Flora & Fauna Assessment
Proposed Residential Subdivision

Lot 95 DP 753149, Lot 7 DP 1069956
Banyula Drive, Old Bar

orogen

Prepared For

Riverside & Oyster Reach Estate Pty Ltd

12 April 2007

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Glossary

Term/abbreviation	Definition
FM Act	*Fisheries Management Act 1994*
LES	Local Environment Study
NP	National Park
NR	Nature Reserve
ha.	Hectares (1 ha = 10,000 m^2)
LGA	Local Government Area
EPBC Act	*Commonwealth Environmental Protection and Biodiversity Conservation Act 1999*
TSC Act	*Threatened Species Conservation Act 1995*
EP & A Act,	*Environmental Planning and Assessment Act 1979*
KTP	Key Threatening Process
Locality	Defined as within approximately 10 km radius of the subject site

Introduction

1.1 Background

Orogen Pty Ltd has been commissioned by Riverside & Oyster Reach Estate Pty Ltd to prepare a Flora and Fauna Assessment to accompany a Part 3A Application for the proposed development for residential subdivision on Lot 95 DP 753149 and Lot 7 DP 1069956 (referred to hereafter as the subject site). The location map is provided in **Figure 1.1** and the layout of the proposed development is provided in **Appendix A.** A selection of site photos is provided in **Appendix D.** For detailed information regarding the proposed development and layout, refer to the main Part 3A Environmental Assessment.

The subject site has an area of approximately 50 ha and it is proposed to develop approximately 24 ha (48 %) of the subject site. The subject site has a variety of vegetation communities ranging from cleared paddock to swamp/wetland habitats. Vegetation occurring within the proposed development area is however, dominated by exotic grass species with scattered remnant trees. The swamp/wetland habitats are zoned 7 (a) and will not be developed.

1.2 Objectives of the Study

The objectives of the study were to:

- Determine the Threatened flora and fauna species and Endangered Ecological Communities known or likely to occur within the site. This determination is based on the results of a desktop review, habitat assessment on site, and the application of the Precautionary Principle; and
- Formulate and document mitigation measures required to alleviate potential impacts of the proposed development of the subject site on the Threatened flora and fauna species and Endangered Ecological Communities known or likely to occur within the site.

1.3 Purpose of the Report

This Flora and Fauna Assessment investigates the potential ecological issues associated with the proposed development particularly with regard to Threatened species, Endangered populations and Endangered Ecological Communities and is intended to assist relevant government authorities in the decision making process.

1.4 Outline of the Report

The report has been structured to provide information consistent with requirements of the *Environmental Planning and Assessment Act 1979* and the *Threatened Species Conservation Act 1995*. The report is structured as follows:

Section 2 – Describes the environmental setting of the site.

Section 3 – Describes the flora survey methods and fauna surveys and assessments employed for the study.

Section 4 – Describes the results of the flora surveys and fauna surveys and assessments.

Section 5 – Contains an assessment of the Section 5A Assessment including a description of the assessment process, the determination of Subject Species and a summary of the outcomes of this assessment.

Section 6 – Provides an assessment in accordance with the *Environmental Protection and Biodiversity Conservation Act 1999* (*EPBC Act*).

Section 7 – Discusses the potential impacts of the proposed development.

Section 8 –Provides a conclusion and recommendations in relation to the potential impacts associated with the proposed development.

Environmental Setting

2.1 Site Location

The subject site directly adjoins the north western extent of the current township of Old Bar, approximately 13 km south east of the Taree CBD (**Figure 1.1**). The subject site has a total area of approximately 50 ha and is bounded by Banyula Drive to the south and rural holdings to the west and north east. The eastern boundary is bordered by residential development.

Oyster Creek drains through the west of the subject site, and Banyula Creek drains through the eastern side of the subject site. These creeks merge at the north eastern portion of the subject site, and then flow into Oyster Arm, a tributary of the Manning River South Channel (**Figure 1.1, Appendix A**). The northern extent of the subject site contains a low lying coastal wetland that forms part of the fluvio-deltaic complex of the lower Manning River South Channel. The vegetation associated with the creek lines and low lying areas is proposed to be retained and includes Swamp Sclerophyll Forest, Swamp Oak Forest, saltmarsh, and mangroves. The majority of swamp and wetland areas within the subject site form part of designated SEPP 14 Wetland (# 571).

The proposed development area contains limited native vegetation as a result of historic clearing for agriculture and grazing. This vegetation is comprised of scattered remnant trees with a ground cover dominated by exotic ground cover species. The majority of the scattered trees are located near an existing house and cattle yards/sheds that occur in the south of the subject site.

2.2 Geology and Soils

The subject site is partially underlain by bedrock, with the lower elevations forming the surface deposits of a Quaternary infilled barrier estuary system. Bedrock lithology comprises a variety of carboniferous meta-sediments of the Koorainghat beds, including lithic sandstone, siltstone, tuff and laminite (Eddie, *in prep.*). Quaternary sediments on the site comprise alluvial muds and silts overlying marine sand deposits.

The subject site is located within the Pelican Bay and Diamond Head variant Soil Landscape Groups (Eddie, *in prep.*). The residual Diamond Head variant Soil Landscape Group is located on the more elevated sections of the subject site and is described as a residual landscape of undulating rises on coastal headlands on various rock types. Soils of this group are 0.5 - 1 m deep, imperfectly drained, and comprise Yellow Podzolics, Soloths, Lithosols and Black Headland Soils, dependant upon parent material (Eddie, *in prep.*).

The significant soil and land qualities associated with the Diamond Head variant Soil Landscape Group include high erodibility, sodicity/dispersibility, low available water holding capacity, low fertility, and hard setting surfaces,

The lower elevations of the site are underlain by the estuarine Pelican Bay Soil Landscape Group. This Group is described as level intertidal and supratidal flats on Holocene sands and muds. Soils are >2 m, waterlogged and comprise Sulfidic Intertidal and Supratidal Hydrosols on muddy sediments, with Arenaceous Intertidal Hydrosols on the sand flats.

The significant soil and land qualities associated with the Pelican Bay Soil Landscape Group include low wet bearing strength, sodicity, high erodibility, with extreme acid sulfate potential.

2.3 Topography

The subject site is located on the central and eastern side of a bedrock knoll that dips gently to the north and east, with average slopes 1.3 ° and 0.6 ° respectively. Elevation over the subject site ranges from 16 m AHD at the southern end of the site on the bedrock high, to < 1 m AHD. Areas at < 1 m AHD are generally associated within the wetlands and saltmarsh.

Study Methodology

3.1 Desktop Review and Background Research

A desktop review was undertaken to determine fauna and flora species and vegetation communities of conservation significance previously recorded in the locality (approximately 10 km radius) of the subject site in order to assist with consideration of species to be targeted during field surveys. The review involved the following:

- A search of the records of Threatened species and Endangered populations held on the Department of Environment and Conservation (DEC), Atlas of NSW Wildlife database (2007);
- A search of the records of Threatened species (FM Act) and endangered populations held on the NSW Government (2007), Bionet online database;
- Greater Taree City Council, (1997). Old Bar Park Plan of Management;
- Mitchell McCotter, (1994), Draft Old Bar Vegetation Survey;
- Terra Consulting (Aust) Pty Ltd, (2004). Draft Local Environmental Study. Old Bar Precinct 3;
- Terra Consulting (Aust) Pty Ltd, (2004). Draft Local Environmental Study. Old Bar Precinct 2B;
- Terra Consulting (Aust) Pty Ltd, (2003). Draft Local Environmental Study. Old Bar Precinct 2A;
- ERM, (2005). Ecological Investigations. Precinct 2B, Old Bar; and
- Key habitats and corridors in North East NSW, NSW NPWS, (2007).

3.2 Flora and Fauna Surveys

A variety of ecological surveys have been undertaken to date for the preparation of the Local Environment Studies (LES's) for Old Bar precincts 2A, 2B and 3. These surveys included; vegetation surveys and vegetation mapping, targeted threatened flora searches, Elliott trapping, hair trap surveys, specific koala habitat assessments and scat searches, spotlighting, call playback surveys, amphibian and reptile searches, microchiropteran surveys (Anabat), fauna transect and habitat searches, hollow tree assessments, and avifauna surveys.

Given the previous surveys undertaken in Precinct 2A and 2B, and that the proposed development area is highly disturbed and provides limited habitat resources, it was not considered necessary to undertake detailed surveys for this assessment. Surveys were therefore limited to fauna transects and specific Koala scat searches. The Koala scat searches for this study were undertaken around the scattered paddock trees that occur within the proposed development area (primarily at the south of the subject site).

3.3 Survey Limitations

As discussed, detailed flora and fauna surveys were not undertaken due to the highly disturbed nature of the proposed development area. Information from the surveys undertaken in the area and application of the Precautionary Principle was used in determining the species potentially utilising the habitats at the subject site.

Results

4.1 Desktop Review

The review of the Atlas of NSW Wildlife database and previous ecological surveys revealed that four (4) threatened plant species and 33 threatened fauna species have been recorded within the locality of the subject site (DEC, 2007). Details of the conservation status, ecology and local occurrence, as well as a consideration of each species '*likelihood of occurrence'* on the subject site based on the habitats present are included in **Tables B.1 – B.2.**. The determination of *'likelihood of occurrence'* on the subject site is ranked from low to high likelihood in the following categories Highly Unlikely, Unlikely, Potential, Likely, Highly Likely, Known.

4.2 Vegetation Communities

The following vegetation communities have been identified on the subject site:

- Mangrove Riparian Forest;
- Mangrove/*Juncus* riparian vegetation
- Saltmarsh;
- *Casuarina glauca* Swamp Oak Forest;
- Melaleuca/*Casuarina glauca* Swamp Forest;
- *Eucalyptus robusta/Melaleuca quinquenervia* Swamp Forest; and
- Cleared land with scattered trees.

A vegetation map showing the distribution of vegetation communities within the subject site is provided in **Figure 4.1.** A selection of site photos is provided in **Appendix D.**

The majority of the subject site has been historically cleared for agricultural/grazing activities and as such, is dominated by extensive areas of grazing land comprising introduced Buffalo (*Stenotaphrum secundatum*) and Paspalum (*Paspalum dilatatum*). Occasional remnant trees including Eucalypts, Melaleuca and *Syncarpia* are scattered throughout the cleared areas.

In general, the vegetated areas within the subject site are associated with Oyster Creek and Banyula Creek. The swamp communities along Oyster Creek grade into saltmarsh community at the northern extent of the subject site. This transition sees *E. robusta* replaced by a higher percentage of *C. glauca, M. quinquenervia* and a mixture of other Melaleuca species. Swamp Oaks then begin to dominate the Melaleuca, and salt marsh vegetation becomes dominant further north. Mangroves also occur at the northern extent of the subject site. Field investigations have that a number of weed species have invaded these communities, most likely due to the edge effects associated within the open paddock areas.

4.2.1 Endangered Ecological Communities

The vegetation communities associated with the creek lines area analogous to a number of Endangered Ecological Communities (EEC) listed under Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995 (TSC Act).* The EEC's occurring at the subject site are:

- Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

These communities are located outside of the proposed development area (**Figure 4.1**).

A small number of isolated *Casuarina glauca* and *Melaleuca quinquenervia* occur within the proposed development area, generally near Banyula Creek. These highly disturbed ecotypes may be considered remnants of either Swamp Oak Forest or Swamp Sclerophyll Forest EEC's.

4.2.2 Threatened or Significant Flora Species

No Threatened flora species have been detected within the subject site. Given previous disturbance, it is unlikely that any Threatened flora species would occur within the proposed development area.

The mangroves which occur at the northern portion of the subject site are protected by the *Fisheries Management Act 1994* (*FM Act*). These occur outside of the proposed development area ad will therefore not be cleared.

A small number of Sydney Peppermint (*Eucalyptus piperita*) have been identified within the subject site. These trees comprise a minor component of the scattered paddock trees and were identified at the southern portion of the subject site, around the existing house and sheds/cattle yards. This species is known to be near its northern distributional limit at Old Bar, and therefore the occurrence of this species at the subject site is considered to be significant.

4.3 Fauna

4.3.1 Habitat Assessment

Swamp/wetland Vegetation

It is has been recognised from previous surveys and habitat assessment, that the swamp forest/wetland areas at the subject site provide habitat resources for a variety of fauna species. The habitat value of these areas however, is not reproduced in detail here as these communities will be retained.

The Swamp Forest/Wetland communities would offer a variety of habitat resources for both protected and Threatened species occurring in the area. This habitat type contains a variety of tree species, including the autumn and winter flowering species such *Melaleuca quinquenervia* and *Eucalyptus robusta* and spring/summer flowering species including *Melaleuca ericifolia* and *M. styphelioides*. Consequently, it is considered that this habitat is likely to provide a food source for a number of insectivorous and nectivorous fauna species throughout the year. The Koala may utilise also the Swamp Sclerophyll forest given the occurrence of suitable feed trees, particularly *Eucalyptus robusta*. In addition, the swamp forest contains a small number of hollow bearing trees, and therefore roosting, denning or nesting habitats.

The saltmarsh and riparian areas are likely to provide foraging and roosting resources for a number of bird species, particularly waders. It is unlikely however, that the wetland habitats within the site would be utilised regularly, or represent a significant area of habitat for any species, including migratory species.

In terms of habitat for reptiles, the swamp/wetland habitats contain leaf litter and fallen timber which provide shelter and foraging resources for reptiles. This habitat also provides potential resources for a number of common frog species. The swamp habitats are also considered to represent potential habitat for the Wallum Froglet, however, it is not expected that other Threatened amphibian species would utilise these habitats. It is also unlikely that any species listed under the *FM Act* would occur within the aquatic habitats occurring at the subject site.

Cleared Land with scattered trees

The proposed development area is comprised of cleared land and scattered trees, and as such was found to offer very little in terms of habitat value for Threatened species. Despite this, these habitats may be used utilised on occasion by a number of Threatened species for foraging purposes as discussed below. There were no hollow bearing trees observed within the proposed development area and as such does not offer roosting, denning or nesting habitats for hollow dependant species.

The scattered trees would provide foraging resources for a variety of nectivorous and insectivorous species such as birds, microchiropteran bats, rodents and scansorial mammals, including the Squirrel Glider and Brush-tailed Phascogale. The open paddocks represent potential hunting habitat for the threatened forest owls and raptors including the Square-tailed Kite which has been detected over the subject site (**refer Figure 4.1**). In addition, microchiropteran bats are known to forage over open areas and agricultural crops.

The Glossy Black Cockatoo may utilise the small number of *Allocasuarina littoralis* trees that occur at the south of the subject site. These trees are however unlikely to represent a substantial food resource for the species and no utilisation has been identified within the subject site.

A selection of the scattered trees may be utilised for nesting by species such as the Osprey or Square-tailed Kite however no nests of these species were observed within the proposed development area.

The proposed development area contains a variety of Eucalypt species which represent suitable feed trees for the Koalas, particularly, the Tallowwoods located at the southern portion of the subject site. The Eucalypts occurring within the proposed development area are however, unlikely to represent a substantial food resource for the species. No evidence of Koala utilisation has been identified within the subject site, including around any trees within the proposed development area.

Foraging and shelter resources for reptiles and amphibians is limited as the proposed development lacks rocky outcrops and contains only a small amount of leaf litter and fallen timber. The proposed development area contains localised depressions that may provide temporary breeding habitat for of common frog species, however it is unlikely that the habitats within the proposed development area would be utilised by Threatened amphibian species.

4.3.2 Fauna Traverse Searches

As discussed, small stands of *Allocasuarina littoralis* trees where observed onsite, however no evidence of Glossy Black Cockatoo feeding was observed.

During the searches no Tiger quoll scats were located, no evidence of Raptor or Forest Owl nest sites were identified, and no Glider feed sites or runs were located. No hollow bearing trees were observed within the proposed development area.

No Threatened amphibians, namely Wallum Froglet *(Crinia tinnula)* were observed or heard calling within or adjoining the proposed development area.

4.3.3 Koala scat searches.

No Koala scats were identified within the subject site during the recent investigations. In addition, no Koalas or evidence of Koala utilisation have been identified in the subject site during previous surveys. Despite this, it is possible that some areas of the subject site may be utilised periodically by the Koala.

4.3.4 Fauna Corridors

The Manning River South Channel occurs within 1 km to the north of the subject site and considered to represent a natural barrier for most non-flying and/or terrestrial fauna species. The subject site is therefore considered to be located at somewhat of a terminus in terms of connective habitats in the locality. Despite this, the swamp/wetland vegetation would facilitate movement through the subject site. This vegetation would provide a connection to habitats to the south (ie upstream of Oyster Creek), and the riparian/wetland habitats to the north and north east, including the estuarine complex of the Manning River South Channel.

The subject site is not located within, or does not adjoin any wildlife corridor modelled by NPWS. The modelled Harrington – Old Bar Regional corridor is however, located within 1 km to the east of the subject site. The riparian vegetation along the Manning River South Channel may also provide a connection to the modelled Harrington – Old Bar Regional corridor.

The highly disturbed paddock areas are considered to provide limited connective habitats for most fauna species, particularly non flying species. Development of this area is unlikely to cause fragmentation of habitats in the locality and as the swamp/wetland vegetation will be retained and as such existing linkages within the subject site will remain.

Section 5A Assessment Process

5.1 Background

This section of the report provides a background to the Section 5A Assessment including a definition of terms used in the assessment process and the determination of Subject Species. The potential for significant impact as a result of the proposed clearing development the Subject Species is provided in Appendix C.

The *Threatened Species Conservation Amendment Act 2002* amended the *EP & A Act*, by the identification of seven factors that must be considered when assessing the impacts of a particular proposal. The objective of the Section 5A Assessment is to determine if the proposed development is likely to have a *significant effect* on Threatened species, populations or ecological communities, or their habitats. This Section 5A Assessment was applied to the species, populations, communities and key threatening processes listed under either the *TSC Act* and the *FM Act.*

5.2 Definitions

5.2.1 Local Population

The *TSC Act* defines a "local population" as "a population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary of the study area can be demonstrated" (NPWS, 1996).

The local population of a species in the area of the proposed development would be limited to the habitats in the local area, rather than the population residing within the study area. Although some individuals may reside within the study area, populations are generally linked to more extensive tracts of vegetation. For the purposes of this assessment the local population is considered as the population which resides within the study area and habitats in the local area.

5.2.2 Viability of the Local Population

The Section 5A Assessment requires that a determination be made as to whether the viability of a local population will be compromised by the proposal in question. A viable local population is defined by the NPWS (1996) as "*a population that has the capacity to live, develop and reproduce under normal conditions*". In respect of the proposed clearing, to determine that the local population would be detrimentally affected, it would be necessary to prove that partial removal of the habitat within the study area would affect the movement of Subject Species to the extent that local populations may become extinct.

5.2.3 Regional Population

The term region is defined by the *TSC Act* as "a bioregion defined in a national system of bioregionalisation that is determined by the Director-General….., to be appropriate for those purposes". The study area is situated within the New South Wales North Coast biogeographic region, which extends from the QLD/NSW Border south to about Port Stephens, and west to the Great Dividing Range (Thackway & Cresswell, 1995).

5.3 Subject Species

While the larger subject site is considered to contain potential habitat for a number of Threatened flora and fauna species, the proposed development area itself contains limited habitat resources for Threatened fauna species and is unlikely to support Threatened flora species. Suitable habitats within the subject site primarily occur in the wetland, swamp and saltmarsh communities that are proposed to be retained. The retained vegetation communities and adjoining estuarine environments will be protected from significant indirect impacts through appropriate stormwater design.

Given this, the subject species were determined in relation to their likely occurrence within the proposed development area. As discussed in previous sections of the report, the proposed development area contains very limited habitat resources for fauna due to previous disturbance. No threatened plant species are expected to occur on the within the proposed development area. A total of four (4) Threatened flora and 33 Threatened fauna species listed under the *TSC Act* and 3 Aquatic species listed under the *FM Act* have been previously recorded, or are considered as potentially occurring, within the locality. A number of these species, however, are not considered likely to occur based on the habitat requirements of the species and the lack of these features within the subject site.

All the Threatened species recorded within the locality are listed in **Tables B.1 and B.2 in Appendix B,** which also provides an assessment of likely occurrence and based on this, the determination of Subject Species. A total of 14 fauna species were considered as Subject Species for the proposed development area (**Table 5.1**). The assessment for significant impact (Section 5A) on these as a result of the proposed clearing is provided in **Table C.1** in **Appendix C**.

Table 5.1 - Subject species for the proposed development

Common Name	Species Name
Square-tailed Kite	*Lophoictinia isura*
Powerful Owl	*Ninox strenua*
Eastern Grass Owl	*Tyto capensis*
Masked Owl	*Tyto novaehollandiae*
Brush-tailed Phascogale	*Phascogale tapoatafa*
Squirrel Glider	*Petaurus norfolcensis*
Koala	*Phascolarctos cinereus*
Grey-Headed Flying-Fox	*Pteropus poliocephalus*
Common Blossom-bat	*Syconycteris australis*
Eastern Freetail-bat	*Mormopterus norfolkensis*
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*
Little Bentwing-bat	*Miniopterus australis*
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*
Greater Broad-nosed Bat	*Scoteanax rueppellii*

Endangered Ecological Communities

As discussed in previous sections of this report, the vegetation communities proposed to be retained are considered to be analogous a number to EEC's listed under Part 3 of Schedule 1 of the *TSC Act.* The EEC's occurring at the site are:

- Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

While these vegetation communities will not be cleared, the potential for significant impact upon these communities as a result of the proposed development has been assessed in the Section 5A Assessment (**Appendix C**).

5.4 Section 5A Assessment Conclusion

From the Section 5A Assessment provided in **Appendix C,** it is concluded that the proposed development is unlikely to cause a significant affect on any Threatened species, ecological communities or populations listed under either the *TSC Act* or *FM Act* occurring within the locality. In addition the development is considered unlikely to contribute to an increase in the operation or impact of any Key Threatening process listed under the *TSC Act* or *FM Act.*

Commonwealth Environmental Protection and Biodiversity Conservation Act 1999

6.1 Commonwealth EPBC ACT Assessment Process

The *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) requires that assessment must be made to determine if an activity is likely to impact upon seven identified matters of National Environmental Significance (NES). Activities considered likely to cause a significant impact to matters of NES require Commonwealth approval under the provisions of the *EPBC Act.*

The seven matters of NES listed under the *EPBC Act* are:

- World Heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

The relevance of each matter of NES when considering the subject site and environs is discussed below and summarised in **Table 6.1**. This assessment was undertaken with reference to a Environment Protection and Biodiversity Conservation Act Online Database search, with a buffer area of 10 km.

Table 6.1 - Consideration of EPBC Act Matters of NES

Consideration	Assessment
World Heritage Areas	The proposed development will not impact upon any World Heritage Area.
National Heritage Places	There are no National Heritage places that will be affected by the proposed development

Table 6.1 - Consideration of EPBC Act Matters of NES

Consideration	Assessment
Ramsar Wetlands of International Significance	The proposed development will not impact upon any Ramsar wetland.
Listed Threatened Species	The proposed development area contains limited potential habitat for EPBC listed threatened species. The proposed development is considered unlikely to cause a significant impact to any Threatened species listed under the *EPBC Act.*
Listed Ecological Communities	The proposed clearing will not cause a significant impact to any *EPBC Act* listed Ecological Communities.
Listed Migratory Species	The proposed development is unlikely to cause a significant impact to any the listed migratory species, including those on JAMBA/CAMBA.
Commonwealth Marine areas	The proposed development is unlikely to cause a significant impact to any Commonwealth marine areas.
Nuclear actions	The proposed development does not constitute a nuclear action

6.1.1 World Heritage Areas

No World Heritage Areas are located within 10 km of the site. Barrington Tops is the closest World Heritage Area and is located over 50 km to the west. The proposal will therefore not affect any World Heritage Area.

6.1.2 National Heritage Places

There are no National Heritage Places located within 10 km of the site.

6.1.3 Ramsar Wetlands of International Significance

No Ramsar listed wetlands are located within 10 km of the site. The nearest Ramsar site is Myall Lakes which is located more than 50 km south of the subject. No Ramsar sites will therefore be adversely affected by the proposal.

6.1.4 Nationally Listed Threatened Species

A total of 37 Threatened species listed under the *EPBC Act* have been identified by the EPBC Act Online Database Search as likely to occur within the locality (**Table 6.2**) The majority of these species are however, oceanic species such as albatross, petrels, whales, turtles and sharks and are highly unlikely to occur at the subject site given the lack of oceanic habitat. Some oceanic species may occur within the estuarine complex and ocean environments to the north and east of the site. These habitats would however, be protected from indirect impact through appropriate on-site stormwater management. The proposed development of the subject site is therefore unlikely to cause a significant impact offsite, including marine and estuarine habitats in the locality.

The subject site is considered to contain potential habitat for a number of EPBC listed plant species such as *Allocasuarina defungens*, however, it is unlikely that any Threatened flora species would occur within the proposed development area. No EPBC listed Threatened flora species have been detected within the subject site.

Suitable habitats for Threatened species at the subject site primarily occur in the wetland, swamp and saltmarsh communities that are proposed to be retained. The retained habitats would be protected from off-site impacts through appropriate stormwater management on-site. The proposed development of the subject site is therefore unlikely to cause a significant impact to the retained vegetation communities. Further, the proposed clearing and development layout, including the retention of vegetation along the creek lines will not cause isolation of habitats in the locality.

The development area does not contain substantial aquatic environments and is unlikely to support breeding habitat for Threatened amphibians such as the Green and Gold Bell Frog (*Litoria aurea*). The vegetation occurring at the proposed development area is dominated by exotic pasture species and scattered native trees. The development area is therefore considered to contain very limited habitat resources and is unlikely to represent a significant area of habitat in a local or regional context for any EPBC listed Threatened species.

Given the above considerations, and that no EPBC listed Threatened species have been detected on the subject site, it was considered unnecessary to assess any EPBC listed Threatened species according to the criteria outlined under the administrative guidelines for the assessment of the significance of the impact of the proposed development. The proposed development is therefore considered unlikely to cause a significant impact to any Threatened species listed under the *EPBC Act.*

Table 6.2 - EPBC Listed Threatened Species identified by the online search as likely to occur in the locality.

Common Name	Species Name	Status	Likelihood of Occurrence within the subject site or adjoining habitats
Green and Golden Bell Frog	*Litoria aurea*	Vulnerable	Considered as unlikely to occur within the subject site.
Stuttering Frog	*Mixophyes balbus*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Giant Barred Frog	*Mixophyes iteratus*	Endangered	Considered extremely unlikely to occur within subject site or adjoining habitats.
Amsterdam Albatross	*Diomedea amsterdamensis*	Endangered	Considered extremely unlikely to occur within subject site or adjoining habitats.
Antipodean Albatross	*Diomedea antipodensis*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Tristan Albatross	*Diomedea dabbenena*	Endangered	Considered extremely unlikely to occur within subject site or adjoining habitats.
Wandering Albatross	*Diomedea exulans*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Gibsons Albatross	*Diomedea gibsoni*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Swift Parrot	*Lathamus discolor*	Endangered	Could potentially forage within swamp sclerophyll forest outside of the proposed development area which will not be subject to potential impacts from the proposed development.

Table 6.2 - EPBC Listed Threatened Species identified by the online search as likely to occur in the locality.

Common Name	Species Name	Status	Likelihood of Occurrence within the subject site or adjoining habitats
Southern Giant-Petrel	*Macronectes giganteus*	Endangered	Considered extremely unlikely to occur within subject site or adjoining habitats.
Northern Giant-Petrel	*Macronectes halli*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Gould's Petrel	*Pterodromra leucoptera*	Endangered	Considered extremely unlikely to occur within subject site or adjoining habitats.
Kermadec Petrel (western)	*Pterodroma neglecta neglecta*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Australian Painted Snipe	*Rostratula australis*	Vulnerable	Potentially occurring within the salt marsh and wetland communities. These areas will be retained and protected from off site impacts.
Buller's Albatross	*Thalassarche bulleri*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Shy Albatross	*Thalassarche cauta*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Campbell's Albatross	*Thalassarche impavida*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Black-browed Albatross	*Thalassarche impavida*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.

Table 6.2 - EPBC Listed Threatened Species identified by the online search as likely to occur in the locality.

Common Name	Species Name	Status	Likelihood of Occurrence within the subject site or adjoining habitats
Salvins Albatross	*Thalassarche salvini*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
White-capped Albatross	*Thalassarche steadi*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining habitats.
Regent Honeyeater	*Xanthomyza phrygia*	Endangered	Could potentially forage within swamp sclerophyll forest outside of the proposed development area which will not be subject to potential impacts from the proposed development.
Grey Nurse Shark (east coast population)	*Charcharius taurus*	Critically Endangered	Considered extremely unlikely to occur within site or adjoining aquatic environs. May occur on occasion near the mouth of the Manning River.
Great White Shark	*Carcharodon carcharias*	Vulnerable	Considered extremely unlikely to occur within site or adjoining aquatic environs. May occur on occasion near the mouth of the Manning River.
Whale Shark	*Rhincodon typus*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining aquatic environs.
Large-eared Pied Bat	*Chalinolobus dwyeri*	Vulnerable	Considered extremely unlikely to occur within the subject site.
Spotted-tail Quoll (SE mainland)	*Dasyurus maculatus maculatus*	Vulnerable	Considered unlikely to occur within the subject site.

Table 6.2 - EPBC Listed Threatened Species identified by the online search as likely to occur in the locality.

Common Name	Species Name	Status	Likelihood of Occurrence within the subject site or adjoining habitats
Blue Whale	*Balaenoptera musculus*	Endangered	Considered extremely unlikely to occur within subject site or adjoining aquatic environs.
Southern Right Whale	*Eubalaena australis*	Endangered	Considered extremely unlikely to occur within subject site or adjoining aquatic environs.
Humpback Whale	*Megaptera novaeangliae*	Vulnerable	Considered extremely unlikely to occur within subject site or adjoining aquatic environs.
Long-nosed Potoroo (SE mainland)	*Potorous tridactylus tridactylus*	Vulnerable	Considered unlikely to occur within the subject site.
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable	**Known to occur within the subject site.** Limited foraging habitat however, occurs within the proposed development area.
Loggerhead Turtle	*Caretta caretta*	Endangered	Considered extremely unlikely to occur within site or adjoining aquatic environs. May occur on occasion near the mouth of the Manning River.
Green Turtle	*Chelonia mydas*	Vulnerable	Considered extremely unlikely to occur within site or adjoining aquatic environs. May occur on occasion near the mouth of the Manning River.
Leathery Turtle	*Dermochelys coriacea*	Endangered	Considered extremely unlikely to occur within site or adjoining aquatic environs. May occur on occasion near the mouth of the Manning River.

Table 6.2 - EPBC Listed Threatened Species identified by the online search as likely to occur in the locality.

Common Name	Species Name	Status	Likelihood of Occurrence within the subject site or adjoining habitats
Dwarf Heath Casuarina	*Allocasuarina defungens*	Endangered	Not recorded during target flora surveys on the site.
Leafless Tongue-orchid	*Cryptostylis hunteriana*	Vulnerable	Not recorded during target flora surveys on the site.
White-flowered Wax Plant	*Cynanchum elegans*	Endangered	Not recorded during target flora surveys on the site.

6.1.5 Threatened Ecological Communities

There are no EPBC listed ecological communities within or adjoining the subject site. The proposed development will therefore not impact upon EPBC listed ecological communities.

6.1.6 Commonwealth Marine Areas

The subject site is located within proximity to the Commonwealth Marine Area. As discussed however approriate stormwater design would ensure that development of the subject site would not cause significant impacts offsite, including the Commonwealth Marine Area.

6.1.7 Migratory Species

A total of 37 migratory species listed under the *EPBC Act* have been identified by the EPBC Act Online Database Search as likely to occur within the locality. Listed migratory species such as albatross, petrels, whales, turtles and sharks are unlikely to occur at the subject site given the lack of oceanic habitats.

A number of listed migratory species such as Lathams' Snipe (*Gallinago hardwickii*) are considered to potentially occur at the subject site, particularly among the wetlands and saltmarsh areas. In addition, a number of other listed migratory species such as the White-throated Needletail (*Hirundapus caudacutus*), Fork-tailed Swift (*Apus pacificus*), Black-faced Monarch (*Monarcha melanopsis*) may forage over the subject site and adjoining habitats.

Despite the occurrence of potential habitat for a number of listed migratory species, the subject site is not considered to contain an 'important area of habitat' for any listed migratory species. In addition, the majority of the suitable habitat resources within the subject site occur within the vegetation communities that will be retained. As discussed the retained vegetation communities and adjoining estuarine environments will be protected from significant indirect impacts through appropriate on-site stormwater design.

One listed migratory species, the Cattle Egret (*Ardea ibis*) has been recorded within the proposed development area, however this species often utilises cleared habitats associated with domestic stock grazing. Such habitat is abundant in the region and it is considered the proposed development would not significantly impact upon this species.

Given the above considerations, the proposed development is considered unlikely to cause a significant impact to the listed migratory species including those on JAMBA/CAMBA.

6.1.8 Key Threatening Processes

There are currently 17 Key Threatening Processes (KTP's) listed under the *EPBC Act*, however, only two (2) of these listed KTP's are relevant to the proposed activity, namely '*loss of climatic habitat caused by anthropogenic emissions of greenhouse gases'* and '*Land Clearance'*.

The contribution of greenhouse gases as a result of the construction activity is however, negligible in the context of other activities occurring in the region. In addition, the small amount of native vegetation proposed to be removed for the proposal is considered negligible the area of native vegetation to be retained on the subject site, and also occurring in the locality.

6.1.9 Potential for Significant Effect on Matters of NES

It is submitted that the proposed development will not result in the potential for a significant effect on Threatened Species and Threatened Ecological Communities listed under the *EPBC Act.*

There are no Wetlands of International Significance, Migratory Species, EPBC listed Threatened species or any other matters protected by the *EPBC Act* that will be significantly affected by the proposed development. It is therefore considered that the proposed development would not require Commonwealth approval under the provisions of the *EPBC Act.*

Discussion of Potential Impacts

7.1 Flora

7.1.1 Vegetation Removal

The majority of the vegetation to be removed occurs as scattered trees with a highly modified understorey. The proposed removal of a small number of trees and highly modified understorey vegetation (dominated by exotic species) is not considered to be a significant area of vegetation in relation to the vegetation communities (eg swamp/wetland communities) that will be retained within the subject site.

As discussed in **Section 4**, a small number of Sydney Peppermint (*Eucalyptus piperita*) were identified as a minor component of the scattered trees within the southern portion of the subject site. This species is at its northern distributional limit at Old Bar, and therefore the occurrence of this species at the subject site is considered to be significant.

Less than six (6) *E. piperita* were observed within the proposed development area. The proposed removal of these trees is unlikely to significantly reduce the extent of the species in the area. Vegetation communities containing much higher densities of *E. piperita* have been designated for retention in other parts of the Old Bar following investigations for various LES's and other ecological studies in the area. In addition, the proposed removal of the small number of *E. piperita* from the subject site may be offset through compensatory planting (eg in landscaped areas of the proposed subdivision).

7.1.2 Weed Invasion

Field investigations identified that the vegetation communities to be retained currently contain a number of weed species. Given the current edge effects associated with the weed dominated paddock area, the proposed development is considered unlikely to significantly increase opportunities for weed invasion in the retained habitats.

The proposed clearing would initially result with reducing the amount of weeds within the subject site. Appropriate weed management and landscaping would reduce the potential for weed species re-establishing and dominating the cleared areas, thereby reducing the potential for weed invasion into the retained habitats. In addition there are opportunities to rehabilitate the retained vegetation communities, including direct weed removal.

7.1.3 Stormwater

Without suitable controls, stormwater has the potential to impact upon the retained vegetation communities adjoining the proposed development area. Stormwater may also impact upon vegetation and habitats adjoining the subject site including the estuarine complex of Manning River. It is therefore imperative that appropriate stormwater management is incorporated into the proposal such that retained vegetation within and adjoining the subject site are not adversely impacted by stormwater generated from the proposed development. It should be noted that the receiving environments of Oyster and Banyula creeks are sensitive to increased nutrient loads and the development should therefore seek to minimise export of nutrients.

7.2 Fauna

7.2.1 Habitat Removal

The proposed development area contains only scattered native trees and the ground cover is dominated by exotic species, as such the proposed development area provides only limited foraging resources for a fauna species, including Threatened species such as the Grey headed Flying Fox. While the removal of vegetation for the proposed development will reduce the area of potential foraging habitat available for both protected species and Threatened species, this habitat is negligible and can be compensated through the landscaping of open space areas.

The proposed development will also not result in the fragmentation of any interconnecting areas of habitat occurring in the locality as the retention of the swamp and wetland habitats will maintain connectivity to habitats adjoining the subject site.

The proposed development has the potential to impact upon aquatic habitats within and adjoining the subject site (eg Oyster Creek). These impacts include degradation of water quality and obstruction of fish passage along the creeks. While it is considered unlikely that that Threatened species listed under the *FM Act* would occur within these habitats, appropriate measures should be undertaken to reduce the potential impact upon aquatic habitats in the area (Section 7.3).

7.2.2 Cumulative Effect

The proposed clearing will have a minimal contribution towards the cumulative loss of habitat in the locality. This cumulative impact of the loss of a small area of potential habitat for Threatened species and protected species as a result of the proposal could not be regarded as considerable or significant.

7.3 Mitigation Measures

While the proposal is not likely to cause a significant impact upon any Threatened species, population or endangered ecological community, a number of mitigation measures are recommended in order to reduce the potential for injury. These are discussed in the following sections of the report.

7.3.1 Weed management

Weed management should be undertaken within all cleared areas, gardens, landscaped areas and Asset Protection Zones (where required) following the initial clearing activity to reduce the likelihood of weed species re-colonising these areas. Weed management should then be regularly undertaken within the subject site following the completion of construction/landscaping works. There may also be opportunities to undertake weed management within the vegetation communities proposed to be retained including the swamp habitats and saltmarsh communities.

Of particular concern is the control of *Lantana camara*, *Chrysanthemoides monilifera* and Exotic perennial grass species. All weed material removed from the site should be taken to an appropriate local waste management depot.

7.3.2 Stormwater

Appropriate stormwater management must be designed in a manner that ensures run off entering receiving waters is equal in quantity to that post development.

There may be opportunities to improve the quality the run-off currently entering receiving waters through stormwater design (eg detention basins, microphyte beds).

Appropriate sedimentation controls should also be adopted during construction and clearing activity.

7.3.3 Aquatic habitats

Aquatic habitats which occur on the subject site are largely degraded and it is unlikely that any Threatened aquatic species would occur in these habitats. The aquatic habitats and ephemeral water courses within the subject site drain into Oyster Reach and ultimately Manning River South Channel. The Manning River is an estuarine habitat with marine and brackish waters with varying salinity depending upon rainfall in the upper catchment. The Green Sawfish (*Pristis zijsron*) could potentially occur within these estuarine environments. In addition, oceanic species listed such as the Great White Shark (*Carcharodon carcharias*), Grey Nurse Shark (*Carcharias Taurus*). Despite this, the adjoining estuarine environments will be protected from significant indirect impacts through appropriate stormwater design.

No riparian vegetation will be cleared. The implementation of best practice stormwater management and sediment erosion control practices would be designed so that any development of the subject site would not cause degradation of riparian vegetation.

The wooden bridge that currently provides a crossing over Oyster Creek (adjoining southern boundary of the subject site) has resulted with alteration to the natural flow regime of this creek. This bridge will, however, be replaced by a new crossing which will be designed in a manner that restores the flow of Oyster Creek at this location to natural conditions (Grant Calvin, *pers. comm.*). This crossing would also be designed to provide for fish passage in accordance with specifications in the Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). The proposed development is therefore likely to result with improving the flow regime and the potential for fish passage at the current crossing of Oyster Creek.

A low level concrete crossing occurs over Banyula creek. Any alterations to this crossing would also be designed in a manner that provides for fish passage. No other in stream crossings or structures will be constructed for the proposed development.

The implementation of stormwater controls as discussed in Section 7.3.2 would also aim to protect water quality of the aquatic habitats, including also riparian vegetation.

7.3.4 Revegetation and Landscaping

It is recommended that appropriate indigenous species are used for revegetating landscaped areas and/or established garden beds within the subject site.

Any revegetation program should include compensatory plantings for any *Eucalyptus piperita* removed for the proposed development. In addition, revegetation should include Koala feed trees, particularly *E. microcorys and E. robusta.* A landscaping plan should be produced to demonstrate the appropriate location for each species to be planted.

7.3.5 Checking trees during clearing activity.

All trees to be cleared should be checked for inhabiting fauna prior to felling. In particular, the crowns of Eucalypts should be inspected for occupation by Koalas prior to removal.

Any injured fauna should be captured where possible and taken to the local wildlife carer.

The number of *E. piperita* removed should be tallied at the time of the clearing activity for compensatory purposes. During the clearing activities seed should be collected from each *E. piperita* removed.

Conclusions

8.1 Conclusions

This report has been prepared to assess the potential impacts associated with a proposed residential subdivision upon the Threatened species known to or considered likely to occur in the locality, and those considered likely to utilise the habitats within and adjoining the subject site.

The subject site contains a variety of vegetation communities and habitat resources for both Threatened and Protected flora and fauna species. The majority of the habitat resources occurring within the subject site are proposed to be retained however; these habitats are generally associated with two creek lines and low lying areas which include swamp, wetland, saltmarsh and mangrove communities. The retained vegetation communities and aquatic habitats of the creek lines would be protected from indirect impact through appropriate stormwater design.

Vegetation occurring within the proposed development area is limited to scattered remnant trees with a highly modified understorey that is dominated by exotic grass species. It is considered however, that this vegetation may provide foraging resources for a small number of Threatened species. From the desktop review and habitat assessment, a total of 14 Threatened fauna species listed under the *TSC Act 1995* could potentially utilise the habitats within the proposed development area. Despite this, it is unlikely that any species would be dependant upon these habitats alone and the proposed clearing will not cause isolation of habitats in the locality and the foraging resources proposed to be removed are considered negligible.

The Section 5A Assessment (**Section 5**, and **Appendix C**) concluded that the proposal is unlikely to have a significant effect on *'Threatened species, populations or ecological communities or their habitats within the locality'*. The preparation of a Species Impact Statement (SIS) is therefore not required.

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Appendix A

PROPOSED DEVELOPMENT LAYOUT

Appendix B

THREATENED SPECIES RECORDED WITHIN THE LOCALITY AND DETERMINATION OF SUBJECT SPECIES

Table B.1 - Threatened Flora Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Cynanchum elegans White-flowered Wax Plant	TSC Act: Endangered EPBC Act: Endangered ROTAP: 3ECi	A variable climber with underground suckering stems. Found on the edge of dry rainforest vegetation, and also associated with littoral rainforest, Coastal Tea Tree – Coastal Banksia coastal scrub; Forest Red Gum *Eucalyptus tereticornis* open forest and woodland, Spotted Gum (*Corymbia maculata*) open forest and woodland, and Bracelet Honeymyrtle (*Melaleuca armillaris*) scrub to open scrub. The species flowers between August and May (Plantnet, 2007).	Recorded within 10 km of the subject site. The proposed development area is considered to contain limited potential habitat for this species. Not detected on the subject site. Potentially occurring.	Not considered a subject species for the proposed development.
Allocasuarina defungens Dwarf Heath Casuarina	TSC Act: Endangered EPBC Act: Endangered ROTAP: 2E	A straggly shrub to 2 m high. Found mainly in tall wet heath on sand, also found to occur on clay soils and sandstone. Extends on to hills nearby the coast and on headlands adjacent sandplains (DEC, 2005, Plantnet).	Recorded within 10 km of the subject site. The proposed development area is considered to contain limited potential habitat for this species. Not detected on the subject site. Potentially occurring.	Not considered a subject species for the proposed development.
Senna acclinis Rainforest Cassia	TSC Act: Endangered EPBC Act: Not listed ROTAP: 3RC-	A shrub to 3 m tall. Grows in or on the edges of subtropical and dry rainforest	Recorded within 10 km of the subject site. The subject site is not considered to contain potential habitat for this species. Not detected on the subject site. Unlikely to occur	Not considered a subject species for the proposed development.

Table B.1 - Threatened Flora Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Syzygium paniculatum Magenta Lillypilly	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 3VCi	The Magenta Lillypilly is found along a narrow coastal strip from Conjola National Park near Jervis Bay to Bulahdelah, with the northern limit being generally at Booti Booti National Park on the NSW mid north coast. There are some scattered records further north, including within Saltwater NP and Ballina. This species grows in subtropical and littoral rainforests on sandy soils or stabilised dunes. In the central coast area the species is recorded from gravels, sands, silts and clays.	Recorded within 10 km of the subject site. The subject site is not considered to contain potential habitat for this species. Not detected on the subject site. Unlikely to occur	Not considered a subject species for the proposed development.
Asperula asthenes Trailing Woodruff	TSC Act: Vulnerable EPBC Act: Vulnerable ROTAP: 3VC-	A low, trailing, perennial herb found in scattered locations from Bulahdelah north to near Kempsey, with several records from the Port Stephens/Wallis Lakes area (DEC, 2007). Grows in damp sites often along river banks, often found in swamp sclerophyll forest on flood plain alluvium (Plantnet, 2007, I. Mammott *pers. comm.*)	Although this species has been recorded over 10 km from the site, some of the vegetation communities within the subject site (eg swamp and wetland communities) may support potential habitat for this species. Despite this, the proposed development area is unlikely to contain habitat for this species. Not detected on the site. Potentially occurring.	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
AMPHIBIANS				
Crinia tinnula Wallum Froglet	TSC Act: Vulnerable EPBC Act: Not Listed	The Wallum Froglet is restricted to coastal areas of south eastern Queensland and northern NSW where it occurs in fringing vegetation associated with wetlands with highly acidic, tannin stained waters that are usually dominated by paperbarks and tea trees (NPWS, 2005; Cogger, 2000).	Recorded within 10 km of the subject site. This species may occur in the swamp communities, however the proposed development area is unlikely to provide suitable breeding or foraging habitat. Potentially occurring.	Not considered a subject species for the proposed development.
BIRDS				
Lophoictinia isura Square-tailed Kite	TSC Act: Vulnerable EPBC Act: Not Listed	Square-tailed Kites occur in open eucalypt forest, woodlands and sand plains of coastal and subcoastal mainland Australia. This species is sparsely distributed through even its preferred habitat and breeding pairs are known to occupy very large home ranges of at least 100 km^2 (1993; NPWS, 2000). Nests are a pile of sticks approximately 0.6 – 1 m in diameter, and are usually located in tall or emergent living trees that are near watercourses (NPWS, 2000; Schodde and Tidemann, 1993).	Numerous records within 2 km of the subject site. Although this species was detected at the subject site, limited habitat for prey species occurs in the proposed development area. No nests were observed within the subject site. Known to occur.	**Considered a subject species for the proposed development.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Pandion haliaetus Osprey	TSC Act: Vulnerable EPBC Act: Not Listed	The Osprey is thinly distributed around to coast of Australia where they forage for fish in fresh, brackish, or saline waters of rivers, lakes, estuaries and inshore coastal waters (Schodde and Tidemann, 1993; NPWS, 2000). Nests are usually located near a suitable area of foraging habitat and are a bulky structure made from piled sticks, often positioned in a tall dead tree or artificial structures such as telecommunication towers or poles (Schodde and Tidemann, 1993; NPWS, 2000). Breeding pairs defend breeding territory against other Ospreys, and active nests are usually more than 1 km apart (NPWS, 2005).	Numerous records in the locality. The subject site does not contain potential foraging habitat for this species. The trees within the proposed development area may be utilised for nesting given the proximity to an estuarine environment. No nests were however, observed within the subject site. Potentially occurring.	Not considered a subject species for the proposed development.
Anseranas semipalmata Magpie Goose	TSC Act: Vulnerable EPBC Act: Not Listed	Magpie Geese generally occur in water bodies associated with shallow swamps and associated grassland. This species feeds on seeds and tubers from native grasses, wild rice and spike rush (Australian Museum, 2003). The commencement of breeding is influenced by water level (NPWS, 2000).	Numerous records in the locality. This species may occur in the swamp/wetland communities, however the proposed development area does not contain suitable habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.
Botaurus poiciloptilus Australasian Bittern	TSC Act: Vulnerable EPBC Act: Not Listed	The Australasian Bittern occurs from southern Queensland to Tasmania and south eastern South Australia. In NSW this species has been recorded along the coast as well as inland wetlands and rivers (NPWS, 1999). The Australasian Bittern occurs in estuarine and freshwater wetlands with tall dense vegetation, including sedges, spike rushes, reeds and bulrush (NPWS, 2000; NPWS, 1999). Feeds mostly at night upon frogs, yabbies, spiders, insects, snails, small fish and mice (Schodde and Tidemann, 1993; NPWS, 2000).	Recorded within 10 km of the subject site. This species may occur in the swamp/wetland communities, however the proposed development area does not contain suitable habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Botaurus poiciloptilus Black Bittern	TSC Act: Vulnerable EPBC Act: Not Listed	The Black Bittern is distributed from southern NSW, north to Cape York and along the entire northern coast to the Kimberley Region. This species occurs in dense vegetation, particularly amongst swamp she oaks and mangroves alongside streams, estuarine and terrestrial wetlands, tidal creeks and mudflats, and swamps. (NPWS, 2000; NPWS, 1999).	Recorded within 10 km of the subject site. This species may occur in the swamp/wetland communities, however the proposed development area does not contain suitable habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.
Burhinus grallarius Bush Stone-curlew	TSC Act: Endangered EPBC Act: Not Listed	The Bush Stone-curlew is widespread in northern and north eastern Australia (NPWS, 2000). Bush Stone-curlews occur in sparsely grassed, lightly timbered open forest or woodland. Preferred habitat is often associated with water courses and woodlands of casuarinas, eucalyptus, and acacia, however dry open grassland and cropland adjacent to woodland is also known to be utilised (NPWS, 2000; NPWS, 1999; Schodde & Tidemann, 1993; Garnett and Crowley, 2000).	Recorded within 10 km of the subject site. The subject site is considered to contain potential habitat for this species. This species may forage amongst the proposed development area; however more suitable habitat areas within the subject site will be retained. Potentially occurring.	Not considered a subject species for the proposed development.
Esacus neglectus Beach Stone-curlew	TSC Act: Endangered EPBC Act: Not Listed	Recorded mostly around the north coast of Australia, between mid-north Western Australia and north-east NSW. Occurs on open beaches, islands, reefs, and estuarine intertidal sandflats and mudflats. Prefers beaches with nearby estuaries or mangroves. Nests are located on sand banks, spits or islands in estuaries among mangroves, or in sand surrounded by short grasses and scattered casuarinas (DEC, 2007)	Recorded within 5 km of the subject site. This species may utilise the wetland community (partially areas with saltmarsh and mangroves), however the proposed development area does not contain suitable habitat for this species. Potentially occurring	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Calyptorhynchus lathami Glossy Black Cockatoo	TSC Act: Vulnerable EPBC Act: Not Listed	Occurs in a variety of Sclerophyll forest types where suitable feed trees (*Allocasuarina* spp) occur (NPWS, 1999).	Recorded within 1 km of the site. The site contains very limited number of suitable feed trees. Less than 6 feed trees were observed in the proposed development area. The subject site does not contain appropriate nesting habitat. Potentially occurring.	Not considered a subject species for the proposed development.
Charadrius mongolus Lesser Sand-plover	TSC Act: Vulnerable EPBC Act: Migratory	The Lesser Sand Plover breeds in Asia and migrates to the Australian coast between September and March where it occurs on mudlflats, white sandy beaches, estuaries and tidal areas in mangroves (NPWS, 2000).	Recorded within 5 km of the subject site. This species may utilise the wetland community (partially areas with saltmarsh and mangroves), however the proposed development area does not contain suitable habitat for this species. Potentially occurring.	Not considered a subject species for the proposed development.
Ephippiorhynchus asiaticus Black-necked Stork	TSC Act: Endangered EPBC Act: Not listed	This species forages in wetlands, mangroves, swamps, mudflats, dry floodplains, irrigated land and occasionally open grassy woodland (NPWS, 2000; NPWS, 2005). The nest is a large flat pile of sticks, grass, and rushes place in a tree, usually near water (NPWS, 2000).	Numerous records in the locality. This species may occur in the swamp/wetland communities, however the proposed development area does not contain suitable foraging habitat for this species. The trees within the proposed development area may be utilised for nesting given the proximity suitable foraging habitat. No nests were however, observed within the subject site. Potentially occurring.	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Haematopus fuliginosus Sooty Oystercatcher	TSC Act: Vulnerable EPBC Act: Not listed	The Sooty Oystercatcher is distributed around the entire coastline and islands around Australia. Throughout its range, the Sooty Oystercatcher primarily occurs on rocky beaches, rocky shores, rocky headlands, rocky shelves and beaches, and offshore islands, and very rarely on sandy beaches and estuarine tidal flats (NPWS, 2000; Scodde & Tidemann, 1993). This species forages on exposed rock and coral at low tide for limpets, mussels, and crustaceans (NPWS, 2000). Nests are a shallow depression in sand above the high tide mark, or a cleft in rocks that may be built up with pebbles (NPWS, 2000; Scodde & Tidemann, 1993).	Recorded within 10 km of the subject site. The subject site does not contain appropriate habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.
Haematopus longirostris Pied Oystercatcher	TSC Act: Vulnerable EPBC Act: Not listed	The Pied Oystercatcher occurs around the entire coastline of Australia. Throughout its range, the Pied Oystercatcher favours beaches, intertidal flats and sand banks and occasionally rocky headlands (NPWS, 2000). Molluscs have been noted to be a staple food source, however, worms, crabs and small fish may be taken (NPWS, 2000; Scodde & Tidemann, 1993). Pied Oystercatchers primarily nest on coastal or estuarine beaches and occasionally use saltmarsh or grassy areas. Nests are shallow scrapes in the sand above the high tide mark or amongst low growth behind the beach (NPWS, 2000).	Recorded within 5 km of the subject site. This species may utilise the wetland community (partially areas with saltmarsh and mangroves), however the proposed development area does not contain suitable habitat for this species. Potentially occurring.	Not considered a subject species for the proposed development.
Sterna albifrons Little tern	TSC Act: Endangered EPBC Act: Migratory	The Little Tern occurs around the coast to Australia from mid WA, around northern and eastern Australia to the east coast of Tasmania (NPWS, 1999). Throughout its range, Little Terns prefer sheltered environments and are predominantly found in coastal waters, bays, shallow inlets, and salt or brackish lakes (NPWS, 1999, NPWS; 2000).	Recorded within 5 km of the subject site. The subject site does not contain appropriate habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Xenus cinereus Terek Sandpiper	TSC Act: Vulnerable EPBC Act: Migratory	The Terek Sandpiper is a non breeding migrant to Australia between September and May (NPWS, 2000). In Australia, this species is distributed around the east, north and west coasts of Australia (NPWS, 1999). The Terek Sandpiper occurs on tidal mudflats, estuaries, shores and reefs of offshore islands and coastal swamps (NPWS, 2000). The Terek Sandpiper feeds on a wide variety of invertebrates including crustaceans, worms, small shell fish and insect larvae (NPWS, 1999).	Recorded within 2 km of the subject site. This species may utilise the wetland community (partially areas with saltmarsh and mangroves), however the proposed development area does not contain suitable habitat for this species. Potentially occurring.	Not considered a subject species for the proposed development.
Ninox strenua Powerful Owl	TSC Act: Vulnerable EPBC Act: Not listed	This species occurs in a range of habitats including open woodland, open forest, tall moist forest and rainforest (NPWS, 2000). The Powerful owl has a very large home range of 800 to 1000 ha per breeding pair (NPWS, 2005). The Powerful Owl requires trees with large hollows that are at least 50 cm deep and 12 – 40 m above the ground (NPWS, 2000; Scodde & Tidemann, 1993).	Numerous records within the locality. The majority of the subject site (including the proposed development area) represents potential hunting habitat for this species. Likely to occur.	**Considered a subject species for the proposed development.**
Tyto capensis Eastern Grass Owl	TSC Act: Vulnerable EPBC Act: Not listed	The Eastern Grass Owl has been recorded in all mainland states of Australia, but are more commonly recorded in northern and north eastern Australia (NPWS, 2000). Eastern Grass Owls are mainly found in tall grass including tussock grasslands, grass tussocks in swampy areas, grassy plains, swamps, coastal dunes, cane grass and other crops, tree lined creeks, and sedges on floodplains (NPWS, 2000; Garnett and Crowley, 2000). This species nests on the ground which may resemble a trampled platform in a large tussock or heavy growth (NPWS, 2000).	Recorded within 10 km the subject site. The subject site contains potential habitat for this species. This habitat is however considered sub-optimal for the species. Potentially occurring.	**Considered a subject species for the proposed development.**
Tyto novaehollandiae Masked Owl	TSC Act: Vulnerable EPBC Act: Not listed	Masked Owls utilise a broad range of habitats, including open forest and woodland with a sparse understorey and adjacent open areas (Hollands, 1991; Debus & Rose, 1994). Essential habitat features include the presence of suitable roosting and nesting hollows and an abundant supply of ground-dwellingl mammals (Higgins 1999; Kavanagh, 1996).	Recorded within 10 km of the subject site. The majority of the subject site represents potential hunting habitat for this species. Likely to occur.	**Considered a subject species for the proposed development.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Tyto tenebricosa Sooty Owl	TSC Act: Vulnerable EPBC Act: Not listed	Sooty Owls occur primarily in closed forests (rainforests) and tall open forests (wet sclerophyll forest). (Debus, 1998). Essential habitat features include the presence of suitable nesting hollows as provided in old growth forests and a supply of arboreal or scansorial mammals (Debus 1998, NPWS, 2000). Estimated inferred home-ranges for the Sooty Owl are 2 -8 km^2 per pair (Debus, 1998).	Recorded within 10 km of the subject site. The subject site does not contain suitable habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.
MAMMALS				
Megaptera novaeangliae Humpback Whale	TSC Act: Vulnerable EPBC Act: Vulnerable	Occurs in oceanic and coastal waters around the world.Australia's east coast population migrates from feed ground in subantarctic waters in summer to warm water winter breeding grounds around the Great Barrier Reef (DEC, 2007).	Recorded within 10 km of the subject site. The subject site does not contain suitable habitat for this species. Highly unlikely to occur.	Not considered a subject species for the proposed development.
Dasyurus maculatus maculatus Spotted-tailed Quoll	TSC Act: Vulnerable EPBC Act: Endangered (SE mainland population)	The Spotted-tailed Quoll occurs along the east coast of Australia from south east Queensland to South Australia and Tasmania. The Spotted-tailed Quoll has been recorded in a wide range of habitat types including dry and moist sclerophyll forests and woodlands, rainforest, coastal heathland, and riparian forest. This species been occasionally sighted in treeless areas, rocky outcrops and grazing lands (NPWS, 1999; NPWS, 2000; Strahan, 1998). The Spotted-tailed Quoll shelters and dens in small caves, fallen logs with large hollows and tree hollows and may utilise numerous dens within its home range which has been estimated to be between 800 ha to 20 km^2 (NPWS, 2000; NPWS in prep in NPWS, 1999).	Recorded within 10 km of the site. The subject site is considered to contain limited foraging resources for this species, and the proposed development area does not contain potential denning habitat. Unlikely to occur.	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Phascogale tapoatafa Brush-tailed Phascogale	TSC Act: Vulnerable EPBC Act: Not listed	The Brush-tailed Phascogale has a patchy distribution around the coast of mainland Australia (NPWS, 1999). The Brush-tailed Phascogale is a largely arboreal species that primarily occurs in dry forests and woodlands with an open or sparse ground cover of herbs, grasses shrubs and leaf litter and a moderate density of trees and shrubs in the midstratum (NPWS, 2000; NPWS, 1999; Soderquist 1995). Males have a home range of up to 100 ha, while females occupy a home range of 20 to 60 ha (NPWS, 1999).	Recorded within 10 km of the site. The subject site contains potential foraging and denning habitat for this species. The proposed development area however lacks suitable denning habitat. Likely to occur.	**Considered a subject species for the proposed development.**
Planigale maculata Common Planigale	TSC Act: Vulnerable EPBC Act: Not listed	The Common Planigale is known to occur in a wide variety of habitats including Swamp Sclerophyll forest, Dry and Wet sclerophyll forests, woodlands and heaths (Strahan, 1998). The species is known to occur in coastal north-eastern NSW and coastal Queensland. The species reaches its southern limit of distribution on the lower north coast.	Recorded within 10 km of the site. This species may occur within the swamp forest, however the proposed development area does not contain potential habitat for this species Although the nearest records are south of the Hastings River, the site contains potential habitat for this species. Potentially occurring.	Not considered a subject species for the proposed development.
Petaurus australis Yellow-bellied Glider	TSC Act: Vulnerable EPBC Act: Not listed	The Yellow-bellied Glider is found in tall mature Eucalypt Forest and they feed on a range of sources including winter-flowering Eucalypts which provide nectar and pollen (NPWS, 2000; Readers Digest 1997). They also feed upon the sap of Eucalypts in which they chew V-shaped incisions to collect the sap. Yellow-bellied Gliders den in large tree hollows (NPWS, 2000).	Recorded within 5 km of the site. The subject site does not contain potential habitat for this species Unlikely to occur.	Not considered a subject species for the proposed development.

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Petaurus norfolcensis Squirrel Glider	TSC Act: Vulnerable EPBC Act: Not listed	The Squirrel Glider is distributed in eastern Australia from northern Queensland, through eastern NSW to Victoria (NPWS, 2000). The Squirrel Glider occurs in dry sclerophyll forest and woodland (Strahan, 1998). This species feeds upon nectar, pollen, flowers, insects, and sap of particular eucalypts (Strahan, 1998; NPWS, 1999). The Squirrel Glider dens in hollow bearing trees, and often dens in family groups (Strahan, 1998; NPWS, 2000). Home ranges have been estimated as between 0.65 to 8.55 ha, with movements tending to be greater for males (NPWS, 1999).	Recorded within 10 km of the site. The subject site contains potential foraging and denning habitat for this species. The proposed development area however lacks suitable denning habitat. Likely to occur.	**Considered a subject species for the proposed development.**
Phascolarctos cinereus Koala	TSC Act: Vulnerable EPBC Act: Not listed	The Koala occurs in eucalypt woodlands and forests throughout eastern Australia (NPWS, 2000). The Koala feeds almost exclusively on the foliage of particular eucalypts, and may prefer certain species within any local or regional area (Strahan, 1998; Callaghan et al, 2002).	Numerous records in the locality. The subject site contains appropriate feed trees for the Koala, including the scattered trees within the proposed development area. Likely to occur.	**Considered a subject species for the proposed development.**
Potorous tridactylus tridactylus Long-nosed Potoroo	TSC Act: Vulnerable EPBC Act: Vulnerable	The Long-nosed Potoroo is known to occur in a wide variety of habitats including moist and dry forests, wet heathland and cool temperate rainforests with dense layers of grasses, ferns, vines or shrubs (NPWS, 2000).	Recorded within 10 km of the site. The subject site is not considered to contain suitable habitat for this species. Unlikely to occur.	Not considered a subject species for the proposed development.
Pteropus poliocephalus Grey-Headed Flying-Fox	TSC Act: Vulnerable EPBC Act: Vulnerable	The Grey-headed Flying-fox occurs in a range of habitats including subtropical and temperate rainforests, dry and wet sclerophyll forests, Banksia woodland, heaths and Melaleuca swamps (Duncan et al, 1999; NPWS, 2001).	Recorded within 500 m of the subject site. The site contains potential foraging habitat for this species. Highly likely to occur.	**Considered a subject species for the proposed development.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Syconycteris australis Common Blossom-bat	TSC Act: Vulnerable EPBC Act: Not listed	The Common Blossom-bat occurs in coastal areas of north eastern NSW and eastern Qld (NPWS, 2000; Strahan, 1998). The Common Blossom-bat usually roosts in rainforest and feeds upon nectar and pollen in adjacent heathland and paperbark swamps (NPWS, 2000).	Recorded within 5 km of the subject site. This species may forage on the scattered trees within the proposed development area, however the majority of the foraging resources occur within the swamp communities (eg *E. robusta* and *M. quinquenervia*) subject site contains potential foraging habitat for this species. Potentially occurring.	**Considered a subject species for the proposed development.**
Mormopterus norfolkensis Eastern Freetail-bat	TSC Act: Vulnerable EPBC Act: Not listed	This species has been recorded from a variety of habitats including Woodland, Dry and Wet sclerophyll forests and has been recorded foraging along a river within Rainforest (Strahan, 1998; Churchill, 1998). It is believed that the Eastern Freetail-bat is primarily a tree roosting species however; it has been recorded within the roof of a hut (Strahan, 1998).	Recorded within 5 km of the subject site. The subject site contains potential foraging and roosting habitat for this species. The proposed development area however does not contain potential roosting habitat. Potentially occurring.	**Considered a subject species for the proposed development.**
Falsistrellus tasmaniensis Eastern False Pipistrelle	TSC Act: Vulnerable EPBC Act: Not listed	The Eastern False Pipistrelle inhabits sclerophyll forests and woodlands. The Eastern False Pipistrelle is known to roost in tree hollows although has been recorded roosting in Jenolan caves and in old wooden houses (Churchill 1998; Strahan, 1998).	Although the nearest records are over 10 km away, this species is considered as likely to occur given its high mobility and occurrence of potential habitat at the subject site. Potentially occurring.	**Considered a subject species for the proposed development.**

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Miniopterus australis Little Bentwing-bat	TSC Act: Vulnerable EPBC Act: Not listed	The Little Bentwing-bat occurs along the east coast of Australia from north eastern Queensland to the central coast of NSW (NPWS, 2000; NPWS, 2005). This species has been noted to predominantly forage between the canopy and the understorey within well timbered habitats including moist and dry sclerophyll forest, woodlands, rainforest, Melaleuca swamps, and dense coastal banksias (Strahan, 1998; NPWS, 2005; NPWS, 2000).	Recorded within 10 km of the subject site. The subject site contains potential foraging habitat for this species. Potentially occurring.	**Considered a subject species for the proposed development.**
Miniopterus schreibersii oceanensis Eastern Bentwing-bat	TSC Act: Vulnerable EPBC Act: Not listed	The Eastern Bentwing-bat occurs in eastern Australia from north Queensland to far south east SA. In NSW they are found along the coast and western slopes, including high elevations of the Great Dividing Range (NPWS, 2000). This species predominantly forages above the tree canopy in a range of well timbered habitats including rainforest, paperbark swamps, heaths, woodlands and sclerophyll forests (Strahan, 1998; NPWS, 2000).	Recorded within 5 km of the subject site. The subject site contains potential foraging habitat for this species. Potentially occurring.	**Considered a subject species for the proposed development.**
Scoteanax rueppellii Greater Broad-nosed Bat	TSC Act: Vulnerable EPBC Act: Not listed	The Greater Broad-nosed Bat occurs in a variety of habitats from woodland, moist and dry eucalypts forest and rainforest (NPWS, 2000; Duncan, 1999). This species feeds upon large flying insects, and is also known to feed upon other species of bats (NPWS, 2000; Strahan, 1998). While little is known about breeding habitat for this species, the Greater Broad-nosed Bat has been found roosting in tree hollows, cracks and fissures in the trunk and boughs of stags, under exfoliating bark, and roof spaces of buildings (Duncan et al., 1999; Strahan, 1998).	Recorded within 5 km of the subject site. The subject site contains potential foraging and roosting habitat for this species. The proposed development area however does not contain potential roosting habitat. Potentially occurring.	**Considered a subject species for the proposed development.**
AQUATIC SPECIES				

Table B.2 - Threatened Fauna Species from the Locality

Species Name/Common Name	Legal Status	Habitat and Distribution	Local Occurrence and Potential Habitats in the Subject Site	Identification of Subject Species
Grey Nurse Shark	*Carcharias taurus*	Subtropical to cool temperate coastal oceanic waters.	Recorded near Wallabi Point. (Bionet 2007) Unlikely to occur in the vicinity of the subject site.	Not considered a subject species for the proposed development.
Green Sawfish	*Pristis zijsron*	Occurs in freshwater and estuarine habitats along of northern coastline extending to northern NSW. Potential appropriate habitat exists to the north of the subject site, however none exists within the subject site.	Although no records exist of the species in the locality appropriate habitat exists in the Manning River. Potentially occurring.	Not considered a subject species for the proposed development.
Black Cod	*Epinephelus daemelii*	Occurs around rocky reefs in warm temperate and sub tropical parts of the south western Pacific Ocean.	May occur around rockwalls at the Manning River entrance and considered likely to occur upstream WBM Oceanics) The proposed development will not impact on the habitat of this species. Potentially occurring.	Not considered a subject species for the proposed development.

Appendix C

SECTION 5A ASSESSMENT TABLE

Table C.1 - Section 5A Assessment Table

Part	Criteria	Assessment
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*	The proposal will not impact upon breeding habitat (eg hollow bearing trees, nest sites) or roosting habitat (eg Flying-fox camp sites) for any subject species. The proposed development area is dominated by exotic ground cover species and contains scattered native trees. This vegetation provides very limited potential foraging resources for the subject species and it is unlikely that any species would be dependant upon these resources alone. The foraging resources proposed to be removed are considered negligible to the area of habitat proposed to be retained at the subject site (eg swamp and wetland habitats). Further, the habitat proposed to be cleared is considered negligible to the large areas of appropriate habitat adjoining the subject site and also occurring in the locality. The proposed development is therefore unlikely to have an adverse effect on the life cycle of any subject species such that a viable local population 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 were identified or are expected to occur in the subject site or adjoining habitats.
c)	*In the case of a critically endangered or endangered ecological community, whether the action proposed:*	No critically endangered communities were identified in or adjoining the subject site.
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*	Less than 10 scattered trees comprising *Casuarina glauca* and *Melaleuca quinquenervia* will be removed from a small area within the eastern edge of the proposed development area. At best, these trees could be considered a highly disturbed ecotype of the swamp sclerophyll or swamp oak EEC. The proposed removal of these trees and development of this small area could not be considered significant in relation to the swamp EEC's proposed to be retained within the subject site. Other than this small area discussed, the remainder of the proposed development area does not contain any listed EEC's. The proposal has the potential to indirectly impact upon the retained vegetation comprising the EEC's due to possible altered hydrology regimes (eg stormwater). The retained vegetation communities and adjoining estuarine environments would however, be protected from significant indirect impacts through appropriate stormwater

Table C.1 - Section 5A Assessment Table

Part	Criteria	Assessment
		design. Given the level of weed infestation throughout the proposed development area and subsequent edge effects, the proposed development is unlikely to increase opportunity for weeds species penetrating the adjoining EEC's proposed to be retained. Given the above considerations, the local occurrence of any EEC is not expected to be placed at risk of extinction as a result of the proposal.
ii)	*Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;*	Given the factors discussed in sub section i) of Part C), the proposed development, is not likely to adversely modify the composition of EEC's occurring within or adjoining the subject site such that the local occurrence of any EEC would be placed at risk of extinction.
d)	*In relation to the habitat of a threatened species, population or ecological community:*	
i)	*The extent to which habitat is likely to be removed or modified as a result of the action proposed, and*	The majority of the proposed clearing entails the removal of groundcover vegetation which is dominated by exotic species. The proposed clearing will also involve the removal of a small number of native trees scattered throughout the proposed development area. No hollow bearing trees occur within the proposed development area.
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 vegetation within the proposed development area is considered to provide limited connectivity. The vegetation communities adjoining the proposed development area (eg swamp communities) would provide linkages through the subject site, and connects to habitats occurring to the north and south of the subject site. As discussed this vegetation will be retained, thereby maintaining existing linkages. The subject species with the ability to fly (ie. Square-tailed Kite, Forest Owls, Megachiropteran bats and Microchiropteran bats), are highly mobile species that utilise fragmented areas of habitat within their large home ranges on a daily basis. In addition, vegetation within open space areas would facilitate movement through the subject site for some species. Given the above considerations, habitat for the subject species (and/or prey species) will therefore not become isolated as a result of the proposed clearing. The proposed clearing will not increase the existing level of fragmentation present in the local area.

Table C.1 - Section 5A Assessment Table

Part	Criteria	Assessment
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 limited habitat proposed to be removed from the proposed development area is considered a small area of habitat for the subject species relative to their home ranges and also to the area of habitat proposed to be retained within the subject site (eg swamp habitats). Further, the habitat proposed to be cleared is considered negligible to the large areas of appropriate habitat adjoining the subject site and also occurring in the locality. Therefore, as discussed in Part a), and sub sections i), ii), and iii) of Part d), the potential habitat proposed to be removed could not be considered an important area of habitat for any subject species or EEC's, or considered important to the long term survival of any EEC's or population of subject species occurring in the locality.
e)	***Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);***	The proposed development will not have an adverse effect on critical habitat.
f)	***Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;***	An approved recovery plan has been prepared for the three Large Forest Owls, *ie.* Powerful Owl, Sooty Owl and Masked Owl. A draft recovery plan has been prepared for the Koala. Considerations of these recovery plans are outlined below. There are no threat abatement plans applicable to the proposal for the subject species. LARGE FOREST OWLS The habitat proposed to be removed is not considered a significant area (in terms of size, quality and importance) of habitat for the Large Forest Owls and no potential nesting habitat will be removed. The proposal is therefore considered to be not inconsistent with the draft recovery plan for this species. Further, the objectives of the recovery plan prepared for the Large Forest Owls are not considered to be relevant to the proposal and more specifically relate to government or other agencies. KOALA The removal of potential or known habitat for the Koala is not considered to be consistent with objectives 1 and 2 of the Draft Recovery Plan prepared for the Koala. Despite this, the number of potential feed trees proposed to be removed could not be considered a significant area of habitat (in terms of size, quality and importance) for the Koala. The number of feed trees proposed to be removed is considered insignificant to the suitable feed trees (eg Swamp Mahogany) that occur in the swamp communities proposed to be retained at the subject site. In addition, the retention of the swamp habitats will ensure that existing linkages through the subject site will remain.. The remaining objectives of the recovery plan for the Koala are not relevant to the proposal and more specifically relate to government or other agencies.

Table C.1 - Section 5A Assessment Table

Part	Criteria	Assessment
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***	
Anthropogenic climate change		The use of machinery during construction and clearing of some vegetation will make a contribution to anthropogenic climate change through release of stored carbon from vegetation and greenhouse gas emissions associated with use of fossil fuels. The clearing of vegetation will also reduce the vegetation available for Carbon dioxide cycling. The impact of the proposal on anthropogenic climate change however is negligible in the context of other activities in the region.
Clearing of native vegetation		As per Parts (a) and (d).
Removal of dead wood and dead trees		As per Parts (a) and (d). No hollow resource will be removed
Invasion, establishment and spread of Lantana camara		The vegetation communities proposed to be retained currently contain lantana Given the current edge effects, the proposed clearing of highly modified, weed infested habitats within the proposed development area is unlikely to significantly increase opportunities for this species to infiltrate the retained vegetation communities. Maintenance of the site, including landscaped areas and gardens once formally established are likely to reduce the potential for Lantana establishing in the cleared areas and adjoining habitats.
Invasion of native plant communities by Chrysanthemoides monilifera		Although not detected, *Chrysanthemoides monilifera* could establish within the subject site given the proximity to the coast. Given the current edge effects at the subject site, however, the proposed clearing within the proposed development area is unlikely to significantly increase opportunities for this species to infiltrate the retained vegetation communities. Maintenance of the site, including landscaped areas and gardens once formally established are likely to reduce the potential for *Chrysanthemoides monilifera* establishing in the cleared areas and adjoining habitats.
Invasion and establishment of exotic vines and scramblers		Given the current edge effects, the proposed clearing of highly modified, weed infested habitats within the proposed development area is unlikely to significantly increase opportunities for exotics vines and scramblers to infiltrate the retained vegetation communities.

Table C.1 - Section 5A Assessment Table

Part	Criteria	Assessment
		Maintenance of the site, including landscaped areas and gardens once formally established are likely to reduce the potential for exotic vines and scramblers establishing in the cleared areas.
	Invasion of native plant communities by exotic perennial grasses	The proposed development area is dominated by weed species including exotic perennial grass species such as *Andropogon virginus* and *Paspalum dilatum* and these have penetrated the adjoining EEC's. Given the level of weed infestation throughout the proposed development area and subsequent edge effects, the proposed development and associated clearing is unlikely to significantly increase opportunities for exotic perennial grasses to infiltrate the retained vegetation communities. Maintenance of the site, including landscaped areas once formally established are likely to reduce the potential for noxious weeds including exotic perennial grasses establishing in the cleared areas.
	Degradation of native riparian vegetation along New South Wales water courses	The proposal will not contribute to this KTP. The proposed development will not result in the clearing of any riparian vegetation.
	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands (TSC Act) / Installation and operation of in-stream structures and other mechanisms that alter natural flow regimes of rivers and streams (FM Act).	The proposal is unlikely to significantly contribute to this KTP. As discussed in other sections of the report. The proposed development would be designed in a manner that results with restoring the flow regime of Oyster Creek and Banyula to near natural conditions. The proposed stormwater design aims to ensure that the quantity of stormwater entering the retained wetlands will be similar to that prior to development of subject site.
The remaining KTP's listed by the *TSC Act and the FM act* are not considered relevant to the proposal.		