject site are underlain by the Wagona and Bogolo formations (NSW Geological Survey, 1971) of the Ordovician Period. The Wagona formation consists of cherts, slate and volcanics whilst the Bogolo formation consists of slate, phyllite, quartz arenite, cherts and conglomerates. The soils are coalluvial and are derived from both of these formations.

Topography and Drainage

The subject site is naturally divided into two catchments by a ridgeline which traverses the site in an east west direction. The topography across the site is gently undulating to steep land and contains a network of drainage lines. Gradients of the subject site range from steep (20^o) in the upper drainage lines to less than 5^o within the floodplain of the Bevian Swamp. The approximate elevation ranges from less than 10m AHD within the Bevian Swamp to 100m (AHD) on the ridge within the north-western section of the subject site.

The northern section of the subject site contains the upper tributaries of Saltwater Creek which discharge over Barlings Beach into the South Pacific Ocean. The catchment drains from several small drainage lines which flow generally to the south east to Saltwater Creek. There are two farm dams located on this drainage line in the north of the subject site. To the south of the old nursery there is another tributary of Saltwater Creek which initially flows in a southerly direction and contains one farm dam in the upper reaches of this tributary. The creek then turns to the east in which two more farm dams have been constructed. To the south another tributary of Saltwater Creek flows in an easterly direction from Bevian Road into a small farm dam. From this farm dam two smaller drainage lines, which were dry at the time of the survey, flow in different directions one to the north east and one to the south east into Saltwater Creek.

The catchment of the southern section of the subject site flows into the Bevian Swamp. One drainage corridor is located to the north west of the Bevian Swamp and contains a small farm dam after which the drainage line is not defined and the topography flattens out and becomes a floodplain. The south eastern section of the subject site contains a floodplain of the Bevian Swamp with no defined drainage corridor located in this area.

Vegetation

The majority of the subject site has been cleared for agricultural purposes. Native open forest forms the eastern, north eastern and north western sections of the property. Native vegetation is also present around the Bevian Swamp in the southern section of the subject site. Two areas of remnant Swamp Oak Open Forest exist within the floodplain to the north and north west of the Bevian Swamp. A disturbed remnant patch of Banksia Scrub vegetation exists upon a hill known locally as “The Knoll”, located in the central section of the property.

Surrounding lands contain native vegetation, with the property adjoining Mogo State Forest along the north western boundary. Lands to the north, east and south west contain native vegetation and are currently used for rural residential purposes. To the south east there is cleared land which is currently a sewage treatment plant. To the south across George Bass Drive is Barlings Beach Caravan Park and native vegetation adjoins the Caravan Park to the east.

Conservation Reserves

The nearest conservation reserve are Illawong and Broulee Island Nature Reserves located approximately 5 km to the south. Murramarang National Park is located approximately 15km to the north of the subject site.

Mogo State Forest adjoins the western and north western boundaries of the subject site and covers an area of approximately 15,500 ha.

Land Use

The study area landscape has been affected by the following impacts:

- *Improvements:* Two existing residences are located in the north east of the subject site adjoining Bevian Road. A nursery which is no longer operational is located to the north west of the residences. Cattle yards and sheds have been erected to the south west of the nursery. A pump station is located in a drainage line to the south of the nursery.

- *Clearing:* The subject site has been subjected to extensive clearing, with most of the natural vegetation being removed. The majority of the subject site consists of pasture with fragmented areas of natural and disturbed vegetation throughout the subject site.

- *Bushfire:* There are no signs of recent bushfire.

- *Agriculture:* The cleared areas of the subject site are currently being used for cattle grazing. The remaining areas of natural vegetation within the subject site are currently being subjected to grazing by cattle.

- *Earthworks:* Ten (10) dams have been constructed throughout the subject site. Four dams are located in the northern drainage line which flows to the east. Three dams are located in the drainage line to the south of the nursery. One dam is located to the east below the Banksia Scrub vegetation ("The Knoll"). One dam is located within the Swamp Oak Open Forest to the west of Bevian Road. The remaining dam is located to the west of the Blackbutt Woodland vegetation community.

- *Introduced weeds:* The Grassland with Scattered Trees vegetation community contains many pasture weeds, with the road sides having the most significant incursions. The area surrounding the nursery contains a number of planted exotics and natives. The drainage lines and dams within the subject site contain incursions of exotic weeds.

SECTION 2.0 - SURVEY TECHNIQUES

2.1 Flora Survey Techniques

- ***Literature Review -*** A review of available literature for the area was undertaken to obtain reference material and background information for this survey. These documents are listed in the Bibliography section of this report.

- ***Database Searches -*** The Atlas of NSW Wildlife (DECC 2007) - Batemans Bay 1:100,000 scale map sheet and Bionet (2007) for the Eurobodalla Local Government Area, threatened flora databases were analysed to provide a predictive list of threatened flora species that occur locally and could possibly occur throughout the habitats identified within the subject site.

- ***Aerial Photograph Interpretation -*** Aerial photographs at 1:25,000 scale were utilised to identify the extent of vegetation with respect to the site and surrounding areas.

- ***Field Survey –*** Flora survey was undertaken on 20, 21 and 22 March 2006. All vegetation communities present within the subject site were targeted. A systematic stratified sampling regime was used within each of the identified vegetation communities, incorporating the placement of 13 20 x 20 metre quadrats and 3 10 X 40 metre quadrats. Due to extensive disturbance and resulting weed incursions, no quadrats were undertaken within vegetation community seven (7) – Grassland and Scattered Trees. Random meanders (Cropper 1993) were also undertaken throughout the subject site. The locations of flora survey quadrats are shown in Figure 7.

  Additional flora survey targeting the extent and quality of endangered ecological communities was undertaken on 3 and 4 July 2007.

- ***Accuracy of Identification -*** Specimens of plants not readily discernible in the field were collected for identification. Structural descriptions of the vegetation, where relevant, were made according to Specht *et. al* (1995).

- ***Condition Assessment of Endangered Ecological Communities –*** Three disturbed remnant vegetation communities identified within the subject were considered to share characteristics of the EEC's, SOFF and RFEFCF. Advice from DECC representatives identified that only EEC's considered to be of "Low condition", as defined by the *Biometric Version 1.8 Operation Manual (Gibbons et al. 2005)* should be subject to clearing, And, only then on the basis that suitable mitigation, management and offset measures that resulted in an overall maintain or improve biodiversity outcome for the site were in place.

- EECs of "Low condition" are defined as those communities comprised of <50% native understorey species & have a canopy cover of <25% of the lower value of the over-storey per cent foliage cover benchmark for that vegetation type.

- To determine the condition of the various EEC's identified within the subject site, fifteen (15) sample plots were completed on the 3rd 4th and 5th of July in accordance with the sample methodology provided in *Appendix 3 of the Biometric Version 1.8 Operation Manual (Gibbons et al. 2005).* The locations of these plots and the derived low condition EECs are provided in Figures 6 and 7.

- **Determining Benchmark Data for condition assessment-** Benchmarks provided for the Biometric assessment for each of the corresponding vegetation communities were initially reviewed for their suitability. Benchmark data that accurately reflected the Estuarine Creekflat Scrub and Estuarine Wetland Scrub communities were not available. For these communities, the lower value canopy benchmarks were derived from the lowest canopy value recorded within sampled reference plots. These reference plots were sampled according the methodology provided in *Appendix 3 of the Biometric Version 1.8 Operation Manual (Gibbons et al. 2005).*

2.2 Fauna Survey Techniques

- ***Literature Review -*** A review of available literature for the area was undertaken to obtain reference material and background information for this survey. These documents are listed in the bibliography of this report.

- ***Database Searches -*** The Atlas of NSW Wildlife (DECC 2007) - Batemans Bay 1:100,000 scale map sheet and Bionet (2007) for the Eurobodalla Local Government Area, threatened fauna databases were analysed to provide a predictive list of threatened fauna species that occur locally and could possibly occur throughout the habitats identified within the subject site.

- ***Field Survey -*** Survey dates, times, weather conditions and methods employed are shown in Appendix 2. The location of fauna survey is presented in Figure 7.

2.2.1 Diurnal Birds

Visual observation of birds was carried out during visits to the subject site.

Opportunistic bird counts are also made while undertaking other survey work and during spotlight surveys of the subject site.

Birds were observed and identified using binoculars. Calls were generally identified in the field by the observer. Any unknown calls were recorded and later identified using reference libraries.

2.2.2 Nocturnal Birds

Masked Owls (*Tyto novaehollandiae*), Powerful Owls (*Ninox strenua*), Sooty Owls (*Tyto tenebricosa*) and Barking Owls (*Ninox connivens*) were targeted by broadcasting recorded calls through a 15 watt Toa 'Faunatech' amplifier. Calls were played for 5-minute periods at 5-minute intervals. This was followed with quiet listening and spotlighting.

Secondary evidence of owl occupancy within the subject site, was investigated through searches for roosting sites, breeding hollows, whitewash and regurgitated pellets. Any findings were recorded.

2.2.3 Arboreal and Terrestrial Mammals

Elliott type A and B traps were used for trapping arboreal and terrestrial mammals. Trapping consisted of 80 arboreal trap nights and 200 terrestrial trap nights.

Arboreal trap-lines using 10-20 metre separations were placed in the most suitable trees along approximately 80m transects. Elliott type A traps were placed onto platforms that were attached to the trunks of trees 2-3 m above the ground at an incline of 10 degrees to facilitate drainage during inclement weather. A mixture of honey and water was then sprayed onto the trunk 3-5 metres above the trap and around the platform as a lure.

Terrestrial trap-lines of type A and B Elliott traps using 10-20 metre separations were placed along the same line as the arboreal traps in the most suitable terrestrial habitats.

All traps were baited with a mixture of rolled oats, honey and peanut butter.

Seven trap-lines were set on the nights of 14, 15, 16 and 17 March, 2006. The location of the trap-lines is shown in Figure 7. Each trap-line consisted of a three (3) type A arboreal traps and two (2) type B arboreal traps, three (3) type B terrestrial traps and two (2) type A terrestrial traps.

Cage trapping was conducted to target the threatened species, Southern Brown Bandicoot (*Isoodon obesulus*) and Spotted-tailed Quoll (*Dasyurus maculatus*). Cage traps were positioned in terrestrial trap-lines with 20-30 metre separations in suitable areas of dense shrub and ground cover. Wire cage traps are made of collapsible wire mesh and designed for the capture of larger size mammals. Cage trapping consisted of a total of 60 trap nights. The cage traps were baited with sardines, chicken or a mix of honey, oats and peanut butter.

Yellow-bellied Gliders (*Petaurus australis*) were targeted by broadcasting recorded calls through a 15 watt Toa 'Faunatech' amplifier. Calls were played for 5-minute periods at 5-minute intervals during each nocturnal survey, followed with quiet listening and spotlighting.

Assessment was made of 'found' scats, markings, diggings, runways and scratches during visits to the subject site. Any scats or pellets collected are sent to Barbara Triggs for identification of contents, hair or bone fragments. Habitat was also assessed to determine the likelihood of threatened native species of fauna occurring within the subject site.

Spotlighting for nocturnal mammalian fauna was carried out using a hand held lamp of 750,000 candlelight power (50W halogen globe). This technique involved walking amongst the woodland areas of the subject site so that a maximum number of trees could be observed.

The subject area was assessed for the presence of Koalas using the following methods:

i. A search of The Atlas of NSW Wildlife (DECC 2007) - Batemans Bay 1:100,000 scale map sheet and Bionet (2007) for the Eurobodalla Local Government Area threatened fauna databases;

ii. The subject site was surveyed on foot, with Koala food trees being inspected for signs of Koala usage. Trees were inspected and identified for the presence of Koalas, characteristic scratch and claw marks on the trunk and scats around the base of each tree. The proportion of trees showing signs of Koala use was calculated. Additionally the location and density of droppings if found were documented;

iii. Koalas were also targeted during spotlight surveys; and

iv. Identification and an assessment of the density of tree species listed as Koala feed trees in State Environmental Planning Policy No. 44 - Koala Habitat Protection was undertaken across the site. An estimate of the percentage density of each tree species across the site was determined by averaging the percentage of stems counted.

The trees on the subject site were also searched for koalas and any sightings of koalas were noted.

2.2.4 Bats

Micro-chiropteran bats were surveyed by echolocation using an Anabat Mk 2 detector in both fixed and mobile positions throughout the subject site. Mega-chiropteran bat species, such as Grey-headed Flying-fox (*Pteropus poliocephalus*), were surveyed by targeting flowering / fruiting trees during spotlighting activities.

2.2.5 Amphibians

Amphibians were surveyed by vocal call identification, using a tape recorder to record male calls in suitable places and then comparing these to known calls. Amphibians were also surveyed by habitat searches.

Green and Golden Bell Frogs *(Litoria aurea)* were targeted by broadcasting recorded calls through a 15 watt Toa 'Faunatech' amplifier. Calls were played for 3-minute periods at 5-minute intervals during each nocturnal survey, followed with quiet listening and spotlighting. These surveys were concentrated along creeklines and dams within the subject site.

Any amphibians found are visually identified and when required to be examined are handled with Latex gloves and kept moist until release.

2.2.6 Reptiles

Searches for reptiles in likely localities such as under logs, rubbish debris, and in deep leaf litter were carried out during diurnal visits to the site. Spotlighting of terrestrial habitats suitable for reptiles occurred during nocturnal surveys.

SECTION 3.0 - SURVEY RESULTS

3.1 Flora Results

A total of two hundred and eighty nine (289) flora species were observed within the subject site. Of these, two hundred and twenty six (226) species were native and sixty three (63) species were exotic. The native species observed consisted of twenty nine (29) trees, forty six (46) shrubs, one hundred and one (101) groundcovers, twenty six (26) vines, twenty two (22) waterplants and two (2) epiphytes. The plants observed are listed in Tables A1.1 of Appendix 1. In addition to those species, a number of unidentified exotic species were observed in the gardens of the two residences located within the north-eastern section of the subject site.

The following nine (9) vegetation communities and three (3) vegetation community variations were identified within the subject site (Figure 6 and Table 2) using aerial photographic interpretation and extensive ground truthing.

Table 2 - Vegetation communities within the subject site

Vegetation community No.	Vegetation Community Title	Existing extent (ha)
1	Spotted Gum/Ironbark Open Forest	15.76
2	Blackbutt Woodland	2.92
3	Dry Gully Rainforest (Preliminary EEC under the *EPBC Act* 1999)	0.52
4	Banksia Scrub	1.28
5	Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48
*5a	Disturbed Swamp Oak Open Heath (Low Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	1.62
6	Aquatic Herbfield	1.24
*6a	Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains EEC - *TSC Act* 1995)	5.94
7	Grassland with Scattered Trees	146.68
8	Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC - *TSC Act* 1995)	2.05
9	Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	0.09
*9a	Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	5.04
* Denotes vegetation community variation		

Detailed condition assessments completed within the subject site EECs, identified two (2) vegetation communities, Closed Swamp Paperbark Scrub and Swamp Oak Open Forest considered to be viable good condition representatives of the EEC, Swamp Oak Floodplain. Forest. While a further three (3) communities, Disturbed Swamp Oak Open Heath, Disturbed Swamp Paperbark Open Heath and Disturbed Redgum Open Woodland were considered to be highly disturbed “low condition” examples of the EECs, Swamp Oak Floodplain Forest and River Flat Eucalypt Forest on Coastal Floodplains respectively. These ‘low condition’ communities are not considered to be viable in the long term under the existing management practices of the site. A summary table of the condition assessment sample plot data is provided in Appendix 3.

3.2 Fauna Results

During the course of the survey a total of one hundred and twenty one (121) species were recorded. This included eighty six (86) birds, twenty two (22) mammals, five (5) reptiles, seven (7) amphibians and one (1) fish species. Species recorded throughout the duration of the fauna survey are listed in Table A1.4 of Appendix 1.

SECTION 4.0 - ECOLOGICAL ASSESSMENT

4.1 Previous Surveys Reviewed

Terrestrial Ecosystems of the Eurobodalla Local Government Area (NPWS, 2000)

This report was extracted from The Southern Comprehensive Regional Assessment (1997-2000) which included surveys of the natural vegetation extending from Oberon in the north to the NSW border in the south to Albury and Boorowa in the east. The report submitted to Eurobodalla Shire Council is an extract which covers the Eurobadalla Local Government Area. This survey has been published in *Cunninghamia* entitled the Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and South Eastern Corner Bioregions (Gillie 2005). A combination of aerial interpretation, field work and compilation of data from a number of sources was utilised to produce vegetation descriptions and mapping for vegetation communities within the Eurobodalla Local Government Area (LGA).

The northern portion of the subject site was mapped by this project as Map Unit 9 – Coastal Lowlands Cycad Dry Shrub Forest, with a small section in the north western section of the site mapped as Map unit 7 – Southern Coastal Hinterland Dry Shrub-Tussock Grass Dry Forest. The vegetation surrounding the Bevian Swamp was mapped as Map Unit 25 - South Coast Swamp Forest Complex. The Bevian Swamp wetland was mapped as Map Unit 188-Sand Dune Wetlands. The remainder of the subject site was mapped as cleared vegetation.

Vulnerable Ecosystems of Eurobodalla Shire (*EcoGIS* 2001)

This report identifies vulnerable forest ecosystems within the Eurobodalla LGA. This study categorised these vulnerable forest ecosystems from highly dysfunctional to functional with an index to determine which ecosystems were under the greatest pressure from key threatening processes.

Gaia Research Pty Ltd (2001), Assessment of Fauna Habitat Linkages and Considerations for Management. Select Rural Residential Areas of Eurobodalla Shire.

This report outlined the results of surveys undertaken on forest dependent fauna in selected rural residential areas within the Eurobodalla LGA. Forest dependent fauna detected were Yellow-bellied Glider, Grey-headed Flying-fox, Glossy Black Cockatoo, Powerful Owl and Greater Glider. The Yellow-bellied Glider was the most commonly detected threatened species throughout the survey. Habitat linkages and significant habitat areas within the Eurobodalla LGA were also assessed.

Flora and Fauna Assessment of Rosedale Urban Release Area George Bass Drive, Rosedale (Gunninah Environmental Consultants, 2002)

Survey of the subject site was undertaken in November 2002. During that survey, one (1) threatened fauna species, *Petaurus australis* (Yellow-bellied Glider) was recorded within the Spotted Gum/Ironbark forest in the north eastern corner of the site. No threatened flora species or ecological communities were observed. The Bevian Swamp was identified as a SEPP 14 wetland and regarded as a feature of high conservation value. This report recommended weed removal, bush regeneration and the provision of buffers to protect the Bevian Swamp from any adverse impacts from the proposed development.

4.2 Vegetation Communities

Nine (9) vegetation communities and three (3) vegetation community variation were identified within the study area using aerial photographic interpretation and extensive ground truthing.

Vegetation Community 1 – Spotted Gum/Ironbark Open Forest/Woodland:

This vegetation community within the subject site corresponds to Map Unit - 9 Coastal Lowlands Cycad Dry Shrub Forest – *Corymbia maculata / Macrozamia communis* as described and mapped by NPWS (2000). Variations from the NPWS (2000) description include, *Eucalyptus fibrosa* occurred as the dominant ironbark along the eastern boundary of the subject site and *Eucalyptus muelleriana* occurred throughout the vegetation community.

Occurrence - This vegetation community occurs in the northern-eastern corner, along the eastern boundary, within the north-western and south-western sections of the subject site and covers approximately 10 % of the subject site.
Structure - Open Forest to Woodland with a canopy cover ranging from 20% to 40% and height of approximately 15-20 metres. The understorey consists of a sparse, to moderate, to dense shrub layer to 3 metres high and sparse, to moderate, to dense groundcover of herbs and grasses.

Disturbances - This vegetation community has been disturbed by partial clearing, underscrubbing and incursions of weeds.

Common Species

Trees: *Corymbia maculata* (Spotted Gum), *Eucalyptus fibrosa* (Broad-leaved Ironbark), *Eucalyptus muelleriana* (Yellow Stringybark) and *Eucalyptus globoidea* (White Stringybark), *Eucalyptus paniculata* subsp. *paniculata* (Grey Ironbark) and *Allocasuarina littoralis (*Black She-oak).

Shrubs: *Acacia irrorata* subsp. *irrorata* (Blueskin), *Acacia floribunda* (Sally Wattle), *Acacia longifolia* (Sydney Golden Wattle), *Acacia longissima, Acacia melanoxylon* (Blackwood), *Acacia paradoxa* (Kangaroo Thorn), *Breynia oblongifolia* (Coffee Bush), *Bursaria spinosa* (Blackthorn), *Exocarpos cupressiformis* (Native Cherry), *Goodenia ovata, Indigophora australis, Ozothamnus diosmifolius* (Ball Everlasting), *Pultenaea villosa* and *Phyllanthus hirtellus* (Thyme Spurge).

Groundcovers: *Aristida vagans* (Wire Grass), *Dianella caerulea* (Flax Lily), *Dichondra repens* (Kidney Weed), *Entolasia stricta* (Wiry Panic), *Glycine tabacina* (Variable Glycine), *Gonocarpus teucroides, Hardenbergia violacea* (False Sarsparilla), *Imperata cylindrica* (Blady Grass), *Lepidosperma laterale* (Variable Sword-sedge)*, Lepidosperma urophorum, Lomandra longifolia* (Spiky-headed Mat-rush), *Macrozamia communis* (Burrawang), *Poa labillardieri, Pratia purpurascens* (Whiteroot), *Pteridium esculentum* (Bracken Fern), *Themeda australis* (Kangaroo Grass) and *Veronica plebeia* (Creeping Speedwell).

Weeds: *Centaurium erythraea* (Pink Stars), *Chrysanthemoides monilifera* (Bitou Bush), *Cirsium vulgare* (Spear Thistle), *Conyza albida* (Tall Fleabane), *Conyza bonariensis* (Flaxleaf Fleabane), *Pennisetum clandestinum* (Kikuyu), *Plantago lanceolata* (Ribwort) and *Rubus anglocandicans* (Blackberries).

Vegetation Community 2 – Blackbutt Woodland:

This vegetation community is a variation on Map Unit 9 – Coastal Lowlands Cycad Dry Shrub Dry Forest mapped by NPWS (2000). The shrub layer and understorey are similar to the Spotted Gum/Ironbark Open Forest. However, the dominant canopy species was *Eucalyptus pilularis* rather than *Corymbia maculata* in comparison to the Spotted Gum/Ironbark Open Forest.

Occurrence - This vegetation community occurs in the eastern section of the subject site and covers <5% of the subject site.

Structure - Woodland with a canopy cover of approximately 20-25% and height of approximately 18-20 metres. The understorey consists of a sparse shrublayer to 2 metres high and moderate to dense groundcover of herbs and grasses.

Disturbances - This vegetation community has been disturbed by underscrubbing and cattle grazing.

Common Species

Trees: *Eucalyptus pilularis* (Blackbutt), *Corymbia maculata* (Spotted Gum), *Eucalyptus fibrosa* (Broad-leaved Ironbark), *Eucalyptus muelleriana* (Yellow Stringybark) and *Eucalyptus globoidea* (White Stringybark).

Shrubs: *Acacia longifolia* (Sydney Golden Wattle), *Acacia terminalis* (Sunshine Wattle), *Acacia ulicifolia* (Prickly Moses), *Allocasuarina littoralis* (Black She-oak), *Daviesia ulicifolia* (Gorse Bitter-pea), *Hibbertia aspera*, *Persoonia linearis* (Narrow-leaved Geebung), and *Pultenaea villosa*.

Groundcovers: *Cassytha glabella* (Devil's Twine), *Centella asiatica, Cynodon dactylon* (Common Couch), *Entolasia stricta* (Wiry Panic), *Glycine tabacina* (Variable Glycine), *Gonocarpus teucroides*, *Hardenbergia violacea*, *Imperata cylindrica* (Blady Grass), *Joycea pallida* (Silvertop Wallaby Grass), *Lepidosperma laterale* (Variable Sword-sedge), *Lomandra longifolia* (Spiky-headed Mat-rush), *Lomandra multiflora* subsp. *multiflora* (Many-flowered Mat Rush), *Panicum simile* (Two Colour Panic), *Poa labillardieri* (Tussock Grass), *Themeda australis* (Kangaroo Grass).

Weeds: *Anagallis arvensis* (Pimpernel), *Ehrharta erecta* (Panic Veldtgrass), *Hypochaeris radicata* (Flatweed), *Plantago lanceolata* (Ribwort), *Rubus ulmifolius* (Blackberries), *Paspalum dilatatum* (Paspalum), and *Pennisetum clandestinum* (Kikuyu).

Vegetation Community 3 – Dry Gully Rainforest (Dry Rainforest of South East Forests – Preliminary *EPBC Act* EEC:

These two areas of rainforest gully forest were mapped as Map Unit 9 – Coastal Lowlands Cycad Dry Shrub Dry Forest by NPWS (2000). The gullies within Mogo State Forest to the west of the subject site have been mapped as Map Unit 2c Moist Eucalypt Forest which includes Map Unit 20 – Coastal Hinterland Ecotonal Gully Rainforest. This vegetation community is most similar to Map Unit 20 – Coastal Hinterland Ecotonal Gully Forest as described by NPWS (2000).

Occurrence - This vegetation community occurs within two gullies in the north western section of the subject site and covers approximately 1% of the subject site.

Structure - Open Forest with a canopy cover of approximately 50% and height of approximately 10-12 metres. The understorey consists of a sparse to moderate shrublayer to 3 metres high and sparse groundcover of herbs, vines and grasses.

Disturbances - This vegetation community is generally undisturbed apart from small weed incursions.

Common Species

Trees: *Alphitonia excelsa* (Red Ash)*, Claoxylon australe* (Brittlewood), *Cassine australis,* Acmena *smithii* (Lilly Pilly) and *Glochidion ferdinandi* (Cheese Tree).

Shrubs: *Elaeocarpus reticulatus* (Blueberry Ash), *Ficus coronata* (Sandpaper Fig), *Pomaderris aspera* (Hazel Pomaderris), *Breynia oblongifolia*, *Melicope micrococca* (White Euodia), *Notelaea longifolia* (Mock Olive) and *Synoum glandulosum* (Scentless Rosewood).

Groundcovers: *Adiantum aethiopicum* (Common Maidenhair), *Blechnum cartilagineum* (Gristle Fern), *Carex appressa* (Tussock Sedge), *Centella asiatica* (Swamp Pennywort), *Cissus hypoglauca* (Water Vine), *Dichondra repens* (Kidney Weed), *Doodia aspera* (Rasp Fern), *Entolasia marginata* (Bordered Panic), *Eustrephus latifolius* (Wombat Berry), *Gahnia melanocarpa* (Black-fruit Saw-sedge), *Geitonoplesium cymosum* (Scrambling Lily), *Hydrocotyle peduncularis* (Pennywort), *Oplismenus aemulus* (Basket Grass), and *Pellaea falcata* (Sickle Fern), *Smilax australis* (Lawyer Vine) and *Veronica plebeia*.

Weeds: *Cirsium vulgare* (Spear Thistle), *Hypochaeris radicata* (Flatweed), *Pennisetum clandestinum* (Kikuyu), *Plantago lanceolata* (Ribwort) and *Trifolium repens* (White Clover).

Vegetation Community 4 – Banksia Scrub:

This area known locally as “The Knoll” was mapped as cleared land by NPWS (2000). This vegetation community is considered floristically to be a disturbed representative of a transition between Map Unit 9 – Coastal Lowlands Spotted Gum and Map Unit 28 – Coastal Sands Blackbutt – Old Man Banksia Shrub – Fern Forest. Variations to the Map Unit – 28 (NPWS 2000) description included; the absence of eucalypt species and *Banksia serrata*, whilst the dominant banksia was *Banksia integrifolia*. The understorey has a similar species composition to that described by NPWS (2000).

Occurrence - This vegetation community occurs on the top of a hill located in the central section of the subject site and covers <5 % of the subject site.

Structure - Open forest with a canopy cover of approximately 40-45% and height of approximately 10-15 metres. The understorey consists of a sparse to moderate shrublayer to 1-3 metres high and moderate to dense groundcover of herbs, ferns and grasses.

Disturbances - This vegetation community has been disturbed by the construction of an informal vehicular track through its centre. This track is currently unused and regrowth of the vegetation is occurring.

Trees: *Acacia irrorata* subsp. *irrorata* (Blueskin), *Acacia longifolia* (Sydney Golden Wattle), *Acacia melanoxylon* (Blackwood), *Allocasuarina littoralis* (Black She-oak) and *Banksia integrifolia* (Coast Banksia).

Shrubs: *Breynia oblongifolia* (Coffee Bush), *Exocarpos cupressiformis* (Native Cherry),

Hibbertia aspera, *Leucopogon lanceolatus* (Lance-leaf Beard-heath), *Notelaea longifolia* (Mock Olive), *Ozothamnus diosmifolius* (Ball Everlasting), *Persoonia linearis* (Narrow-leaved Geebung), *Phyllanthus hirtellus* (Thyme Spurge), *Pittosporum undulatum* (Sweet Pittosporum) and *Platysace lanceolata* (Lance-leaved Platysace).

Groundcovers: *Adiantum aethiopicum* (Common Maidenhair), *Aristida vagans* (Wire Grass), *Cassytha pubescens* (Devil's Twine), *Centella asiatica* (Swamp Pennywort), *Dianella caerulea* (Flax Lily), *Dichondra repens* (Kidney Weed), *Doodia aspera* (Rasp Fern), *Entolasia marginata* (Bordered Panic), *Geitonoplesium cymosum* (Scrambling Lily), *Glycine tabacina* (Variable Glycine), *Gonocarpus teucroides*, *Goodenia hederacea Hibbertia scandens* (Climbing Guinea Flower), *Lomandra longifolia* (Spiky-headed Mat-rush), *Macrozamia communis* (Burrawang), *Pratia purpurascens* (Whiteroot), *Pteridium esculentum* (Bracken Fern), *Smilax australis* (Lawyer Vine), and *Solanum pungetium* (Forest Nightshade).

Weeds: *Cerastium glomeratum* (Mouse-ear Chickweed), *Chrysanthemoides monilifera* (Bitou Bush), *Cirsium vulgare* (Spear Thistle), *Conyza albida* (Tall Fleabane), *Conyza bonariensis* (Flaxleaf Fleabane), *Hypochaeris radicata* (Flatweed), *Modiola caroliniana* (Red-flowered Mallow), *Myrsiphyllum asparagoides* (Bridal Creeper), *Oxalis corniculata* (Creeping Oxalis) and *Plantago lanceolata* (Ribwort).

Vegetation Community 5 – Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest – *TSC Act* EEC):

This vegetation community was mapped as Map Unit – 25 South Coast Swamp Forest Complex however, it is most similar to Map Unit 27 – Ecotonal Coastal Swamp Forest as described by NPWS (2000). Variations of this community to the community described by NPWS (2000) include; only a small percentage (<5%) of *Eucalyptus botryoides* surrounding the wetland and the dominance of *Casuarina glauca.* Two areas of this vegetation community within the floodplain have a high level of disturbance due to cattle grazing hence the dominance of the coloniser species, *Casuarina glauca.* In contrast, the area surrounding the Bevian Swamp has a moderate level of disturbance with a diverse composition of species in both the shrublayer and groundlayer, more representative of Map Unit 27 – Ecotonal Coastal Swamp Forest as described by NPWS (2000).

Occurrence - This vegetation community occurs within the floodplains and along the edge of the Bevian Swamp in the south eastern section of the subject site and covers approximately 15 % of the subject site. Two fragmented areas of this community exist within the floodplain of the Bevian Swamp.

Structure - Open Forest with a canopy cover of approximately 40% and height of approximately 15-20 metres. The understorey consists of a sparse to dense groundcover of herbs and grasses.

Disturbances - Two areas of this community within the floodplain are highly disturbed with no shrub layer and a sparse groundcover due to cattle grazing. Vegetation surrounding the Bevian Swamp has been disturbed by the construction of Bevian Road along its western and part of its northern boundaries. Along the edges of Bevian Road a moderate incursion of pasture weeds exists. Regrowth of this community is occurring within a disused road along the northern boundary of the subject site.

Variation 5a Disturbed Swamp Oak Open Scrub (Low Quality Swamp Oak Floodplain Forest – *TSC Act* EEC) – A highly disturbed regrowth variation associated with previously cleared and heavily grazed areas of the floodplain. This community generally consists of no canopy, scattered samplings of *Casuarina glauca* <1m in height and an understorey

generally dominated by a mixture of exotic herbs and pasture grasses with minor patches of native understorey. Detailed sampling identified this community as being of 'low condition' in accordance with the criteria set out in the Biometric operation manual version 1.8 (Gibbons *etal.* 2005). This community has been mapped separately within the Figure 6.

Common Species

Trees: *Casuarina glauca* (Swamp Oak), and *Eucalyptus botryoides* (Bangalay).

Shrubs: *Acacia longifolia* (Sydney Golden Wattle), *Acacia maidenii* (Maidens Wattle), *Banksia integrifolia* (Coast Banksia), *Leptospermum polygalifolium* (Yellow Tea Tree), and *Melaleuca ericifolia*.

Groundcovers: *Dichondra repens* (Kidney Weed), *Entolasia marginata* (Panic), *Gahnia aspera* (Rough Saw-sedge), *Gahnia clarkei* (Tall Saw-sedge), *Gahnia melanocarpa* (Black-fruit Saw-sedge), *Goodenia hederacea* var. *hederacea* (Violet-leaved Goodenia), *Glycine tabacina* (Variable Glycine), *Hydrocotyle peduncularis* (Pennywort), *Juncus continuous, Oplismenus imbecillis* (Basket Grass), *Parsonsia straminea, Persicaria decipiens*, *Persicaria lapathifolia*, and *Viola hederacea*.

Weeds: *Axonopus fissifolius* (Narrow-leaf Carpet Grass), *Juncus acutus, Juncus cognatus, Modiola caroliniana* (Red-flowered Mallow), *Oxalis corniculata* (Creeping Oxalis), *Paspalum dilatatum* (Paspalum), *Pennisetum clandestinum* (Kikuyu), *Phalaris aquatica* (Phalaris), *Plantago lanceolata* (Ribwort) and *Trifolium repens* (White Clover).

Vegetation Community 6 – Aquatic Herbfield:

This vegetation community has been mapped as cleared land by NPWS (2000) and consists of farm dams and does not correspond to any of the map units described by NPWS (2000).

Occurrence - This vegetation community occurs in eight (8) farm dams located throughout the subject site and parts of Bevian Swamp and covers approximately 10% of the subject site.

Structure - Sparse, to moderate, to dense herbfield to a height of approximately 1-2 metres.

Disturbances – Cattle are currently trampling the edge of these dams and weed incursions of Kikuyu are extensive along the edges of all farm dams.

Variation 6a Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains *TSC Act* EEC) – A native Aquatic Herbfield variation to this community associated with the open water of Bevian Swamp is located in the south of the subject site. This largely natural community variation contains the floristic and geomorphological characteristics of the EEC, Freshwater Wetlands on Coastal Floodplains and as such has been mapped separately within the Figure 6.

Common Species

Groundcovers: *Blechnum cartilagineum* (Gristle Fern), *Centella asiatica* (Swamp Pennywort), *Eleocharis sphacelata,* (Tall-spike Rush) *Juncus usitatus* (Common Rush), *Ottelia ovalifolia* (Swamp Lily), *Paspalum distichum* (Water Couch), *Persicaria decipiens*, *Persicaria lapathifolia*, *Philydrum lanuginosum* (Woolly Frogmouth), *Schoenoplectus validus* (River Club-rush), *Sparganium subglobosum* (Floating Burr Weed), *Typha domingensis* (Cumbungi) and *Typha orientalis* (Cumbungi).

Weeds: *Cyperus eragrostis* (Umbrella Sedge), *Hydrocotyle bonariensis* (Pennywort) and *Juncus acutus* subsp. *acutus* (Sharp Rush).

Vegetation Community 7 – Grassland with Scattered Trees:

Occurrence - This vegetation community occurs in the majority of the subject site and covers approximately 70% of the subject site.

Structure - Moderate to dense groundcover of herbs, ferns and grasses with scattered trees and shrubs.

Disturbances - This vegetation community is the result of clearing and agricultural activities.

Common Species

Trees: *Corymbia maculata* (Spotted Gum), *Eucalyptus globoidea* (White Stringybark), *Eucalyptus fibrosa* (Broad-leaved Ironbark), *Eucalyptus longifolia* (Wollybutt), and *Eucalyptus tereticornis* (Forest Red Gum).

Shrubs: *Acacia floribunda* (Sally Wattle), *Acacia longifolia* (Sydney Golden Wattle) and *Bursaria spinosa* (Blackthorn).

Groundcovers: *Aristida vagans* (Wire Grass), *Austrodanthonia ramosissima* (Stout Bamboo Grass), *Centella asiatica* (Swamp Pennywort), *Cheilanthes sieberi* (Mulga Fern), *Cynodon dactylon* (Common Couch), *Dichelachne micrantha* (Short-hair Plume Grass), *Dichondra repens* (Kidney Weed), *Glycine tabacina* (Variable Glycine), *Goodenia hederacea*, *Hydrocotyle peduncularis* (Pennywort), *Imperata cylindrica* (Blady Grass), *Joycea pallida* (Silvertop Wallaby Grass), *Microlaena stipoides* (Weeping Grass), *Panicum simile* (Two Colour Panic), *Pratia purpurascens* (Whiteroot), *Pteridium esculentum* (Bracken Fern), *Themeda australis* (Kangaroo Grass) and *Veronica plebia* (Creeping Speedwell).

Weeds: *Avena fatua* (Wild Oats), *Axonopus fissifolius* (Narrow-leaf Carpet Grass), *Bidens pilosa* (Cobblers Pegs), *Briza maxima* (Quaking Grass), *Briza minor* (Shivery Grass), *Briza subaristata*, *Bromus cartharticus* (Prairie Grass), *Centaurium erythraea* (Pink Stars), *Cirsium vulgare* (Spear Thistle), *Conyza albida* (Tall Fleabane), *Conyza bonariensis* (Flaxleaf Fleabane), *Ehrharta erecta* (Panic Veldtgrass), *Gamochaeta spicata* (Cudweed), *Hypericum perforatum* (St John's Wort), *Hypochaeris radicata* (Flatweed), *Medicago sp.* (Medic), *Modiola caroliniana* (Red-flowered Mallow), *Oxalis corniculata* (Creeping Oxalis), *Paspalum dilatatum* (Paspalum), *Pennisetum clandestinum* (Kikuyu), *Plantago lanceolata* (Ribwort), *Protasparagus aetheopicus* (Asparagus Fern), *Rubus ulmifolius* (Blackberries), *Setaria gracilis* (Slender Pigeon Grass), *Sida rhombifolia* (Paddy's Lucerne), *Sporobolus africanus* (Parramatta Grass), *Trifolium repens* (White Clover), *Verbena bonariensis* (Purple Top) and *Verbena rigida* (Veined Verbena).

Vegetation Community 8 – Disturbed Redgum Open Woodland (Low Quality River Flat Eucalypt Forest on Coastal Floodplains *TSC Act* 1995):

Occurrence - This vegetation community occurs as a number of isolated patches in the south-eastern portion of the subject site associated with the alluvial floodplain soils.

Structure - Isolated paddock trees to Open Woodland with a canopy cover of approximately <5% and height of approximately 20 metres. The understorey consists of a generally absent to sparse shrublayer 1 metres high and a moderate to dense groundcover of herbs, sedges and grasses.

Disturbances - This vegetation community is the result of extensive clearing and agricultural activities including grazing. Detailed sampling identified this community as being of 'low condition' in accordance with the criteria set out in the Biometric operation manual version 1.8 (Gibbons *etal.* 2005).

Common Species

Trees: *Eucalyptus tereticornis* (Forest Red Gum).

Shrubs: *Melaleuca ericifolia* and *Eucalyptus tereticornis* (Forest Red Gum) Saplings.

Groundcovers: *Cynodon dactylon* (Common Couch), *Dichelachne micrantha* (Short-hair Plume Grass), *Eragrostis leptostachya* (Paddock Lovegrass), *Hemarthria uncinata* (Matgrass), *Hydrocotyle peduncularis* (Pennywort), *Lomandra longifolia* (Spiky Headed Mat Grass) *Microlaena stipoides* (Weeping Grass), *Ranunculus plebeius* and *Themeda australis* (Kangaroo Grass).

Weeds: *Axonopus fissifolius* (Narrow-leaf Carpet Grass), *Bidens pilosa* (Cobblers Pegs), *Cirsium vulgare* (Spear Thistle), *Gamochaeta spicata* (Cudweed), *Hypericum perforatum* (St John's Wort), *Hypochaeris radicata* (Flatweed), *Medicago sp.* (Medic), *Modiola caroliniana* (Red-flowered Mallow), *Paspalum dilatatum* (Paspalum), *Pennisetum clandestinum* (Kikuyu), *Plantago lanceolata* (Ribwort), *Rubus ulmifolius* (Blackberries), *Setaria gracilis* (Slender Pigeon Grass), *Sida rhombifolia* (Paddy's Lucerne), *Sporobolus africanus* (Parramatta Grass), *Trifolium repens* (White Clover), *Verbena rigida* (Veined Verbena).

Vegetation Community 9 – Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest – *TSC Act* EEC):

Occurrence - This vegetation community occurs as a small isolated patch in the southern most portion of the subject site associated with the alluvial floodplain soils.

Structure - Closed Scrub with a canopy cover of approximately 70-90% and height of approximately 2 to 4 metres. The understorey consists of a sparse s groundcover of herbs, sedges and grasses.

Disturbances - There is very little disturbance within this community

Variation 9a Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest – *TSC Act* EEC) – A highly disturbed regrowth variation associated with previously cleared and heavily grazed areas of the floodplain. This community generally consists of no canopy, scattered regrowth samplings of *Melaleuca ericifolia* <1m in height and an understorey generally dominated by a mixture of exotic herbs and pasture grasses with minor patches of native species. Detailed sampling identified this community as being of 'low condition' in accordance with the criteria set out in the Biometric operation manual version 1.8 (Gibbons *etal.* 2005). This community has been mapped separately within the Figure 6.

Common Species

Emergent Trees: *Casuarina glauca* (Swamp Oak).

Shrubs: *Melaleuca ericifolia*.

Groundcovers: *Carex fascicularis* (Tassel Sedge), *Cynodon dactylon* (Common Couch), *Dichondra repens* (Kidney Weed), *Echinopogon caespitosus var. caespitosus* (Tufted

Hedgehog Grass), *Entolasia marginata* (Bordered Panic), *Hemarthria uncinata* (Matgrass), *Gonocarpus tetragynus, Hydrocotyle peduncularis* (Pennywort), *Juncus usitatus* (Common Rush), *Lomandra longifolia* (Spiky Headed Mat Grass) *Microlaena stipoides* (Weeping Grass), *Parsonsia straminea* (Common Silkpod), *Ranunculus plebeius* and *Themeda australis* (Kangaroo Grass) *Viola hederacea* (Ivy-leaved Violet).
Weeds: *Axonopus fissifolius* (Narrow-leaf Carpet Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Ribwort), *Rubus ulmifolius* (Blackberries), *Setaria gracilis* (Slender Pigeon Grass) and *Verbena rigida* (Veined Verbena).

4.3 Proposed vegetation removal/modification and restoration

This Flora and Fauna Report (*Conacher Travers* 2007) provides an assessment (Section 5) of the potential impacts of the proposed development on threatened species and endangered ecological communities. The assessment is based on habitat, which relates directly to the remnant vegetation communities within the site, their existing extent and the likely removal/modification and restoration of these remnants.

In order to provide a clear explanation of vegetation removal/modification within the site, before the Section 5 assessment, the following vegetation communities will be removed, modified and or restored. Table 3 below outlines the existing extent of vegetation within the subject site, the proposed removal/modification and post development extent.

Table 3 – Proposed removal/modification and restoration of vegetation within the subject site

Vegetation community No.	Vegetation Community Title	Existing extent (ha)	Removal/modification (ha)	Post development extent (ha)
1	Spotted Gum/Ironbark Open Forest	15.76	2.3	38.86
2	Blackbutt Woodland	2.92	-	3.94
3	Dry Gully Rainforest (Preliminary EEC under the *EPBC Act* 1999)	0.52	-	0.91
4	Banksia Scrub	1.28	-	2.78
5	Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	-	6.76
*5a	Disturbed Swamp Oak Open Heath (Low Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	1.62	0.08	0.39
6	Aquatic Herbfield	1.24	-	1.24
*6a	Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains EEC - *TSC Act* 1995)	5.94	-	5.94
7	Grassland with	146.68	142.62	4.06

Table 3 – Proposed removal/modification and restoration of vegetation within the subject site

Vegetation community No.	Vegetation Community Title	Existing extent (ha)	Removal/modification (ha)	Post development extent (ha)
	Scattered Trees			
8	Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC - *TSC Act* 1995)	2.05	0.36	2.43
9	Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	0.09	-	5.65
*9a	Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	5.04	1.7	1.94
TOTALS		187.62 (40.94ha without Vegetation Community 7)	147.06 (97% Vegetation Community 7)	74.9
* Denotes vegetation community variation				

Approximately 147.06 hectares of vegetation identified within the subject site (173.59ha) will be removed or modified. Whilst this figure appears to be significant, 97% (142.62ha) forms Vegetation Community 7 – Grassland with scattered trees. The Grassland with Scattered Trees vegetation community is considered to be of low importance in comparison to the other remnant vegetation within the site in terms of threatened species habitat. For this reason this vegetation community has been excluded from the maintain or improve assessment in Section 5 of this report.

All other remnant vegetation communities within the subject site will be increased in extent (Table 3) as part of the restoration works within Ecological Corridors 1 & 2, riparian zones and the Southern Conservation Zone (Schedule 1 – Restoration Management). Restoration areas include the north western corner of the property, which is not part of the current subdivision plan.

4.4 Vegetation Connectivity

The majority of the vegetation within the subject site has been cleared for agricultural purposes (Figure 2). The vegetation along the western boundary of the site adjoins Mogo State Forest (Figure 1) which extends to the north and west of the subject site and encompasses an area of approximately 15,500ha. Native vegetation exists to the north of the site which is partially fragmented by rural residential development and which extends to Mogo State Forest to the west of Malua Bay. Native vegetation exists to the east of the site which is partially fragmented by rural and urban development. Council sewerage works adjoin the south-eastern boundary of the site, with the adjoining site to the south only

partially cleared for an existing residence and an unformed vehicle track. To the south west is a small area of native vegetation which extends to Tomakin. Native vegetation to the south east adjoins the caravan park, which extends to Long Nose Point, further south of the subject site. The proposed development will not remove any areas of vegetation which have connectivity to surrounding areas of native vegetation.

4.5 Flora Species

The plants observed are listed in Tables A1.1 of Appendix 1. Methodology utilised throughout the duration of flora surveys is presented in Section 2.1.

No threatened flora species were observed during the survey. Three (3) endangered ecological communities consisting of Swamp Oak Floodplains Forest, River Flat Eucalypt Forest on Coastal Floodplains and Freshwater Wetlands on Coastal Floodplains were observed within the subject site.

4.6 Regional Significance

The Spotted Gum/Ironbark Open Forest vegetation community which is similar to Map Unit 9 – Coastal Lowlands Spotted Gum – Cycad Dry Shrub Forest is not considered to be a vulnerable ecosystem by NPWS (2000) or EcoGIS (2001). EcoGIS (2001) found over 38,819 ha of this community within the Eurobodalla LGA. Therefore, the Spotted Gum/Ironbark Open Forest is not considered to be regionally significant.

The Blackbutt Woodland is a variation of Map Unit 9 – Coastal Lowlands Spotted Gum – Cycad Dry Shrub Forest and is not considered to be a vulnerable ecosystem by NPWS (2000) or EcoGIS (2001). Therefore the Blackbutt Woodland is not considered to be of regional significance.

The Dry Gully Rainforest, which is similar to Map Unit 20 – Coastal Hinterland Ecotonal Gully Rainforest is not considered to be a vulnerable ecosystem by NPWS (2000) or EcoGIS (2001). There is currently 99ha of this community mapped within the Eurobodalla LGA (EcoGIS 2001). In addition, extensive areas of this community have been mapped by NPWS (2000) as occurring within the Mogo State Forest adjoining the subject site. The study by EcoGIS (2001) described this vegetation community as being functional within the region, therefore this vegetation community is not considered to be regionally significant. However, this vegetation community has recently (December 2006) been nominated as a preliminary EEC under the *EPBC ACT 1999,* at the time of compilation of this report a final determination is yet to be made.

The Banksia Scrub vegetation community is considered to be vulnerable by EcoGIS (2001). Whilst this vegetation community is considered floristically to be a disturbed representative of a transition between Map Unit 9 – Coastal Lowlands Spotted Gum and Map Unit 28 – Coastal Sands Blackbutt – Old Man Banksia Shrub – Fern Forest, it is still considered to be representative of the description by NPWS (2000). EcoGIS (2001) considers this vegetation community to be a moderately functional ecosystem under threat from processes such as clearing and urban development, therefore this vegetation community is considered to be regionally significant.

The Swamp Oak Open Forest vegetation community within the subject site is a transition between two map units (25 & 27) mapped by NPWS (2000), both are considered to be vulnerable (NPWS 2000). It is considered due to the small number of Bangalays present within this community, it is most similar to Map Unit 27 Ecotonal Coastal Swamp Oak – Bangalay Swamp Forest. EcoGIS (2001) has described Map Unit 27 Ecotonal Coastal Swamp Oak – Bangalay Swamp Forest as highly dysfunctional and requiring immediate

protection and or restoration. This vegetation community surrounds the Bevian Swamp and is considered to be representative of the endangered ecological community, Swamp Oak Floodplain Forest, and as such is of high regional significance.

The Regrowth Redgum Open Woodland vegetation community within the subject site corresponds with map unit 27 Ecotonal Coastal Swamp Forest (NPWS 2000), considered to be vulnerable (NPWS 2000). This vegetation community surrounds the Bevian Swamp and is considered to be representative of the endangered ecological community, River Flat Eucalypt Forest on Coastal Floodplains and as such is of high regional significance. However, given the highly degraded condition and low long term viability this community's significance is substantially reduced.

The Swamp Paperbark Closed Scrub vegetation community within the subject site corresponds with map unit 24: Coastal Wet Heath Swamp Forest mapped by Gellie (2005), which is given a Vulnerable rating of 3. This vegetation community surrounds the Bevian Swamp and is considered to be representative of the endangered ecological community, Swamp Oak Floodplain Forest, and as such is of high regional significance.

The Aquatic Herbfield and Grassland with Scattered Trees vegetation communities are highly disturbed and as such do not correspond to any vegetation community described by NPWS (2000) and are not considered to be of regional significance.

The Bevian Swamp is a freshwater wetland and is identified under State Environmental Planning Policy 14 – Coastal Wetlands (SEPP 14) as Wetland No. 197, and corresponds with the endangered ecological community, Freshwater Wetlands on Coastal Floodplains, as listed under the *Threatened Species Conservation (TSC) Act* (1995). The Bevian Swamp is mapped by NPWS (2000) as Map Unit 188 – Sand Dune Wetlands. This map unit corresponds to the Bevian Swamp as it is situated on hind dunes. This map unit is not considered to be a vulnerable ecosystem by either NPWS (2000) or EcoGIS (2001). However, Gaia Research Pty Ltd (2001) has listed the Bevian Swamp as a significant coastal freshwater wetlands in the Eurobodalla LGA. It is therefore concluded that the Bevian Swamp is of high regional significance due the listing as a SEPP 14 wetland and the diversity of habitat for flora and fauna present within this wetland.

4.7 Threatened Flora

Two (2) threatened flora species, *Aldrovanda vesiculosa* and *Correa baeuerlenii,* protected by State and National legislation have been identified as having the potential to occur within the subject site. These species are described in the sub-section below.

4.7.1 State Legislative Matters

- *Threatened Species Conservation Act* (1995)

A search of the Atlas of NSW Wildlife (DECC 2007) - Batemans Bay 1:100,000 scale map sheet and Bionet (2007) for the Eurobodalla Local Government Area, threatened flora databases indicated that one (1) threatened flora species, *Aldrovanda vesiculosa,* has been recorded within a 10 km radius of the study area. This species is listed in Table A1.3 (Appendix 1).

In addition to *Aldrovanda vesiculosa*, *Correa baeuerlenii*, has been recorded within 20 km of the subject site during previous surveys undertaken by *Conacher Travers Pty Ltd*. Both species were considered to have potential habitat within the subject site.

Aldrovanda vesiculosa – A small waterplant which traps aquatic insects and grows in shallow fresh water, often caught on submerged vegetation. Known only in shallow coastal wetlands in the Moruya and Evans Head area. This species was targeted during the survey, no specimens were observed.

Correa baeuerlenii – A shrub 1-2.5 m high which grows in sclerophyll forest, from the Clyde River District to Bega. This species was targeted during the survey, no specimens were observed.

Due to the potential for these threatened flora species to occur within the subject site, both have been assessed, with regard to the potential impacts of the proposed development, under Part 3A of the *EP&A Act 1979,* maintain or improve assessment in Section 5 of this report. In addition, these species have been assessed under the 7-part test of significance, Section 5A of the *EP&A Act 1979,* which forms Addendum 1 of this report.

Three (3) endangered ecological communities, Swamp Oak Floodplains Forest, River Flat Eucalypt Forest on Coastal Floodplains and Freshwater Wetlands on Coastal Floodplains, were identified within the subject site during the survey and are discussed in Section 4.7. These communities are also assessed with regard to the potential impacts of the proposed development under Part 3A of the *EP&A Act 1979,* maintain or improve assessment in Section 5 of this report and under the 7-part test of significance, Section 5A of the *EP&A Act 1979,* which forms Addendum 1 of this report.

- *SEPP 14 Coastal Wetlands assessment*

The objectives of this policy are outlined in Section 1.3.1 of this report.

Bevian Wetland is located within the southern portion of the subject site (Figure 3) and has been mapped by the NSW Department of Planning as SEPP 14 Wetland No. 197. As such the proposed development is required to consider and meet the objectives of the SEPP 14 – Coastal Wetlands Policy.

Specific areas of consideration are:

(a) the environmental effects of the proposed development, including the effect of the proposed development on:

(v) the growth of native plant communities,
(vi) the survival of native wildlife populations,
(vii) the provision and quality of habitats for both indigenous and migratory species,
(viii) the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding area, including salinity and water quality,

The Bevian Road Concept Application has considered the specific plant species and vegetation communities associated with the Bevian Wetland, which include three endangered ecological communities, Swamp Sclerophyll Forest, River Flat Eucalypt Forest on Coastal Floodplains and Freshwater Wetlands on Coastal Floodplains. These vegetation communities will be retained and buffered as part of the Plan of Subdivision (Figure 4).

The land surrounding the wetland and containing two of the endangered ecological communities, Swamp Sclerophyll Forest and River Flat Eucalypt Forest on Coastal Floodplains, will form an important restoration zone which will achieve an overall net improvement in the retention and restoration of these communities.

No migratory species have been recorded within the site however, the wetland may provide potential habitat for migratory species. The potential habitat for migratory species will be improved through restoration works within the vegetation surrounding the wetland and the implementation of water sensitive urban design principles across the site. As such, there is unlikely to be a significant impact on any migratory birds with the potential to utilise the site.

Bevian Wetland currently undergoes wetting and drying cycles, which follow rainfall patterns with a lag period, likely to be due to slower subsurface water flows draining the landscape. The occurrence of dry periods indicates the wetlands are mainly supplied by surface flows. Water sensitive urban design principles have been modelled to achieve an improvement in the existing conditions with regards to water quality and to maintain current water flows (*Patterson Britton* 2007b).

(b) whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment,

Adequate safeguards to protect the wetland and associated vegetation have been incorporated into the Plan of Subdivision (Figure 4). These management measures include: the application of a 50 metre vegetated buffer to the wetland, two detention basins to the north of the wetland within the Bevian Wetland Catchment, the upgrade of Bevian Road from the existing unsealed surface and the restoration of the vegetation communities surrounding the wetland.

In addition, Grass swales will be applied to road reserves and rain water tanks will be installed with each dwelling.

(c) whether carrying out the development would be consistent with the aim of this policy,

The Bevian Road Concept Application is considered to be consistent with the aim of the policy, which is to ensure the preservation and protection of the wetland in the environmental and economic interests of the State.

This is achieved through the implementation of water sensitive urban design principles, development setbacks from the wetland, buffering of the wetland and restoration works surrounding the wetland.

(d) the objectives and major goals of the "National Conservation Strategy for Australia" (as set forth in the second edition of a paper prepared by the Commonwealth Department of Home Affairs and Environment for comment at the National Conference on Conservation held in June, 1983, and published in 1984 by the Australian Government Publishing Service) in so far as they relate to wetlands and the conservation of "living resources" generally, copies of which are deposited in the office of the Department,

The three main objectives in conserving living resources as outlined in the *National Conservation Strategy for Australia* are:

1. To maintain essential ecological processes and life support systems
2. To preserve genetic diversity
3. To ensure the sustainable utilisation of species and ecosystems

The Bevian Road Concept Application incorporates the following ecological protection and enhancement measures across the site, which adequately meets the objectives outlined above:

- Retention, protection and restoration of existing remnants within the site

- Revegetation of drainage lines creating connectivity between existing remnants and vegetation offsite and as a consequence improving the viability of habitat
- The integration of conservation precincts, open space precincts and development precincts such that the ecological functioning of the landscape is improved whilst also improving the social, visual and recreational values and opportunities of the site.

(e) whether consideration has been given to establish whether any feasible alternatives exist to the carrying out of the proposed development (either on other land or by other methods) and if so, the reasons given for choosing the proposed development,

The lands associated with the Bevian Road Concept Application are predominately zoned 10 – Urban Expansion and as such have been identified under the Eurobodalla Local Environment Plan as suitable for the residential subdivision proposed. The proposed development will results in an improved environmental outcome for the land through the removal of livestock, restoration of vegetation communities, revegetation of riparian zones and implementation of water sensitive urban design principles.

(f) any representations made by the Director of National Parks and Wildlife in relation to the development application, and

Key issues raised by the Department of Environment and Climate Change (DECC) with regard to the previous application for the Bevian Road, Rosedale site are:

- Environmental impacts on the SEPP 14 Wetland – Bevian Swamp, notably due to stormwater and road construction.
- Environmental impacts on the foraging habitat of threatened species including the Yellow-bellied Glider and Eastern Bent-wing Bat.
- Environmental impacts of pets and increased human presence on wildlife and shorebirds.
- Protection of Endangered Ecological Communities (EECs).

These issues have been addressed in the current Bevian Road Concept Application in the following ways:

- Impacts to the Bevian wetland have been addressed as per the comments provided in points (a) – (e) above. Specifically, those impacts associated with the Bevian Road upgrade have been addressed above under *'Potential impacts associated with the upgrade of Bevian Road'.*
- Assessment of threatened species habitat under the maintain or improve assessment in Section 5 of the *Flora and Fauna Assessment report* (*Conacher Travers* 2007a) resulted in no significant impacts on threatened species habitats. The summary of these findings is provided in Section 4.1.2.1 of that report.
- The impact of domestic animals has been considered within the proposed development and a by-law is proposed to exclude all cats and dogs from the development, with the exception of companion animals as defined under the *Companion Animals Act 1998.* This by-law will be regulated under a community management title proposed for the development.
- The three endangered ecological communities associated with Bevian Wetland, Swamp Oak Floodplain Forest, River Flat Eucalypt Forest on Coastal Floodplains and Freshwater Wetlands on Coastal Floodplains, will predominately be retained within the 50 metre buffer surrounding the wetland. These vegetation communities will also have a development setback applied. The areas surrounding the wetland will form an important restoration zone (Schedule 1 – Restoration Management Plan), which will restore the

endangered ecological communities in order to achieve a net improvement in their coverage and protection.

The consideration of these previous key issues raised by the DECC and recent onsite visits and consultation undertaken with the DECC has been an important component of the current design of the Bevian Road Concept Application and it is considered that the current application adequately addresses these concerns.

(g) any wetlands surrounding the land to which the development application relates and appropriateness of imposing conditions requiring the carrying out of works to preserve or enhance the value of those surrounding wetlands.

Bevian Wetland is the only wetland within the vicinity of the proposed development. It is considered that the Bevian Road Concept Application adequately protects this wetland through the measures outlined in points (a) – (f) above. All works associated with the development will be controlled under an Ecological Site Management Plan - ESMP - (*Conacher Travers 2007b),* which will further ensure that protection measures are implemented prior, during and post construction phases.

Conclusion

The Bevian Road Concept Application adequately protects Bevian Wetland through its consistency with the objectives of the SEPP 14 – Coastal Wetlands Policy. The proposed development will apply a 50 metre buffer to the wetland, an extensive restoration area surrounding the wetland for the rehabilitation of associated endangered ecological communities, two detention basins to the north of the wetland within the Bevian Wetland catchment and the implementation of water sensitive urban design principles across the site.

- *SEPP 71 Coastal Protection assessment*

The key considerations of this policy are outlined in Section 1.3.1 of this report. Commentary on those considerations relevant to the ecological features (denoted in Section 1.3.1 by an asterix* and listed below) of the site are provided below.

Subject site remediation

Three key restoration zones have been designated within the site (Schedule 1 – Restoration Management Plan). These include Vegetation Corridor 1, Vegetation Corridor 2 and the Southern Restoration Zone. The two vegetation corridors will provide vegetation connectivity between protected remnants within the site and to vegetation off site. These corridors will improve the movement of fauna and genetic transfer of plant materials across the site and improve the habitat viability of protected remnants within the site. Further improvements proposed for vegetation connectivity are further described in Section 4.1.2.2 of the Ecological Assessment Report (*Conacher Travers* 2007d).

Conservation of water quality and use

The aim of the Bevian Road Concept Application has been to achieve a maintain or improve outcome for water quality post development. Modelling of the water treatment measures to be applied across the site has resulted in an improvement to existing conditions in water quality (*Patterson Britton* 2007b). Further details as to the comprehensive water sensitive urban design principles to be applied across the site are provided in Sections 4.2.2.2 & 4.3.2.2 of the Ecological Assessment Report (*Conacher Travers* 2007d).

Conservation of fish and marine vegetation and their habitats

There are no marine habitats within the site and fresh water fish habitats are considered to be limited to the Bevian Wetland and dam areas. Fish habitat has been considered in the ephemeral drainage lines within the northern portion of the site which link with the Saltwater Creek ICOLL and eventually the South Pacific Ocean. Fish passage structures are proposed along the northern drainage lines within the site to allow for freedom of movement for fish into Saltwater Creek during times of flow.

Conservation of animals, plants and their habitats

The conservation of flora and fauna and their habitats has been key to the final Constraints Map (Figure 3) developed for the site. The Subdivision Plan (Figure 4) has been designed in response to the Constraints Map. The result being that The Bevian Road Concept Application provides for the integration of development and conservation precincts. Conservation precincts retain and protect remnant native vegetation within the site, whilst the proposed restoration of riparian zones will improve the vegetation connectivity between these protected remnants and to vegetation off site. As a consequence, fauna movement and the genetic transfer of plant material across the site will be enhanced.

4.7.2 National Legislative Matters

***Environment Protection and Biodiversity Conservation (EPBC) Act* (1999)**

A review of the schedules of the *EPBC Act* (1999) indicated the potential for four (4) threatened flora species and no endangered ecological communities to occur within a 10km radius of the subject site. One (1) preliminary endangered ecological community, Dry Gully Rainforest, was identified in the north western side of the site. Threatened flora species included; *Caladenia tessellata, Cryptostylis hunteriana, Genoplesium vernale* and *Thesium australe* (Listed in Table A1.3, Appendix 1).
None of these species were considered likely to occur within the subject site and none were identified during the survey. As such a referral to Department of the Environment & Heritage is not required.

4.8 Endangered Ecological Communities

The following endangered ecological communities have been recorded within the general locality of the subject site: Bangalay Sand Forest, Freshwater Wetlands on Coastal Floodplains, Littoral Rainforest, Coastal Saltmarsh, River-Flat Eucalypt Forest on Coastal Floodplains and Swamp Oak Floodplain Forest.

It is considered that the subject site does not contain the habitat requirements or species composition for Littoral Rainforest or Coastal Saltmarsh.

A more detailed description of the ecological communities with the potential to occur within the subject site, Bangalay Sand Forest, Freshwater Wetlands on Coastal Floodplains, River-Flat Eucalypt Forest on Coastal Floodplains and Swamp Oak Floodplain Forest, are provided below.

BANGALAY SAND FOREST (BSF)

General Description

Bangalay Sand Forest occurs in the Sydney Basin and South East Corner bioregions. This endangered ecological community occurs on flat to moderate slopes within a few kilometres of the sea, at altitudes below 100 m.

Habitat Requirements

- Geology / Soils: Deep free draining to damp sandy soils.
- Topography: Coastal sand plains on flat to moderate slopes within a few kilometres of the sea, occurs at altitudes below 100m.
- Characteristic Canopy Species: *Eucalyptus botryoides, Eucalyptus pilularis* and *Casuarina glauca.*

Conservation Status and Distribution

This community occurs in the Sydney Basin and South East Corner bioregions. Bangalay Sand Forest is conserved in Royal, Seven Mile Beach, Conjola, Meroo, Murramarang, Eurobodalla and Biamanga National Parks.

Key Threatening Processes

- Clearing of native vegetation
- Invasion of native plant communities by exotic perennial grasses
- Anthropogenic pressures from camping areas
- High frequency fire regimes

Occurrence and quality within the subject site

The Swamp Oak Open Forest vegetation surrounding the Bevian Swamp within the southeast corner of the subject site contains a small number of the floristic characteristics of this endangered ecological community. It is considered that the vegetation surrounding the Bevian Swamp is a transition between Swamp Oak Floodplain Forest and Bangalay Sand Forest.

As this community is dominated by Casuarina glauca with very few of Eucalyptus botryoides trees present, it is considered that the Swamp Oak Open Forest vegetation is more closely representative of the EEC, Swamp Oak Floodplain Forest than Bangalay Sand Forest and has been assessed as such below.

It was also acknowledged that the Banksia Scrub vegetation community contained a small number of characteristic species of this EEC. However, analysis of the greater floristic assemblage, topographic position on the elevated hilltop, and the underlying geological substrates have identified that the geomorphological requirements of this EEC are not present within this location.

SWAMP OAK FLOODPLAIN FOREST (SOFF)

General Description

The ecological community associated with grey-black clay-loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines.

Habitat Requirements

- Geology / Soils: Alluvial soils of fluvial or estuarine origin, with significant salinity.
- Topography: Flood plains in areas with saline soils and flats adjoining estuaries.
- The most dominant canopy species of Swamp Oak Floodplain Forest is *Casuarina glauca.*

Conservation Status and Distribution

Small areas of Swamp Oak Floodplain Forest are contained within existing conservation reserves, including: Stotts Island Nature Reserve (NR), Ukerebagh NR, Tuckean NR, Pambalong NR, Towra Point NR, Cullendulla Creek NR, Bongil Bongil National Park (NP), Myall Lakes NP and Conjola NP.

Key Threatening Processes

- Clearing of native vegetation;
- Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands;
- Invasion of native plant communities by exotic perennial grasses;
- Predation, habitat destruction, competition and disease transmission by feral pigs;
- Anthropogenic climate change; and
- High frequency fire regimes.

Occurrence and quality within the subject site

The Swamp Oak Open Forest and Closed Swamp Paperbark Scrub vegetation identified within the southern portion of the subject site contain a number of the key floristic and geomorphologic characteristics of the endangered ecological community, SOFF, and as such this community is considered to occur on site. The condition of these communities range from very high in those areas directly adjoining Bevian Swamp to moderate/low in those small number of isolated remnants further up the drainage lines. These isolated remnants contain significantly fewer native species within the total floristic assemblage and are severely impacted by a variety of exotic herbs and pasture grasses and cattle grazing.

It is also considered that the highly disturbed communities, Regrowth Swamp Oak Open Heath and Regrowth Swamp Paperbark Open Heath also contain a small number of the characteristic species and geomorphologic requirements of the EEC, SOFF. However, detailed floristic condition sampling completed in accordance with the methodology provided in Appendix 3 of the Biometric Version 1.8 Operation Manual (Gibbons et al. 2005), identified these communities as being of " Low condition" and as such, they are considered to have a high likelihood of not being viable in the long-term under current management practises.

FRESHWATER WETLANDS ON COASTAL FLOODPLAINS (FWCF)

General Description
A variable complex of wetland communities on floodplains, which is distinct from the endangered ecological community Sydney Freshwater Wetlands.

Habitat Requirements
- Geology / Soils: Alluvial soils which are subject to periodic or semi-permanent inundation by freshwater.
- Topography: Depressions, flats, drainage lines, lagoons and lakes of coastal floodplains.
- Characteristic Canopy Species: Sedgelands and reedlands, to herbfields, in which woody plants are generally scarce.

Conservation Status and Distribution
Occurs generally at elevations of less than 20 metres AHD, along the length of coastal NSW. Small areas are conserved in existing conservation reserves, including Ukerebagh, Tuckean, Tabbimobile Swamp, Hexham Swamp, Pambalong and Pitt Town Nature Reserves and Bungawalbin, Scheyville and Seven Mile Beach National Parks.

Key Threatening Processes
- Clearing of native vegetation
- Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands
- Invasion of native plant communities by exotic perennial grasses;
- Predation, habitat destruction, competition and disease transmission by feral pigs
- Anthropogenic climate changes

Occurrence and quality within the subject site

The Bevian Swamp observed within the southeast corner of the subject site contains a number of the key floristic and geomorphological characteristics of the endangered ecological community, FWCF, and as such this community is considered to occur on site.

RIVER-FLAT EUCALYPT FOREST ON COASTAL FLOODPLAINS

General Description
A variable complex of wetland communities on floodplains, which is distinct from the endangered ecological community Sydney Freshwater Wetlands.

Habitat Requirements
- Geology / Soils: Alluvial soils which are subject to periodic or semi-permanent inundation by freshwater.
- Topography: Depressions, flats, drainage lines, lagoons and lakes of coastal floodplains.
- Characteristic Canopy Species: Sedgelands and reedlands, to herbfields, in which woody plants are generally scarce.

Conservation Status and Distribution
Occurs generally at elevations of less than 20 metres AHD, along the length of coastal NSW. Small areas are conserved in existing conservation reserves, including Ukerebagh, Tuckean, Tabbimobile Swamp, Hexham Swamp, Pambalong and Pitt Town Nature Reserves and Bungawalbin, Scheyville and Seven Mile Beach National Parks.

Key Threatening Processes
- Clearing of native vegetation;
- Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands;
- Invasion of native plant communities by exotic perennial grasses;
- Predation, habitat destruction, competition and disease transmission by feral pigs; and
- Anthropogenic climate changes.

Occurrence and quality within the subject site

The Regrowth Redgum Open Woodland vegetation identified within the south-eastern portion of the subject site contains a small number of the key floristic and geomorphologic characteristics of the endangered ecological community, RFEFCF, and as such this community is considered to occur on site. However, detailed floristic condition sampling completed in accordance with the methodology provided in Appendix 3 of the Biometric Version 1.8 Operation Manual (Gibbons et al. 2005), identified this community as being of " Low condition" and as such, it is considered to have a high likelihood of not being viable in the long-term under current management practises.

4.9 Fauna Species

A total of one hundred and twenty one (121) species were observed within or adjacent to the subject site during the survey. This number comprised eighty (86) bird, five (5) reptile, seven (7) amphibian, twenty two (22) mammal species and one (1) fish species. Five (5) threatened species, Powerful Owl (*Ninox strenua*), Glossy Black-Cockatoo (*Calyptorhynchus lathami*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Eastern Bentwing-bat (*Miniopterus schreibersii oceansis*), and Greater Broad-nosed Bat (*Scoteanax rueppellii*) were observed utilising the subject site by *Conacher Travers*. In addition, one (1) threatened fauna species, Yellow-bellied Glider (*Petaurus australis*) was recorded within the subject site

by *Gunninah Environmental Consultants* in 2002. All other species as listed in Table 1.4 of Appendix 1 are considered relatively common in the local area.

Eighty six (86) birds were identified within the subject site. This included two (2) threatened species, Glossy Black-Cockatoo and Powerful Owl. All other species are considered to be common within the local area. Sixteen (16) threatened bird species are considered to have potential to utilise the subject site.

Twenty two (22) species of mammal were recorded to be utilising the subject site. This included eight (8) terrestrial species, five (5) common arboreal species and nine (9) bats. Three (3) bats species identified within the subject site are listed as threatened species. Fourteen (14) threatened mammal species, are considered to have potential habitat within the subject site.

Five (5) common species of reptile were recorded within the subject site. No threatened species of reptile are considered to have potential to utilise the subject site.

Seven (7) amphibians were heard calling within the wetland, creeklines and dams throughout the site. Two (2) threatened species of amphibian are considered to have potential to utilise the subject site.

One (1) fish species, Marbled Eel, was recorded within a dam located in the north-eastern portion of the subject site.

4.10 Habitat Types

A range of fauna habitats exist throughout the site and include:

- Vegetated areas of Open Forest / Woodland
- Open Forest dominated by the winter flowering Spotted Gum
- Dense to sparse shrublayer
- Sparse to moderate density ground cover
- Nectar producing plants, principally *Banksia* and *Acacia*
- Tree hollows
- Fallen timber and hollow logs
- Loose soil suitable for burrowing
- Sparse to moderate litter layer
- Aquatic Habitats characterised by farm dams, creeklines and ephemeral drainage lines
- Bevian Swamp Wetland
- Grassland and scattered trees
- Dwellings, sheds and landscaped gardens
- Occasional rubbish debris associated with abandoned nursery
- Masonry refuse

4.11 Habitat assessment

The nine (9) vegetation communities and three (3) vegetation community variations present within the subject site provide a diverse array of habitat. The habitat attributes of each vegetation community are described below.

Vegetation Community 1 – Spotted Gum/Ironbark Open Forest/Woodland occurs in the northern-eastern corner, along the eastern boundary and within the north-western and

south-western sections of the subject site. This community is dominated by the winter flowering *Corymbia maculata* (Spotted Gum). This community provides suitable foraging habitat for birds, bats and arboreal mammals. Winter flowering species provide foraging resources for threatened migratory bird species such as Swift Parrots and Regent Honeyeaters. This community contains a number of tree hollow types and sizes. These hollows provide suitable roosting and nesting habitat for a range of small birds, large forest owls, arboreal mammals and arboreal reptiles species. A moderate to sparse shrublayer provides refuge and foraging habitat for birds, arboreal mammals and terrestrial mammal species. A moderate litter layer provides a micro habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 2 – Blackbutt Woodland occurs in the eastern section of the subject site and covers approximately 5% of the subject site. This community is dominated by the early January flowering *Eucalyptus pilularis* (Blackbutt). This provides foraging habitat for birds, bats and arboreal mammals. The vegetation community provides little den habitat, with only a low number of small hollows (<10cm) detected. A sparse shrublayer provides limited protective and foraging habitat for birds, arboreal mammals and terrestrial mammal species. This community has a long grazing history and contains a dense groundcover of herbs and grasses which provide limited habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 3 – Dry Gully Rainforest occurs within two gullies in the north western section of the subject site. This community provides suitable foraging habitat for birds, bats and arboreal mammals. This community provides little den habitat. No tree hollows were detected however the *Livistona australis* species provides an alternative den/shelter resource for small arboreal species. The dense shrublayer provides suitable foraging and shelter habitat for a number of species including birds, arboreal mammals and terrestrial mammal species. This community provides suitable foraging resources for the Superb Fruit-dove. The dense litter layer within this community provides a micro habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 4 – Banksia Scrub occurs on the top of a hill located in the central section of the subject site. This area is known locally as the “The Knoll”. This community is dominated by the January to June flowering *Banksia integrifolia* (Coastal Banksia) which provide foraging habitat for birds, bats and small arboreal mammals. No hollow trees were observed within this community. A moderate to dense shrublayer provides suitable protective and foraging habitat for birds, arboreal mammals and terrestrial mammal species. A dense groundcover of herbs and grasses as well as tree litter provides suitable habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 5 – Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC) occurs within the floodplains and along the edge of the Bevian Swamp Wetland in the south eastern section of the subject site. This subject site is dominated by *Casuarina glauca* with a low number of *Eucalyptus botryoides* (Bangalow). This community provides foraging habitat for birds, bats and arboreal mammals. This community provides little den habitat, with only a low number of small hollows (<10cm) detected. The sparse shrublayer provides limited protective and foraging habitat for birds, arboreal mammals and terrestrial mammal species. This community has a long grazing history and contains a dense groundcover of herbs and grasses which provide limited habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 5a – Disturbed Swamp Oak Open Heath (Low Quality Swamp Oak Floodplain Forest EEC) occurs within the highly disturbed previously cleared floodplains in the southern section of the subject site. This community is dominated by scattered samplings of *Casuarina glauca* which provide only limited feed resources. This community

provides no den habitat for birds, arboreal mammals and terrestrial mammal species. This community has a long grazing history and contains a dense groundcover of herbs and grasses which provide limited habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 6 – Aquatic Herbfield occurs in eight farm dams located throughout the subject site. This community provides a foraging and watering resource for birds, bats, terrestrial mammals, reptiles and amphibians. The majority of farm dams were surrounded by Eleocharis *sp*, which provides suitable refuge for birds, reptile, amphibian and small mammal species. Fallen timber and building debri around water bodies also provides refuge for amphibian, reptile and small mammal species.

Vegetation Community Variation 6a – Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains EEC) occurs within the Bevian Swamp in the southern portion of the subject site. This community provides a foraging and watering resource for birds, bats, terrestrial mammals, reptiles and amphibians.

Vegetation Community 7 – Grassland with Scattered Trees occurs in the majority of the subject site. This community contains the winter flowering *Corymbia maculata* (Spotted Gum) and *Eucalyptus tereticornis* (Forest Red Gum) species. These species provide a winter foraging resource for threatened migratory bird species (Swift Parrot and Regent Honeyeater). This community provides sparse foraging habitat for birds, bats and arboreal mammals. A number of hollow bearing trees were observed within this vegetation community. These contained small (<10cm), medium (10 - 30cm) and large (>30cm) sized hollows. These provide potential roosting and nesting habitat for birds, micro-chiropteran bats, small arboreal mammals and some arboreal reptile species. This community has a long grazing history and contains a dense groundcover of herbs and grasses which provide limited habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 8 – Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC) occurs in the far southeast of the subject site on the floodplain. This community contains a small number of the winter flowering *Eucalyptus tereticornis* (Forest Red Gum) species. This species provide a winter foraging resource for threatened migratory bird species (Swift Parrot and Regent Honeyeater). This community provides sparse foraging habitat for birds, bats and arboreal mammals. A small number of hollow bearing trees were observed within this vegetation community. These contained small (<10cm) and medium (10 - 30cm) sized hollows. These provide potential roosting and nesting habitat for birds, micro-chiropteran bats, small arboreal mammals and some arboreal reptile species. This community has a long grazing history and contains a dense groundcover of herbs and grasses which provide limited habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 9 – Swamp Paperbark Closed Scrub (Core Quality Swamp Oak Floodplain Forest EEC) occurs as a small isolated patch on the floodplain, along the edge of the Bevian Swamp Wetland in the south eastern section of the subject site. This vegetation is dominated by *Melaleuca ericifolia*. This community provides foraging habitat for birds, bats and arboreal mammals. This community provides no den habitat for birds, arboreal mammals and terrestrial mammal species. This community has a dense groundcover of herbs and grasses which provide habitat for small terrestrial mammals, reptiles and amphibians.

Vegetation Community 9a – Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC) occurs within the highly disturbed previously cleared floodplains in the southern section of the subject site. This community is dominated by scattered samplings of *Melaleuca ericifolia*. which provide only limited feed resources. This community provides no den habitat for birds, arboreal mammals and terrestrial mammal species. This

community has a long grazing history and contains a dense groundcover of herbs and grasses which provide limited habitat for small terrestrial mammals, reptiles and amphibians.

4.12 Threatened Fauna

4.12.1 State Legislative Matters

Threatened Species Conservation Act (1995)

A search of the Atlas of NSW Wildlife (DECC 2007) database for threatened species resulted in records of twenty one (21) threatened species within a 10 km radius of the subject site. Coastal and oceanic threatened species found within 10 km have not been included. Ten (10) threatened species, not recorded within a 10km radius of the subject site by the Atlas of NSW Wildlife database, are considered to have the potential to utilise the site based on previous survey work in and knowledge of the locality by *Conacher Travers Pty Ltd.*
These species have been included in the list of threatened species to be assessed in accordance with Part 3A of the *EP&A Act 1979* (Section 5 of this report) and have also been assessed under a Section 5A, *EP&A Act* (1979) 7-part test (Addendum 1). Table A1.5 of Appendix 1 identifies whether the subject site provides potential habitat for these species.

A habitat assessment of the vegetation communities present within the subject site, combined with knowledge of the location of local threatened species populations, yielded the identification of potential habitat for the following threatened species within the subject site.

Species	Shelter	Foraging	Roosting	Breeding
Giant Burrowing Frog		✓		✓
Green & Golden Bell Frog		✓		✓
Square-tailed Kite		✓	✓	✓
Osprey			✓	✓
Black Bittern	✓	✓		✓
Australasian Bittern	✓	✓		✓
Painted Snipe		✓		✓
Superb Fruit-dove		✓	✓	✓
Glossy Black-Cockatoo		✓	✓	✓
Gang-Gang Cockatoo		✓	✓	✓
Swift Parrot		✓		
Turquoise Parrot		✓	✓	✓
Regent Honeyeater		✓		
Diamond Firetail		✓	✓	✓
Olive Whistler		✓	✓	✓
Barking Owl		✓	✓	✓
Powerful Owl		✓		✓
Masked Owl		✓	✓	✓
Sooty Owl		✓	✓	✓
Hooded Robin		✓	✓	✓
Brush-tail Phascogale	✓	✓		✓
Spotted-tailed Quoll		✓		
Southern Brown Bandicoot		✓		
Long-nosed Potoroo		✓		
Koala		✓		
Squirrel Glider	✓	✓		✓
Yellow-bellied Glider	✓	✓		✓
Grey-headed Flying-fox		✓		
Large-footed Myotis		✓	✓	
Little Bentwing-bat		✓	✓	

Eastern Bentwing-bat		✓		
Greater Broad-nosed Bat		✓	✓	✓
Eastern Freetail-bat		✓	✓	✓
Eastern False Pipistrelle		✓	✓	✓

A detailed assessment in accordance with Part 3A of the *EP&A Act* (1979) will be completed for these species in Section 5 of this report. In addition, these species have also been assessed under a Section 5A, *EP&A Act* (1979) 7-part test (Addendum 1)

Fisheries Management Act (1994)

It is considered that the subject site does not provide any potential habitat for threatened aquatic species listed under the *Fisheries Management Act* (1994) based on the low quality habitat and intermittent nature of the water bodies within the site. It is expected that fish habitat within the site will be improved with the revegetation and regeneration works along riparian zones and the implementation of water sensitive urban design principles across the site.

SEPP 44 - Koala Habitat Protection

One (1) Koala food tree species (*Eucalyptus tereticornis*) listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44), was observed within the subject site. This species made up <10% of trees within the site. This is less than the 15% required by SEPP 44 for classification as Potential Koala Habitat. Therefore the subject site is not considered to contain 'Potential Koala Habitat' as defined by SEPP 44.

No Koalas or secondary evidence of habitation were observed during the fauna survey. A search of the Atlas of NSW Wildlife (DECC 2007) - Batemans Bay 1:100,000 scale map sheet and Bionet (2007) for the Eurobodalla Local Government Area, threatened fauna databases found no records of Koala habitation within a 10 km radius from the study area.

The potential impacts of the proposed development on the Koala were specifically addressed in Section 5, Maintain or Improve Assessment Table No. 22 of this report. The results of this assessment found that habitat for this species would be lost however, the majority of this formed low quality Grassland with Scattered Trees and as such a significant impact would not result. The 7 part test, Addendum 1 of this report, also concluded that potential habitat for koalas would not be significantly impacted by the proposed development.

Based on the absence of SEPP 44 Potential or Core Koala habitat within the subject site and the results of the maintain or improve assessment in Section 5 of the Flora and Fauna Assessment Report (Conacher Travers 2007a), the subject site is not considered to be significant with regards to Koala habitat and as such the Bevian Road Concept Application is unlikely to have an impact on the Koala. Further to this, the future development may improve the potential habitat for this species through the creation of wildlife corridors between remnants within the site and vegetation off site.

4.12.2 National Legislative Matters

EPBC Act (1999) – A review of the schedules of the *EPBC Act* (1999) identified the presence of ten (10) threatened species within a 10km radius of the subject site. These species have been listed in Table A1.5 (Appendix 1) and those with potential to utilise the subject site have been assessed in accordance with Part 3A of the *EP&A Act 1979* (Section 5 of this report) and have also been assessed under a Section 5A, *EP&A Act* (1979) 7-part test (Addendum 1).

A referral to the Department of Environment and Heritage (DEH) is not required.

SECTION 5.0 - THREATENED SPECIES, POPULATIONS & ENDANGERED ECOLOGICAL COMMUNITIES - MAINTAIN OR IMPROVE ASSESSMENT (Part 3A *EP&A Act* 1979)

The maintain or improve assessment relies on the ecological appraisal provided in Sections 3 & 4 of this report and should be read as such. The assessment is set out in accordance with the *DRAFT Guidelines for Threatened Species Assessment* (DEC & DPI 2005) and includes the following steps:

- Step 1, (Section 5.1) - evaluates the impacts of the proposal on the extent of endangered ecological communities and suitable habitat for threatened species.
- Step 2, (Section 5.2) - discusses the proposed mitigation measures used within the development to protect endangered ecological communities and threatened species.
- Step 3, (Section 5.3) - discusses the proposed offset measures used to compensate for any loses in vegetation and to achieve a net improvement in vegetation and habitat extent.
- Step 4, (Section 5.4) - provides conclusions to the maintain or improve assessment for endangered ecological communities and threatened flora and fauna species.
- Step 5, (Section 5.5) - evaluates the conclusions of the assessment against the key threshold criteria outlined in the *DRAFT Guidelines for Threatened Species Assessment* (DEC & DPI 2005).

Each step has been used to determine whether a potential impact is to be avoided, mitigated or offset with the overall aim being to maintain or improve the existing situation in each case.

5.1 Evaluation of the Impacts of the proposal

Criteria used to assess the potential impacts of the Bevian Road Concept Application on the extent of suitable habitat for threatened flora and fauna species and endangered ecological communities recorded within the subject site or considered likely to occur within the subject site are:

- Existing area of vegetation or habitat (ha)
- Area of vegetation or habitat to be removed (ha)
- Area of vegetation or habitat to be retained/restored (ha)
- Area of vegetation or habitat to be revegetated/offset (ha)

Endangered Ecological Communities (EECs)

Three (3) endangered ecological communities, Swamp Oak Floodplain Forest (SOFF), River Flat Eucalypt Forest on Coastal Floodplains (RFEFCF) and Freshwater Wetlands on Coastal Floodplains (FWCF) have been recorded within the southern portion of subject site, associated with Bevian Wetland and the surrounding coastal floodplain and drainage lines. To assist the maintain or improve assessment, the status of each community was analysed as being in low or good condition in accordance with the BioMetric Operation Manual Guidelines (Gibbons *et al* 2005). The low condition remnants were considered to be significantly affected by existing disturbance and are unlikely to be viable in the long term. Within the context of the proposed development an alternative restoration offset has been proposed which will result in an improved outcome for all three endangered ecological communities.

EEC maintain/improve extent assessment

The maintain or improve assessment Tables 3-5, prepared for each of the EECs, provide the details on the extent of each community in good and low condition being; removed, retained and offset (via revegetation works). Field data collected to prepare the assessment tables is provided in Appendix 3. To further determine if a maintain or improve outcome is achieved, in regards to each communities extent within the subject site, the initial extent and proposed total retained extent of each community, in good and low condition is also provided.

Table 3: EEC Maintain/Improve Assessment

Swamp Oak Floodplain Forest EEC						
Vegetation community type and quality	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total Retained (ha)**	**Maintain or Improve**
Swamp Oak Open Forest						
Core Good Condition	4.48	0	5.64	1.12	6.76	**Improve**
Low Condition	1.62	0.08	0.36	0.03	0.39	
Total	6.1	0.08	6.0	1.15	7.15	
Swamp Paperbark Scrub						
Core Good Condition	0.09	0	1.99	3.38	5.65	**Improve**
Regenerating Low Condition	5.04	1.7	1.44	0.5	1.94	
Total	5.13	1.7	3.43	3.88	7.59	
Total Swamp Oak EEC	**11.23**	1.78	9.43	5.03	**14.46**	**Improve**

Table 4: EEC Maintain/Improve Assessment

River Flat Eucalypt Forest on Coastal Floodplains EEC						
Vegetation community type and quality	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total Retained (ha)**	**Maintain or Improve**
Disturbed Red Gum Open Woodland						
Core Good Condition	0	0	0.92	0.69	1.61	**Improve**
Regenerating Low Condition	2.05	0.36	0.77	0.05	0.82	
Total	2.05	0.36	1.69	0.74	2.43	

Table 4: EEC Maintain/Improve Assessment

River Flat Eucalypt Forest on Coastal Floodplains EEC						
Total River Flat EEC	2.05	0.36	1.69	0.74	2.43	**Improve**

Table 5: EEC Maintain/Improve Assessment

Freshwater Wetlands on Coastal Floodplains EEC						
Vegetation community type and quality	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total Retained (ha)**	**Maintain or Improve**
Freshwater Wetland Vegetation						
Core Good Condition	5.94	0	5.94	0	5.94	**Maintain**
Regenerating Low Condition	0	0	0	0	0	
Total	5.94	0	5.94	0	0	
Total Freshwater Wetlands EEC	**5.94**	0	5.94	0	**5.94**	**Maintain**

Summary of results from maintain/improve assessment Tables 3 – 5

The overall results of the maintain or improve assessment tables for endangered ecological communities were as follows:

Table 6: Maintain/improve assessment result by endangered ecological community

Endangered Ecological Community	Maintain/improve assessment result	Table
Swamp Oak Floodplain Forest	Improve	3
Riverflat Eucalypt Forest on Coastal Floodplains	Improve	4
Freshwater Wetlands on Coastal Floodplains	Maintain	5

In addition to the maintain and/or improve assessment of the proposal on each communities extent, the likely impacts of the proposal on SOFF and RFEFCF have been assessed below in accordance with the criteria provided in Appendix 3 of the Draft Guidelines for Threatened Species Assessment *(DEC & DPI 2005).* Given the complete retention, buffer and mitigation measures proposed, the proposal is not considered to have any direct or indirect impacts on the EEC- FWCF and as such this community is not assessed further.

- *How is the proposal likely to affect the lifecycle of a threatened species and/or population?*

Not applicable to Endangered Ecological Communities.

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

Direct impacts

The proposal will not result in the removal of any EEC in Core Good condition, as all of the areas identified will be "**avoided'** and securely retained, buffered and restored within the designated conversation area surrounding Bevian Wetland. In regards to the Low Condition EECs observed on site, the proposal is likely to require the removal of approximately 1.8ha of SOFF and 0.36ha of RFEFCF. These impacts are considered to be permanent and irreversible. However, it is considered that given the current condition of these areas of EECs, their unlikely long term viability under existing landuse pressures and the relatively small proportion of the total area of similar and/or better condition EECs proposed for retention within the subject site, these impacts are not likely to be significant.

Managed Impacts

The proposal is also likely to result in the retention and management of areas of existing Low Condition EECs in Asset protection Zones and retention basins. These areas will allow the regeneration of the EECs in accordance with Planning for Bushfire Protection (2006), the majority of which will be to outer protection standards. Given, the current condition of these EECs, their unlikely long term viability and the sites existing landuse pressures, the proposed retention and management of these areas of Low condition EEC is likely to maintain and potentially improve their existing condition in the long term.

Indirect Impacts

Indirect impacts associated with the proposed development in relation to EECs are predominately associated with stormwater runoff, erosion and edge effects. Stormwater

runoff associated with the development will be controlled through the implementation of water sensitive urban design principles, which will include a stormwater treatment train. The treatment train will include water tanks associated with each dwelling to avert flows during rainfall events, gross pollutant traps, bio-retention swales along road sides and detention basins. A Water Management Report has been prepared by *Patterson Britton* (2007b), which outlines the proposed stormwater runoff management techniques. Adopted water management measures are likely to result in maintained or improved conditions in water quality and maintained water flows across the site (*Patterson Britton* 2007b).

The Ecological Site Management Plan prepared by *Conacher Travers* (2007b) outlines weed management works to be undertaken within retained vegetation across the site to allow for the regeneration of and improvement in the quality of native vegetation communities. The Ecological Site Management Plan (*Conacher Travers* 2007b) will also prevent and manage the impacts associated with soil erosion through rapid replanting/seeding of exposed soils, installation of silt fencing and other best practice management techniques prior, during and post construction phases.

- *Does the proposal affect any threatened species or populations that are at the limit of its known distribution?*

Not applicable to Endangered Ecological Communities.

- *How is the proposal likely to affect current disturbance regimes?*

The majority of the good condition SOFF remnants surrounding Bevian Wetland are relatively undisturbed by the current disturbance regimes. However, the isolated remnant patches of good condition SOFF on the floodplain north of the Wetland, and those areas adjoining the existing road and cleared areas are currently subjected to significant edge effects, grazing, compaction, high levels of exotic weed invasion and slashing. In addition to the areas of good condition SOFF, approximately 6.66ha of low condition vegetation were also observed. Areas of low condition SOFF are also significantly affected by the current disturbance regimes of grazing, compaction, high levels of exotic weed invasion, pasture improvement and slashing to the extent that they are unlikely to be viable in the long term. The proposal is likely to exacerbate current disturbance regimes on a small portion (1.78ha) of the area of low condition SOFF through direct removal and development. However, the majority of the current disturbance regimes on the remaining low condition and all of the retained good condition SOFF will be removed by the proposed mitigation and management measures.

Under the current disturbance regimes the entire area (2.05ha) of RFEFCF observed within the subject site is considered to be in low condition and unlikely to be viable in the long term. These existing disturbance regimes include; grazing, compaction, high levels of exotic weed invasion, pasture improvement and slashing. The proposal is likely to exacerbate current disturbance regimes on approximately 50% (0.36ha) of the area of low condition RFEFCF through direct removal and development. However, the entire area of the remaining low condition remnants will have the affects of the current disturbance regimes significantly improved through the proposed mitigation and management measures.

It is considered that the proposals retention and restoration of the entire area of good condition and majority of the low condition SOFF and RFEFCF within the site is likely to result in a net improvement of the current disturbance regimes affecting these communities.

- *How is the proposal likely to affect habitat connectivity?*

Currently the site has little to no connectivity between existing remnants within the site and vegetation offsite.

Through the retention of native vegetation remnants along the boundaries of the site, the revegetation of Ecological Corridors 1 & 2 and the Southern Restoration Zone (Schedule 1 – Restoration Management Plan), the proposed development will result in an improvement in vegetation connectivity and consequently the viability of habitat. Ecological Corridors 1 & 2 will create east west linkages with vegetation offsite and connect the remnant vegetation along the boundaries of the site.

Specifically, restoration works within the Southern Conservation Zone, which contains the EECs, will establish linkages between the fragmented patches of EEC within the site, improving their viability.

As such, the Bevian Road Concept Application will improve habitat connectivity across the site.

- *How is the proposal likely to affect critical habitat?*

No critical habitat relevant to these endangered ecological communities is declared under the *TSC Act 1995* within the subject site.

Threatened Flora Species

Two (2) threatened flora species are considered to have the potential to occur within the subject site:

- *Aldrovanda vesiculosa*
- *Correa baeuerlenii*

Aldrovanda vesiculosa
Aldrovanda vesiculosa is a small waterplant which traps aquatic insects and grows in shallow fresh water, often caught on submerged vegetation. Known only in shallow coastal wetlands in the Moruya and Evans Head area. The Bevian Swamp was identified as containing sub optimal habitat for this species. During the survey of the subject site, no specimens of *Aldrovanda vesiculosa* were observed.

Correa baeuerlenii
Correa baeuerlenii – A shrub 1-2.5 m high which grows in sclerophyll forest, from the Clyde River District to Bega. It is considered that the Spotted Gum/Ironbark Open Forest and the Blackbutt Woodland vegetation communities within the subject site provide potential habitat for *Correa baeuerlenii*. During the survey of the subject site, no specimens of *Correa baeuerlenii* were observed.

Threatened flora maintain/improve suitable habitat extent assessment

The maintain or improve assessment Tables 7-8, prepared for each of the threatened flora species with potential habitat within the subject site, provide the details on the extent of each species suitable habitat and the area to be removed, retained/restored and revegetated/offset. To further determine a maintain or improve outcome in regards to each threatened species' suitable habitat within the subject site is achieved, the initial extent and proposed total retained extent of each threatened species suitable habitat is also provided.

Table 7: Threatened Flora Maintain/Improve Assessment

***Aldrovanda vesiculosa* – Maintain/Improve Assessment**						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total Retained (ha)**	**Maintain or Improve**
Freshwater Wetlands	5.94	0	5.94	0	5.94	
Total Suitable Habitat	**5.94**	0	5.94	0	**5.94**	**Maintain**

Table 8: Threatened Flora Maintain/Improve Assessment

***Correa baeuerlenii* – Maintain/Improve Assessment**						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total Retained (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.39 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Total Suitable Habitat	**18.68**	2.3	16.38	26.42	**42.8 (10.64 in APZ)**	**Improve**

Summary of results from maintain/improve assessment Tables 7 & 8

The overall results of the maintain or improve assessment tables based on the suitable habitat within the site for threatened flora species were as follows:

Table 9: Maintain/improve assessment result by threatened flora species

Threatened Flora	Maintain/improve assessment result	Table
Aldrovanda vesiculosa	Maintain	7
Correa baeuerlenii	Improve	8

In addition to the maintain and/or improve assessment of the proposal on each threatened flora species' suitable habitat, the potential impacts of the proposal on *Aldrovanda vesiculosa* and *Correa baeuerlenii* have been assessed below in accordance with the criteria provided in Appendix 3 of the Draft Guidelines for Threatened Species Assessment *(DEC & DPI 2005).*

How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Aldrovanda vesiculosa has not been recorded within the subject site however, 5.94ha of existing suitable habitat (Table 7) is considered to be within the site. This species habitat is within the Freshwater Wetlands vegetation associated with Bevian Wetland. This vegetation will be maintained by the proposed development. Indirect impacts including stormwater runoff from the proposed development may will be managed under the Water Cycle Management Report (*Patterson Britton* 2007b) and the Ecological Site Management Plan (*Conacher Travers* 2007b).

Correa baeuerlenii has not been recorded within the subject site however, 18.68ha of existing suitable habitat (Table 8) is considered to be within the site. The restoration of Ecological Corridors 1 & 2 (Schedule 1 – Restoration Management Plan) will result in an increase of 23.1ha of the Spotted Gum/Ironbark vegetation community and 1.02ha of the Blackbutt Woodland vegetation community, increasing the overall suitable habitat for this species within the site to 42.8ha (Table 7). Edge effects associated with the proposed development may increase the possibility of weed incursions within retained native remnants however, these are proposed to be managed through regeneration works as outlined in the Ecological Site Management Plan (*Conacher Travers* 2007b).

Based on the improvement in potential habitat for *Correa baeuerlenii,* the maintained habitat for *Aldrovanda vesiculosa* and the absence of any records of these species within the subject site, it is considered that the proposed development is unlikely to affect the lifecycle of these threatened flora species.

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

Direct impacts

The proposal will result in the direct removal of 2.3ha of Spotted Gum/Ironbark vegetation (Table 8), which is considered to provide suitable habitat for *Correa baeuerlenii*. However, 13.46ha of Spotted Gum/Ironbark vegetation will be retained, restored and buffered and a further 25.4ha will be revegetated (Schedule 1 – Restoration Management Plan).

In addition, the entire Blackbutt vegetation community (2.92ha), which is also considered to provide potential habitat for this species, will be retained, restored and buffered in its entirety and further increased by 1.02ha through revegetation works (Schedule 1 – Restoration Management Plan).

As such, the overall potential habitat for *Correa baeuerlenii* within the site will increase and is likely to be improved in quality as a result of the proposed development.

The 5.94ha of suitable habitat for *Aldrovanda vesiculosa* will not be directly impacted, through removal, and as such the habitat for this species will be maintained.

Managed Impacts

Whilst 10.64ha of suitable habitat for *Correa baeuerlenii* will be managed as Asset Protection Zones, these areas will allow for regeneration of vegetation in accordance with Planning for Bushfire Protection (2006), the majority of which will be to outer protection standards. As such, the overall potential habitat for *Correa baeuerlenii within* the site will increase. In addition, the quality of the habitat is likely to be improved through the Ecological Site Management Plan (*Conacher Travers 2007b*), which will ensure the implementation of protective fencing and weed eradication works.

Indirect Impacts

Indirect impacts associated with the proposed development are predominately associated with stormwater runoff, erosion and edge effects. Stormwater runoff associated with the development will be controlled through the implementation of water sensitive urban design principles, which will include a stormwater treatment train. The treatment train will include water tanks associated with each dwelling to avert flows during rainfall events, gross pollutant traps, bio-retention swales along road sides and detention basins. A Water Management Report has been prepared by *Patterson Britton* (2007b), which outlines the proposed stormwater runoff management techniques. Adoption of this report is likely to result in maintained or improved conditions in water quality and maintained water flows across the site (*Patterson Britton* 2007b).

The Ecological Site Management Plan prepared by *Conacher Travers* (2007b) outlines weed management works to be undertaken within retained vegetation across the site to allow for the establishment and improvement in the quality of native vegetation communities. The Ecological Site Management Plan (*Conacher Travers* 2007b) will also prevent and manage the impacts associated with soil erosion through rapid replanting/seeding of exposed soils, silt fencing and other best practice management techniques prior, during and post construction phases.

- *Does the proposal affect any threatened species or populations that are at the limit of its known distribution?*

Correa baeuerlenii has been recorded from the Clyde River District to Bega. Given the southern most recording of this species within the Bega district it is considered that the potential habitat provided for this species within the subject site is unlikely to be at the limit of the species known distribution.

Aldrovanda vesiculosa has been recorded in shallow coastal wetlands in the Moruya and Evans Head area only. As such the habitat within the subject site may be considered to be near the limits of this species known distribution. However, this species has not been recorded within the subject site and its suitable habitat will be maintained.

As such, the Bevian Road Concept application does not affect any threatened species at the limits of their known distribution.

- *How is the proposal likely to affect current disturbance regimes?*

The majority of existing suitable habitat for *Correa baeuerlenii* within the subject site is along the boundaries of the site and has been protected from current disturbance regimes, such as agricultural associated clearing and grazing practices, predominately due to topographical constraints. It is likely that the Spotted Gum Ironbark vegetation and Blackbutt Woodland vegetation once extended further into the area termed Grassland with Scattered Trees (Figure 6) prior to broad scale agricultural clearing and grazing activities. If left undeveloped, the current disturbance regimes within the site such as weed incursions, grazing, compaction, pasture improvement and slashing are likely to continue to prevent the regeneration of suitable habitat for *Correa baeuerlenii.*

The proposed development will protect the remaining remnants of suitable habitat for this species through the retention, restoration and buffering of vegetation. In addition, the revegetation of Spotted Gum Ironbark Open Forest and Blackbutt Woodland within the Ecological Corridors 1 & 2 (Schedule 1 – Restoration Management Plan) will result in a net improvement in the extent of these communities and hence suitable habitat for *Correa baeuerlenii.*

Current disturbance regimes affecting the habitat of *Aldrovanda vesiculosa* include runoff during rainfall events. The proposal is likely to exacerbate the runoff however, water sensitive urban design principles have been applied across the site to ensure water quality is maintained or improved and that water quantities are maintained.

- *How is the proposal likely to affect habitat connectivity?*

Currently the site has little to no connectivity between existing remnants within the site and vegetation offsite.

Through the retention of native vegetation remnants along the boundaries of the site, the revegetation of Ecological Corridors 1 & 2 and the Southern Restoration Zone (Schedule 1 – Restoration Management Plan), the proposed development will result in an improvement in vegetation connectivity and consequently the viability of habitat. Ecological Corridors 1 & 2 will create east west linkages with vegetation offsite and connect the remnant vegetation along the boundaries of the site.

- *How is the proposal likely to affect critical habitat?*

No critical habitat relevant to this species is declared under the *TSC Act 1995* within the subject site.

Threatened Fauna Species

Twenty eight (28) threatened fauna species are considered to have the potential to occur within the subject site, whilst six (6) threatened fauna species have been recorded within the subject site (denoted by asterix*):

Threatened fauna species

- Giant Burrowing Frog
- Olive Whistler

- Green & Golden Bell Frog
- Square-tailed Kite
- Osprey
- Australasian Bittern
- Black Bittern
- Painted Snipe
- Superb Fruit-dove
- Glossy Black-Cockatoo
- Swift Parrot
- Turquoise Parrot
- Regent Honeyeater
- Barking Owl
- Powerful Owl
- Masked Owl
- Sooty Owl
- Hooded Robin
- Diamond Firetail
- Gang-Gang Cockatoo
- Brush-tailed Phascogale
- Spotted-tailed Quoll
- Southern Brown Bandicoot
- Long-nosed Potoroo
- Koala
- Squirrel Glider
- Yellow-bellied Glider
- Grey-headed Flying-fox
- Large-footed Myotis
- Little Bentwing-bat
- Eastern Bentwing-bat
- Greater Broad-nosed Bat
- Eastern Freetail-bat
- Eastern False Pipistrelle

Giant Burrowing Frog

The Giant Burrowing Frog occurs in disjunct populations from Olney State Forest to the Victorian Highlands. It occurs in semi permanent to ephemeral sand or rock based streams, and infrequently occurs in semi-permanent to permanent fire dams and artificial drainage ditches / culverts on roadsides (Ehmann, 1997). It is strongly associated with the upper drainage lines and ridgetops of Hawkesbury Sandstone and occurs in a variety of habitats. This species has been seen emerging from burrows on ridgetops several hundred metres from available water. This species has also been found in deeper rainforest gullies of Sydney sandstone. It is normally encountered during or after extended periods of heavy rain.

The subject site provides a small amount of suitable habitat for this species within the ephemeral drainage lines of the Open Forest vegetation communities. This species was not recorded during the fauna survey. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Green and Golden Bell Frog

The Green and Golden Bell Frog prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds where it is often located under debris including corrugated iron, timber and rock.

The subject site contains suitable habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Square-tailed Kite

The Square-tailed Kite moves low over the canopy of woodland, exploiting ecotones while hunting. It is known to favour *Angophora floribunda* and *Angophora subvelutina* woodland in association with box / ironbark eucalypt species along moist valleys on the coast of NSW. There is usually profuse blossom associated with this type of vegetation, which provides an abundance of nesting birds on which the kite typically preys.

The subject site provides suitable nesting and foraging habitat for this species. This species was not recorded during the fauna survey. The proposal will retain suitable foraging and nesting habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Osprey
The Osprey utilises various environments including waterbodies such as coastal waters, inlets, lakes, estuaries for foraging and offshore islands with dead trees for perching and breeding. The subject site provides suitable nesting and roosting habitat for this species. This species was not recorded and no nest sites were observed during the fauna survey. The proposal will retain areas of suitable nesting and roosting habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Australasian Bittern
The Australasian Bittern inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges. The subject site contains suitable foraging and shelter habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Black Bittern
The Black Bittern inhabits freshwater and brackish wetlands, ponds and streams with tall dense reed beds (Lindsey 1992). The subject site contains suitable foraging and shelter habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Painted Snipe
The Painted Snipe habitats terrestrial shallow freshwater, wetlands; empheral and permanent: lakes, swamps, claypans, inundated or waterlogged grassland or saltmarsh. (Marchant & Higgins 1993). Generally uncommon, this species is scattered east of a line between Eyre Peninsular Karumba, Qld, and the Murray-Darling Basin of NSW (Marchant & Higgins 1993). Painted Snipe take seeds and invertebrates, including insects, worms, molluscs and crustaceans. (Garnett & Crowley 2000). The subject site contains suitable foraging and shelter habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Superb Fruit-dove
The Superb Fruit-dove inhabits rainforests and their fringes, as well as mangroves and wooded stream margins (Pizzey and Knight, 1997). Habitat within and near rainforests includes scrub, lantana thickets, isolated figs, pittosporums, lilly pillies, and blackberries (Pizzey and Knight, 1997). The Superb Fruit-dove feeds primarily on the fruit of rainforest trees and moist vegetation.

The subject site provides suitable foraging and nesting habitat for this species particularly within the dry rainforest vegetation community. This species was not recorded during the fauna survey. The proposal will retain the dry rainforest vegetation community. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Glossy Black-Cockatoo
The Glossy Black-Cockatoo inhabits *Allocasuarina* forest and woodland where it feeds almost exclusively on the fruit of *Allocasuarina* spp. The subject site contains suitable foraging and breeding habitat for this species. Target surveys revealed Glossy Black-

Cockatoo foraging evidence (chewed Allocasuarina cones) within the Spotted Gum/ Iron Bark vegetation community along the eastern boundary of the site. The development does not plan to remove large areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Swift Parrot
The Swift Parrot inhabits eucalypt forests and woodlands foraging mainly on nectar from winter flowering eucalypts and also psyllids and lerp, and seeds and fruits (Higgins, 1999). This migratory species breeds in Tasmania and its offshore islands in summer and in late March, almost the entire population migrates to mainland Australia. It is considered that the subject site provides potential foraging habitat for this species predominantly within the winter flowering tree species, but also in all other trees throughout the subject site. This species was not recorded during the fauna survey. The development does not plan to remove large areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Turquoise Parrot
The Turquoise Parrot inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. The subject site contains suitable foraging and nesting habitat for this species. This species was not recorded during the fauna survey. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Regent Honeyeater
The Regent Honeyeater inhabits mostly dry eucalypt woodlands and forests dominated by box and ironbark eucalypts. In areas on western slopes of the Great Divide, this species is associated with moister more fertile soils, along creeks, broad river valleys and on lower slopes of foothills. This species is known to forage mainly among foliage or flowers in the upper canopy of trees, sometimes in the lower strata on trunks of trees, in shrubs, and occasionally on the ground. This species feeds on nectar, invertebrates (mostly insects) and their exudates, such as lerp and honeydew and occasionally on fruit. This species usually nests in canopy of forest or woodland. This species is often observed foraging on winter flowering eucalypts throughout western Sydney.

It is considered that the subject site provides potential foraging habitat for this species predominantly within the winter flowering tree species, but also in all other trees throughout the subject site. This species was not recorded during the fauna survey. The development does not plan to remove large areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Barking Owl
The Barking Owl utilises eucalypt forests, woodlands and adjacent cleared areas for foraging and large hollows for nesting and breeding (Schodde & Tidemann, 1986). This species usually roosts in large densely foliaged trees, either among foliage or on bare branch below foliage, sometime quite low (Higgins, 1999).

The subject site provides suitable foraging and breeding habitat for this species. This species was not observed during surveys. The proposal will retain areas of Open Forest that contain large hollows suitable for breeding. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Powerful Owl
The Powerful Owl inhabits dense mountain gullies, coastal forests and woodlands, coastal scrubs, and pine plantations over a large range (approx. 400-1400 ha). The Powerful Owl

occurs in a range of vegetation types from woodland and open forest to rainforest. In NSW this species most commonly occurs in tall, wet or dry sclerophyll forests. This species nests in large hollows within large old trees, usually in living *Eucalypts* (Higgins, 1999; *Conacher Travers*, 2006). This species mostly roosts in closed forest, including rainforest or wet sclerophyll forest within densely foliaged trees (Higgins, 1999).

The subject site provides suitable foraging and breeding habitat for this species. This species was observed responding to call playback surveys from Mogo State Forest on the 16th March 2006. This species was recorded calling approx 200-300m west of the subject site boundary, within Mogo State Forest. It is considered likely that this species would utilise the small amount of available habitat present within the subject site. No breeding sites were identified within the subject site during surveys. The proposal will retain areas of Open Forest that contain large hollows suitable for breeding. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Masked Owl

The Masked Owl utilises eucalypt forests, woodlands and adjacent cleared areas for foraging and large hollows for roosting, nesting and breeding. It is considered that the subject site provides potential nesting and foraging habitat for the Masked Owl within the Scribbly Gum / Red Gum Open Woodland vegetation community. The subject site provides suitable foraging and breeding habitat for this species. This species was not observed during surveys. No breeding sites were identified within the subject site during surveys. The proposal will retain areas of Open Forest that contain large hollows suitable for breeding. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Sooty Owl

The Sooty Owl is found throughout coastal NSW, generally east of the Great Dividing Range. Although regarded as a specialist inhabitant of rainforest and tall open forest, it is occasionally recorded foraging in adjacent dry sclerophyll forests. It roosts by day in dense gully vegetation such as rainforest, although the species will also roost in tree hollows, caves and rock overhangs and occupies territory between 200-800ha.

The subject site provides suitable foraging and breeding habitat for this species. This species was not observed during surveys. No breeding sites were identified within the subject site during surveys. The proposal will retain areas of Open Forest that contain large hollows suitable for breeding. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Hooded Robin

The Hooded Robin is found in drier Eucalypt woodlands and scrubland. It has been found to occur in areas with fallen logs, cleared paddocks with stumps. Despite the presence of potential habitat within the Open Forest vegetation communities, this species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Diamond Firetail

The Diamond Firetail inhabits open forests, mallee and savanna grassland preferring the vicinity of watercourses. The Diamond Firetail is sedentary often nesting in the same tree year after year (Pizzey and Knight, 1997). The study area provides suitable habitat for this species. Despite the presence of potential habitat, this species was not recorded during the fauna survey.

Olive Whistler
The Olive Whistler inhabits dense often damp, forests and woodlands in breeding season and more open land in winter (Flegg 2002). This species has a restricted distribution, scarce in the north and more common in the south. The Olive Whistler is often recorded solitary and flies off silently. The study area provides suitable habitat for this species. Despite the presence of potential habitat, this species was not recorded during the fauna survey.

Gang-gang Cockatoo
The Gang-gang Cockatoo is associated with a variety of woodland and forest habitats, and occasionally more open areas in south–eastern New South Wales and Victoria (NSW Scientific Committee, 2001). This species has been observed in eucalypt forests and exotic trees (Morris 1997), and is known to feed on the seeds of native shrubs and trees, in addition to some exotic species such as the Hawthorn and Cupressus species (Schodde & Tideman 1976). The Gang-gang Cockatoo nests in hollows in large, dead trees (NSW Scientific Committee, 2001).

Despite the presence of potential habitat within the Open Forest vegetation communities, this species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Brush-tailed Phascogale
The Brush-tailed Phascogale is presently distributed in south-east Queensland and north-east New South Wales, and in a band extending from south-east New South Wales through to the west Victorian border where it is found in open forests with sparse ground cover. This species nests and shelters in tree hollow, using many different hollows over a short period of time. Suitable hollows for this species are 25-40mm wide. The Brush-tailed Phascogale mate between May and July. The subject site provides suitable foraging and den habitat throughout the Open Forest vegetation communities. This species was not recorded during surveys. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Spotted-tailed Quoll
The Spotted-tailed Quoll inhabits a number of habitats including dry to moist open forests or closed forests containing rock caves, hollow logs or trees for shelter / breeding. It is considered that the subject site provides potential foraging habitat for this species within the woodland vegetation community. This species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Southern Brown Bandicoot

The Southern Brown Bandicoot has been detected in a range of habitats including open forest, woodland, heaths, agricultural land and urban areas, preferring areas with thick ground cover which provide protection from predators (Braithwaite 1988). It nests in shallow depressions in the ground which are covered by grass, litter and other plant material. The chamber within the nest is lined with grass or leaves and has no permanent entry or exit point, the animal using any point to emerge (Braithwaite 1988). Males have a home range of between 5-20 hectares which is larger than the home range of females which is between 1.8-3.3 hectares (Braithwaite 1988). Within an animals home range several nests may be used. It is considered that the subject site provides potential foraging habitat for the Southern Brown Bandicoot. This species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Long-nosed Potoroo

The Long-nosed Potoroo inhabits coastal heath and dry and wet sclerophyll forests. Its optimum habitat is wet sclerophyll forest and rainforest patches in moist sclerophyll forest, with a moist shrubby understorey, often associated with grassy areas. The subject site contains suitable foraging and shelter habitat for this species. This species was not observed during surveys. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Koala

The Koala inhabits both wet & dry eucalypt forest on high nutrient soils containing preferred feed trees. It is considered that the subject site provides potential foraging habitat for this species. This species was not recorded during the fauna survey. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Squirrel Glider

The Squirrel Glider inhabits mixed aged stands of eucalypt forest & woodlands including gum barked and high nectar producing species with hollow bearing trees. According to Quin (1995) the home-ranges of Squirrel Gliders have been estimated at between 0.65 and 8.55 ha, the movement of males being greater than that of females. Nightly movements are estimated at between 300 and 500 m. Quin (1995) found that the home-range of a family group is likely to vary according to habitat quality and availability of resources. The Squirrel Glider is a hollow-dependant species.

The subject site contains suitable foraging and den habitat throughout the Open Forest Vegetation communities and the vegetated drainage lines. This species was not observed during surveys. The proposal will retain suitable foraging and den habitat within the Open Forest vegetation communities. Promoting regeneration throughout the creek and drainage lines will improve the arboreal habitat within the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Yellow-bellied Glider
The Yellow-bellied Glider utilises tall mature eucalypt forests which contain high nectar producing species and hollow bearing trees (Russell, 1984). The subject site provides suitable habitat for this species. This species was spotlighted and observed calling within the subject site and adjoining lands by Gunninah in 2002. The on site records were located within the Spotted Gum Forests within the north eastern portion of the subject site. These Gliders may form part of an isolated population identified by the Eurobodalla Shire Council in 2001. The Yellow-bellied Glider was not detected nor were feed scars observed within the subject site during surveys conducted by *Conacher Travers* in March 2006, However this species is considered likely to occur. The Yellow-bellied Glider has a home range in the order of 35 hectares (Strahn, 98). It is likely that this species also utilises the habitat within the adjacent Mogo State Forest. The subject site makes up a very small portion of the area utilised by the Yellow-bellied Glider. The proposal may require the removal of small areas of suitable habitat however larger areas of suitable habitat will be retained throughout the site. The Eurobodalla Shire Council has identified that large powerlines may restrict the movement of the Yellow-bellied Glider.

The Eurobodalla Shire Council has adopted a *Policy for the Conservation of the Yellow-bellied Glider* in the LGA. The policy identifies farm lands as a major barrier to habitat linkages. There is currently no arboreal connectivity directly through the subject site. *Conacher Travers* recommends that arboreal connectivity should be retained and enhanced throughout the subject site. With the exception of some habitat removal the proposal does comply with the Eurobodalla Shire Council Conservation Policy for this species.

Grey-headed Flying-fox
The Grey-headed Flying-fox is a canopy feeding frugivore and nectarivore species inhabiting rainforests, open forests, woodlands, *Melaleuca* swamps and *Banksia* woodlands. This species provides a means of seed dispersal and pollination for many native plants. Grey-headed Flying-foxes congregate in large numbers at roosting sites (camps) that may be found in rainforest patches, *Melaleuca* stands, mangroves, riparian woodland or modified vegetation in urban areas.

The subject site contains suitable foraging habitat throughout the Open Forest, Banskia and Scattered Tree Vegetation communities. This species or its camp sites were not observed during surveys. The proposal will retain suitable foraging habitat throughout the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Large-footed Myotis
The Large-footed Myotis inhabits rainforests and sclerophyll forests near creeks and lakes over which it forages for aquatic insects and small fish. This species is known to roost in tree hollows, caves, mines and tunnels. It is considered that the subject site provides potential roosting habitat for this species within the Scribbly Gum / Red Gum Open Woodland vegetation community and potential foraging habitat for this species within the watercourse and the Swamp Mahogany vegetation community.

The subject site contains suitable foraging habitat within the Bevian Swamp and farm dams. The subject site also provides suitable roosting habitat within the hollow trees present. This species was not recorded during targeted surveys. The development does not propose to remove suitable foraging habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Little Bentwing-bat
The Little Bentwing-bat forages below the canopy within open forests and woodlands, feeding on small insects. This species roost in caves, tunnels, tree hollows and occasionally old buildings. The subject site provides suitable foraging and roosting habitat for this species throughout the subject site. This species was not recorded during surveys. The proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

Eastern Bentwing-bat
The Eastern Bentwing-bat inhabits areas where there are caves, old mines, old buildings, stormwater drains for shelter and well-timbered areas for foraging. It is considered that the subject site provides potential foraging habitat for this species throughout the subject site.

The subject site provides suitable foraging habitat for this species. This species was recorded on the 21 March 2006 during the *Conacher Travers Pty Ltd* survey in one (1) location in the Spotted Gum/Iron Bark vegetation community along the eastern boundary of the site. This species was also recorded within the subject site by Gunninah in 2002. The Eastern Bentwing-bat has been recorded travelling long distances to forage (Churchill, 1998). The abandoned Bimbimbi mines located within the Mogo area is a known roost site for this species. It is considered that the subject site is likely to be within the foraging range of this known population. The subject site does not provide suitable roosting habitat. The Eastern Bentwing-bat is a highly mobile species and it is considered that this species forages throughout the local area and not the subject site exclusively. The development proposal will retain large areas of foraging habitat for this species.

Greater Broad-nosed Bat
The Greater Broad-nosed Bat inhabits areas containing moist river & creek systems especially tree-lined creeks for foraging and breeding. It is considered that the subject site provides potential roosting and foraging habitat for this species.

The subject site provides suitable foraging and roosting habitat for this species. This species was recorded on the 21 March 2006 foraging over a farm dam located in the north western portion of the subject site. The Greater Broad-nosed Bat is a highly mobile species and it is considered that this species forages throughout the local area and not the subject site exclusively. The development proposal will retain large areas of habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

Eastern Freetail-bat
The Eastern Freetail-bat inhabits open forests and woodlands foraging above the canopy and along the edge of forests. This species is known to roost in tree hollows, under bark and buildings. The subject site provides suitable foraging and roosting habitat for this species. This species was recorded on the 17, 20 and 21 March 2006 foraging within four locations (Fig X) throughout the subject site. The Eastern Freetail-bat is a highly mobile species and it is considered that this species forages throughout the local area and not the subject site exclusively. There are extensive areas of similar and higher quality habitat within the local

area including Mogo State Forest. The development proposal will retain large areas of habitat for this species.

Eastern False Pipistrelle
The Eastern False Pipistrelle has been recorded roosting in caves, old buildings and tree hollows. This species forages throughout woodlands and open forest. The subject site provides suitable foraging and roosting habitat for this species. The Eastern False Pipistrelle is a highly mobile species and it is considered that this species may forage throughout the local area. However this species was not recorded during surveys. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest. The development proposal will retain large areas of habitat for this species.

Threatened fauna maintain/improve suitable habitat extent assessment

The maintain or improve assessment Tables 10-29, prepared for each of the threatened fauna species known to occur (denoted by asterix *) or with potential habitat in the subject site, provide the details on the extent of each species suitable habitat and the area to be removed, retained/restored and revegetated/offset. Threatened fauna have been divided into 20 groups reflecting their specific habitat requirements within the subject site. To further determine a maintain or improve outcome in regards to each threatened fauna species' suitable habitat within the subject site is achieved, the initial extent and proposed total retained extent of each threatened fauna species suitable habitat is also provided. Habitat types are based on natural vegetation communities listed in Table 2 of this report, with the exception of the Grassland with Scattered Trees vegetation community.

The Grassland with Scattered Trees vegetation community, which covers approximately 78% (146.68 ha) of the site (Figure 6) has been excluded from the assessment based on its disturbed nature. 142.62 ha of this community will be removed as a result of the proposed development. This habitat is not considered to be significant to the lifecycle of any threatened fauna species for the following reasons:

- Grassland with Scattered Trees habitat is considered to be of low quality due to past agricultural associated clearing and current grazing by cattle. Weed incursions are extensive across the majority of this habitat.
- The Grassland with Scattered Trees habitat is considered to provide a limited foraging resource only and as such provides marginal habitat.
- The majority of the threatened fauna likely to utilise the Grassland with Scattered Trees habitat are considered to be highly mobile and would be unlikely to utilise the subject site exclusively.
- Surrounding farmlands to the north and west of the site provide similar cleared lands with scattered trees suitable for foraging.
- Any hollow bearing trees identified within the Grassland with Scattered Trees habitat will be retained within the post development landscape or replaced at a ratio of 2:1 in conservation zones (Figure 7) within the subject site.
- Areas of cleared foraging land will be retained across the site in the form of open space/recreation areas and larger lots
- Compensatory habitat will be provided for within the site including the revegetation of Ecological Corridors 1 & 2 (Schedule 1 - Restoration Management Plan), which will create new vegetation linkages between remnants within the site and vegetation offsite and the retention and restoration of the Southern Conservation Zone (Schedule 1 - Restoration Management Plan).
- Of the twenty (20) threatened fauna species considered to have a loss in suitable habitat within the site, four (4) have been recorded within the site (Table 29). These four species are: Powerful Owl, Eastern Freetail Bat, Greater Broad-nosed Bat and

Eastern Bentwing Bat. These species are considered to be highly mobile and are unlikely to utilise the subject site exclusively. Habitat to the north and west of the site are likely to provide a similar foraging resource for these species.

All other vegetation communities within the site are considered to provided suitable habitat and have been assessed accordingly.

Table 10: Threatened Fauna Maintain/Improve Assessment

Group 1: Giant Burrowing Frog						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Aquatic Herbfield	1.24	0	1.24	0	1.24	
Total Suitable Habitat	**1.24**	0	1.24	0	**1.24**	**Maintain**

Table 11: Threatened Fauna Maintain/Improve Assessment

Group 2: Green and Golden Bell Frog, Australasian Bittern, Black Bittern, Painted Snipe						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Aquatic Herbfield	1.24	0	1.24	0	1.24	
Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains	5.94	0	5.94	0	5.94	

Table 11: Threatened Fauna Maintain/Improve Assessment

Group 2: Green and Golden Bell Frog, Australasian Bittern, Black Bittern, Painted Snipe						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
EEC - *TSC Act* 1995)						
Total Suitable Habitat	**7.18**	0	7.18	0	**7.18**	**Maintain**

Table 12: Threatened Fauna Maintain/Improve Assessment

Group 3: Square-tailed Kite						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	
Disturbed Swamp Oak Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	1.62	0.08	0.36	0.03	0.39	
Aquatic Herbfield	1.24	0	1.24	0	1.24	
Natural Freshwater Wetland	5.94	0	5.94	0	5.94	

Table 12: Threatened Fauna Maintain/Improve Assessment

Group 3: Square-tailed Kite						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
(Core Quality Freshwater Wetlands on Coastal Floodplains EEC - *TSC Act* 1995)						
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	0.09	0	1.99	3.38	5.65	
Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	5.04	1.7	1.44	0.5	1.94	
Total Suitable Habitat	**39.14**	4.44	34.68	31.17	**67.15 (10.75 in APZ)**	**Improve**

Table 13: Threatened Fauna Maintain/Improve Assessment

Group 4: Osprey						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	
Total Suitable Habitat	**20.24**	2.3	19.1	26.52	**45.62 (10.51 in APZ)**	**Improve**

Table 14: Threatened Fauna Maintain/Improve Assessment

Group 5: Superb Fruit Dove, Sooty Owl						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Total Suitable Habitat	**0.52**	0	0.52	0.39	**0.91 (0.06 in APZ)**	**Improve**

Table 15: Threatened Fauna Maintain/Improve Assessment

Group 6: Glossy Black – Cockatoo*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Banksia Scrub	1.28	0	1.28	1.5	2.78 (0.45 in APZ)	
Total Suitable Habitat	**19.96**	2.3	17.66	27.92	**45.58 (11.2 in APZ)**	**Improve**

Table 16: Threatened Fauna Maintain/Improve Assessment

Group 7: Turquoise Parrot, Hooded Robin, Diamond Firetail, Barking Owl, Masked Owl, Squirrel Glider						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	

Table 16: Threatened Fauna Maintain/Improve Assessment

Group 7: Turquoise Parrot, Hooded Robin, Diamond Firetail, Barking Owl, Masked Owl, Squirrel Glider						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Total Suitable Habitat	**20.73**	2.66	14.01	27.16	**41.17 (10.75 in APZ)**	**Improve**

Table 17: Threatened Fauna Maintain/Improve Assessment

Group 8: Gang-Gang Cockatoo, Powerful Owl*, Brush-tailed Phascogale						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	

Table 17: Threatened Fauna Maintain/Improve Assessment

Group 8: Gang-Gang Cockatoo, Powerful Owl*, Brush-tailed Phascogale						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Total Suitable Habitat	**21.25**	2.66	18.59	27.55	**45.96 (10.81 in APZ)**	**Improve**

Table 18: Threatened Fauna Maintain/Improve Assessment

Group 9: Regent Honeyeater, Swift Parrot						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Total Suitable Habitat	**17.81**	2.66	19.21	15.15	**41.29 (10.51 in APZ)**	**Improve**

Table 19: Threatened Fauna Maintain/Improve Assessment

Group 10: Olive Whistler						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Banksia Scrub	1.28	0	1.28	1.5	2.78 (0.45 in APZ)	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Total Suitable Habitat	**22.53**	2.66	19.87	29.05	**48.92 (11.26 in APZ)**	**Improve**

Table 20: Threatened Fauna Maintain/Improve Assessment

Group 11: Spotted-tailed Quoll						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Total Suitable Habitat	**15.76**	2.3	13.46	25.4	**38.86 (10.51 in APZ)**	**Improve**

Table 21: Threatened Fauna Maintain/Improve Assessment

Group 12: Long-nosed Potoroo, Southern Brown Bandicoot						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Banksia Scrub	1.28	0	1.28	1.5	2.78 (0.45 in APZ)	
Total Suitable Habitat	**17.04**	2.3	14.74	26.9	**41.64 (10.95 in APZ)**	**Improve**

Table 22: Threatened Fauna Maintain/Improve Assessment

Group 13: Koala						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Total Suitable Habitat	**2.05**	0.36	1.69	0.74	**2.43**	**Improve**

Table 23: Threatened Fauna Maintain/Improve Assessment

Group 14: Yellow-bellied Glider*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Total Suitable Habitat	**16.28**	2.3	13.98	25.79	**39.77 (10.57 in APZ)**	**Improve**

Table 24: Threatened Fauna Maintain/Improve Assessment

Group 15: Grey-headed Flying-fox						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Banksia Scrub	1.28	0	1.28	1.5	2.78 (0.45 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	0.09	0	1.99	3.38	5.65	
Total Suitable Habitat	**27.1**	2.66	27.5	33.55	**61.33 (11.27 in APZ)**	**Improve**

Table 25: Threatened Fauna Maintain/Improve Assessment

Group 16: Little Bentwing-bat, Eastern Bentwing-bat*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Banksia Scrub	1.28	0	1.28	1.5	2.78 (0.45 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	
Disturbed Swamp Oak Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	1.62	0.08	0.36	0.03	0.39	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	0.09	0	1.99	3.38	5.65	

Table 25: Threatened Fauna Maintain/Improve Assessment

Group 16: Little Bentwing-bat, Eastern Bentwing-bat*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	5.04	1.7	1.44	0.5	1.94	
Total Suitable Habitat	**33.76**	4.44	29.3	34.08	**63.66 (11.26 in APZ)**	**Improve**

Table 26: Threatened Fauna Maintain/Improve Assessment

Group 17: Greater Broad-nosed Bat*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	

Table 26: Threatened Fauna Maintain/Improve Assessment

Group 17: Greater Broad-nosed Bat*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Disturbed Swamp Oak Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	1.62	0.08	0.36	0.03	0.39	
Aquatic Herbfield	1.24	0	1.24	0	1.24	
Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains EEC - *TSC Act* 1995)	5.94	0	5.94	0	5.94	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	0.09	0	1.99	3.38	5.65	
Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	5.04	1.7	1.44	0.5	1.94	
Total Suitable Habitat	**39.66**	4.44	35.2	32.58	**68.06 (10.82 in APZ)**	**Improve**

Table 27: Threatened Fauna Maintain/Improve Assessment

Group 18: Large-footed Myotis						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Aquatic Herbfield	1.24	0	1.24	0	1.24	
Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains EEC - *TSC Act* 1995)	5.94	0	5.94	0	5.94	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Total Suitable Habitat	**27.91**	2.66	25.25	27.16	**52.41 (10.75 in APZ)**	**Improve**

Table 28: Threatened Fauna Maintain/Improve Assessment

Group 19: Eastern Freetail-bat*						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	
Disturbed Swamp Oak Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	1.62	0.08	0.36	0.03	0.39	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	0.09	0	1.99	3.38	5.65	
Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	5.04	1.7	1.44	0.5	1.94	
Total Suitable Habitat	**31.96**	4.44	27.5	32.19	**59.97 (10.76 in APZ)**	**Improve**

Table 29: Threatened Fauna Maintain/Improve Assessment

Group 20: Eastern False Pipistrelle						
Suitable Habitat	**Initial Extent (ha)**	**Direct Removal (ha)**	**Existing vegetation retained & restored post development (ha)**	**Proposed revegetation offset in cleared land (ha)**	**Total extent post development (ha)**	**Maintain or Improve**
Spotted Gum/Ironbark Open Forest	15.76	2.3	13.46	25.4	38.86 (10.51 in APZ)	
Blackbutt Woodland	2.92	0	2.92	1.02	3.94 (0.25 in APZ)	
Dry Gully Rainforest (Preliminary EEC – *EPBC Act 1999*)	0.52	0	0.52	0.39	0.91 (0.06 in APZ)	
Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest EEC - *TSC Act* 1995)	4.48	0	5.64	1.12	6.76	
Disturbed Swamp Oak Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	1.62	0.08	0.36	0.03	0.39	
Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains EEC – *TSC Act 1995*)	2.05	0.36	1.69	0.74	2.43	
Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	0.09	0	1.99	3.38	5.65	
Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest EEC – *TSC Act 1995*)	5.04	1.7	1.44	0.5	1.94	
Total Suitable Habitat	**32.48**	4.44	28.02	32.58	**60.88 (10.82 in APZ)**	**Improve**

Summary of results from maintain/improve assessment Tables 10-29

The overall results of the maintain or improve assessment tables based on the suitable habitat within the site for threatened fauna species was as follows:

Table 30: Maintain/improve assessment result by threatened fauna species

Threatened fauna species	Maintain/improve assessment result	Table
• Giant Burrowing Frog	Maintain	10
• Green & Golden Bell Frog	Maintain	11
• Square-tailed Kite	Improve	12
• Osprey	Improve	13
• Australasian Bittern	Maintain	11
• Black Bittern	Maintain	11
• Painted Snipe	Maintain	11
• Superb Fruit-dove	Improve	14
• Glossy Black-Cockatoo*	Improve	15
• Turquoise Parrot	Improve	16
• Gang-Gang Cockatoo	Improve	17
• Regent Honeyeater	Improve	18
• Swift Parrot	Improve	18
• Hooded Robin	Improve	16
• Olive Whistler	Improve	19
• Diamond Firetail	Improve	16
• Barking Owl	Improve	16
• Powerful Owl*	Improve	17
• Masked Owl	Improve	16
• Sooty Owl	Improve	14
• Brush-tailed Phascogale	Improve	17
• Spotted-tailed Quoll	Improve	20
• Long-nosed Potoroo	Improve	21
• Southern Brown Bandicoot	Improve	21
• Koala	Improve	22
• Squirrel Glider	Improve	16
• Yellow-bellied Glider*	Improve	23
• Grey-headed Flying-fox	Improve	24
• Little Bentwing-bat	Improve	25
• Eastern Bentwing-bat*	Improve	25
• Greater Broad-nosed Bat*	Improve	26
• Large-footed Myotis	Improve	27
• Eastern Freetail-bat*	Improve	28
• Eastern False Pipistrelle	Improve	29
* Denotes those threatened fauna species recorded within the site		

Of the thirty four (34) threatened fauna species assessed, twenty nine (29) resulted in an improvement in suitable habitat, whilst five (5) resulted in maintained habitat.

How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Habitat for threatened fauna species will be maintained or improved across the site. Other impacts associated with the development include: stormwater runoff and predation by domestic animals. Stormwater runoff will be controlled through the implementation of water sensitive urban design principles and will include rainwater tanks on all dwellings, gross

pollutant traps, bio-retention basins, bio-swales and revegetation of significant watercourses. Domestic animals will be prohibited within the site with the exception of companion animals as defined under the *Companion Animals Act 1998*.

As such, the Bevian Road Concept Application will not result in any significant impacts to the life cycle of threatened fauna within the site.

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

Direct impacts

The Bevian Road Concept Application will result in maintained or improved habitat for threatened fauna species as a result of the retention and restoration of native remnants and the revegetation of significant watercourse within the site. Revegetation works will also improve the vegetation connectivity across the site and to vegetation offsite.

As such, the Bevian Road Concept Application will result in a net improvement in threatened fauna species habitat within the site.

Managed Impacts

The proposal will result in the management of 11.15ha of vegetation within Asset Protection Zones in accordance with Planning for Bushfire Protection (2006), the majority of which will be to outer protection standards. Other areas of habitat will be managed within open space/recreation areas and larger lots. Streets within the development will be landscaped with locally occurring native species. These areas will allow for managed foraging habitat for threatened fauna species and act as 'stepping stones' to larger areas of habitat.

Indirect Impacts

Indirect impacts associated with the proposed development which have the potential to impact on suitable habitat for threatened fauna species are predominately associated with stormwater runoff, erosion, edge effects and predation by domestic animals. Stormwater runoff associated with the development will be controlled through the implementation of water sensitive urban design principles, which will include a stormwater treatment train. The treatment train will include water tanks associated with each dwelling to avert flows during rainfall events, gross pollutant traps, bio-retention swales along road sides and detention basins. A Water Management Report has been prepared by *Patterson Britton* (2007b), which outlines the proposed stormwater runoff management techniques. Adoption of water cycle management measures is likely to result in maintained or improved conditions in water quality and maintained water flows across the site (*Patterson Britton* 2007b).

The Ecological Site Management Plan prepared by *Conacher Travers* (2007b) outlines weed management works to be undertaken within retained vegetation across the site to allow for the establishment and improvement in the quality of native vegetation communities. The Ecological Site Management Plan (*Conacher Travers* 2007b) will also prevent and manage the impacts associated with soil erosion through rapid replanting/seeding of exposed soils, silt fencing and other best practice management techniques prior, during and post construction phases.

Domestic animals will be prohibited within the site with the exception of companion animals as defined under the *Companion Animals Act 1998*.

- *Does the proposal affect any threatened species or populations that are at the limit of its known distribution?*

None of threatened fauna species identified as having suitable habitat within the subject site are considered to be at the limit of their known distribution.

- *How is the proposal likely to affect current disturbance regimes?*

The majority of existing suitable habitat for threatened fauna species known to occur or with the potential to occur within the subject site is along the boundaries of the site and has been protected from current disturbance regimes, such as agricultural associated clearing and grazing practices, predominately due to topographical constraints. It is likely that the suitable habitat within remnants such as Spotted Gum Ironbark vegetation and Blackbutt Woodland vegetation once extended further into the area termed Grassland with Scattered Trees (Figure 6) prior to broad scale agricultural clearing and grazing activities. If left undeveloped, the current disturbance regimes within the site such as weed incursions, grazing, compaction, pasture improvement and slashing are likely to continue to prevent the regeneration of suitable habitat for threatened fauna species.

The proposed development will protect the remaining remnants of suitable habitat for threatened fauna species through the retention, restoration and buffering of vegetation. In addition, the creation of the Ecological Corridors 1 & 2 (Schedule 1 – Restoration Management Plan) through revegetation works will result in a net improvement in the extent of suitable habitat for these species.

- *How is the proposal likely to affect habitat connectivity?*

Currently the site has little to no connectivity between existing remnants within the site and vegetation offsite.

Through the retention of native vegetation remnants along the boundaries of the site, the revegetation of Ecological Corridors 1 & 2 and the Southern Restoration Zone (Schedule 1 – Restoration Management Plan), the proposed development will result in an improvement in vegetation connectivity and consequently the viability of habitat. Ecological Corridors 1 & 2 will create east west linkages with vegetation offsite and connect the remnant vegetation along the boundaries of the site. The improved vegetation connectivity across the site will improve the movement of threatened fauna species within the site and to vegetation off site.

- *How is the proposal likely to affect critical habitat?*

No critical habitat relevant to these species is declared under the *TSC Act 1995* within the subject site.

5.2 Proposed Mitigation Measures

Endangered Ecological Communities

Given the proposed removal of a small proportion of areas identified as being “Low Condition” EEC, the Bevian Road Concept Application incorporates a number of mitigation, management and offset strategies to ensure that the overall outcome for each community is improved.

The mitigation and management strategies include substantial restoration of retained areas of Low condition EEC through the;

- Exclusion of existing cattle grazing
- Weed control
- Erosion control
- Installation of protective fencing and signage
- Stormwater quality and quantity control (bio-retention basins, bio-swales, gross pollutant traps, rainwater tanks and revegetation of watercourses)
- Retention of regrowth
- Strategic, supplementary planting

These strategies will generally be implemented under the Ecological Site Management Plan (*Conacher Travers* 2007b) in perpetuity and are likely to result in a substantial increase, over the long term, in the extent of each of the Core Good Condition EECs observed on site.

In addition to the proposed restoration of existing Low Condition EECs to Core Good Condition, the proposal will also result in the retention and management of areas of existing Low Condition EECs in Asset protection Zones and bio-retention basins. These areas will maintain regeneration of the EECs in accordance with Planning for Bushfire Protection (2006), the majority of which will be to outer protection standards. Given the current condition of these EECs, their unlikely long term viability and the sites existing landuse pressures it is considered that the proposed retention and management of these areas of Low condition EEC will maintain and potentially improve their current condition.

Threatened Flora Species

Habitat for *Aldrovanda vesiculosa* will be maintained in its entirety within the subject site. A small proportion of suitable habitat for *Correa baeuerlenii,* identified as Spotted Gum/Ironbark Forest will be removed however, extensive areas of revegetation will result in a net improvement in this species habitat. The Bevian Road Concept Application incorporates a number of mitigation, management and offset strategies to ensure that the overall outcome for each threatened flora species, in terms of potential habitat, is maintained or improved.

The mitigation and management strategies are;

- Exclusion of existing cattle grazing
- Weed control
- Erosion control
- Installation of protective fencing and signage
- Stormwater quality and quantity control (bio-retention basins, bio-swales, gross pollutant traps, rainwater tanks and revegetation of watercourses)
- Retention of regrowth
- Strategic, supplementary planting

These strategies will generally be implemented under the Ecological Site Management Plan (*Conacher Travers* 2007b) in perpetuity and are likely to result in a substantial increase in the extent and improvement, over the long term, of suitable habitat for *Correa baeuerlenii* and improved quality of habitat for *Aldrovanda vesiculosa* within the subject site.

In addition, revegetation works associated with the proposal will result in an improvement in vegetation connectivity across the site and hence the genetic transfer of plant material between retained remnants and vegetation off site.

Threatened Fauna Species

Habitat for threatened fauna species will be maintained and improved across the site. Extensive areas of revegetation and restoration across the site will result in a net improvement in threatened fauna habitat. The Bevian Road Concept Application incorporates a number of mitigation, management and offset strategies to ensure that the overall outcome for each threatened fauna species, in terms of potential habitat, is maintained or improved.

The mitigation and management strategies are;

- Exclusion of existing cattle grazing
- Weed control
- Erosion control
- Installation of protective fencing and signage
- Stormwater Quality and Quantity Control (Bio-retention basins, bio-swales, gross pollutant traps, rainwater tanks and revegetation of watercourses)
- Prohibition of domestic animals with the exception of companion animals as defined under the *Companion Animals Act 1998*.
- Retention of Dead Timber and Habitat Supplementation
- Retention of Regrowth
- Strategic Supplementary Planting

These strategies will generally be implemented under the Ecological Site Management Plan (*Conacher Travers* 2007b) in perpetuity and are likely to result in a substantial increase in the extent and improvement, over the long term, of suitable habitat for threatened fauna species utilising the subject site.

In addition, revegetation works associated with the proposal will result in an improvement in vegetation connectivity across the site and hence the movement of fauna within the site and to vegetation off site.

5.3 Offset Measures

Endangered Ecological Communities

Finally, as part of an additional Offset strategy, the development also proposes substantial revegetation and dedication of currently cleared areas to the EECs, SOFF and RFEFCF, the majority of which will be restored to better condition than that proposed for removal. The offset will result in the rehabilitation of cleared lands for every hectare of Low condition EEC removed at a ratio of approximately:

- 3:1 for the SOFF
- 2:1 for the RFEFCF

It is proposed that these areas be restored through significant restoration works including;

- Strategic Planting
- Exclusion of existing cattle grazing
- Weed control
- Erosion control
- Stormwater Quality and Quantity Control
- Retention of Dead Timber and Habitat Supplementation
- Retention of Regrowth

These strategies will generally be implemented under the specific Ecological Site Management Plan (*Conacher Travers* 2007b) in perpetuity and are likely to result in a substantial increase in the extent of each of the Core Good Condition EECs observed on site.

Additional benefits of the proposed offset will include;

- A significantly enhanced buffer of continuous native vegetation between Bevian Wetland and the proposed development.
- Improved connectivity around the Bevian Wetland and adjoining floodplain.
- Improved edge to area ratio of the existing fragmented landscape under a single management zone.
- Further supplementation of the existing natural regeneration within areas of low condition EEC.

Threatened Flora& Fauna Species

Habitat for both threatened flora and fauna will be improved through revegetation works within the proposed Ecological Corridors 1 & 2 and Southern Restoration Zone (Schedule 1 – Restoration Management Plan). It is considered that these areas of revegetation in combination with the remnant native vegetation to be retained, buffered and restored, will result in a net improvement in threatened flora and fauna habitat across the site, offsetting any minor removals of vegetation proposed by the development.

5.4 Maintain or Improve Assessment Conclusions

Endangered Ecological Communities

The Bevian Road Concept Application will result in a net improvement in the extent of endangered ecological communities recorded within the subject site.

Threatened flora species

The Bevian Road Concept Application will result in a net improvement in suitable habitat for threatened flora species with the potential to occur within the subject site.

Threatened fauna species

The Bevian Road Concept Application will result in a net improvement in suitable habitat for threatened fauna species known to occur and with the potential to occur within the subject site.

5.5 Evaluation of Proposal against Key Thresholds

Key thresholds identified within Step 5 of the *Draft Guidelines for threatened species assessment (DECC & DPI 2005*) – written in *italics* - have been addressed below:

"*Whether or not the proposal, including actions to avoid or mitigate impacts or compensate to prevent unavoidable impacts will maintain or improve biodiversity values*."

The Bevian Road Concept Application will result in a net improvement in biodiversity values as a result of:

- Exclusion of existing cattle grazing

- Weed control
- Erosion control
- Installation of protective fencing and signage
- Stormwater Quality and Quantity Control (Bio-retention basins, bio-swales, gross pollutant traps, rainwater tanks and revegetation of watercourses)
- Prohibition of domestic animals with the exception of companion animals as defined under the *Companion Animals Act 1998*;
- Retention of Dead Timber and Habitat Supplementation
- Retention of Regrowth
- Strategic Supplementary Planting

"*Whether or not the proposal is likely to reduce the long-term viability of a local population of the species, population or ecological community*."

Based on the results of the maintain or improvement assessment in Section 5 of this report and the 7 part test of significance in Addendum 1 of this report, it is considered that the Bevian Road Concept Application will not reduce the long-term viability of any local population of species, population or ecological community.

"*Whether or not the proposal is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction*."

Based on the results of the maintain or improvement assessment in Section 5 of this report and the 7 part test of significance in Addendum 1 of this report, it is considered that the Bevian Road Concept Application will not accelerate the extinction of any species, population or ecological community or place it at risk of extinction.

"*Whether or not the proposal will adversely affect critical habitat*."

No critical habitat has been identified within the subject site.

SECTION 6.0 - CONCLUSIONS

This Flora and Fauna Assessment Report has been prepared by *Conacher Travers Pty Ltd* on behalf of *Marsim (trading as Nature Coast Developments Pty Ltd)* to identify and assess any potential impacts on the flora and fauna characteristics of Lot 2 DP 627034, Lot 2 DP 623340 and Lots 11, 29, 32, 72, 102, 118, 119 and 213 DP 755902, Bevian Road, Rosedale. Figure 1 depicts the property location, whilst Figure 2 provides an aerial appraisal of the site.

The Bevian Road Concept Application seeks the approval of two specific plans referred to collectively as the 'Concept Approval Plans'. These are:

- A plan of the net developable area – referred to as 'The Constraints Map' (Figure 3 attached)
- An 806 lot residential subdivision and 15 community lots – referred to as 'The Plan of Subdivision' (Figure 4 attached). Note this plan is a concept layout only, a detailed DA will be lodged once the concept has been approved.

A summary of the conclusions made in this report with regard to the potential impacts from the development to threatened flora and fauna species and endangered ecological communities are provided below.

Outcome of DGR Assessment

DGR 4.1
A maintained or improved result has been achieved for threatened flora, endangered ecological communities and a number of threatened fauna species known to occur or with the potential to occur within the site (Section 5). The loss of Grassland with Scattered Trees vegetation community is not considered to be significant to the lifecycle of any threatened species or endangered ecological community.

The implementation of the following mitigation measures will result in the protection of threatened flora and fauna species and endangered ecological communities known to occur or with the potential to occur within the site:

- Exclusion of existing cattle grazing
- Weed control
- Erosion control
- Installation of protective fencing and signage
- Stormwater Quality and Quantity Control (Bio-retention basins, bio-swales, gross pollutant traps, rainwater tanks and revegetation of watercourses)
- Retention of Dead Timber and Habitat Supplementation
- Prohibition of domestic animals with the exception of companion animals as defined under the *Companion Animals Act 1998*
- Retention of Regrowth
- Creation of vegetation corridors
- Retention or replacement of all hollow bearing trees
- Strategic Supplementary Planting

As such, the Bevian Road Concept Application adequately meets the requirements of the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI July 2005) and the provisions of the *Threatened Species Conservation Act 1995.*

Compliance with statutory requirements

- *Threatened Species Conservation Act 1995*

In respect of matters required to be considered under the *Threatened Species Conservation (TSC) Act* (1995), five (5) threatened fauna species were recorded by *Conacher Travers,* Powerful Owl (*Ninox strenua*), Glossy Black-Cockatoo (*Calyptorhynchus lathami*), Eastern Freetail-bat (*Mormopterus norfolkensis*), Greater Broad-nosed Bat (*Scoteanax rueppellii*) and Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis).*

In addition, one (1) threatened fauna species, Yellow-bellied Glider (*Petaurus australis),* was recorded within the subject site by *Gunninah Environmental Consultants* (2002). Three (3) endangered ecological communities, Swamp Oak Floodplain Forest (SOFF), River Flat Eucalypt Forest on Coastal Floodplains (RFEFCF) and Freshwater Wetlands on Coastal Floodplains (FWCF) were also recorded within the subject site.

- *Fisheries Management Act 1994*

No threatened fauna species listed under this Act were recorded within the subject site. The subject site is considered to comprise of limited habitat for fish species with dams and Bevian Swamp. Fish habitat will be improved through the revegetation of drainage lines.

- *Environmental Planning & Assessment Act 1979*

Part 3A maintain/improve assessment

Endangered Ecological Communities

The application of the maintain and improve assessment for Swamp Oak Floodplain Forest (SOFF), Riverflat Eucalypt Forest on Coastal Floodplains (RFEFCF) and Freshwater Wetlands on Coastal Floodplains (FWCF), Tables 3-5 respectively, resulted in a maintained or improved outcome for all endangered ecological communities identified within the site.

Specifically, an improvement in both the condition and overall extent will be achieved through the restoration and revegetation of endangered ecological communities SOFF and RFEFCF.

The total extent of SOFF will improve from 11.23ha to 14.46ha, whilst the total area of core condition vegetation will improve from 4.57ha to 12.41ha.

The total extent of RFEFCF will improve from 2.05ha to 2.43ha, whilst the total area of core condition vegetation will improve from 0ha to 1.61ha.

The total extent and condition of FWCF will be maintained at 5.94ha.

All endangered ecological communities recorded on site will be protected from indirect impacts such as stormwater runoff through the implementation of bio-swales along road sides, bio-retention basins, gross pollutant traps and the revegetation of watercourses.

As such it is considered that the Bevian Road Concept Application will result in a net improvement in the extent and condition of SOFF and RFEFCF and will maintain the extent and condition of FWCF of endangered ecological communities recorded within the subject site.

Threatened Flora

The application of the maintain and improve assessment for *Aldrovanda vesiculosa* and *Correa baeuerlenii,* Tables 7 & 8 respectively, resulted in a maintained or improved outcome for all threatened flora species with the potential to occur within the site.

Specifically, a significant improvement in overall extent of suitable habitat for *Correa baeuerlenii* will be achieved from the existing 18.68ha to 42.8ha. This is a result of the revegetation works across the site, which will create ecological corridors through the replanting of Spotted Gum/Ironbark Forest and Blackbutt Woodland.

The total extent of suitable habitat for *Aldrovanda vesiculosa* will be maintained within the Bevian Wetland.

As such, the Bevian Road Concept Application will result in maintained or improved suitable habitat for threatened flora species with the potential to occur within the subject site.

Threatened Fauna

The application of the maintain and improve assessment for threatened fauna, Tables 10-29, resulted in a maintained or improved outcome for all threatened fauna species known to occur or with the potential to occur within the site.

Habitat types used for the assessment were based on natural vegetation communities listed in Table 2 of this report, with the exception of the Grassland with Scattered Trees vegetation community.

The Grassland with Scattered Trees vegetation community, which covers approximately 78% (146.68 ha) of the site (Figure 6) has been excluded from the assessment based on its disturbed nature. 142.62 ha of this community will be removed as a result of the proposed development. This habitat is not considered to be significant to the lifecycle of any threatened fauna species for the following reasons:

- Grassland with Scattered Trees habitat is considered to be of low quality due to past agricultural associated clearing and current grazing by cattle. Weed incursions are extensive across the majority of this habitat.
- The Grassland with Scattered Trees habitat is considered to provide a limited foraging resource only and as such provides marginal habitat.
- The majority of the threatened fauna likely to utilise the Grassland with Scattered Trees habitat are considered to be highly mobile and would be unlikely to utilise the subject site exclusively.
- Surrounding farmlands to the north and west of the site provide similar cleared lands with scattered trees suitable for foraging.
- Any hollow bearing trees identified within the Grassland with Scattered Trees habitat will be retained within the post development landscape or replaced at a ratio of 2:1 in conservation zones within the subject site.
- Areas of cleared foraging land will be retained across the site in the form of open space/recreation areas and larger lots
- Compensatory habitat will be provided for within the site including the revegetation of Ecological Corridors 1 & 2 (Schedule 1 - Restoration Management Plan), which will create new vegetation linkages between remnants within the site and vegetation offsite and the retention and restoration of the Southern Conservation Zone (Schedule 1 - Restoration Management Plan).

As such, the Bevian Road Concept Application will result in a net improvement in suitable habitat and vegetation connectivity for all threatened fauna species known to occur and with

the potential to occur within the subject site and any losses in Grassland with Scattered Trees habitat are considered to be insignificant.

Section 5(A) 7 part test of significance

An assessment under Section 5(A) of the *Environmental Planning & Assessment (EP&A) Act 1979* (Addendum 1 of this report) concluded that the proposed development will not cause a significant impact on threatened species, populations and endangered ecological communities.

- *State Environmental Planning Policy 44 – Koala Habitat Protection*

Based on the absence of SEPP 44 Potential or Core Koala habitat within the subject site, the results of the maintain or improve assessment in Section 5 of this report and the 7 part test of significance (Addendum 1 of this report), the subject site is not considered to be significant with regards to Koala habitat and as such the Bevian Road Concept Application is unlikely to have an impact on the Koala. Conversely, the future development may improve the potential habitat for this species through the creation of wildlife corridors between remnants within the site and vegetation off site.

This policy is specifically addressed in Section 4.11.1 – State Legislative Matters (Fauna) - of this report.

- *State Environmental Planning Policy 14 – Coastal Wetlands*

Key ecological aspects of this policy were considered within this report including: the growth of native plant communities, the survival of native wildlife populations, the provision and quality of habitats for both indigenous and migratory species, the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding area, including salinity and water quality. The Bevian Road Concept Application is considered to adequately meet each of these objectives through the protection and enhancement of native vegetation, revegetation of drainage lines and overall all improvement in vegetation connectivity across the site and to vegetation off site.

This policy is specifically addressed in Section 4.6.1 – State Legislative Matters (Flora) - of this report.

- *State Environmental Planning Policy 71 – Coastal Protection*

The Bevian Road Concept Application meets the requirements of this state policy through the retention, protection and enhancement of vegetation within the site. As a result water quality within the site and reaching areas down stream of the site will be improved and native flora and fauna habitats will be enhanced.

This policy is specifically addressed in Section 4.6.1 – State Legislative Matters (Flora) - of this report.

- *Environment Protection and Biodiversity Conservation Act 1999*

In respect of matters required to be considered under the *Environment Protection and Biodiversity Conservation (EPBC) Act* (1999) no threatened fauna or flora species were recorded within the subject site. One (1) preliminary listed Endangered Ecological Community (EEC), Dry Rainforest of South East Forests, was recorded within the subject site. This vegetation community will be entirely retained and protected with a conservation precinct as part of the future development.

Given that no threatened flora or fauna species listed under the *EPBC Act 1999* were identified within the site and that the EEC is currently only a preliminary nomination, a referral to Department of the Environment & Water Resources (DEWR) is not required.

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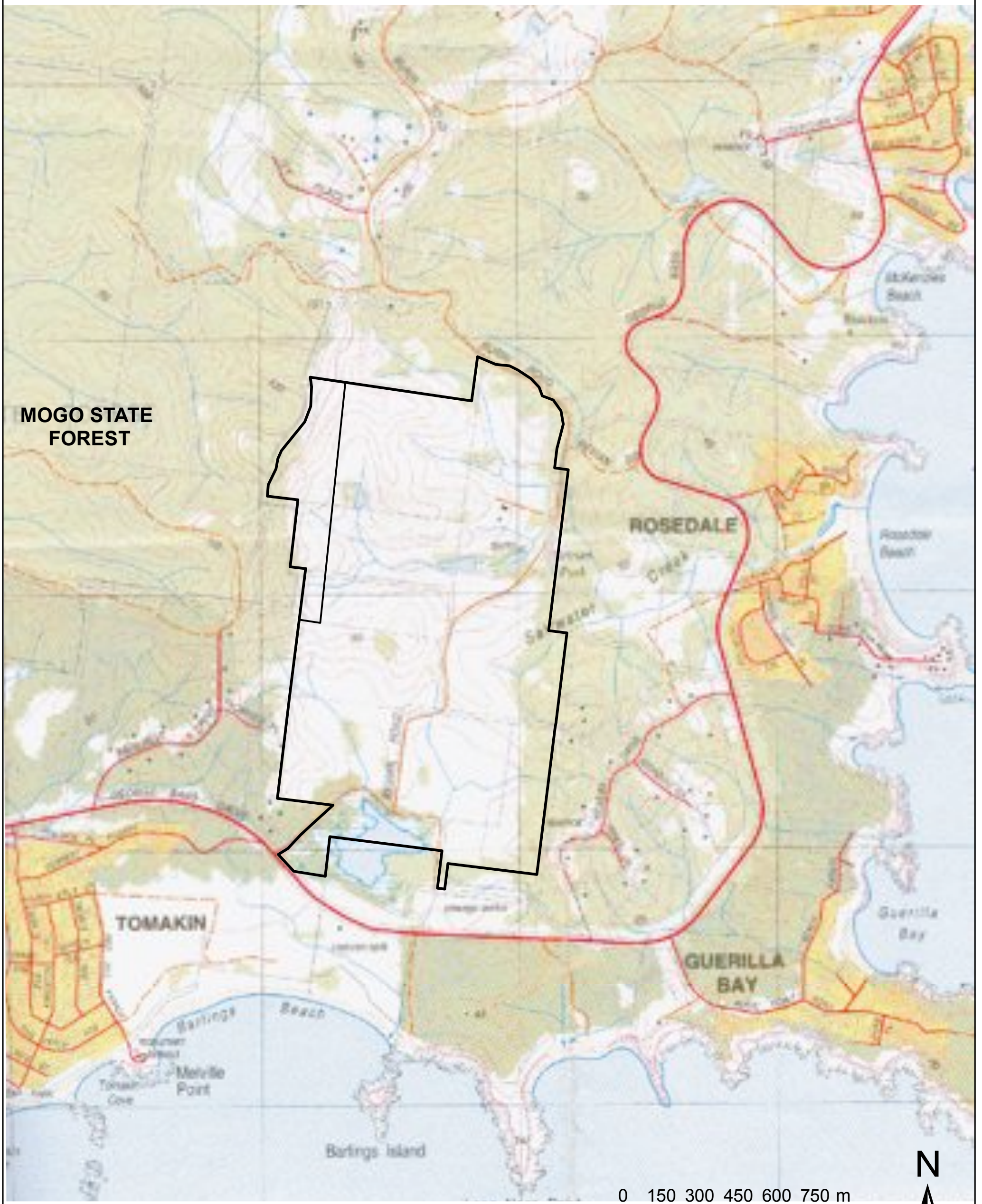
FIGURES



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Bushfire & Environmental Consultants
40 The Avenue, Mt. Penang Parklands,
Central Coast Highway, Kariong NSW 2250
Ph (02) 4340 0677 Fax (02) 4340 2367
e-mail: ecology@conachertravers.com.au

Figure 1 -
Property Location
Bevian Road, Rosedale

Ver.F1 By.TM 17/10/07 Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,

0 200 400 600 800 1,000 m

1:14,000

Original plan produced in A3 colour

N

Legend

Property Boundary

*Subject Site boundary subject to final survey

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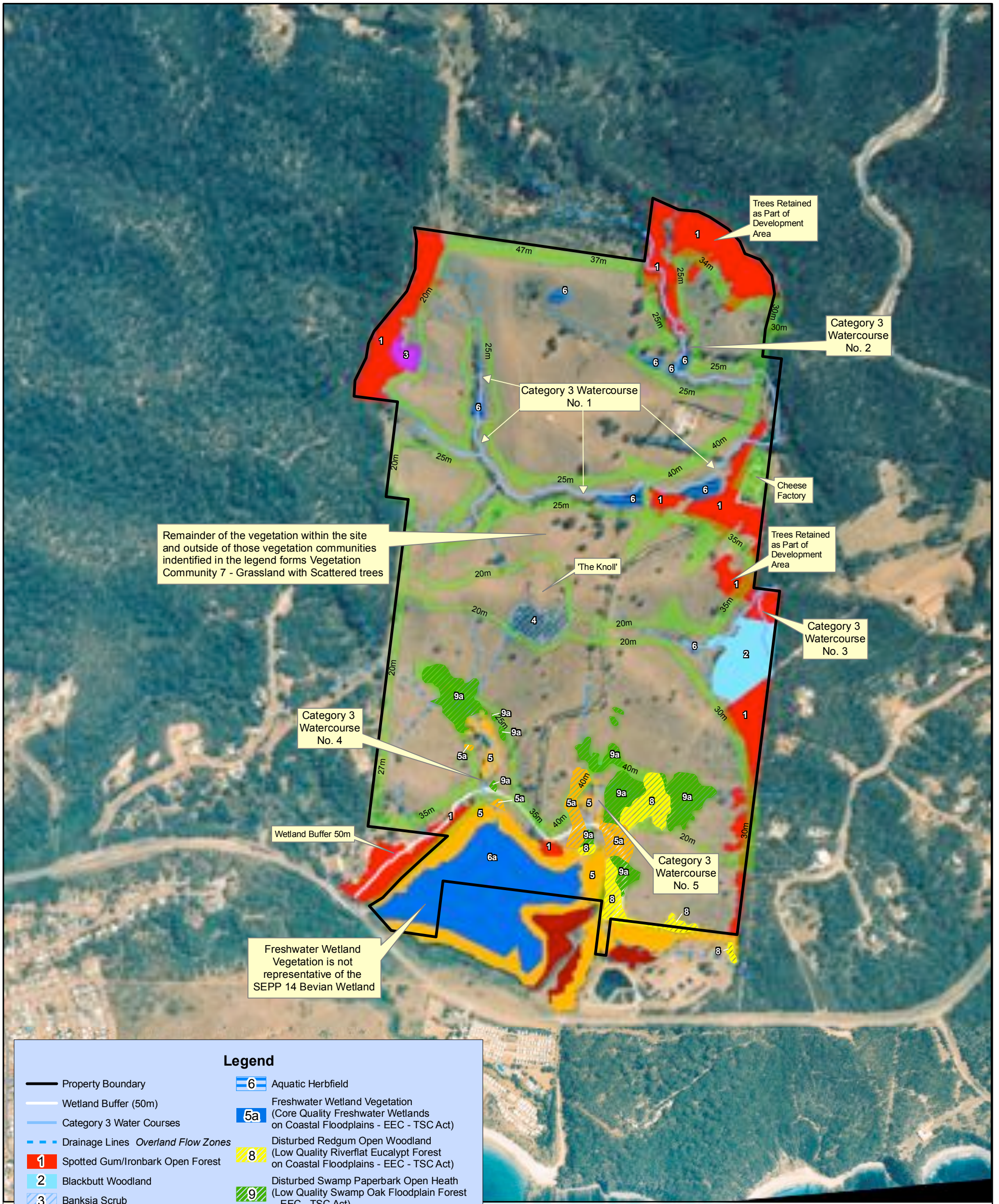
Figure 2 -

Aerial Appraisal

Bevian Road, Rosedale

Ver.F2 By.TM 17/10/07 Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,



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e-mail: ecology@conachertravers.com.au

Figure 3 -
The Constraints Map - Ecological and Bushfire Constraints
Bevian Road, Rosedale

Ver.F3 By.TM 17/10/07 Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,

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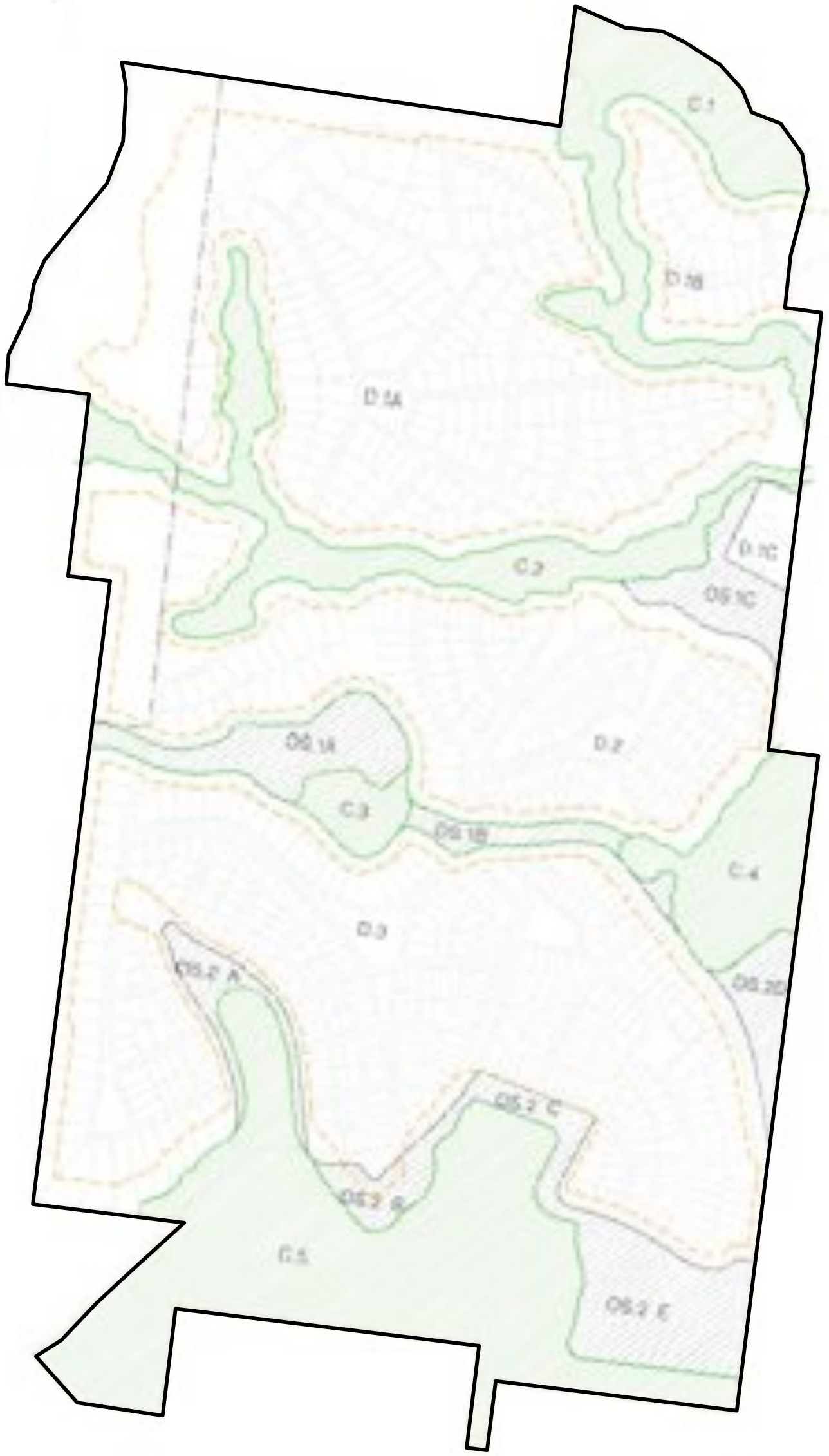
Figure 4 -
The Plan of Subdivision
Bevian Road, Rosedale

Ver.F4 By.TM
17/10/07
Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,



0 100 200 300 400 500 m

1:7,000

Original plan produced in A3 colour

N

Legend

Property Boundary

**Subject Site boundary subject to final survey*

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Figure 5 -

Precinct Plan

Bevian Road, Rosedale

Ver.F5
17/10/07
Ref.No.6052

Source: Dept. of Lands 1:25,000, Aerial Photograph

Remainder of the vegetation within the site and outside of those vegetation communities indentified in the legend forms Vegetation Community 7 - Grassland with Scattered trees

Freshwater Wetland Vegetation is not representative of the SEPP 14 Bevian Wetland

Legend

- Property Boundary
- 1 Spotted Gum/Ironbark Open Forest
- 2 Blackbutt Woodland
- 4 Banksia Scrub
- 3 Dry Gully Rainforest (Preliminary EEC - EPBC Act)
- 5 Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 5a Disturbed Swamp Oak Open Heath (Low Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 6 Aquatic Herbfield
- 6a Freshwater Wetland Vegetation (Core Quality Freshwater Wetlands on Coastal Floodplains - EEC - TSC Act)
- 8 Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains - EEC - TSC Act)
- 9 Swamp Paperbark Closed Scrub (Core Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 9a Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- Bangalay Sand Forest
- Category 3 Water Courses
- Drainage Lines

N

0 90 180 270 360 m

1:8,000

Original plan produced in A3 colour

Flora and fauna survey locations are approximate and have not been fixed by land survey

*Subject Site boundary subject to final survey

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Ph (02) 4340 0677 Fax (02) 4340 2367
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Figure 6 -
Vegetation Communites
Bevian Road, Rosedale

Ver.F6 By.TM
17/10/07
Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,

Remainder of the vegetation within the site and outside of those vegetation communities indentified in the legend forms Vegetation Community 7 - Grassland with Scattered trees

Freshwater Wetland Vegetation is not representative of the SEPP 14 Bevian Wetland

Legend

- Property Boundary
- Vegetation Condition Sampling Plots (20m x 20m)
- Glossy Cockatoo
- Powerful Owl
- Eastern Freetail Bat
- Greater Broad-nosed Bat
- Eastern Bentwing Bat
- Call Playback Station
- Anabat Station
- Elliot Trap Lines
- Cage Trap Line
- 20m x 20m Vegetation Quadrat
- 10m x 40m Vegetation Quadrat
- Category 3 Water Courses
- Drainage Lines
- Wetland Buffer
- 1 Spotted Gum/Ironbark Open Forest
- 2 Blackbutt Woodland
- 3 Banksia Scrub
- 4 Dry Gully Rainforest (Preliminary EEC - EPBC Act)
- 5 Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 5a Disturbed Swamp Oak Open Heath (Low Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 6 Aquatic Herbfield
- 6a Freshwater Wetland Vegetation (Core Quality Freshwater Wetlands on Coastal Floodplains - EEC - TSC Act)
- 8 Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains - EEC - TSC Act)
- 9 Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 9a Swamp Paperbark Closed Scrub (Core Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- Bangalay Sand Forest

N

12 Approximatly 200m East

0 100 200 300 400 500 m

1:7,000

Original plan produced in A3 colour

Flora and fauna survey locations are approximate and have not been fixed by land survey.

*Subject Site boundary subject to final survey

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Ph (02) 4340 0677 Fax (02) 4340 2367
e-mail: ecology@conachertravers.com.au

Figure 7 -

Flora & Fauna Survey Locations & Records

Bevian Road, Rosedale

Ver.F7 By.TM 17/10/07 Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,

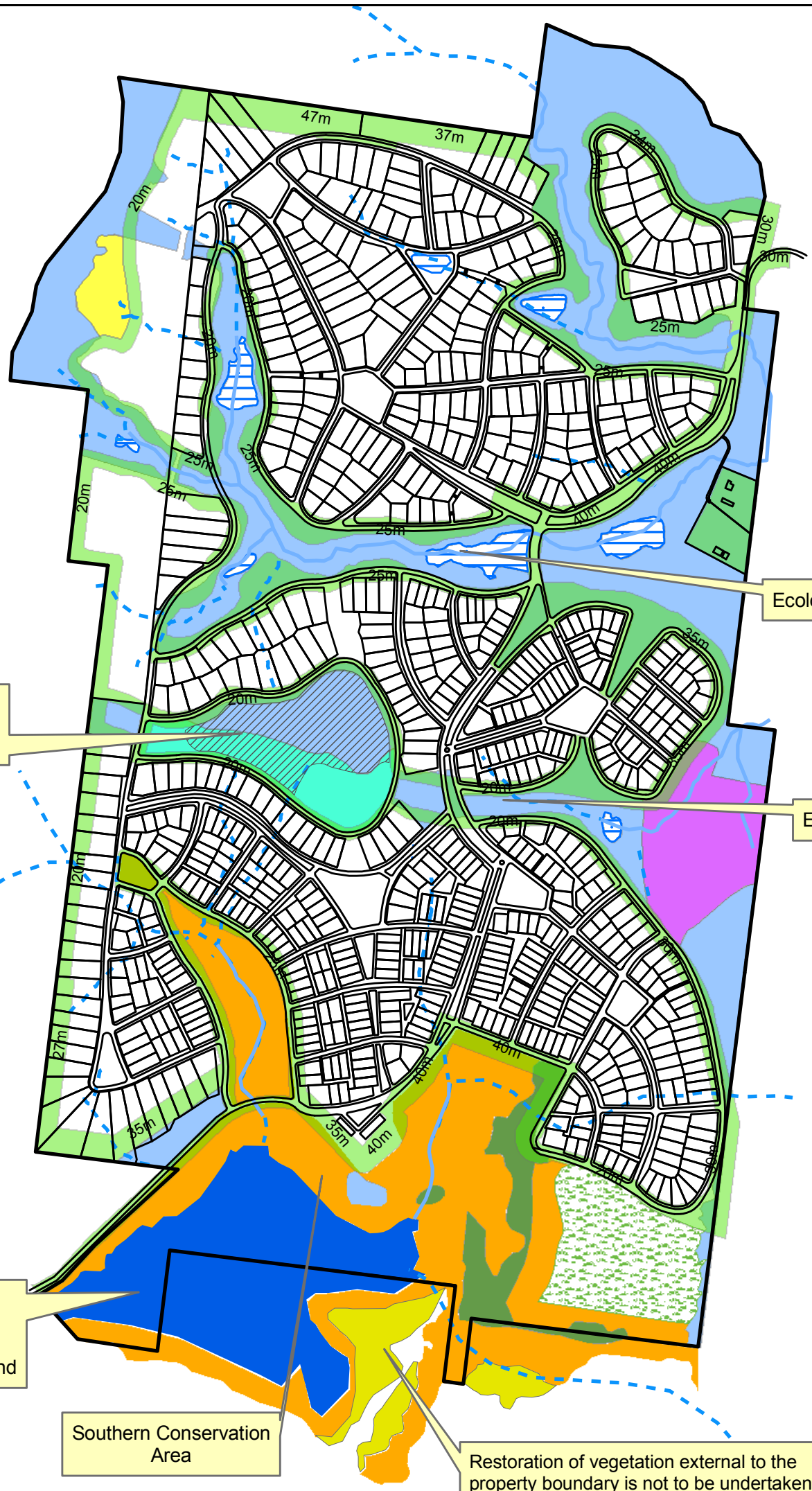
SCHEDULES

SCHEDULE 3 Restoration Management Plan

Restoration Specifications

Restoration is to be achieved through a combination of regeneration, revegetation and formal landscaping. The following specifications apply to the restoration of the target communities.

1. Open space areas within ecological corridors are to planted with locally occuring native plant species.
2. Revegetation within the riparian zones are to be in accordance with the General Terms of Approval to be issued by DWE.
3. Rehabilitation of EEC vegetation is to be fully structured vegetation endemic to that EEC.



Legend

Target Regeneration / Restoration Communities

- Bangalay Sand Forest
- Freshwater Wetland Vegetation (TSC Act EEC)
- Asset Protection Zone
- Grassland
- Swamp Oak Open Forest
- Spotted Gum / Ironbark Open Forest
- Banksia Scrub
- Blackbutt Woodland
- Dry Gully Rainforest (Preliminary EEC)
- Disturbed Redgum Open Woodland (TSC Act EEC)
- Aquatic Herbs/Macrophytes
- Passive Recreation Area
- Category 3 Water Courses
- Drainage Lines
- Property Boundary

Note: Open space areas are to be provided within ecological corridors in accordance with the Landscape Concept Plan.

0 100 200 300 400 500 m

1:8,000

Original plan produced in A3 colour

N

All features located by Trimble GPS have been modified
All mapped features are approximate and require land survey to confirm the location of Asset Protection Zones relative to developement footprint
Property boundary subject to final survey

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40 The Avenue, Mt. Penang Parklands,
Central Coast Highway, Kariong NSW 2250
Ph (02) 4340 0677 Fax (02) 4340 2367
e-mail: ecology@conachertravers.com.au

Schedule 3 -
Restoration Management
Bevian Road, Rosedale

Ver.S3 By.TM 11/02/07 Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,

APPENDIX 1

Flora and Fauna Species Lists

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
TREES			
Arecaceae	*Livistona australis*	Cabbage Tree Palm	3
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak	1 2 4 7
Casuarinaceae	*Casuarina glauca*	Swamp Oak	5
Celastraceae	*Cassine australis var. australis*	Red Olive Plum	1 3
Cyatheaceae	*Cyathea australis*	Rough Tree-fern	6
Eleocarpaceae	*Elaeocarpus reticulatus*	Blueberry Ash	3
Euphorbiaceae	*Claoxylon australe*	Brittlewood	3
	Glochidion ferdinandii	Cheese Tree	1 2 3
Fabaceae	*Erythrina X sykesii**	Coral Tree	7
Meliaceae	*Synoum glandulosum*	Scentless Rosewood	1 3
Mimosaceae	*Acacia irrorata* subsp. *irrorata*	Green Wattle	1 2 4 5 7
	Acacia maidenii	Maiden's Wattle	3 7
	Acacia mearnsii	Black Wattle	1 3 4
	Acacia melanoxylon	Blackwood	1 3 4
Moraceae	*Ficus coronata*	Sandpaper Fig	3
Myrtaceae	*Acmena smithii*	Lillypilly	3
	Corymbia maculata	Spotted Gum	1 2 3 7
	Eucalyptus botryoides	Bangalay / Southern Mahogany	5
	Eucalyptus fibrosa	Broad Leaved Ironbark	1 2 7
	Eucalyptus globoidea	White Stringybark	1 2 7
	Eucalyptus longifolia	Woollybutt	7
	Eucalyptus muelleriana	Yellow Stringybark	1 2
	Eucalyptus paniculata subsp. *paniculata*	Grey Ironbark	1
	Eucalyptus pilularis	Blackbutt	1 2
	Eucalyptus tereticornis	Forest Red Gum	7
	Lophostemon confertus	Brush Box	7
Oleaceae	*Olea europa* subsp. *africana**	Common Olive	7
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	1 2 4 5
Rhamnaceae	*Alphitonia excelsa*	Red Ash	3
Rutaceae	*Citrus limon**	Lemon Tree	7
Salicaceae	*Salix babylonica**	Weeping Willow	7
Santalaceae	*Exocarpos cupressiformis*	Native Cherry	1 2
Taxodium	*Taxodium distichum**	Bald Cypress	7
SHRUBS			
Apiaceae	*Platysace lanceolata*	Lance-leaf Platysace	1 2 7
Apiaceae	*Xanthosia tridentata*	Rock Xanthosia	4
Asteraceae	*Cassinia aculeata*	Dolly Bush	1 2
Asteraceae	*Chrysanthemoides monilifera* subsp. *monilifera**	Bitou Bush	1 2 7
	Ozothanmus ferrugineus	Tree Everlasting	4
Celastraceae	*Celastrus australis*	-	

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
Cesalpinioideae	*Senna pendula* var. *glabrata**	-	7
Epacridaceae	*Leucopogon juniperinus*	Prickly Beard-heath	1 2 7
Epacridaceae	*Leucopogon lanceolatus*	Lance-leaf Beard-heath	1 2 7
	Monotoca elliptica	Tree Broom-heath	1 2 7
	Breynia oblongifolia	Coffee Bush	1 2 3 4 5 7
	Omalanthus populifolius	Bleeding Heart	1 3 7
	Phyllanthus hirtellus	Thyme Spurge	1 2 4
Fabaceae	*Daviesia ulicifolia*	Gorse Bitter Pea	1 2 7
	Indigofera australis	Native Indigo	1
	Podolobium ilicifolium	Prickly Shaggy Pea	1 2 4 7
	Pultenaea daphnoides	Large-leaf Bush Pea	1 2
	Pultenaea villosa	-	1 2 7
Lamiaceae	*Westringia fruiticosa*	Coast Westringia	7
Mimosaceae	*Acacia falciformis*	Broad-leaved Hickory	1 2 4 5 7
	Acacia floribunda	Sally Wattle	1 2 4 5 7
	Acacia implexa	Hickory	1 2 4 5 7
	Acacia longifolia var. *longifolia*	Sydney Golden Wattle	1 2 4 7
	Acacia longissima	-	1 2 3 4 7
	Acacia paradoxa	Kangaroo Thron	4
	Acacia stricta	Hop Wattle	1 2
	Acacia ulicifolia	Prickly Moses	1 2 7
Myrtaceae	*Callistemon* sp. (cultivar)	-	7
Myrtaceae	*Leptospermum polygalifolium*	Lemon Scented Tea-tree	5
	Melaleuca ericifolia	Swamp Paperbark	1 5 7
Ochnaceae	*Ochna serrulata**	Mickey Mouse Plant	3
Oleaceae	*Notelaea longifolia*	Mock Olive	1 2 3 4 5 7
Oleaceae	*Notelaea venosa*	Veined Mock Olive	1 2 3 4 5 7
Pittosporaceae	*Bursaria spinosa* var. *spinosa*	Blackthorn	1 2 4 7
	Pittosporum revolutum	Yellow Pittosporum	1 2 4 5
Proteaceae	*Banksia ericifolia* var. *ericifolia*	Heath-leaved Banksia	7
	Banksia integrifolia subsp. *integrifolia*	Coast Banksia	1 4 5 7
	Lomatia silaifolia	Crinkle Bush	2
	Persoonia linearis	Narrow-leaved Geebung	1 2 7
Rutaceae	*Correa reflexa*	Native Fuschia	4
Rhamnaceae	*Pomaderris aspera*	-	1 3 4
Rosaceae	*Rubus anglocandicans**	Blackberry	1 2 4 5 7
Rosaceae	*Rubus parvifolius*	Native Raspberry	1 2 3 4 5 7
Rutaceae	*Zieria smithii*	Sandfly Zieria	1
Sapindaceae	*Alectryon subcinereus*	Native Quince	1 3
Solanaceae	*Lycium ferocissimum**	African Boxthorn	7
	*Solanum mauritianum**	Wild Tobacco	1 7
Solanaceae	*Solanum pungetium*	Eastern Nightshade	1 2 4 7

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
Ulmaceae	*Trema tomentosa* var. *viridis*	Native Peach	3 7
Verbenaceae	*Clerodendrum tomentosum*	Hairy Clerodendrum	1
Verbenaceae	*Lantana camara**	Lantana	1 7
Zamiaceae	*Macrozamia communis*	Burrawang	1 2 4 7
GROUNDCOVERS			
Acanthaceae	*Brunoniella australis*	Blue Trumpet	1 4 7
	Brunoniella pumilio	Dwarf Blue Trumpet	1 2 7
	Pseuderanthemum variabile	Pastel Flower	1 4 7
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair	1 2 3
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	5
Apiaceae	*Apium prostratum* var. *filiforme*	Sea Celery	5
	Centella asiatica	Swamp Pennywort	1 2 3 4 5 7
	*Hydrocotyle bonariensis**	Kurnell Curse / Pennywort	5
	Hydrocotyle laxiflora	Stinking Pennywort	7
	Hydrocotyle peduncularis	Pennywort	3 5 6
Asparagaceae	*Protasparagus aethiopicus**	Asparagus Fern	1 7
Asteraceae	*Aster subulatus**	Wild Aster	5 7
	*Bidens pilosa**	Cobbler's Pegs	1 7
	*Cirsium vulgare**	Spear Thistle	1 2 7
	*Conyza albida**	Fleabane	1 7
	*Conyza bonariensis**	Flax-leaf Fleabane	1 7
	*Gamochaeta spicata**	Cudweed	7
	*Hypochaeris radicata**	Flatweed	1 2 4 5 7
	Lagenifera stipitata	-	1 2 7
	Onopordum acanthium subsp. *acanthium*	Scotch Thistle	7
	Pseudognaphalium luteo-album	Cudweed	1 7
	Senecio hispidulus var. *hispidulus*	Fireweed	1 2 3 4 7
	Senecio linearifolius	Fireweed	1 2 3 4 7
	*Senecio madagascariensis**	Fireweed	7
	Sigesbeckia orientalis	Indian Weed	1 2 7
	*Sonchus oleraceus**	Common Sow-thistle	7
	*Taraxacum officinale**	Dandelion	1 7
Blechnaceae	*Blechnum cartilagineum*	Gristle Fern	5 6 7
	Blechnum nudum	-	5 7
	Doodia aspera	Rasp Fern	1 2 3 4 5 6 7
	Doodia caudata var. *caudata*	Rasp Fern	3
Brassicaceae	*Capsella bursa-pastoris**	Shepherds purse	7
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell	1 7
Carophyllaceae	*Cerastium glomeratum**	Mouse-ear Chickweed	7
Caryophyllaceae	*Stellaria media**	Common Chickweed	7
Chenopodiaceae	*Einadia hastata*	Berry Saltbush	7

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
Clusiaceae	*Hypericum gramineum*	Small St Johns Wort	1 7
Commelinaceae	*Commelina cyanea*	Scurvy Weed	1 5 7
	*Tradescantia fluminensis**	Wandering Jew	5
Convolvulaceae	*Dichondra repens*	Kidney Weed	1 2 3 4 5 7
Cyperaceae	*Baumea juncea*	-	5 6a 9
	Carex appressa	Tall Sedge	3 5
	Carex longebrachiata	Bergalia Tussock	5
	*Cyperus eragrostis**	Umbrella Sedge	6 7
	Cyperus polystachyos	-	6 7
	Cyperus sanguinolentus	-	6
	Fimbristylis dichotoma	Common Fringe-rush	5 8 9
	Gahnia aspera	Saw Sedge	5
	Gahnia clarkei	Tall Saw-sedge	1 2 5
	Gahnia melanocarpa	Black-fruit Saw-sedge	5
	Lepidosperma laterale	Variable Sword-sedge	1 2 7
	Schoenus brevifolius	Bog-rush	1 3 5
Dennstaedtiaceae	*Hypolepis muelleri*	Harsh Ground Fern	
Dicksoniaceae	*Calochlaena dubia*	False Bracken	1 6 7
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower	1 2 3 4 5 7
	Hibbertia obtusifolia	Grey Guinea Flower	1 2 3 7
Euphorbiaceae	*Chamaesyce prostrata*	Red Caustic Weed	1 2 4 5 7
	*Euphorbia peplus**	Spurge	1 7
	Poranthera microphylla		1 2 5 7
Fabaceae	*Medicago polymorpha**	Burr Medic	7
	*Trifolium repens**	White Clover	1 7
Gentianaceae	*Centaurium erythraea**	Pink Stars	7
	Geranium homeanum	Northern Cranesbill	1 2
Goodeniaceae	*Goodenia hederacea* var. *hederacea*	Ivy-leaved Goodenia	1 4 7
	Goodenia ovata	-	1 7
Haloragaceae	*Gonocarpus teucroides*	Raspwort	1 2 4 7
Iridaceae	*Romulea rosea* var. *australis**	Onion Grass	6 7
Juncaceae	*Juncus acutus**	-	5 6 7
	*Juncus cognatus**	-	5 8 9
	Juncus continuus	-	5
	Juncus usitatus	Common Rush	5 6
Lamiaceae	*Plectranthus parviflorus*	Cockspur Flower	1 3 5 7
Lindsaeaceae	*Lindsaea linearis*	Screw Fern	1 2
Lomandraceae	*Lomandra confertifolia* var. *rubiginosa*	-	1 2 4
	Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush	4
	Lomandra longifolia	Spiky-headed Mat-rush	1 2 3 4 5 7
	Lomandra multiflora	Many-flowered Mat-rush	1 2 4 5

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
Malvaceae	*Modiola caroliniana**	Red-flowered Mallow	1 7
	*Sida rhombifolia**	Paddy's Lucerne	1 2 4 7
Onagraceae	*Epilobium billardierianum*	Smooth Willow Herb	1 2 7
Oxalidaceae	*Oxalis corniculata**	Yellow Wood Sorrel	1 7
	Oxalis perrenans	-	1 2 3 4 5
Phormiaceae	*Dianella caerulea* var. *caerulea*	Flax Lily	1 2 5
	Dianella longifolia	-	5
	Dianella revoluta var. *revoluta*	Spreading Flax Lily	1 2
Plantaginaceae	*Plantago lanceolata**	Ribwort	1 2 4 7
	*Plantago major**	Large Plantain	1 2 4 7
Poaceae	*Anisopogon avenaceus*	Oat Speargrass	7
	Aristida vagans	Three-awn Speargrass	1 2 4 7
	Austrodanthonia longifolia	Long-leaved Wallaby Grass	7
	Austrostipa ramosissima	Stout Bamboo Grass	7
	*Avena fatua**	Wild Oats	7
	*Axonopus affinis**	Narrow-leaved Carpet Grass	7
	*Briza maxima**	Quaking Grass	7
	*Briza minor**	Shivery Grass	7
	*Bromus cartharticus**	Prairie Grass	7
	*Chloris gayana**	Rhodes Grass	7
	Cymbopogon refractus	Barbwire Grass	4
	Cynodon dactylon	Common Couch	1 2 3 4 5 7
	Digitaria parviflora	Small-flowered Finger Grass	7
	Dichelachne micrantha	Short-hair Plume Grass	1 2 3 4 5 7 8
	Echinopogon caespitosus var. *caespitosus*	Tufted Hedgehog Grass	1 2 3 4 5 7
	Echinopogon ovatus	Forest Hedgehog Grass	1 2 4 7
	*Ehrharta erecta**	Panic Veldtgrass	1 2 7
	Entolasia marginata	Bordered Panic	3 5
	Entolasia stricta	Wiry Panic	1 2 7
	Eragrostis brownii	Brown's Lovegrass	1 2 3 7
	Eragrostis leptostachya	Paddock Lovegrass	1 2 4 5 7 8 9
	Hemarthria uncinata var. uncinata	Matgrass	5 7 8 9
	Imperata cylindrica var. *major*	Blady Grass	1 2 4 5 7
	Joycea pallida	Silvertop Wallaby Grass	1 7
	Microlaena stipoides var. *stipoides*	Weeping Rice Grass	1 2 7
	Oplismenus aemulus	Basket Grass	1 3 7
	Oplismenus imbecillis	-	1 3 7
	Panicum simile	Two Colour Panic	7
	Paspalidium distans	-	7 1
Poaceae	*Paspalum dilatatum**	Paspalum	1 2 4 5 7

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
	*Paspalum urvillei**	Vasey Grass	7
	*Pennisetum clandestinum**	Kikuyu	1 2 4 5 6 7
	Poa labillardieri var. *labillardieri*	Tussock Grass	1 2 7
	Poa seiberiana	Tussock Grass	4
	*Setaria gracilis**	Slender Pigeon Grass	7
	*Sporobolus africanus**	Parramatta Grass	1 7
	Themeda australis	Kangaroo Grass	1 2 4 5 7
Polygonaceae	*Acetosella vulgaris**	Sheep Sorrel	7
	Persicaria decipiens	Slender Knotweed	5
	Persicaria hydropiper	Water Pepper	5
	Rumex brownii	Swamp Dock	6 5
	*Rumex crispus**	Curled Dock	5
Primulaceae	*Anagallis arvensis**	Scarlet Pimpernel	7
	Samolus repens	Creeping Brookweed	1 5
Ranunculaceae	*Ranunculus inundatus*	River Buttercup	1 2 5
	Ranunculus lappaceus var. *lappaceus*	Glossy Buttercup	1 2
	Ranunculus plebeius	Hairy Buttercup	5 7 8 9
	*Ranunculus repens**	Creeping Buttercup	1 2 5 7
Rubiaceae	*Galium binifolium*	-	1 2
	*Richardia stellaris**	-	7
Scrophulariaceae	*Verbascum virgatum**	Twiggy Mullein	7
	Veronica plebia	Creeping Speedwell	1 2 5 7
Sinopteridaceae	*Cheilanthes sieberi* subsp. *sieberi*	Poison Rock Fern	1 4 7
	Pellaea falcata	Sickle Fern	1 7
Solanaceae	*Solanum pseudocapsicum**	-	4
Stylidiaceae	*Stylidium graminifolium*	Trigger Plant	7
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*	Slender Rice Flower	1 2 7
Verbenaceae	*Verbena bonariensis**	Purpletop	1 7
	*Verbena rigida**	Veined Verbena	1 7
Violaceae	*Viola hederacea*	Ivy-leaved Violet	1 3 4 5 7
Xanthorrhoaceae	*Xanthorrhoea concava*	-	7
VINES			
Apocynaceae	*Parsonsia straminea*	Common Silkpod	1 2 3 4 5 7
Asparagaceae	*Myrsiphyllum asparagoides**	Bridal Creeper	1 7
Bignoniaceae	*Pandorea pandorana*	Wonga Vine	1 2 4 5 7
Convolvulaceae	*Ipomoea indica**	Coastal Morning Glory	7
	Polymeria calycina	Bindweed	1 2 4 5 7
Dilleniaceae	*Hibbertia dentata*	Twining Guinea Flower	1 2 3
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea-flower	1 2 3 4 5 7
Fabaceae	*Desmodium rhytidophyllum*	-	1 2
	Desmodium varians	-	1 2
	Glycine clandestina	Twining Glycine	1 2 3 4

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
	Glycine tabacina	Twining Glycine	1 2 3 4 5 7
	Hardenbergia violacea	False Sarsparilla	1 2 7
	Kennedia rubicunda	Dusky Coral Pea	1 7
	*Vicia hirsuta**	Hairy Vetch	7
Lauraceae	*Cassytha glabella* forma *glabella*	Slender Devil's Twine	1 2
	Cassytha pubescens	Common Devil's Twine	1 2
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry	1 3 4
	Geitonoplesium cymosum	Scrambling Lily	1 2 4 5 7
Menispermiaceae	*Stephania japonica* var. *discolor*	Snake Vine	5
Passifloraceae	*Passiflora herbertiana*	Native Passionfruit	4
Pittosporaceae	*Billardiera scandens* var. *scandens*	Apple Dumplings	1 2 4 7
Polygonaceae	*Muehlenbeckia gracillima*	Slender Lignum	3
Ranunculaceae	*Clematis aristata*	Old Man's Beard	1 2
Ranunculaceae	*Ranunculus plebeius*	Hairy Buttercup	5 6 7 8
Rubiaceae	*Morinda jasminoides*	-	1 2 4 7
Smilacaceae	*Ripogonum album*	White Supplejack	1 3 5
	Smilax australis	Lawyer Vine	1 3
	Smilax glyciphylla	Sarsaparilla	1 3
Vitaceae	*Cayratia clematidea*	Slender Grape	3 4
	Cissus hypoglauca	Water Vine	1 2 3 4 7
WATERPLANTS			
Asteraceae	*Epaltes australis*	-	5 6
Cyperaceae	*Baumea articulata*	Jointed Twig-Rush	5 6
	Baumea juncea	-	5 6
	Cyperus difformis	Variable Flat-sedge	6
	Cyperus gracilis	-	6
	Eleocharis acuta	Common Spikerush	6
	Eleocharis sphacelata	Tall Spike-rush	6
	Isolepis inundata	Swamp Club-rush	6
	Lepidosperma urophorum	-	5 6
	Schoenoplectus validus	River Clubrush	6
Goodeniaceae	*Goodenia paniculata*	Swamp Goodenia	5 7
Haloragaceae	*Myriophyllum variifolium*	Variable Water Milfoil	6
Hydrocharitaceae	*Ottelia ovalifolia*	Swamp Lily	6
Juncaceae	*Juncus cognatus**	-	6
	Juncus prismatocarpus	Branching Rush	6
Juncaceae	*Juncus subsecundus*	Finger Rush	5 6
Marsileaceae	*Marsilea hirsuta*	Nardoo	6
Onagraceae	*Ludwigia peploides* subsp. *montevidensis*	Water Primrose	6
Phylydraceae	*Phylidrum lanuginosum*	Woolly Frogsmouth	6
Poaceae	*Paspalum distichum*	Water Couch	5 6

Table A1.1 - Flora Observations for the Subject Site

Family	Scientific Name	Common Name	Vegetation Community
Sparganiaceae	*Sparganium subglobosum*	Floating Burr Reed	6
Typhaceae	*Typha domingensis*	Cumbungi	6
	Typha orientalis	Cumbungi	6
EPIPHYTES			
Loranthaceae	*Amyema congener* subsp. *congener*	Mistletoe	4
	Muellerina eucalyptoides	Mistletoe	1
Species name^{TS} = Threatened Species * = Introduced Species			

Table A1.2 - Threatened Flora

Scientific name	Growth Form and Habitat Requirements	Conservation Status	Comments	TSC Act	EPBC Act
Aldrovanda vesiculosa	Small herb, 5-2cm in length with whorled leaves, occurs in shallow fresh water often caught on submerged vegetation. Distribution limits Known from Evans Head and Moruya area.	Not known in any conservation Reserves	Sub-optimal habitat present. Not observed during flora survey.	E	-
*Caladenia tessellate**	Terrestrial orchid. Clay-loam or sandy soils. Distribution limits N-Swansea S- south of Eden.	Munmorah SRA, Popran NP, Wyrrabalong NP	No Suitable Habitat. Flora Survey outside flowering period.	E1	V
*Correa baeuerlenii**	Shrub to 2.5 metres which grows in sclerophyll forest. Distribution limits N-Clyde River S- Bega.	Not known in any conservation Reserves	Suitable habitat. Not observed during flora survey.	V	V
*Cryptostylis hunteriana**	Saprophytic orchid. Grows in swamp heath on sandy soils. Distribution limits N-Gibraltar Range S- south of Eden.	Gibraltar Range NP, Ku-ring-gai Chase NP, Ben Boyd NP	No Suitable Habitat. Flora Survey outside flowering period.	V	V
*Genoplesium vernale**	Small ground orchid. Grows in dry sclerophyll forest from 17km south of Batemens Bay to 24 km north of Ulladulla.	Booderee National Park	No Suitable Habitat. Flora Survey outside flowering period.	V	V
*Thesium australe**	Erect herb to 0.4 m high. Root parasite. Grassland or woodland often damp. Distribution limits N - Tweed Heads S - south of Eden.	Bullen Range NR, Kosciuszko NP, Namadgi NP, Crowdy Bay NP, Hat Head NP, Kattang NR	No suitable habitat. Not observed during flora survey.	V	V
* Denotes listed EPBC species recorded within 10 km of the subject site but not recorded on the Atlas of NSW Wildlife database.					

Table A1.3 - Fauna Observations within and adjacent to the subject site

Common name	Scientific name	Method Observed
Birds		
Australasian Grebe	*Tachybaptus novaehollandiae*	OC
Australian King Parrot	*Alisterus scapularis*	OC
Australian Magpie	*Gymnorhina tibicen*	OC
Australian Magpie-Lark	*Grallina cyanoleuca*	OC
Australian Pelican	*Pelecanus conspicillatus*	O
Australian Raven	*Corvus coronoides*	OC
Australian White Ibis	*Threskiornis molucca*	O
Australian Wood Duck	*Chenonetta jubata*	OC
Black Swan	*Cygnus atratus*	OC
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	OC
Brown Falcon	*Falco berigora*	O
Brown Gerygone	*Gerygone mouki*	OC
Brown Thornbill	*Acanthiza pulsilla*	OC
Cattle Egret	*Ardea ibis*	O
Chestnut Teal	*Anas castanea*	O
Common Starling *	*Sturnus vulgaris*	OC
Crested Pigeon	*Ocyphaps lophotes*	OC
Crimson Rosella	*Platycerus elegans*	OC
Darter	*Anhinga melanogaster*	O
Dusky Moorhen	*Gallinula tenebrosa*	OC
Dusky Woodswallow	*Artamus cyanopterus*	O
Eastern Rosella	*Platycercus eximius*	OC
Eastern Spinebill	*Acanthorhynchus tenuirostris*	OC
Eastern Whipbird	*Psophodes olivaceus*	OC
Eastern Yellow Robin	*Eopsaltria australis*	OC
Eurasian Coot	*Fulica atra*	O
Fan Tailed Cuckoo	*Cuculus flabelliformis*	C
Fork-tailed Swift	*Apus pacificus*	O
Galah	*Cacatua roseicapilla*	OC
Glossy-black Cockatoo[V]	*Calyptorhynchus lathami*	Sc
Golden Whistler	*Pachycephala pectoralis*	OC
Great Cormorant	*Phalacrocorax carbo*	O
Great Egret	*Ardea alba*	O
Grey Butcherbird	*Cracticus torquatus*	OC
Grey Fantail	*Rhipidura fuliginosa*	OC
Grey Shrike-thrush	*Colluricincla harmonica*	OC
Grey Teal	*Anas gracilis*	O
Hardhead	*Aythya australis*	O
Hoary-headed Grebe	*Poliocephalus poliocephalus*	O
Jacky Winter	*Microeca fascinans*	O
Latham's Snipe	*Gallinago hardwickii*	O
Laughing Kookaburra	*Dacelo novaeguineae*	OC
Lewin's Honey-eater	*Meliphaga lewinii*	OC
Little Black Cormorant	*Phalacrocorax sulcirostris*	OC
Little Lorikeet	*Glossopsitta pusilla*	O
Little Pied Cormorant	*Phalacrocorax melanoleucos*	O
Little Wattlebird	*Anthochaera chrysoptera*	OC
Masked Lapwing	*Vanellus miles*	OC
Mistletoe Bird	*Dicaeum hirundinaceum*	OC
New Holland Honeyeater	*Phylidonyris novaehollandiae*	OC
Noisy Miner	*Manorina melanocephala*	OC
Pacific Black Duck	*Anas supercilliosa*	OC

Table A1.3 - Fauna Observations within and adjacent to the subject site (Cont.)

Common name	Scientific name	Method Observed
Birds		
Pied Cormorant	*Phalacrocorax varius*	O
Pied Currawong	*Strepera graculina*	OC
Powerful Owl	*Ninox strenua*	C
Purple Swamphen	*Porphyrio porphyrio*	OC
Rainbow Lorikeet	*Trichoglossus haematodus*	OC
Red Wattle Bird	*Anthochaera carunculata*	OC
Red-browed Finch	*Neochmia temporalis*	OC
Richard's Pipit	*Anthus novaeseelandiae*	OC
Rufous Fantail	*Rhipidura rufifrons*	O
Rufous Whistler	*Pachycephala rufiventris*	OC
Satin Bowerbird	*Ptilonorhynchus violaceus*	OC
Silver Gull	*Larus novaehollandiae*	OC
Silvereye	*Zosterops lateralis*	OC
Southern Emu-wren	*Stipiturus malachurus*	O
Spotted Turtle-dove *	*Streptopelia chinensis*	OC
Striated Thornbill	*Acanthiza lineata*	OC
Sulphur Crested Cockatoo	*Cacatua galerita*	OC
Superb Fairy-wren	*Malurus cyaneus*	OC
Superb Lyrebird	*Menura novaehollandiae*	OC
Varied Sittella	*Daphoenositta chrysoptera*	O
Welcome Swallow	*Hirundo neoxena*	O
Whistling Kite	*Haliastur sphenerus*	OC
White-bellied Sea-eagle	*Haliaeetus leucogaster*	O
White-browed Scrubwren	*Sericornis frontalis*	OC
White-faced Heron	*Egretta novaehollandiae*	O
White-naped Honeyeater	*Melithreptus lunatus*	O
White-throated Needletail	*Hirundapus caudacutus*	O
White-throated Treecreeper	*Cormobates leucophaeus*	OC
Willie Wagtail	*Rhipidura leucophrys*	OC
Wonga Pigeon	*Leucosarcia melanoleuca*	OC
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	OC
Yellow Thornbill	*Acanthiza nana*	OC
Yellow-faced Honeyeater	*Lichenostomus chrysops*	OC
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	OC
Mammals		
Brown Antechinus	*Antechinus stuartii*	E
Bush Rat	*Rattus fuscipes*	E
Eastern Grey Kangaroo	*Macropus giganteus*	O, Sc
Sugar Glider	*Petaurus breviceps*	E, C
Common Ringtail Possum	*Pseudocheirus peregrinus*	Sp
Common Brushtail Possum	*Trichosurus vulpecula*	Sp
Swamp Wallaby	*Wallabia bicolor*	O
Red-necked Wallaby	*Macropus rufogriseus*	O
Greater Glider	*Petauroides volans*	Sp
Gould's Wattled Bat	*Chalinolobus gouldii*	A
Chocolate Wattled Bat	*Chalinolobus morio*	A
Eastern Bentwing-bat [v]	*Miniopterus schreibersii oceanensis*	A
Eastern Freetail-bat [v]	*Mormopterus norfolkensis*	A
A Long-eared Bat	*Nyctophilus sp.*	A
Eastern Broad-nosed Bat	*Scotorepens orion*	A
Greater Broad-nosed Bat	*Scoteanax rueppelli*	A

Table A1.3 - Fauna Observations within and adjacent to the subject site (Cont.)

Common name	Scientific name	Method Observed
Mammals (Cont.)		
Large Forest Bat	*Vespadelus darlingtoni*	A
Little Forest Bat	*Vespadelus vulturnus*	A
Rabbit *	*Oryctolagus cuniculus*	Sp, Sc
Black Rat *	*Rattus rattus*	E
European Red Fox *	*Vulpes vulpes*	Sp, Sc
Cow *	*Bos taurus*	O, Sc
Reptiles		
Long-necked Tortoise	*Chelodina longicollis*	O
Eastern Water Skink	*Eulamprus quoyii*	O
Grass Skink	*Lampropholis delicata*	O
Garden Skink	*Lampropholis guichenoti*	O
Red-Bellied Black Snake	*Pseudechis porphyriacus*	O
Amphibians		
Common Eastern Froglet	*Crinia signifera*	C
Striped Marsh Frog	*Limnodynastes peronii*	OC
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	OC
Lesueur's Frog	*Litoria lesueuri*	O
Perons Tree Frog	*Litoria peronii*	OC
Whistling Tree Frog	*Litoria verreauxii*	C
Brown Toadlet	*Pseudophryne bibronii*	C
Fish		
Marbled Eel	*Anguilla reinhardtii*	Sp
Note: * indicates introduced species ^{v} indicates vulnerable species		

A	-	Anabat II	C	-	Call Identification
O	-	Observation	P	-	Call Playback Response
E	-	Elliott Trap	S	-	Habitat Search
Sp	-	Spotlight	Sc	-	Scat, Track or Sign Identification

It is important to note that field survey data collected during the survey period is representative of species occurring within the study area for that occasion.

Due to effects of fire, breeding cycles, migratory patterns, camouflage, weather conditions, time of day, visibility, predatory and / or feeding patterns, increased species frequency or richness may be observed within the study area outside the nominated survey period. Habitat assessments based on the identification of micro-habitat features for various species of interest, including regionally significant and threatened species, has been used to over come this survey limitation.

Table A1.4 - Threatened Fauna

Common Name *Scientific Name*	Preferred Habitat	Comments	TSC Act or FM Act	EPBC Act
*Giant Burrowing Frog *Heleioporus australiacus*	Inhabits open forests and riparian forests along non-perennial streams, digging burrows into sandy creek banks. Distribution Limit- N-Near Singleton. S-South of Eden	Suitable habitat present. Not observed during surveys.	V	V
*Green and Golden Bell Frog *Litoria aurea*	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. Distribution Limit – N-Byron Bay. S-South of Eden	Suitable habitat present. Not observed during surveys.	E1	V
*Heath Frog *Litoria littlejohnii*	Found in wet and dry sclerophyll forest associated with sandstone outcrops at altitudes 280-1000m on eastern slopes of Great Dividing Range. Prefers flowing rocky streams. Distribution Limit – N-Hunter River. S-Eden	No suitable habitat present.	V	V
Square-tailed Kite *Lophoictinia isura*	Utilises mostly coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and mallee that are rich in passerine birds. Distribution Limit – N-Goondiwindi. S-South of Eden.	Suitable foraging and roosting habitat present. Not observed during surveys.	V	-
Osprey *Pandion haliaetus*	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding. Distribution Limit – N-Tweed Heads. S-South of Eden.	Suitable roosting habitat present. Not observed during surveys.	V	-
Sooty Oystercatcher *Haematopus fuliginosus*	Exclusively coastal in distribution foraging along rocky coastlines and estuaries. Distribution Limit- N-Tweed Heads S-South of Eden.	No suitable habitat present.	V	-
Pied Oystercatcher *Haemotopus longirostris*	Inhabits coastal beaches and estuarine flats. Distribution Limit N-Tweed Heads S-South of Eden.	No suitable habitat present.	V	-
Australasian Bittern *Botaurus poiciloptilus*	Inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges. Distribution Limit – N-North of Lismore. S- Eden.	Suitable foraging and breeding habitat present. Not observed during surveys.	V	-

Table A1.4 - Threatened Fauna (Cont.)

Common Name *Scientific Name*	Preferred Habitat	Comments	TSC Act or FM Act	EPBC Act
Black Bittern *Ixobrychus flavicollis*	Freshwater & brackish streams & ponds. Distribution Limit – N-Tweed Heads. S-South of Eden.	Suitable foraging and breeding habitat present. Not observed during surveys.	V	-
Painted Snipe *Rostratula benghalensis*	Most numerous within the Murray-Darling basin and inland Australia within marshes and freshwater wetlands with swampy vegetation. Distribution Limit- N-Tweed Heads S-South of Eden	Suitable foraging and breeding habitat present. Not observed during surveys.	V	V
Comb-crested Jacana *Irediparra gallinacea*	Deep and permanent vegetation-choked tropical and warm temperate wetlands. Distribution Limit – N-Tweed Heads. S – Ku-ring-gai Chase National Park.	Sub-optimal foraging and breeding habitat present. Not observed during surveys.	V	-
Superb Fruit-dove *Ptilinopus superbus*	Rainforests, adjacent mangroves, eucalypt forests, scrubland with native fruits. Distribution Limit – N-Border Ranges National Park. S-Bateman's Bay.	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-
Glossy Black-Cockatoo *Calyptorhynchus lathami*	Open forests with *Allocasuarina* species and hollows for nesting. Distribution Limit – N-Tweed Heads. S-South of Eden.	Suitable foraging and nesting habitat present. Observed during surveys.	V	-
Gang-Gang Cockatoo *Callocephalon fimbriatum*	Prefers wetter forests and woodlands from sea level to > 2000m on Divide, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. Distribution Limit –mid north coast of NSW to western Victoria	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-

Table A1.4 - Threatened Fauna (Cont.)

Common Name *Scientific Name*	Preferred Habitat	Comments	TSC Act or FM Act	EPBC Act
Swift Parrot *Lathamus discolor*	Inhabits eucalypt forests and woodlands with winter flowering eucalypts. Distribution Limit – N-Border Ranges National Park. S-South of Eden.	Suitable foraging habitat present. Not observed during surveys.	E1	E
**Turquoise Parrot *Neophema pulchella*	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. Distribution Limit – N-Near Tenterfield. S-South of Eden.	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-
**Ground Parrot *Pezoporus wallicus*	Inhabits low heath, sedgeland and buttongrass plains with dense vegetation to provide suitable roosting cover. Distribution Limit- N-North of Tweed Heads. S-South of Eden	Sub-optimal habitat present. Not observed during surveys.	V	-
Regent Honeyeater *Xanthomyza phrygia*	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. Distribution Limit – N-Urbanville. S-Eden	Suitable foraging habitat present. Not observed during surveys.	E	E
**Olive Whistler *Pachycephala olivacea*	Tall wet forest, woodlands and alpine heaths. Distributional Limits N - N-Border Ranges National Park S-South of Eden.	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-
**Barking Owl *Ninox connivens*	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting. Distribution Limits- N-Border Ranges National Park S-Eden	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-
Powerful Owl *Ninox strenua*	Forests containing mature trees for shelter or breeding & densely vegetated gullies for roosting. Distribution Limits – N-Border Ranges National Park. S-Eden	Suitable foraging and nesting habitat present. Observed during surveys.	V	-

Table A1.4 - Threatened Fauna (Cont.)

Common Name *Scientific Name*	Preferred Habitat	Comments	TSC Act or FM Act	EPBC Act
Masked Owl *Tyto novaehollandiae*	Open forest & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. Distribution Limit – N-Border Ranges National Park. S-Eden	Suitable foraging, roosting and breeding habitat present. Not observed during surveys.	V	-
Sooty Owl *Tyto tenebricosa*	Tall, dense, wet forests containing trees with very large hollows. Distribution Limit – N-Border Ranges National Park. S-South of Eden	Suitable foraging, roosting and nesting habitat present. Not observed during surveys.	V	-
Hooded Robin *Melanodryas cucullata*	Occupies drier eucalypt forest, woodland and scrub, grasses and low shrubs, as well as cleared paddocks with regrowth or stumps. Distribution Limit - N-Tweed Heads. S-South of Eden	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-
**Diamond Firetail *Stagonopleura guttata*	Inhabits open eucalypt woodlands/ forests, mallee, river redgums feeding on grass seeds. Distribution N- Rockhampton, S- Eyre Pen. SA	Suitable foraging and nesting habitat present. Not observed during surveys.	V	-
Brush-tailed Phascogale *Phascogale tapoatafa*	A largely arboreal mammal of open forests and woodlands using hollows as nesting in hollow bearing trees. Distribution Limit - N-Border Ranges National Park. S-Eden.	Suitable foraging and den habitat present. Not observed during surveys.	V	-
*Spotted-tailed Quoll *Dasyurus maculatus*	Dry and moist open forests containing rock caves, hollow logs or trees. Distribution Limit- N-Mt Warning National Park S-South of Eden.	Suitable foraging habitat present. Not observed during surveys.	V	V

Table A1.4 - Threatened Fauna (Cont.)

Common Name *Scientific Name*	Preferred Habitat	Comments	TSC Act or FM Act	EPBC Act
Southern Brown Bandicoot *Isoodon obesulus*	Utilises a range of habitats containing thick ground cover - open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland. Distribution Limit - N-Kempsey. S-South of Eden.	Suitable foraging habitat present. Not observed during surveys.	E1	E
Long-nosed Potoroo *Potorous tridactylus*	Coastal heath and dry and wet sclerophyll forests. Distribution Limit - N-Mt Warning National Park. S-South of Eden.	Suitable foraging habitat present. Not observed during surveys.	V	V
**Koala *Phascolarctos cinereus*	Inhabits both wet & dry eucalypt forest on high nutrient soils containing preferred feed trees. Distribution Limit - N-Tweed Heads. S-South of Eden	Suitable foraging habitat present. Not observed during surveys.	V	-
Squirrel Glider *Petaurus norfolcensis*	Mixed aged stands of eucalypt forest & woodlands including gum barked & high nectar producing species & hollow bearing trees. Distribution Limit - N- Tweed Heads S-Albury	Suitable foraging and den habitat present. Not observed during surveys.	V	-
Yellow-bellied Glider *Petaurus australis*	Tall mature eucalypt forests with high nectar producing species and hollow bearing trees. Distribution Limit- N-Border Ranges National Park. S-South of Eden.	Suitable foraging and den habitat present. Observed by Gunninah 2002.	V	-
Grey-headed Flying-fox *Pteropus poliocephalus*	Occurs primarily along the eastern coastal plains of NSW. It is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, Melaleuca swamps and Banksia woodlands (NPWS, 2000).	Suitable foraging habitat present. Not observed during surveys.	V	V
**Large-footed Myotis *Myotis adversus*	Rainforests and sclerophyll forests near creeks and lakes over which it feeds. Roosts in tree hollows, caves, mines and tunnels. Distribution Limit - N-Border Ranges National Park. S-South of Eden.	Suitable foraging habitat present. Not observed during surveys.	V	-

Table A1.4 - Threatened Fauna (Cont.)

Common Name *Scientific Name*	Preferred Habitat	Comments	TSC Act or FM Act	EPBC Act
**Little Bentwing-bat *Miniopterus australis*	Roosts in caves, old buildings and tree hollows in the higher rainfall forests along the south coast of Australia. Distribution Limit - N-Border Ranges National Park. S-Sydney.	Suitable foraging habitat present. Not observed during surveys.	V	-
Eastern Bentwing-bat *Miniopterus schreibersii oceansis*	Prefers areas where there are caves, old mines, old buildings, stormwater drains & well timbered areas. Distribution Limit - N-Border Ranges National Park. S-South of Eden.	Suitable foraging habitat present. Recorded during surveys.	V	-
**Greater Broad-nosed Bat *Scoteanax rueppellii*	Inhabits areas containing moist river & creek systems especially tree lined creeks. Distribution Limit - N-Border Ranges National Park. S-Pambula.	Suitable foraging and roosting habitat present. Recorded during surveys.	V	-
**Eastern Freetail-bat *Mormopterus norfolkensis*	Inhabits open forests and woodlands foraging above the canopy and along the edge of forests. Roosts in tree hollows, under bark and buildings. Distribution Limit - N-Woodenbong. S-Pambula.	Suitable foraging and roosting habitat present. Recorded during surveys.	V	-
**Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Recorded roosting in caves, old buildings and tree hollows. Distribution Limit- N-Border Ranges National Park S-Pambula	Suitable foraging and roosting habitat present. Not recorded during surveys.	V	-
* - Denotes listed EPBC species recorded within 10 km of the subject site but not recorded on the Atlas of NSW Wildlife database.				
** - Denotes species not recorded within 10 km of the subject site on the Atlas of NSW Wildlife database that are considered to have suitable habitat within the subject site.				

APPENDIX 2

Fauna Survey Details

APPENDIX 2 - FAUNA SURVEY DETAILS				
Fauna Group	**Date**	**Weather Conditions**	**Survey Method**	**Survey Effort / Time (24hr)**
Diurnal Birds	14/3/06 15/3/06 15/3/06 16/3/06 16/3/06 17/3/06 20/3/06 20/3/06 21/3/06 21/3/06 22/3/06	0-8/8 cloud, light NW wind, temp 22°C, no rain 3-8/8 cloud, light NW wind, temp 21°C, no rain 8/8 cloud, light NW wind, temp 22°C, no rain 2/8 cloud, light NW wind, temp 24°C, no rain 1/8 cloud, light NW wind, temp 24°C, no rain 3/8 cloud, light NW wind, temp 20°C, no rain 1/8 cloud, light NW wind, temp 24°C, no rain 1/8 cloud, light NW wind, temp 24°C, no rain 2/8 cloud, no wind, temp 25°C, no rain 2-6/8 cloud, no wind, temp 24°C, no rain 7/8 cloud, no wind, temp 24 °C, no rain	Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic Diurnal Opportunistic	4hrs 1400 - 1800 4hrs 0730 - 1130 2hrs 1400 - 1600 4hrs 0730 - 1130 3hrs 1330 – 1630 3hrs 0715 – 1015 2hrs 0800 -1000 5hrs 1200 – 1700 4hrs 0800 – 1200 5hrs 1230 – 1730 4hrs 0800 - 1200
Nocturnal Birds	16/3/06 20/3/06 21/3/06	8/8 cloud, light NW wind, temp 20°C, early showers 1/8 cloud, light NW wind, temp 23°C, no rain 7/8 cloud, no wind, temp 22 °C, no rain	Owl call playback Owl call playback Owl call playback	45min 2015 - 2100 45min 1930 - 2015 45min 1930 - 2015
Arboreal Mammals	14/3/06 15/3/06 16/3/06 16/3/06 17/3/06 20/3/06 21/3/06	8/8 cloud, light NW wind, temp 20°C, early showers 8/8 cloud, light NW wind, temp 18°C, rain showers 2-4/8 cloud, light NW wind, temp 20°C, no rain 4/8 could, light NW wind, temp 23 °C, no rain 3/8 cloud, light NW wind, temp 20°C, no rain 1/8 cloud, light NW wind, temp 23°C, no rain 7/8 cloud, no wind, temp 22 °C, no rain	Elliott trapping Elliott trapping Elliott trapping Spotlighting Call Playback – Yellow-bellied Glider Elliott trapping Spotlighting Call Playback - Yellow-bellied Glider Spotlighting Call Playback - Yellow-bellied Glider	20 trap nights 20 trap nights 20 trap nights 1hr 30min 2015 - 2145 45min 2015 - 2100 20 trap nights 2hrs 1930 - 2130 45min 1930 - 2015 3hrs 1930 - 2230 45min 1930 - 2015 Total 80 arboreal trap nights

APPENDIX 2 - FAUNA SURVEY DETAILS				
Fauna Group	**Date**	**Weather Conditions**	**Survey Method**	**Survey Effort / Time (24hr)**
Terrestrial Mammals	14/3/06	8/8 cloud, light NW wind, temp 20°C, early showers	Elliott trapping Small + Large Cage Trapping	35 trap nights 15 trap nights
	15/3/06	8/8 cloud, light NW wind, temp 18°C, rain showers	Elliott trapping Small + Large Cage Trapping	35 trap nights 15 trap nights
	16/3/06	2-4/8 cloud, light NW wind, temp 20°C, no rain	Elliott trapping Small + Large Cage Trapping	35 trap nights 15 trap nights
	16/3/06	4/8 could, light NW wind, temp 23 °C, no rain	Spotlighting	1hr 30min 2015 – 2145
	17/3/06	3/8 cloud, light NW wind, temp 20°C, no rain	Elliott trapping Small + Large Cage Trapping	35 trap nights 15 trap nights
	20/3/06	1/8 cloud, light NW wind, temp 23°C, no rain	Spotlighting	2hrs 1930 - 2130
	21/3/06	7/8 cloud, no wind, temp 22 °C, no rain	Spotlighting	3hrs 1930 - 2230 Total 200 Terrestial trap nights
Bats	16/3/06	4/8 could, light NW wind, temp 23 °C, no rain	Anabat II x 2 Anabat II	2hr 30min 1900 - 2130 All night 1900 - 0630
	20/3/06	1/8 cloud, light NW wind, temp 23°C, no rain	Anabat II x 2 Anabat II	2hr 30min 1900 - 2130 All night 1900 – 0630
	21/3/06	7/8 cloud, no wind, temp 22 °C, no rain	Anabat II x 2 Anabat II	3hr 30min 1900 - 2230 All night 1900 – 0630
Reptiles	14/3/06	0-8/8 cloud, light NW wind, temp 22°C, no rain	Diurnal Opportunistic	4hrs 1400 - 1800
	15/3/06	3-8/8 cloud, light NW wind, temp 21°C, no rain	Diurnal Opportunistic	4hrs 0730 - 1130
	15/3/06	8/8 cloud, light NW wind, temp 22°C, no rain	Habitat search, Opportunistic	2hrs 1400 - 1600
	16/3/06	2/8 cloud, light NW wind, temp 24°C, no rain	Diurnal Opportunistic	4hrs 0730 - 1130
	16/3/06	1/8 cloud, light NW wind, temp 24°C, no rain	Habitat search, Opportunistic	3hrs 1330 – 1630
		4/8 could, light NW wind, temp 23 °C, no rain	Spotlighting	1hr 30min 2015 – 2145
	17/3/06	3/8 cloud, light NW wind, temp 20°C, no rain	Diurnal Opportunistic	3hrs 0715 – 1015
	20/3/06	1/8 cloud, light NW wind, temp 24°C, no rain	Habitat search, Opportunistic	2hrs 0800 -1000
	20/3/06	1/8 cloud, light NW wind, temp 24°C, no rain	Diurnal Opportunistic	5hrs 1200 – 1700
		1/8 cloud, light NW wind, temp 23°C, no rain	Spotlighting	2hrs 1930 - 2130
	21/3/06	2/8 cloud, no wind, temp 25°C, no rain	Diurnal Opportunistic	4hrs 0800 – 1200
	21/3/06	2-6/8 cloud, no wind, temp 24°C, no rain	Diurnal Opportunistic	5hrs 1230 – 1730
		7/8 cloud, no wind, temp 22 °C, no rain	Spotlighting	3hrs 1930 - 2230
	22/3/06	7/8 cloud, no wind, temp 24 °C, no rain	Diurnal Opportunistic	4hrs 0800 - 1200

APPENDIX 2 - FAUNA SURVEY DETAILS				
Fauna Group	**Date**	**Weather Conditions**	**Survey Method**	**Survey Effort / Time (24hr)**
Amphibians	14/3/06	8/8 cloud, light NW wind, temp 19^{o}C, rain	Spotlight + call detection	1.5hrs 1930 – 2100
			Call Playback	1.5hrs 1930 – 2100
	15/3/06	8/8 cloud, light NW wind, temp 22^{o}C, no rain	Habitat search	2hrs 1400 - 1600
		8/8 cloud, light NW wind, temp 19^{o}C, rain	Spotlight + call detection	1.5hrs 1930 – 2100
			Call Playback	1.5hrs 1930 – 2100
	16/3/06	1/8 cloud, light NW wind, temp 24^{o}C, no rain	Habitat search	3hrs 1330 – 1630
	20/3/06	1/8 cloud, light NW wind, temp 24^{o}C, no rain	Habitat search	2hrs 0800 -1000

APPENDIX 3

Endangered Ecological Community (EEC)
Condition Assessment Summary Table

APPENDIX 3 EEC CONDITION ASSESSMENT SUMMARY TABLE

Vegetation Community Classification						
Site Vegetation Name (Number of Reference/Site Value Plots Sampled)	Swamp Oak Open Forest (3 Reference Plots)	Disturbed Swamp Oak Open Heath (3)	Closed Swamp Paperbark Scrub (2 Reference Plots)	Disturbed Swamp Paperbark Open Heath (3)	Redgum Open Forest (1 Reference Plot offsite)	Disturbed Redgum Open Woodland (3)
Endangered Ecological Community (TSC Act)	Swamp Oak Floodplain Forest	Swamp Oak Floodplain Forest	Swamp Oak Floodplain Forest	Swamp Oak Floodplain Forest	River Flat Eucalypt Forest on Coastal Floodplains	River Flat Eucalypt Forest on Coastal Floodplains
Vegetation formation (as per Keith 2004)	Forested wetlands	Forested wetlands	Saline wetlands	Saline wetlands	Grassy woodlands	Grassy woodlands
Vegetation class (as per Keith 2004)	Coastal Floodplain Wetlands	Coastal Floodplain Wetlands	Saltmarshes	Saltmarshes	Coastal Valley Grassy Woodlands	Coastal Valley Grassy Woodlands
Vegetation type (BioMetric)	Estuarine Creek flat Scrub	Estuarine Creek flat Scrub	Estuarine Wetland Scrub	Estuarine Wetland Scrub	South Coast Grassy Woodland	South Coast Grassy Woodland
Appropriate Benchmark Data Available	No	No	No	No	Yes	Yes
Average plot data						
Number of native plant species	18	12	21	11	39	10
Benchmark Value of the Lower Over-storey Cover (%)	10	10	60	60	15	15
Native Over-storey Cover (%)	44	0	76	0	31	2
Native Mid-storey Cover (%)	11	1	0	0	24	1
Native Ground Cover (%) - Grass	44	46	22	2.5	10	41
Native ground cover (%) - Shrubs	2	14	3	28	67.5	14
Native ground cover (%) - Other	23	5	24	2.5	44	8
Exotic Plant Cover (%)	17	>50	3	80	2.5	52
Meets "Low Condition"	No	Yes	No	Yes	No	Yes

"Low condition" = (<50% native understorey & <25% of the lower value of the over-storey per cent foliage cover benchmark for that vegetation type)

ADDENDUM 1

7-Part Test of Significance

Section 5a, *Ep&A Act (1979)*

7-PART TEST OF SIGNIFICANCE (SECTION 5A, *EP&A Act 1979*)

The following threatened species, population and endangered ecological community assessment relies on the ecological assessment provided in Sections 3 & 4 of this report and should be read as such. It is considered that the subject site provides potential habitat for the following threatened species, which will be assessed in accordance with the following seven-part test:

Threatened flora species
- *Aldrovanda vesiculosa*
- *Correa baeuerlenii*

Endangered Ecological Communities
- Swamp Oak Floodplain Forest
- Riverflat Eucalypt Forest on Coastal Floodplains
- Freshwater Wetlands on Coastal Floodplains

Threatened fauna species
- Giant Burrowing Frog
- Green & Golden Bell Frog
- Square-tailed Kite
- Osprey
- Australasian Bittern
- Black Bittern
- Painted Snipe
- Superb Fruit-dove
- Glossy Black-Cockatoo
- Swift Parrot
- Turquoise Parrot
- Regent Honeyeater
- Barking Owl
- Powerful Owl
- Masked Owl
- Sooty Owl
- Hooded Robin
- Diamond Firetail
- Olive Whistler
- Gang-Gang Cockatoo
- Brush-tailed Phascogale
- Spotted-tailed Quoll
- Southern Brown Bandicoot
- Long-nosed Potoroo
- Koala
- Squirrel Glider
- Yellow-bellied Glider
- Grey-headed Flying-fox
- Large-footed Myotis
- Little Bentwing-bat
- Eastern Bentwing-bat
- Greater Broad-nosed Bat
- Eastern Freetail-bat
- Eastern False Pipistrelle

The '7 part test of significance' is as follows.

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

Detailed flora and fauna investigations of the subject site, together with habitat assessments, have resulted in the identification of potential habitat for a variety of threatened species. An assessment of these species is as follows:

Aldrovanda vesiculosa
Aldrovanda vesiculosa is a small waterplant which traps aquatic insects and grows in shallow fresh water, often caught on submerged vegetation. Known only in shallow coastal wetlands in the Moruya and Evans Head area. The Bevian Swamp was identified as containing sub optimal habitat for this species. During the survey of the subject site, no specimens of *Aldrovanda vesiculosa* were observed. The proposed development will conserve the Bevian

Swamp and the surrounding vegetation. A vegetation management plan is recommended to remove weeds from the Bevian Swamp and this may increase the quality of the habitat for *Aldovanda vesiculosa.* It is proposed to mitigate any increases in the quantity or decreases in the quality of the water flowing into the Bevian Swamp.

Despite the presence of potential habitat for Aldovanda vesiculosa within the subject site, it is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Correa baeuerlenii

Correa baeuerlenii – A shrub 1-2.5 m high which grows in sclerophyll forest, from the Clyde River District to Bega. It is considered that the Spotted Gum/Ironbark Open Forest and the Blackbutt Woodland vegetation communities within the subject site provide potential habitat for *Correa baeuerlenii*. During the survey of the subject site, no specimens of *Correa baeuerlenii* were observed.

Therefore, it is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Giant Burrowing Frog

The Giant Burrowing Frog occurs in disjunct populations from Olney State Forest to the Victorian Highlands. It occurs in semi permanent to ephemeral sand or rock based streams, and infrequently occurs in semi-permanent to permanent fire dams and artificial drainage ditches / culverts on roadsides (Ehmann, 1997). It is strongly associated with the upper drainage lines and ridgetops of Hawkesbury Sandstone and occurs in a variety of habitats. This species has been seen emerging from burrows on ridgetops several hundred metres from available water. This species has also been found in deeper rainforest gullies of Sydney sandstone. It is normally encountered during or after extended periods of heavy rain.

The subject site provides a small amount of suitable habitat for this species within the ephemeral drainage lines of the Open Forest vegetation communities. This species was not recorded during the fauna survey. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Green and Golden Bell Frog

The Green and Golden Bell Frog prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds where it is often located under debris including corrugated iron, timber and rock.

The subject site contains suitable habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Square-tailed Kite
The Square-tailed Kite moves low over the canopy of woodland, exploiting ecotones while hunting. It is known to favour *Angophora floribunda* and *Angophora subvelutina* woodland in association with box / ironbark eucalypt species along moist valleys on the coast of NSW. There is usually profuse blossom associated with this type of vegetation, which provides an abundance of nesting birds on which the kite typically preys.

The subject site provides suitable nesting and foraging habitat for this species. This species was not recorded during the fauna survey. The proposal will retain suitable foraging and nesting habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Osprey
The Osprey utilises various environments including waterbodies such as coastal waters, inlets, lakes, estuaries for foraging and offshore islands with dead trees for perching and breeding. The subject site provides suitable nesting and roosting habitat for this species. This species was not recorded and no nest sites were observed during the fauna survey. The proposal will retain areas of suitable nesting and roosting habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Australasian Bittern
The Australasian Bittern inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges. The subject site contains suitable foraging and shelter habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Black Bittern
The Black Bittern inhabits freshwater and brackish wetlands, ponds and streams with tall dense reed beds (Lindsey 1992). The subject site contains suitable foraging and shelter habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Painted Snipe

The Painted Snipe habitats terrestrial shallow freshwater, wetlands; empheral and permanent: lakes, swamps, claypans, inundated or waterlogged grassland or saltmarsh. (Marchant & Higgins 1993). Generally uncommon, this species is scattered east of a line between Eyre Peninsular Karumba, Qld, and the Murray-Darling Basin of NSW (Marchant & Higgins 1993). Painted Snipe take seeds and invertebrates, including insects, worms, molluscs and crustaceans. (Garnett & Crowley 2000). The subject site contains suitable foraging and shelter habitat within the Bevian Swamp and farm dams present. This species was not recorded during targeted surveys. The development does not propose to remove areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Superb Fruit-dove
The Superb Fruit-dove inhabits rainforests and their fringes, as well as mangroves and wooded stream margins (Pizzey and Knight, 1997). Habitat within and near rainforests includes scrub, lantana thickets, isolated figs, pittosporums, lilly pillies, and blackberries (Pizzey and Knight, 1997). The Superb Fruit-dove feeds primarily on the fruit of rainforest trees and moist vegetation.

The subject site provides suitable foraging and nesting habitat for this species particulary within the dry rainforest vegetation community. This species was not recorded during the fauna survey. The proposal will retain the dry rainforest vegetation community. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Glossy Black-Cockatoo
The Glossy Black-Cockatoo inhabits *Allocasuarina* forest and woodland where it feeds almost exclusively on the fruit of *Allocasuarina* spp. The subject site contains suitable foraging and breeding habitat for this species. Target surveys revealed Glossy Black-Cockatoo foraging evidence (chewed Allocasuarina cones) within the Spotted Gum/ Iron Bark vegetation community along the eastern boundary of the site. The development does not plan to remove large areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Swift Parrot
The Swift Parrot inhabits eucalypt forests and woodlands foraging mainly on nectar from winter flowering eucalypts and also psyllids and lerp, and seeds and fruits (Higgins, 1999). This migratory species breeds in Tasmania and its offshore islands in summer and in late March, almost the entire population migrates to mainland Australia. It is considered that the subject site provides potential foraging habitat for this species predominantly within the winter flowering tree species, but also in all other trees throughout the subject site. This species was not recorded during the fauna survey. The development does not plan to remove large areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Turquoise Parrot
The Turquoise Parrot inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. The subject site contains suitable foraging and nesting habitat for this species. This species was not recorded during the fauna survey. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Regent Honeyeater
The Regent Honeyeater inhabits mostly dry eucalypt woodlands and forests dominated by box and ironbark eucalypts. In areas on western slopes of the Great Divide, this species is associated with moister more fertile soils, along creeks, broad river valleys and on lower slopes of foothills. This species is known to forage mainly among foliage or flowers in the upper canopy of trees, sometimes in the lower strata on trunks of trees, in shrubs, and occasionally on the ground. This species feeds on nectar, invertebrates (mostly insects) and their exudates, such as lerp and honeydew and occasionally on fruit. This species usually nests in canopy of forest or woodland. This species is often observed foraging on winter flowering eucalypts throughout western Sydney.

It is considered that the subject site provides potential foraging habitat for this species predominantly within the winter flowering tree species, but also in all other trees throughout the subject site. This species was not recorded during the fauna survey. The development does not plan to remove large areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Barking Owl
The Barking Owl utilises eucalypt forests, woodlands and adjacent cleared areas for foraging and large hollows for nesting and breeding (Schodde & Tidemann, 1986). This species usually roosts in large densely foliaged trees, either among foliage or on bare branch below foliage, sometime quite low (Higgins, 1999).

The subject site provides suitable foraging and breeding habitat for this species. This species was not observed during surveys. The proposal will retain areas of Open Forest

that contain large hollows suitable for breeding. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Powerful Owl
The Powerful Owl inhabits dense mountain gullies, coastal forests and woodlands, coastal scrubs, and pine plantations over a large range (approx. 400-1400 ha). The Powerful Owl occurs in a range of vegetation types from woodland and open forest to rainforest. In NSW this species most commonly occurs in tall, wet or dry sclerophyll forests. This species nests in large hollows within large old trees, usually in living *Eucalypts* (Higgins, 1999; *Conacher Travers*, 2006). This species mostly roosts in closed forest, including rainforest or wet sclerophyll forest within densely foliaged trees (Higgins, 1999).

The subject site provides suitable foraging and breeding habitat for this species. This species was observed responding to call playback surveys from Mogo State Forest on the 16th March 2006. This species was recorded calling approx 200-300m west of the subject site boundary, within Mogo State Forest. It is considered likely that this species would utilise the small amount of available habitat present within the subject site. No breeding sites were identified within the subject site during surveys. The proposal will retain areas of Open Forest that contain large hollows suitable for breeding. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Masked Owl
The Masked Owl utilises eucalypt forests, woodlands and adjacent cleared areas for foraging and large hollows for roosting, nesting and breeding. It is considered that the subject site provides potential nesting and foraging habitat for the Masked Owl within the Scribbly Gum / Red Gum Open Woodland vegetation community. The subject site provides suitable foraging and breeding habitat for this species. This species was not observed during surveys. No breeding sites were identified within the subject site during surveys. The proposal will retain areas of Open Forest that contain large hollows suitable for breeding. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Sooty Owl
The Sooty Owl is found throughout coastal NSW, generally east of the Great Dividing Range. Although regarded as a specialist inhabitant of rainforest and tall open forest, it is occasionally recorded foraging in adjacent dry sclerophyll forests. It roosts by day in dense gully vegetation such as rainforest, although the species will also roost in tree hollows, caves and rock overhangs and occupies territory between 200-800ha.

The subject site provides suitable foraging and breeding habitat for this species. This species was not observed during surveys. No breeding sites were identified within the subject site during surveys. The proposal will retain areas of Open Forest that contain large

hollows suitable for breeding. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Hooded Robin
The Hooded Robin is found in drier Eucalypt woodlands and scrubland. It has been found to occur in areas with fallen logs, cleared paddocks with stumps. Despite the presence of potential habitat within the Open Forest vegetation communities, this species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Diamond Firetail
The Diamond Firetail inhabits open forests, mallee and savanna grassland preferring the vicinity of watercourses. The Diamond Firetail is sedentary often nesting in the same tree year after year (Pizzey and Knight, 1997). The study area provides suitable habitat for this species. Despite the presence of potential habitat, this species was not recorded during the fauna survey.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Olive Whistler
The Olive Whistler inhabits dense often damp, forests and woodlands in breeding season and more open land in winter (Flegg 2002). This species has a restricted distribution, scarce in the north and more common in the south. The Olive Whistler is often recorded solitary and flies off silently. The study area provides suitable habitat for this species. Despite the presence of potential habitat, this species was not recorded during the fauna survey.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Gang-gang Cockatoo
The Gang-gang Cockatoo is associated with a variety of woodland and forest habitats, and occasionally more open areas in south–eastern New South Wales and Victoria (NSW Scientific Committee, 2001). This species has been observed in eucalypt forests and exotic trees (Morris 1997), and is known to feed on the seeds of native shrubs and trees, in addition to some exotic species such as the Hawthorn and Cupressus species (Schodde & Tideman 1976). The Gang-gang Cockatoo nests in hollows in large, dead trees (NSW Scientific Committee, 2001).

Despite the presence of potential habitat within the Open Forest vegetation communities, this species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Brush-tailed Phascogale

The Brush-tailed Phascogale is presently distributed in south-east Queensland and north-east New South Wales, and in a band extending from south-east New South Wales through to the west Victorian border where it is found in open forests with sparse ground cover. This species nests and shelters in tree hollow, using many different hollows over a short period of time. Suitable hollows for this species are 25-40mm wide. The Brush-tailed Phascogale mate between May and July. The subject site provides suitable foraging and den habitat throughout the Open Forest vegetation communities. This species was not recorded during surveys. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Spotted-tailed Quoll

The Spotted-tailed Quoll inhabits a number of habitats including dry to moist open forests or closed forests containing rock caves, hollow logs or trees for shelter / breeding. It is considered that the subject site provides potential foraging habitat for this species within the woodland vegetation community. This species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Southern Brown Bandicoot

The Southern Brown Bandicoot has been detected in a range of habitats including open forest, woodland, heaths, agricultural land and urban areas, preferring areas with thick ground cover which provide protection from predators (Braithwaite 1988). It nests in shallow depressions in the ground which are covered by grass, litter and other plant material. The chamber within the nest is lined with grass or leaves and has no permanent entry or exit point, the animal using any point to emerge (Braithwaite 1988). Males have a home range of between 5-20 hectares which is larger than the home range of females which is between 1.8-3.3 hectares (Braithwaite 1988). Within an animals home range several nests may be used. It is considered that the subject site provides potential foraging habitat for the Southern Brown Bandicoot. This species was not recorded during the fauna survey. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Long-nosed Potoroo

The Long-nosed Potoroo inhabits coastal heath and dry and wet sclerophyll forests. Its optimum habitat is wet sclerophyll forest and rainforest patches in moist sclerophyll forest, with a moist shrubby understorey, often associated with grassy areas. The subject site contains suitable foraging and shelter habitat for this species. This species was not observed during surveys. The development proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Koala

The Koala inhabits both wet & dry eucalypt forest on high nutrient soils containing preferred feed trees. It is considered that the subject site provides potential foraging habitat for this species. This species was not recorded during the fauna survey. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Squirrel Glider

The Squirrel Glider inhabits mixed aged stands of eucalypt forest & woodlands including gum barked and high nectar producing species with hollow bearing trees. According to Quin (1995) the home-ranges of Squirrel Gliders have been estimated at between 0.65 and 8.55 ha, the movement of males being greater than that of females. Nightly movements are estimated at between 300 and 500 m. Quin (1995) found that the home-range of a family group is likely to vary according to habitat quality and availability of resources. The Squirrel Glider is a hollow-dependant species.

The subject site contains suitable foraging and den habitat throughout the Open Forest Vegetation communities and the vegetated drainage lines. This species was not observed during surveys. The proposal will retain suitable foraging and den habitat within the Open Forest vegetation communities. Promoting regeneration throughout the creek and drainage lines will improve the arboreal habitat within the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction

Yellow-bellied Glider

The Yellow-bellied Glider utilises tall mature eucalypt forests which contain high nectar producing species and hollow bearing trees (Russell, 1984). The subject site provides suitable habitat for this species. This species was spotlighted and observed calling within the subject site and adjoining lands by Gunninah in 2002. The on site records were located within the Spotted Gum Forests within the north eastern portion of the subject site. These Gliders may form part of an isolated population identified by the Eurobodalla Shire Council in 2001. The Yellow-bellied Glider was not detected nor were feed scars observed within the subject site during surveys conducted by *Conacher Travers* in March 2006, However this species is considered likely to occur. The Yellow-bellied Glider has a home range in the order of 35 hectares (Strahn, 98). It is likely that this species also utilises the habitat within the adjacent Mogo State Forest. The subject site makes up a very small portion of the area utilised by the Yellow-bellied Glider. The proposal may require the removal of small areas

of suitable habitat however larger areas of suitable habitat will be retained throughout the site. The Eurobodalla Shire Council has identified that large powerlines may restrict the movement of the Yellow-bellied Glider.

The Eurobodalla Shire Council has adopted a *Policy for the Conservation of the Yellow-bellied Glider* in the LGA. The policy identifies farm lands as a major barrier to habitat linkages. There is currently no arboreal connectivity directly through the subject site. *Conacher Travers* recommends that arboreal connectivity should be retained and enhanced throughout the subject site. With the exception of some habitat removal the proposal does comply with the Eurobodalla Shire Council Conservation Policy for this species.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction

Grey-headed Flying-fox
The Grey-headed Flying-fox is a canopy feeding frugivore and nectarivore species inhabiting rainforests, open forests, woodlands, *Melaleuca* swamps and *Banksia* woodlands. This species provides a means of seed dispersal and pollination for many native plants. Grey-headed Flying-foxes congregate in large numbers at roosting sites (camps) that may be found in rainforest patches, *Melaleuca* stands, mangroves, riparian woodland or modified vegetation in urban areas.

The subject site contains suitable foraging habitat throughout the Open Forest, Banskia and Scattered Tree Vegetation communities. This species or its camp sites were not observed during surveys. The proposal will retain suitable foraging habitat throughout the subject site. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction

Large-footed Myotis
The Large-footed Myotis inhabits rainforests and sclerophyll forests near creeks and lakes over which it forages for aquatic insects and small fish. This species is known to roost in tree hollows, caves, mines and tunnels. It is considered that the subject site provides potential roosting habitat for this species within the Scribbly Gum / Red Gum Open Woodland vegetation community and potential foraging habitat for this species within the watercourse and the Swamp Mahogany vegetation community.

The subject site contains suitable foraging habitat within the Bevian Swamp and farm dams. The subject site also provides suitable roosting habitat within the hollow trees present. This species was not recorded during targeted surveys. The development does not propose to remove suitable foraging habitat for this species. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Little Bentwing-bat
The Little Bentwing-bat forages below the canopy within open forests and woodlands, feeding on small insects. This species roost in caves, tunnels, tree hollows and occasionally old buildings. The subject site provides suitable foraging and roosting habitat for this species

throughout the subject site. This species was not recorded during surveys. The proposal will retain areas of suitable habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest. The NSW Wildlife Atlas Database has no records of this species within a 10km radius of the subject site.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Eastern Bentwing-bat
The Eastern Bentwing-bat inhabits areas where there are caves, old mines, old buildings, stormwater drains for shelter and well-timbered areas for foraging. It is considered that the subject site provides potential foraging habitat for this species throughout the subject site.

The subject site provides suitable foraging habitat for this species. This species was recorded on the 21 March 2006 during the *Conacher Travers Pty Ltd* survey in one (1) location in the Spotted Gum/Iron Bark vegetation community along the eastern boundary of the site. This species was also recorded within the subject site by Gunninah in 2002. The Eastern Bentwing-bat has been recorded travelling long distances to forage (Churchill, 1998). The abandoned Bimbimbi mines located within the Mogo area is a known roost site for this species. It is considered that the subject site is likely to be within the foraging range of this known population. The subject site does not provide suitable roosting habitat. The Eastern Bentwing-bat is a highly mobile species and it is considered that this species forages throughout the local area and not the subject site exclusively. The development proposal will retain large areas of foraging habitat for this species.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Greater Broad-nosed Bat
The Greater Broad-nosed Bat inhabits areas containing moist river & creek systems especially tree-lined creeks for foraging and breeding. It is considered that the subject site provides potential roosting and foraging habitat for this species.

The subject site provides suitable foraging and roosting habitat for this species. This species was recorded on the 21 March 2006 foraging over a farm dam located in the north western portion of the subject site. The Greater Broad-nosed Bat is a highly mobile species and it is considered that this species forages throughout the local area and not the subject site exclusively. The development proposal will retain large areas of habitat for this species. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Eastern Freetail-bat
The Eastern Freetail-bat inhabits open forests and woodlands foraging above the canopy and along the edge of forests. This species is known to roost in tree hollows, under bark and buildings. The subject site provides suitable foraging and roosting habitat for this species. This species was recorded on the 17, 20 and 21 March 2006 foraging within four locations (Figure 7) throughout the subject site. The Eastern Freetail-bat is a highly mobile species and it is considered that this species forages throughout the local area and not the subject site exclusively. There are extensive areas of similar and higher quality habitat within the

local area including Mogo State Forest. The development proposal will retain large areas of habitat for this species.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Eastern False Pipistrelle
The Eastern False Pipistrelle has been recorded roosting in caves, old buildings and tree hollows. This species forages throughout woodlands and open forest. The subject site provides suitable foraging and roosting habitat for this species. The Eastern False Pipistrelle is a highly mobile species and it is considered that this species may forage throughout the local area. However this species was not recorded during surveys. There are extensive areas of similar and higher quality habitat within the local area including Mogo State Forest. The development proposal will retain large areas of habitat for this species.

It is considered that the proposal is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

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

No endangered populations have been recorded within a 10km radius of the subject site (DECC 2007 and Bionet 2007) or considered likely to utilise the subject site.

Therefore the proposed action is not expected to have an adverse effect on the life cycle of a species that constitutes an endangered population such that a viable local population is likely to be placed at risk of extinction.

c) In the case of a critically endangered or endangered ecological community, whether the action proposed:

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

Swamp Oak Floodplain Forest (SOFF)
The subject site has an area of 187 ha, of which, Swamp Oak Open Forest and Swamp Paperbark Scrub (constituting the Swamp Oak Floodplain Forest endangered ecological community) occupies three separate stands totalling approximately 11.23 hectares. The proposed development will remove/modify approximately 1.78ha of this community. However, 5.04ha of this community is proposed to be revegetated in cleared lands and improved from its current state. This will result in a net improvement (14.46ha) in the total extent of the community within the subject site.
Within the locality, Gillie (2005) recorded 390ha of MU – 27 Ecotonal Coastal Swamp Forest, which constitutes SOFF. Seven percent (7%) of this area is secured in conservation reserves.

Given the conservation of approximately 7% of this community within the locality and the proposal to retain, revegetate and rehabilitate the community within the subject site, it is considered that the proposed development is unlikely to have an adverse effect on the extent of this community such that its local occurrence is likely to be placed at risk of extinction.

Riverflat Eucalypt Forest on Coastal Floodplains (RFEFCF)
The subject site has an area of 187 ha, of which, Disturbed Red Gum Open Woodland (constituting Riverflat Eucalypt Forest on Coastal Floodplains endangered ecological community) occupies approximately 2.05 hectares in fragmented stands. The proposed development will remove/modify approximately 0.36ha of this community. However, 0.74ha of this community is proposed to be revegetated in cleared lands and improved from its currently disturbed state. This will result in a net improvement (2.43ha) in the total extent of the community within the subject site.

Given the proposal to retain, revegetate and rehabilitate the community within the subject site, it is considered that the proposed development is unlikely to have an adverse effect on the extent of this community such that its local occurrence is likely to be placed at risk of extinction.

Freshwater Wetlands on Coastal Floodplains (FWCF)
The subject site has an area of 187 ha, of which, Freshwater Wetland vegetation (constituting Freshwater Wetlands on Coastal Floodplains) occupies approximately 5.94ha within the Bevian Wetland. The proposed development will retain this community in its entirety and protect the Bevian Wetland from any indirect impacts such as stormwater runoff.

Therefore the proposed development is unlikely to have an adverse effect on the extent of this community such that its local occurrence is likely to be placed at risk of extinction.

ii. Is likely to substantially and adversely modify the composition such that its local occurrence is likely to be placed at risk of extinction,

Swamp Oak Floodplain Forest (SOFF)
The vegetation communities, Swamp Oak Open Forest and Swamp Paperbark Scrub, which constitute the SOFF are located within the proposals southern restoration/conservation zone associated with Bevian Wetland. This zone will not be significantly impacted by the proposal and will be managed in perpetuity under an Ecological Site Management Plan (*Conacher Travers* 2007b) for weed invasion and general rehabilitation. Approximately seven percent (7%) of this community's extent within the locality is secured within conservation reserves. The proposal will exclude cattle from this community and will consequently enhance the biodiversity within this community.

Therefore it is considered unlikely that the proposal will substantially and adversely modify the composition of this community such that its local occurrence is likely to be placed at risk of extinction.

Riverflat Eucalypt Forest on Coastal Floodplains (RFEFCF)
The vegetation community, Disturbed Red Gum Open Woodland, which constitutes the RFEFCF is located within the proposals southern restoration/conservation zone associated with Bevian Wetland. This zone will not be significantly impacted by the proposal and will be managed in perpetuity under an Ecological Site Management Plan (*Conacher Travers* 2007b) for weed invasion and general rehabilitation. The proposal will exclude cattle from this community and will consequently enhance the biodiversity within this community.

Therefore it is considered unlikely that the proposal will substantially and adversely modify the composition of this community such that its local occurrence is likely to be placed at risk of extinction.

Freshwater Wetlands on Coastal Floodplains (FWCF)
The vegetation community, Freshwater Wetland vegetation, which constitutes the FWCF is located within the Bevian Wetland ion the southern boundary of the site. This zone will not be significantly impacted by the proposal and will be managed in perpetuity under an Ecological Site Management Plan (*Conacher Travers* 2007b) for weed invasion and general rehabilitation.

The Bevian Road Concept Application will manage stormwater runoff associated with the proposed development through an extensive stormwater treatment train comprising, gross pollutant traps, bio-retention basins and bio-swales within all road reserves. A Water Cycle Management Report has been prepared by *Patterson Britton* (2007b) to ensure that there is no net change in the quantity or quality of stormwater runoff within and leaving the site.

The upgrade on an existing, unsealed road along the western boundary of Bevian Wetland will assist in reducing the potential for sediments entering the wetland. The existing road alignment will be retained to reduce the extent of required earthworks.

Therefore it is considered unlikely that the proposal will substantially and adversely modify the composition of this community such that its local occurrence is likely to be placed at risk of extinction.

(d) In relation to the habitat of threatened species, populations or ecological community:

It is considered that the habitat attributes of the subject site provide known or potential habitat for *Aldrovanda vesiculosa, Correa baeuerlenii,* Swamp Oak Floodplain Forest, Riverflat Eucalypt Forest on Coastal Floodplains, Freshwater Wetlands on Coastal Floodplains, Giant Burrowing Frog, Green and Golden Bell Frog, Square-tailed Kite, Osprey, Australasian Bittern, Black Bittern, Painted Snipe, Superb Fruit-dove, Gang-Gang Cockatoo, Swift Parrot, Turquoise Parrot, Swift Parrot, Regent Honeyeater, Olive Whistler, Diamond Firetail, Hooded Robin, Barking Owl, Powerful Owl, Masked Owl, Sooty Owl, Koala, Brush-tailed Phascogale, Spotted-tailed Quoll, Southern Brown Bandicoot, Long-nosed Potoroo, Yellow-bellied Glider, Squirrel Glider, Grey-headed Flying-fox, Large-footed Myotis, Little Bentwing-bat, Eastern Bentwing-bat, Greater Broad-nosed Bat, Eastern Freetail-bat and Eastern False Pipistrelle.

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

The subject site has an area of 173.59 ha, the majority of the property is cleared with only a small portion of native vegetation occurring within the subject site.

The proposed development is likely to retain and improve all areas of potential habitat for the aforementioned species. Revegetation works creating ecological corridors will improve vegetation connectivity between native remnants retained within the site and to vegetation off site.

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

The development proposal is likely to remove or modify only a small portion of native vegetation as part of the proposal. A net improvement in native vegetation, extent connectivity and viability is expected to result from the proposed development as a consequence of revegetation works creating ecological corridors and the restoration and revegetation works within the lands surrounding the Bevian Wetland.

As the majority of the native vegetation within the subject site is to be retained as part of the development and given the extensive revegetation and restoration works proposed it is considered that known habitat for a threatened species, population or ecological community within the local area and region is unlikely to become isolated or fragmented as a result of the proposal.

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

The proposed development is likely to remove or modify predominately grassland with scattered trees vegetation, which is considered to be of low importance to the long-term survival of threatened species or endangered ecological communities. Higher quality native remnants within the site will be retained, restored and revegetated resulting in an overall net improvement in vegetation connectivity and viability across the site.

Given the conservation of high quality native remnants and revegetation works to be undertaken across the site, it is considered that the grassland with scattered trees vegetation to be removed from the site is insignificant to the long-term survival of threatened species and endangered ecological communities occurring or with the potential to occur within the site.

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

The subject site has not been identified as critical habitat within the provisions of the *TSC Act* (1995).

Therefore this matter does not require any further consideration.

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

FLORA

There is no current recovery plan or threat abatement plan prepared for Aldrovanda vesiculosa, and Correa baeuerlenii and as such this matter does not require any further consideration for these species.

FAUNA

There are current recovery plans for the following threatened species with potential habitat within the subject site: Green and Golden Bell Frog, Barking Owl, The Large Forest Owls, Yellow-bellied Glider, Southern Brown Bandicoot, and Koala.

Green and Golden Bell Frog

The Green and Golden Bell Frog Draft Recovery Plan specific objectives includes to prevent further loss of habitat at key populations across the range. The proposed development does not plan to remove potential habitat for this species. The creeklines and dams of the subject site will be protected and allowed to regenerate in the current development plan.

The proposed development is considered consistent with the objectives or actions of the Draft Recovery Plan.

Barking Owl and Large Forests Owls
The proposed development is considered generally consistent with the objectives or actions of the Barking Owl and Large Forest Owls Recovery Plans. However these plans emphasise the need for protection of suitable habitat for these species.

In this regard the proposed development does not correspond with this objective of the Recovery Plans.

Yellow-bellied Glider
The proposal will increase connectivity through the subject site to surrounding areas. Small areas of habitat within the subject site will be expanded and connectivity enhanced through strategic rehabilitation works.

The proposed development is considered generally consistent with the objectives or actions of the Yellow-bellied Glider Recovery Plans.

Southern Brown Bandicoot
The proposed development is generally consistent with the objectives or actions of the Draft Southern Brown Plan. However these plans emphasise the need for protection of suitable habitat, predator control and roading issues which conflict with the development proposal.

Koala
The proposed development is considered consistent with the objectives or actions of the Koala Draft Recovery Plan.

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

The proposal is likely to include clearing of native vegetation and removal of dead wood. "Clearing of native vegetation" and "Removal of dead wood and dead trees" are listed as Key Threatening Processes under the TSC Act (1995) and as such the proposal is of a class of development or activity that is recognised as a threatening process.

A final determination exists within the *Threatened Species Conservation Act* (1995) for "Invasion of native plant communities by exotic perennial grasses" as a Key Threatening Process. The proposal is of a class of development recognised as a threatening process due to possible incursions of grasses such as *Pennisetum clandestinum* (Kikuyu). It is expected that the proposed development will provide an opportunity to manage weed invasions in perpetuity.