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month K.

* Out of Bioplan area
but has Wiyabrut units
comparable to some of
Dunbarrough bushland



Solutions for a better quality of life

Lot 50 Eagle Crescent, Eagle Bay
Environmental Assessment



**Lot 50 Eagle Crescent, Eagle Bay
Environmental Assessment**

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BSD Consultants Pty Ltd

EXECUTIVE SUMMARY

The Eagle Bay area lies between land reserved for conservation around Cape Naturaliste, 2km to the west, and between Bunker Bay and Dunsborough, less than 1km to the east. A narrow foreshore reserve links these conservation areas. Lot 50 Eagle Crescent and associated road alignment ('the site') is located to the west of existing Eagle Bay townsite and is part of a natural amphitheatre surrounding Eagle Bay (**Figure 1**).

Lot 50 has an area of approximately 48.8 hectares, most of which has not been intensively developed for agriculture. The lot slopes from west to east, towards Eagle Bay and has a variety of soil types and vegetation communities. The site is zoned for "Rural Residential" and "Recreation" purposes and is situated within a landscape value area and development investigation area under the Shire of Busselton's Town Planning Scheme No. 20. Approximately 14.2 hectares in the north east corner of Location 1348 and north west corner of Location 580 have been proposed to form the road access into Lot 50. Currently Locations 1348 and 580 are zoned "Agriculture" with a small section on the north eastern boundary of Lot 580 zoned "Recreation". Jingarnup Brook enters Lot 50 through Location 1348, which has been parkland cleared. Location 580 is mostly parkland cleared however the survey area supports an Open Forest with a disturbed understorey.

The site was surveyed on 17th, 18th and 19th of September 2003 by traversing the area on foot, using a GPS unit. A search for Declared Rare and Priority Flora was undertaken in conjunction with a Flora and Vegetation Assessment. This entailed walking the entire site in 50m transects, meandering within the 50m corridor was deliberate to allow for maximum area surveyed.

The site lies in the Southern Jarrah Forest Subregion in Menzies Botanical Subdistrict within the Southwestern Botanical Province as described by Beard (1990). Flora composition of the Southern Jarrah Forest Subregion has been described by Beard (1990) as predominately consisting of jarrah (*Eucalyptus marginata*) forest followed by woodlands of marri (*Corymbia calophylla*) and wandoo (*Eucalyptus wandoo*).

Seven Declared Rare Flora (DRF) species have been recorded in the general vicinity as well as two Priority 2, three Priority 3 and six Priority 4 flora species. No species of Declared Rare Flora (DRF), pursuant to subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and listed by the CALM were located during the survey. None of the species recorded are listed pursuant to section 178 of the EPBC Act (1999). One Priority 4 flora species, *Eucalyptus rudis* subsp. *cratyantha* was recorded on site. This species occurred in one area as the co-dominant canopy tree in vegetation community 2a, in association with drainage lines.

The study area has a substantially intact vertebrate fauna habitat, which reflects the good quality of much of the available habitat, and the juxtaposition of reserves. The proposed development will inevitably result in some habitat loss, but consideration of a number of factors should minimise these impacts: Overall, Lot 50 Eagle Crescent lies between larger reserves and probably has a linkage

function for wildlife. Maintenance of fauna habitats across the area will be important to protect that function.

There are no System 1 reserves within the study area (EPA 1976). The Leeuwin-Naturaliste National Park lies to the west and stretches from Bunker Bay to Augusta, approximately 120 kilometres. The National Park is of considerable conservation and recreational value. The Meelup Regional Park lies to the south east of site. There is a small vegetated corridor at the south of Eagle Bay townsite, which connects the Meelup Regional Park to Location 580 and ultimately Lot 50 and the Leeuwin Naturaliste National Park.

The site presents a unique opportunity to protect the environmental values of the area while offering quality lifestyle rural residential blocks. Due to the nature of the site and its place in the landscape, there appears significant opportunity to accommodate innovative development which is sensitive and in keeping with the character of the area. The following recommendations provide guidance as how specific constraints and opportunities could be addressed in a development context:

1. Where possible retain and protect all remnant vegetation on site.
2. Clearing should be restricted to designated building envelopes and designed to minimise disturbance to good condition vegetation.
3. Larger block sizes should be located within the areas of excellent vegetation condition to minimise disturbance.
4. Smaller blocks should be located on disturbed and cleared areas.
5. Revegetation of disturbed and cleared areas, particularly the creekline, should be undertaken.
6. Any development to the site should avoid Jingarmup Brook and seasonally waterlogged/overflow areas and a 50m revegetation buffer and fencing introduced.
7. Revegetation strategies for areas of limited potential for development such as Jingarmup Brook and flood prone areas and those already cleared (in accordance with the Meelup to Bunker Bay Structure Plan) should be considered to further enhance and retain the amenity in the area.
8. The development should be connected to reticulated sewer and mains water, if feasible.
9. If on-site effluent treatment is necessary, ATUs are preferable over conventional leach treatment.
10. Storm water runoff should not be diverted to the existing drainage lines but locally infiltrated to groundwater. Practices outlined in *A Manual for Managing Urban Stormwater Quality in Western Australia* (Water and Rivers 1998) should be used to develop an environmentally sensitive stormwater strategy.
11. Property owners should be educated on effects of garden nutrients on creeks and lakes to ensure that gardens do not adversely effect Jingarmup Brook or associated drainage lines.
12. Any buildings constructed on site should be of a scale, colour and material consistent with other developments and landscape features.
13. Native gardens, in keeping with surrounding vegetation should be encouraged on site.
14. Fire control and provisions for fire fighting such as water supply and landowner education should be developed in a Bushfire Management Plan as part of preliminary approval.
15. A pamphlet on domestic cat issues is available from the Shire of Busselton called "Local Law on the Keeping and Welfare of cats" should be offered to residents.

16. A revised Executive Development Guide Plan that responds to these recommendations is contained in Appendix D.

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1. INTRODUCTION

The Eagle Bay area lies between land reserved for conservation around Cape Naturaliste, 2km to the west, and between Bunker Bay and Dunsborough, less than 1km to the east. A narrow foreshore reserve links these conservation areas. Lot 50 Eagle Crescent and associated road alignment ('the site') is located to the west of existing Eagle Bay townsite and is part of a natural amphitheatre surrounding Eagle Bay (**Figure 1**).

Lot 50 has an area of approximately 48.8 hectares, most of which has not been intensively developed for agriculture. The lot slopes from west to east, towards Eagle Bay and has a wide variety of soil types and vegetation communities. The site is zoned for "Rural Residential" and "Recreation" purposes and is situated within a landscape value area and development investigation area under the Shire of Busselton's Town Planning Scheme No. 20. Lot 50 is mostly land-locked and a number of access routes have been proposed in the past, however not widely supported. It was therefore necessary to undertake an agreement with the owner of Location 1348 and 580 for road access.

Approximately 14.2 hectares in the north east corner of Location 1348 and north west corner of Location 580 have been proposed to form the road access into Lot 50. Currently Locations 1348 and 580 are zoned "Agriculture" with a small section on the north eastern boundary of Lot 580 zoned "Recreation". Jingarmup Brook enters Lot 50 through Location 1348, which has been parkland cleared. Location 580 is mostly parkland cleared however the area in question supports an Open Forest with a disturbed understorey.

Lot 50 is high in the landscape and retains about 75% of its native vegetation cover, with a valley in the north supporting pasture. The native vegetation consists largely of jarrah (*Eucalyptus marginata* subsp. *marginata*) with scattered marri (*Corymbia calophylla*), forming a Low Open Woodland to Low Forest over a mostly diverse understorey. This woodland and forest occurs mainly on higher ground where the soils are lateritic gravel. Low Shrublands and Heaths occurred on outcroppings of granite. The south of the property slopes down to a seasonal watercourse lined with Freshwater Paperbark (*Melaleuca raphiophylla*) and Flooded Gum (*Eucalyptus rudis* subsp. *cratyantha* P4). Sandy soils adjacent to this watercourse supported Peppermint (*Agonis flexuosa* var. *flexuosa*). A minor watercourse drained the pasture in the north of the property.

The proposed subdivision of Lot 50 and access to site has been the subject of many official documents for a number of years and concern has been raised on the detrimental effects of further development in the Eagle Bay area. Ecoscape (2000) was commissioned by to undertake a flora and vegetation assessment of Lot 50 to address environmental issues and contribute to the sustainable environmental planning in the area. The botanical information contained in the Ecoscape report has been used in the preparation of this report to ensure that mapping of the presence and condition of flora and vegetation on site is comprehensive. Additionally, flora and vegetation has been surveyed over more than one spring season, which is considered to be a comprehensive survey.

This survey undertook a flora and vegetation survey of Lot 50 and the road alignment and associated land (Locations 1348 and 580), which were not surveyed in the draft Ecoscape report. This report also undertook a comprehensive Declared Rare and Priority Flora survey to document the presence of significant species on site. A fauna and habitat assessment was undertaken on-site by a professional Zoologist and Aboriginal Heritage issues were investigated.

This report was prepared to support the environmental impact and planning process, and identifies the existing environmental values, the constraints and opportunities, potential impacts and recommended management measures to ensure that any development is consistent with the local receiving environment.

1.1 ENVIRONMENTAL ASSESSMENT HISTORY

An application to sub-divide Lot 50 Eagle Crescent was submitted to the Western Australian Planning Commission in early 2000. The subdivision application was referred to the Environmental Protection Authority (EPA) pursuant to section 38 of the Environmental Protection Act. Prior to recommending a level of environmental assessment to the EPA, the Department of Environmental Protection (DEP) sought additional information on significant flora, fauna or vegetation communities on site. Additional concerns regarding clearing and stormwater management were also raised. It was advised by the Ministry of Planning that support for subdivision proposal would not be given until environmental and drainage issues were addressed and support was received from relevant Government agencies.

Ecoscape was commissioned in 2000 to undertake a flora and vegetation assessment of site and Environmental Management Plan to address these issues. In 2002, a DEP representative advised the planning consultant that the Ecoscape flora and vegetation assessment met the requirements of assessment however needed to be updated to reflect new designs.

BSD Consultants was commissioned by Eagle Bay Joint Venture to undertake the preparation of the Development Structure Plan for the site. As part of this, it was proposed to undertake an environmental assessment of the site to ensure that a comprehensive document was produced to address environmental issues, including all flora, fauna and vegetation issues previously raised. The BSD environmental assessment of Lot 50 Eagle Crescent, combining information from Ecoscape's (2000) flora and vegetation assessment, summarises two assessments of the area over two spring surveys and thoroughly addresses flora, fauna and vegetation issues.

This report and previous work undertaken by Ecoscape (2000) provide a number of environmental management measures that, if implemented, will minimise the environmental impacts associated with the proposal.

2. EXISTING ENVIRONMENT

2.1 EXISTING USE

Currently, Lot 50 is not intensively developed. It retains good to excellent quality remnant vegetation over more than 75% of the site. The site has one patch of cleared pasture, which has not been recently used and is regenerating on the edges. Generally, the area is sparsely disturbed by the surrounding land uses although edge effects are evident in the vegetation condition mapping. A number of well-used tracks transect the area.

Locations 1348 and 580 ('the road alignment') are more disturbed with approximately one-third of the area parkland cleared for agricultural use. Vegetated areas have a reduced diversity possibly caused by uncontrolled grazing.

2.2 CLIMATE

The site experiences a Mediterranean climate typified by cool wet winters and warm dry summers with five to six dry months per year. Mean temperatures range from 13°C in winter to 19.5°C in summer and the range between minimum and maximum daily temperature rarely exceeds 15°C.

An average rainfall of approximately 1,000 to 1,200 mm falls mainly during winter (Beard 1981). The area is subject to major weather systems and can experience strong to gale force winds in winter and spring.

2.3 GEOLOGY

The site is located on the Margaret River Plateau, which is a gently undulating plateau of laterised granite and gneissic basement rock of the Leeuwin Block. It is dissected by a series of valley systems and forms a 5 to 15km north-south strip from Dunsborough to Augusta (Tille & Lantzke 1990). The site has both lateritic and granitic outcropping scattered throughout.

2.4 LANDFORMS AND SOILS

A land capability study carried out in the Busselton/Margaret River/Augusta region identified two dominant land units within the site (Tille & Lantzke 1990). This study discussed the physical limitations of these soil units in relation to housing on small rural lots.

The Cowaramup Upland land system is a gently undulating plain with elevation ranging from 80-140m above sea level in the north. The major portion of the Cowaramup Upland consists of flats and gentle slopes with yellow-brown gravelly duplex and pale grey mottled soils.

The Cowaramup Flats (C) soil is the dominant soil unit on site. Cowaramup Flats (C) are described as flats (0-20% gradient) with gravelly duplex and mottled pale grey soils. Cowaramup Flats (C) possess

minor limitations associated with trafficability (ease and safety of vehicle access) and moderate limitations associated with soil absorption (ability of the soil to absorb effluent).

Wilyabrup Valleys land system form undulating to rolling low hills lying below the surrounding Cowaramup Upland land system. The side slopes of the valleys commonly have yellow-brown gravelly duplex and red-brown gravelly gradational soils. These slopes are usually either gently inclined or moderately inclined.

Two subdivisions of the Wilyabrup Valleys land system are found on site:

1. Wilyabrup Slopes (W) are slopes with gradients generally 5-15% but ranging from 2-30% and gravelly soils. Wilyabrup Slopes (W) have moderate or minor limitations with regards to soil absorption, water erosion hazard, ease of excavation, trafficability and slope.
2. Wilyabrup Fertile Flats (Wf) are well-drained valley flats and floodplains with deep alluvial soils, often red brown loams. Wilyabrup Fertile Flats (Wf) possess minor soil absorption limitations.

Generally, there is a presumption against developing prime agricultural land for residential purposes in the Shire of Busselton. **Figure 2** illustrates the extent of prime agricultural land on site which generally relates to the Cowaramup Flats (C) soil type and upland Wilyabrup Slopes (W). More than 60% of Lot 50 is rated as prime agricultural land.

2.5 SLOPE AND TOPOGRAPHY

The site has a generally easterly aspect and descends from the highest point on the western boundary of Lot 50 into Eagle Bay townsite from RL 60 AHD to RL 10 (**Figure 3**). In some areas, particularly along the proposed road alignment and adjacent proposed lots, the slope encountered is greater than 10% and may be considered steep.

2.6 SURFACE WATER FEATURES

There are three surface hydrological features within the site that are apparent in **Figure 3**. Two seasonal creeklines extend through pasture to the south and meet in the south-easterly corner of Lot 50. A small holding dam is found on Jingarmup Brook, which then absorbs the minor creekline on Lot 50 and flows towards Eagle Bay.

The condition of Jingarmup Brook was evaluated at "B2-B3" by Pen (1997), which rates the area with an intermediate level of naturalness. The site visit confirms the degraded nature of the creekline understorey with infestation of Arum Lilly (*Zantedeschia aethiopica*) and pastoral weeds evident. Another minor drainage line extends easterly through the cleared pasture area and drains through private lots to Eagle Bay.

Most creeklines are seasonal and show evidence of high water flow in winter. Areas surrounding the creeklines have flooding potential during high flow events (**Figure 3**). All creeklines were flowing at

the time of site visit, although the flow of minor drainage line in the pasture area was very slow and evidence of extreme seasonality.

2.7 VEGETATION

The site lies in the Southern Jarrah Forest Subregion in Menzies Botanical Subdistrict within the Southwestern Botanical Province as described by Beard (1990). Flora composition of the Southern Jarrah Forest Subregion has been described by Beard (1990) as predominately consisting of jarrah (*Eucalyptus marginata*) forest followed by woodlands of marri (*Corymbia calophylla*) and wandoo (*Eucalyptus wandoo*). Jarrah occurs solely on laterite but is joined by marri in more superficial soils and valley soils. In most cases, jarrah and marri grow to 20-30m with a lower layer of smaller trees around 7m high and a layer of shrubs reaching between 0.5-2m over herbaceous ground cover (Beard 1990).

Regional Forest Agreement (RFA) mapping of the Southern Jarrah Forest undertaken by Matiske & Havel (1999) for the Department of Conservation and Land Management (CALM) and describes three vegetation complexes within the project area (**Figure 4**). The vegetation mapping units are closely related to the soil types in the area and are similarly named.

The following vegetation mapping units were located within the survey area:

Cowaramup (C2): Open Forest of *Eucalyptus marginata* subsp. *marginata*-*Corymbia calophylla*-*Banksia grandis* on lateritic uplands in hyperhumid and humid zones.

Wilyabrup (Wr): Woodland of *Corymbia calophylla*-*Eucalyptus marginata* subsp. *marginata* with Closed Heath of Myrtaceae-Proteaceae-Papilionaceae spp. on steep rocky slopes in the hyperhumid zone.

Wilyabrup (Ww2): Tall Open Forest of *Corymbia calophylla*-*Agonis flexuosa* on flats and valleys in perhumid and humid zones.

Mapping of the wider area also included the following vegetation complexes (**Figure 4**):

Abba (Ad): Woodland of *Corymbia calophylla*-*Agonis flexuosa*-*Allocasuarina fraseriana*-*Nyctia floribunda* on mild slopes in the humid zone.

Cowaramup (Cd): Woodland of *Eucalyptus marginata* subsp. *marginata*-*Corymbia calophylla*-*Banksia ilicifolia* on sandy rises and Low Woodland of *Melaleuca preissiana* on lower slopes in the hyperhumid to humid zones.

Cowaramup (Cw2): Woodland of *Eucalyptus marginata* subsp. *marginata*-*Corymbia calophylla* on slopes and low woodland of *Melaleuca preissiana*-*Banksia littoralis* on depressions in perhumid and humid zones.

Gracetown (G3): Mixture of low woodland of *Agonis flexuosa*, open forest of *Corymbia calophylla-Eucalyptus marginata* subsp. *marginata* and tall open forest of *Eucalyptus diversicolor* with some *Corymbia calophylla* and *Eucalyptus cornuta* on eastward facing slopes in the hyperhumid zone.

Gracetown (GE): Closed heath of *Olearia axillaris-Rhagodia baccata-Agonis flexuosa* on seaward slopes in hyperhumid to humid zones.

Kilcarnup (KB): Mosaic of coastal complex on exposed dunes on seaward slopes in hyperhumid to humid zones.

Kilcarnup (KbE): Mosaic of coastal complex and closed heath of *Olearia axillaris-Pimelea ferruginea-Melaleuca huegelii* on exposed calcareous dunes on seaward slopes in hyperhumid to humid zones.

Kilcarnup (KE): Tall Shrubland to Closed Heath of *Agonis flexuosa-Spyridium globulosum* on exposed slopes of calcareous dunes in hyperhumid to humid zones.

Kilcarnup (Kr): Tall Shrubland of *Agonis flexuosa-Acacia saligna* on leaside of calcareous dunes in hyperhumid to humid zones.

Ludlow (LW): Open woodland of *Melaleuca raphiophylla* and sedgelands of Cyperaceae-Restionaceae spp. on broad depressions in the subhumid zone.

Metricup (M): Woodland to open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on escarpment in the humid zone.

Metricup (Mv): Low woodland of *Eucalyptus marginata* subsp. *marginata* with some *Nuytsia floribunda* on deeply incised valleys in the humid zone.

Wilyabrup (W2): Open forest of *Corymbia calophylla-Allocasuarina decussata-Agonis flexuosa* on deeply incised valleys in perhumid and humid zones.

Wilyabrup (Wd): Woodland of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on slight rises on lower slopes in perhumid and humid zones.

Wilyabrup (We): Low woodland and woodland of *Corymbia calophylla-Eucalyptus marginata* subsp. *marginata* with some *Banksia* spp. on exposed slopes in hyperhumid to humid zones.

Yelverton (Y): Woodland of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Allocasuarina fraseriana-Agonis flexuosa* and open woodland of *Corymbia calophylla* on low undulating uplands in the humid zone.

Yelverton (Yd): Woodland of *Allocasuarina fraseriana*-*Eucalyptus marginata* subsp. *marginata*-*Xylomelum occidentale*-*Banksia attenuata* on sandy slopes in the humid zone.

2.7.1 Declared Rare and Priority Flora

Liaison with CALM District Office in Perth identified a number of Declared Rare and Priority Flora within the wider Eagle Bay/Cape Naturaliste area (**Appendix C**).

Seven Declared Rare Flora (DRF) species have been recorded in the general vicinity as well as two Priority 2, three Priority 3 and six Priority 4 flora species.

Table 1: Results of CALM Threatened Flora Database Search for wider Eagle Bay Area

Species	CALM Conservation Status
<i>Acacia lateritica</i> (glabrous variant)	Priority 3
<i>Boronia tenuis</i>	Priority 4
<i>Caladenia arrecta</i>	Declared Rare Flora
<i>Caladenia busselliana</i>	Declared Rare Flora
<i>Caladenia caesarea</i> subsp. <i>maritima</i>	Declared Rare Flora
<i>Caladenia excelsa</i>	Declared Rare Flora
<i>Caladenia huegelii</i>	Declared Rare Flora
<i>Caladenia longicauda</i> subsp. <i>clivicola</i>	Priority 4
<i>Caladenia viridescens</i>	Declared Rare Flora
<i>Calothamnus graniticus</i> subsp. <i>graniticus</i>	Priority 4
<i>Chorizema reticulatum</i>	Priority 3
<i>Dryandra sessilis</i> var. <i>cordata</i>	Priority 2
<i>Eucalyptus marginata</i> x <i>megacarpa</i>	Priority 4
<i>Eucalyptus phylacis</i>	Declared Rare Flora
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	Priority 4
<i>Millotia tenuifolia</i> var. <i>laevis</i>	Priority 2
<i>Tetratheca parvifolia</i>	Priority 3
<i>Wurmbea calcicola</i>	Declared Rare Flora

Flora species acquire Declared Rare or Priority conservation status where populations are geographically restricted or threatened by local processes. CALM enforce regulations under the *Wildlife Conservation Act 1950* to conserve DRF and protect significant populations. Priority Flora species are potentially rare or threatened and are classified in order of threat. Rare and Priority Flora definitions are listed in **Table 1**.

Rare Flora species are gazetted under subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and therefore it is an offence to “take” or damage rare flora without Ministerial approval. Section 23F of the Act defines “to take” as “... to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora to cause or permit the same to be done by any means”.

Table 2: Definition of Rare and Priority Flora Species (CALM 2002)

Conservation Code	Category
R	Declared Rare Flora – Extant Taxa. Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such.
P1	Priority One – Poorly Known Taxa Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Priority Two – Poorly Known Taxa Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey.
P3	Priority Three – Poorly Known Taxa Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but need further survey.
P4	Priority Four – Rare Taxa Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) promotes the conservation of biodiversity by providing strong protection for plants at a species level. Section 178 and 179 provides the lists and categories of threatened species under the Act each species and is presented in **Table 2**.

Seven flora species identified in the area by the CALM database search are also listed as Endangered by the EPBC Act. All species descriptions are taken from Florabase (Western Australian Herbarium 1998-2003).

Caladenia busselliana (R) is a tuberous herb to 0.3m high with a green, yellow and cream flower appearing in September to October. The preferred habitat is winter-wet swamps in sandy loam.

Caladenia caesarea subsp. *maritima* (R) is a tuberous perennial herb from 0.15-0.2 m high. It flowers with green, yellow and brown flowers in August to September and prefers loam or granite soils and rock outcrops. It is endemic to the Cape Naturaliste area.

Caladenia excelsa (R) is a tuberous herb to 0.9m high with a green, white and red flower appearing in September to October. The preferred habitat is sands or sandy loam.

Caladenia huegelii (R) is a tuberous perennial herb, which grows between 0.25-0.6 m high. It flowers in September and October and is commonly found in grey or brown sand and clay loam. Its range extends throughout the west coast from Perth to Cape Naturaliste.

Caladenia viridescens (R) is a tuberous perennial herb growing between 0.25-0.4 m high. It has a green and yellow flower, which appears between September and October. It is commonly found in loam and grey sand and is endemic to area. It is listed as Endangered under the EPBC Act (1999).

Eucalyptus phylacis (R) is a tree or occasionally mallee to 5 m high with rough & flaky bark on trunk. It flowers in May with cream flowers. It is commonly found in laterite or loamy soils over granite and particularly in coastal areas. It is also endemic to area.

Wurmbea calcicola (R) is a cormous perennial herb to 0.25 m high. It flowers in June with white inflorescence and is found in loamy soils and coastal limestone cliffs. It is endemic to the area.

Table 3: Categories of Threatened Species (EPBC Act, Section 179, 1999)

Category
<p>Extinct</p> <p>Taxa which is known only to survive in cultivation, in captivity or as a naturalised population, well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>
<p>Critically Endangered</p> <p>Taxa which is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.</p>
<p>Endangered</p> <p>Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
<p>Vulnerable</p> <p>Taxa which is not endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</p>
<p>Conservation Dependant</p> <p>A species that is the focus of a specific conservation program; the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.</p>

2.7.2 Threatened Ecological Communities

The EPBC Act (1999) also provides for the strong protection of plant communities, or Threatened Ecological Communities (TEC), which is listed under section 181 of the Act and are described as 'Critically Endangered', 'Endangered' or 'Vulnerable' under section 182.

One Threatened Ecological Community is known to occur in the area (English & Blythe 1997, Hopkins *et al* 2002) and is described as “*Calothamnus graniticus* heaths on south west coastal granites”. Although some granite outcropping occurred on site, no *Calothamnus graniticus* individuals or communities were identified within the site.

2.7.3 *Site Visit*

An Environmental Scientist from BSD Consultants undertook a three day site visit from 17th to 19th September 2003.

The aims of this assessment were:

- produce a flora list of species observed/collected on the site;
- undertake a flora and vegetation survey of the road alignment area, not previously surveyed;
- undertake and produce vegetation community and condition mapping of the site;
- review vegetation community significance in a local and regional context
- review other environmental values in the area; and
- make management recommendations.

The assessment was carried out with reference to guidance and position statements published by the Environmental Protection Authority (2001, 2003) on flora surveys, environmental impact and reporting and Commonwealth EPBC Act (1999).

2.7.4 *Methods*

2.7.4.1 *Flora*

Prior to fieldwork a desktop analysis of the existing information of the Declared Rare and Priority Flora database records on species known to occur in the region. Relevant species were examined at the Western Australian State Herbarium prior to the field survey being undertaken.

The site was surveyed on 17th, 18th and 19th of September 2003 by traversing the area on foot, using a GPS unit. A search for Declared Rare and Priority Flora was undertaken in conjunction with a Flora and Vegetation Assessment. This entailed walking the entire site in 50m transects, meandering within the 50m corridor was deliberate to allow for maximum area surveyed.

All plant specimens collected during the field survey were handled and identified in accordance with the requirements of the Western Australian Herbarium. Where necessary, specimens were compared with pressed specimens housed at the Western Australian Herbarium, and plant taxonomists with specialist skills were consulted. Nomenclature of recorded species follows that recommended by the Western Australian Herbarium (1998-2003).

2.7.4.2 *Vegetation*

The vegetation communities occurring on this site were described in detail. The use of a standard data collection form ensured the data was collected in a systematic and consistent manner. At each site the following records were made: condition/disturbance, topography, soils, outcropping rocks and their type. For each species recorded, the average height and dominance within the community were noted.

Survey sites representing vegetation communities present were chosen based on differing vegetation community type and for each survey site, the flora was systematically recorded and collections of plant specimens were made where further identification was required. Non-quantitative opportunistic recordings/collections were then made (within the same vegetation community type) of species not recorded within the monitoring plot.

Aerial photography was used to extrapolate and map plant communities at a scale of 1:2,500 in combination with running notes made during the course of the survey. Vegetation condition was also recorded at each site and through running notes made while traversing the project area.

To determine the conservation and reservation status of the vegetation types defined for the project area, a comparison was made with vegetation community types identified in the RFA mapping (Mattiske & Havel 1999) and compared with poorly conserved vegetation types outlined in the Biodiversity Strategy for Private Land in the Busselton Shire (Shire of Busselton 2002)

2.7.4.3 *Threatened Flora and Ecological Communities*

The vegetation assessment considered all native vegetation occurring on site at both a species and community level. All plant species and vegetation communities that were recorded were then reviewed against both State and Commonwealth lists of Threatened Species and Threatened Ecological Communities.

2.7.5 *Flora*

The flora recorded during Ecoscape's flora and vegetation assessment (October 2000) was combined with flora recorded during this survey (September 2003) to produce a comprehensive species list of the area. A total of 277 taxa, comprising 50 families and 126 genera were recorded on site (**Appendix A**).

Species representation was greatest among the Myrtaceae (Myrtles), Papilionaceae (Peas) and Proteaceae (Banksias) families, typical of the Southern Jarrah Forest Subdistrict (Beard 1981). Twenty-four introduced (weed) species were collected. Weeds were abundant in Caryophyllaceae and Poaceae (grasses) families.

All flora species identified during the September 2003 field visit were found to be within their known range (WA Herbarium 1998-2003). Species collected during Ecoscape (2000) field visit were not compared as specimens could not be confirmed.

2.7.6 *Declared Rare and Priority Flora*

No species of Declared Rare Flora (DRF), pursuant to subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and listed by the CALM were located during the survey. None of the species recorded are listed pursuant to section 178 of the EPBC Act (1999).

One Priority 4 flora species, *Eucalyptus rudis* subsp. *cratyantha* was recorded on site. It occurred in one area as the co-dominant canopy tree in vegetation community 2a, in association with drainage lines.

Samples of two species of *Caladenia* identified on site were sent to Mr Andrew Brown of the Department of Conservation and Land Management as they were suspected of being DRF but were later identified as not threatened.

2.7.7 *Vegetation*

Nine vegetation communities were observed during the survey, comprising two RFA mapping (Mattiske & Havel 1999) communities described in **Table 3**. The distribution of the vegetation communities is illustrated in **Figure 5** and a photographic record is presented as **Photo Plates 1-9**.

Table 4: Vegetation Communities Recorded during Site Survey, Eagle Bay, September 2003

Community Description	Inferred RFA Community
Vegetation Community 1 – <i>Eucalyptus</i> Forests and Woodlands	
1a Low Open Forest of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over <i>Xanthorrhoea preissii</i> and <i>Acacia pulchella</i> over <i>Hibbertia hypericoides</i> and <i>Burchardia umbellata</i> in sandy gravel.	C2
1b Low Woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> over <i>Acacia pulchella</i> , <i>Hakea lissocarpha</i> and <i>Xanthorrhoea preissii</i> over <i>Hibbertia hypericoides</i> , <i>Calothamnus sanguineus</i> and <i>Chamaescilla corymbosa</i> in brown sandy clay loam.	C2
1c Low Woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> over <i>Hakea trifurcata</i> and <i>Allocasuarina humilis</i> over <i>Calothamnus sanguineus</i> , <i>Hibbertia hypericoides</i> and <i>Dryandra lindleyana</i> subsp. <i>lindleyana</i> in brown sandy clay loam with numerous granite outcropping.	C2
1d Disturbed Low Woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> over <i>Acacia pulchella</i> , <i>Hakea lissocarpha</i> and <i>Xanthorrhoea preissii</i> over <i>Hibbertia hypericoides</i> , <i>Calothamnus sanguineus</i> and <i>Chamaescilla corymbosa</i> in brown sandy clay loam.	C2
Vegetation Community 2 – <i>Agonis</i> Forests	
2b Low Open Forest of <i>Agonis flexuosa</i> var. <i>flexuosa</i> , <i>Melaleuca raphiophylla</i> and <i>Eucalyptus rudis</i> subsp. <i>cratyantha</i> (P4) over <i>Juncus pallidus</i> and <i>Xanthorrhoea preissii</i> over * <i>Zantedeschia aethiopica</i> and pastoral weeds in brown sandy loam in association with watercourses.	Ww2
2c Low Open Forest of <i>Agonis flexuosa</i> var. <i>flexuosa</i> , <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over <i>Xanthorrhoea preissii</i> and <i>Acacia pulchella</i> over <i>Hibbertia hypericoides</i> , <i>Sowerbaea laxiflora</i> and pastoral weeds in grey sands.	Ww2
Vegetation Community 3 – Mixed Shrublands	
3a Open Heath of <i>Xanthorrhoea preissii</i> , <i>Hakea lissocarpha</i> , <i>Phyllanthus calycinus</i> and <i>Calothamnus sanguineus</i> over <i>Stylidium bulbiferum</i> , <i>Hovea trisperma</i> and <i>Burchardia umbellata</i> in red sandy clay soils with numerous granite outcropping.	
3b Open Heath of <i>Hakea trifurcata</i> with <i>Xanthorrhoea preissii</i> over <i>Hibbertia hypericoides</i> and <i>Stylidium bulbiferum</i> on granite outcropping.	
CL Cleared	

Of the nine vegetation communities mapped on the site, it was not possible to infer RFA mapping codes for two. As Community type 3 – Mixed Heaths is restricted to very specific soil types, it is not likely to be described in large-scale vegetation descriptions. The lack of native vegetation and variety of soil types in the pasture areas makes inference on vegetation that may have existed difficult although the regeneration suggests that the area may have been vegetation community 1b.

2.7.8 *RFA Mapping*

To determine the conservation and reservation status of the vegetation types defined, a comparison was made with previous vegetation community types identified in the area by the RFA mapping (Mattiske & Havel 1999) and the vegetation communities defined for the project area, resulting in inferred vegetation communities, which are presented in **Table 4**.

The Biodiversity Incentive Strategy for Private Land in the Busselton Shire lists a number of vegetation complexes that are poorly represented (<30% remaining) in the region based on RFA mapping (Shire of Busselton 2002). None of the vegetation complexes represented on the site are currently listed. The area is highlighted as one of few privately held lands in the Cape Naturaliste area with more than 20ha of remnant vegetation held as private land.

2.7.9 *Threatened Ecological Communities*

One Threatened Ecological Community is known to occur in the area (English & Blythe 1997, Hopkins *et al* 2002) and is described as “*Calothamnus graniticus* heaths on south west coastal granites”. Although some granite outcropping occurred on site, no *Calothamnus graniticus* individuals or communities were identified within the site.

Currently none of the inferred vegetation community types are listed as TECs in Western Australia by English and Blyth (1997) or triggers under Federal legislation (EPBC Act 1999).

2.7.10 *Vegetation Significance*

Vegetation communities are referred to as Locally Significant because they:

- support populations of Priority Flora; or
- are very restricted to one or two locations within the project area and occur as small isolated communities, e.g. communities associated with calcrete are locally significant due to their small size and which are restricted to small pockets within the local context but area well represented within the region; or
- support a range extension of a particular population of taxa from previously recorded locations; or
- are gazetted within the State as Threatened or any other category.

All flora species identified during the September 2003 field visit were found to be within their known range (WA Herbarium 1998-2003).

Vegetation community 2a is considered to be locally significant as it supports a population of Priority 4 flora species, *Eucalyptus rudis* subsp. *cratyantha*.

The dominant vegetation communities represented on site can be found in the region within private land to the north, Meelup Regional Park and Leeuwin Naturaliste National Park.

A number of vegetation communities identified are restricted to one or two locations within the site but as the area surveyed is small, it is likely that they occur in adjacent areas. The information available at a local scale is restricted and therefore local significance of vegetation communities follows the information available in the Biodiversity Incentive Strategy for Private Land in the Busselton Shire. The report lists a number of vegetation complexes that are poorly represented (<30% remaining) within the Busselton region based on RFA mapping (Shire of Busselton 2002). None of the vegetation complexes represented on the site are currently rated as significant vegetation communities.

The local significance rating targets regions that have been highly modified in a large scale, such as the Wheatbelt. Significant parcels of uncleared land exist in the general area, the Cape to Cape region has an area of 97,118 hectares of which 64,535 is remnant vegetation which represents 66% of the area is vegetated (Hopkins *et al* 2002).

Vegetation communities are referred to as Regionally Significant for one or more factors:

- they support populations of Declared Rare Flora; or
- they are limited to specific landforms that are not located regularly in the regional context e.g. granite outcrops and breakaways; or
- are listed in the EPBC Act (1999) as Threatened or any other category.

No granite outcropping occurs on site and no DRF or Threatened flora were identified therefore, at the time of survey, no vegetation communities described are considered to be Regionally Significant.

The RFA vegetation communities represented on site are held in the area to the north on private property in a large intact block and within the Meelup Regional Park and Leeuwin Naturaliste National Park. Large blocks of the dominant vegetation type on site (Cowaramup C2) are present in to the south (Shire of Busselton 2002). Additionally, over 60% of Jarrah Forest in the Southern Jarrah Forest is held as CALM reserves in the south west of Western Australia.

In a study of biodiversity in the south west, the vegetation present on site was not listed as poorly reserved within the CALM Estate or as a priority vegetation association (Hopkins *et al* 2002). Shepherd *et al.* (2002) described the extent, type and status of native vegetation in Western Australia. Inference of site vegetation communities was undertaken and Low jarrah Woodland was described as retaining 15,971ha or 76.3% of original extent while Low jarrah/marri Forest was described as retaining 523ha or 62.6% of its original extent. Other surveys in the area (Ecoscape 2000) did not rate the site as regionally significant given the large area of large reserves with similar floristic communities and presence of vegetation communities adjacent to site.

The significance of site as a fauna corridor or greenway linkage is possible, although fauna would more likely use the Meelup Regional Park as a corridor as the site is excluded from the coast by Eagle Bay settlement and other areas by agricultural disturbance. If Eagle Bay settlement or agricultural clearing is not considered a barrier to fauna travel, it is unlikely that any development on site should

cause any detrimental effect, provided it was carried out within an environmentally sensitive framework.

2.7.11 *Vegetation Condition*

Vegetation condition was rated according to the vegetation condition scale used in the Bushland Plant Survey (Keighery 1994). Generally, the vegetation condition was rated as “Excellent” with lesser ratings mostly in associations with pasture, tracks and in relation to populated areas (**Figure 6**). A photographic example of vegetation condition is presented as **Photo Plates 10-14**.

Community 1b has excellent diversity and makes up the dominant vegetation community on site. Edge effects are evident in the vegetation condition mapping with the majority of boundaries recording a more disturbed condition than other areas, particularly abutting agricultural uses. Jingarmup Creek and association vegetation community 2a is very disturbed, both on Lot 50 and within the road alignment area.

The area of Location 1348 that makes up part of the road alignment is completely degraded and has been used as a grazing area for a number of years. It supports some trees but no native understorey. Location 580 also shows signs of previous uncontrolled grazing with a disturbed and reduced understorey. Currently this area is zoned “Recreation” and is not used for agriculture. Although the area is heavily wooded, intensive rehabilitation would be required to return a diverse understorey.

2.7.12 *Weeds and Introduced Species*

In this survey, collections of weeds present, for the most part, was not undertaken. It was assumed that Ecoscape (2000) had adequately identified weed species present and more weighting was put on collecting and identifying native species.

Twenty-four weed (introduced) species have been recorded on the site. The survey area is generally in excellent condition with little weed invasion internally. The effects of disturbance on edges of intact bushland are evident. The creekline to the south east of Lot 50 was infested with Arum Lilly **Zantedeschia aethiopica* and pastoral grasses.

The site supports two Declared Plants as defined by the Agriculture Protection Program (Agriculture WA 2002). Arum Lilly **Zantedeschia aethiopica* and Apple of Sodom **Solanum linnaeanum* were found in the project area. Arum Lilly was identified in association with drainage lines but also found in shady areas. Apple of Sodom was found as scattered individuals in disturbed areas, such as on the edge of pasture.

Pursuant to Section 37 of the *Agriculture and Related Resources Protection Act 1976*, both Arum Lilly and Apple of Sodom require special management to prevent spread. Both species are Declared Plants within the Shire of Busselton and have been rated P1 and P4. P1 prohibits the movement of the plant or seed within the Shire. A ranking of P4 dictates that the infested area must be managed in such a

way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery (Agriculture WA 2002).

2.8 RARE AND THREATENED FAUNA

Bamford Consulting Ecologists were commissioned by BSD Consultant Pty Ltd to undertake a fauna habitat assessment and desktop review of Lot 50 Eagle Crescent, Eagle Bay, as part of a proposal to sub-divide the site.

The aims of the fauna assessment were to:

- produce a fauna list of species observed or predicted to occur on the site;
- identify species of conservation significance that might occur there;
- identify significant or sensitive habitats and locations on the site; and
- make management recommendations.

The assessment was carried out with reference to guidance and position statements published by the WA Environmental Protection Authority on fauna surveys and environmental protection, and Commonwealth Biodiversity Legislation. This report details the findings of the survey.

2.8.1 Methods

The site was visited on 25th August 2003 by Dr Mike Bamford. The aim of this inspection was to become familiar with the environment of the site so that fauna records for the general area could be interpreted with respect to available fauna habitats. In addition, it was possible to make some direct observations on fauna.

Observations made on fauna in the field were supplemented by a search of the Western Australian Museum FaunaBase and the Department of Conservation and Land Management's (DCLM) Threatened Fauna Database for records from the general vicinity of the project area. Additional information on fauna in the area was obtained from previous observations made in the region (M. Bamford unpubl. data). Most information on fauna is for vertebrates only, although the DCLM database contains records of invertebrates where applicable.

Taxonomy and nomenclature for fauna species used in this report generally follow Aplin and Smith (2001) for amphibians and reptiles, How *et al.* (2001) for mammals and Johnstone (2001) for birds. Alternative names, including common names recommended for national and international use by Christidis and Boles (1994) for birds, are also given.

2.8.2 Assessment of Conservation Significance

The conservation status of fauna species is assessed under Commonwealth and State Acts such as the *Commonwealth Environment Protection and Biodiversity Conservation Act* (EPBC Act) 1999 and the *Western Australian Wildlife Conservation Act* 1950. The significance levels for fauna used in the EPBC Act are those recommended by the International Union for the Conservation of Nature and

Natural Resources (IUCN) and reviewed by Mace and Stuart (1994). The *WA Wildlife Conservation Act 1950* uses a set of Schedules but also classifies species using some of the IUCN categories. These categories and Schedules are described in Appendix One.

The EPBC Act also has lists of migratory species that are recognised under international treaties such as the China Australia Migratory Bird Agreement (CAMBA), the Japan Australia Migratory Bird Agreement (JAMBA) and the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals). Those species listed in JAMBA are also protected under Schedule 3 of the *WA Wildlife Conservation Act*. In addition, Environment Australia has supported the publication of reports on the conservation status of most vertebrate fauna species e.g. reptiles (Cogger *et al.* 1993), birds (Garnett and Crowley 2000), monotremes and marsupials (Maxwell *et al.* 1996), rodents (Lee 1995) and bats (Duncan *et al.* 1999); while the Threatened Species and Communities Section of Environment Australia has produced a list of Threatened Australian Fauna (Environment Australia 1999), although this list is effectively a precursor to the list produced under the EPBC Act. These publications also use the IUCN categories, although those used by Cogger *et al.* (1993) and Wager and Jackson (1993) differ in some respects as this report pre-dates Mace and Stuart's review (1994).

In Western Australia, the Department of Conservation and Land Management has produced a supplementary list of Priority Fauna, being species that are not considered Threatened under the WA Act but for which the Department feels there is cause for concern. Some Priority species, however, are also assigned to the IUCN Conservation Dependent category. Levels of Priority are described in Appendix One.

Fauna species included under conservation acts and/or agreements are formally recognised as of conservation significance under state or federal legislation. Species listed only as Priority by CALM, or that are included in publications such as Garnett and Crowley (2000) and Cogger *et al.* (1993) but not in State or Commonwealth Acts, are also of recognised conservation significance. In addition, species that are at the limit of their distribution, those that have a very restricted range and those that occur in breeding colonies, such as some waterbirds, can be considered of conservation significance, although this level of significance has no legislative or published recognition and is based on interpretation of distribution information. The WA Department of Environmental Protection (2000) used this sort of interpretation to identify significant bird species in the Perth metropolitan area as part of Perth Bushplan.

On the basis of the above comments, three levels of conservation significance are recognised in this report:

Conservation Significance (CS) 1: Species listed under State or Commonwealth Acts.

Conservation Significance (CS) 2: Species not listed under State or Commonwealth Acts, but listed in publications on threatened fauna or as Priority species by CALM.

Conservation Significance (CS) 3: Species not listed under Acts or in publications, but considered of at least local significance because of their pattern of distribution.

2.8.3 *Invertebrates*

The only information on invertebrates comes from the threatened fauna database of the DCLM. This lists one species of conservation significance that may occur in the habitats present on Lot 50, the scorpion fly *Austromerope poultoni*. This is listed as Priority 1 by the DCLM and is therefore Conservation Significance Level 2. The only information available on the species is that it is associated with forest litter and is active after rain.

2.8.4 *Freshwater fish*

No freshwater fish were observed in the seasonal watercourse in the south of the property, nor in the dam on this watercourse. The watercourse was not included in an extensive study of freshwater fish in the South-West (Morgan *et al.* 1998). One native freshwater fish, the Mud Minnow *Galaxiella munda*, does occur in seasonal watercourses in the South-West but was not found by Morgan *et al.* (1998) in watercourses in the Dunsborough area. Therefore, it seems unlikely that it is present in the watercourse on Lot 50 Eagle Crescent.

2.8.5 *Frogs*

Eleven species of frogs may be present on the site and three species were recorded during the site inspection (**Appendix D – Table 1**). All observations made during the site inspection were along the watercourses, where there were shallows suitable for breeding, but at least some of the species are likely to move into upland areas outside the winter breeding season. The Moaning Frog and Pobblebonk in particular are known to travel several kilometres from wetlands (Bamford 1993).

None of the frog species is of conservation significance.

2.8.6 *Reptiles*

Thirty-three species of reptiles may be present but only two were observed during the site inspection (**Appendix D - Table 2**). The species total includes the aquatic Oblong (long-necked) Tortoise, although it is not certain that the watercourse in the south of the property contains adequate habitat for it.

The majority of reptiles are likely to be widespread in suitable habitat in the region, and the intact understorey of the majority of the site is likely to be an important habitat feature for them. Three species are of conservation significance as follows.

2.8.6.1 *Conservation Significance Level 1*

Morelia spilota imbricata

Carpet Python (SW subspecies)

The south-western subspecies of the Carpet Python is classified as Schedule 4 – Fauna Specially Protected for Other Reasons under the W.A. Wildlife Conservation Act, and is also classified as Priority 4 by CALM. The species has probably experienced a decline as a result of habitat loss due to land-clearing for agriculture, and may also be affected by introduced predators. Carpet Pythons have

been seen in the general area (M. Bamford pers. obs.).

2.8.6.2 Conservation Significance Level 3

Elapognathus minor

Short-nosed Snake

The Short-nosed Snake is endemic to Western Australia and has a restricted distribution in the “humid coastal plains of the deep southwest” (Storr *et al.* 2002). It is at the northern limit of its range at Eagle Bay. The indication that it occurs on coastal plains suggests that if present on lot 50, it may occur along the watercourse in the south of the property.

Rhinoplocephalus bicolor

Square-nosed Snake

The Square-nosed Snake has a similar restricted distribution to the Short-nosed Snake and is at the northern limit of its range at Eagle Bay.

2.8.7 Birds

A total of 113 bird species may occur on the site, of which 30 were observed during the site inspection (**Appendix D - Table 3**). The total number of species will not be present at any one time, as it includes species that are seasonal or irregular visitors. The list excludes species considered to be locally extinct (**Appendix D - Table 5**). It also excludes species that are likely to occur as vagrants, such as seabirds, that do not rely on habitats provided by the site.

The avifauna can be roughly divided according to the habitats they utilize. The ducks, grebe, cormorant, herons, crakes/rails and lapwing/plover are likely to rely on the large watercourse in the south of the property, and may in particular use the dam on this watercourse. For many of these species, the dense vegetation fringing this watercourse is likely to be important. There is also a suite of species that rely mainly on farmland on the property, including the ibis, some of the ducks, some of the birds of prey and species such as the Magpie-lark, White-fronted Chat and Richard’s Pipit. The majority of species, however, are likely to be dependent upon the native vegetation that extends from the margins of the watercourse to the upland areas.

The avifauna includes a number of species of conservation significance as follows.

2.8.7.1 Conservation Significance Level 1

Ardea alba

Great Egret

The Great Egret is listed as migratory under the EPBC Act and under international conservation agreements to which Australia is a signatory. The Great Egret is likely to be an occasional visitor to the watercourse in the south of the property, particularly around the small dam.

Apus pacificus

Fork-tailed Swift

The Fork-tailed Swift is listed as migratory under the EPBC Act and under international conservation agreements to which Australia is a signatory. It is likely to be an occasional visitor to the study area, but is almost entirely aerial and largely independent of terrestrial habitats.

Falco peregrinus

Peregrine Falcon

The Peregrine Falcon is classified as Schedule 4 – Fauna Specially Protected for Other Reasons under both the EPBC Act and the W.A. Wildlife Conservation Act. It is widespread in the South-West. The project area is likely to be within the range of a pair and the possibility exists that they may nest in a large tree hollow on the site.

Calyptorhynchus latirostris

Carnaby's Black-Cockatoo

Carnaby's Black-Cockatoo is classified as Endangered under the EPBC Act, the W.A. Wildlife Conservation Act and by Garnett and Crowley (2000). The main threats to the species are the loss of both breeding (Wheatbelt) and non-breeding (coastal South-West) habitat. The project area is within the non-breeding range of the species and suitable food plants (eucalypts such as marri and proteaceous species such as grevillea and banksia) were present.

Calyptorhynchus baudinii

Baudin's Black Cockatoo

Baudin's Black-Cockatoo is classified as Vulnerable under both the EPBC Act and the W.A. Wildlife Conservation Act, and Near Threatened by Garnett and Crowley (2000). The main threats to the species have been habitat loss through land-clearing for agriculture, whilst illegal shooting continues to affect the population (Garnett and Crowley, 2000). It is largely confined to eucalypt forests of the South-West. A small group including at least one young bird from the 2002 breeding season was present during the site inspection. Nest hollows used by this species may be present in some of the large Marri on the property.

2.8.7.2 Conservation Significance Level 2

Ixobrychus flavicollis

Black Bittern (SW Pop.)

The south-western population of the Black Bittern is classified as Priority 2 by CALM, whilst on a national level Garnett and Crowley (2000) consider the species to be of Least Concern. The main threats to the species are considered to be salinisation of waterbodies, drainage of wetlands and clearance of riparian and wetland vegetation (Garnett and Crowley 2000). It favours large trees alongside lakes and rivers, and the watercourse in the south of the property may provide suitable habitat, although this was small in area and probably of marginal value for the species.

Calyptorhynchus banksii naso

Forest Red-tailed Black Cockatoo

The Forest Red-tailed Black Cockatoo is classified as Priority 3 by CALM and Near Threatened by Garnett and Crowley (2000). The main threats to the species are considered to be the loss of habitat from land-clearance for agriculture and the preferential logging of the species' preferred nesting trees (Garnett and Crowley 2000). It is probably a regular visitor to the project area and may nest in large tree hollows on the site.

Ninox connivens connivens

Barking Owl (southern)

The Barking Owl (southern) is classified as Priority 2 by CALM and Near Threatened by Garnett and Crowley (2000). The main threats to the species are considered to be loss of habitat from land-clearance for agriculture and forestry practices that reduce the number of nesting and roosting hollows

available for the species (Garnett and Crowley 2000). In some parts of its range, the Barking Owl is associated with forests around wetlands. Although infrequently recorded in the South-West, the Flooded Gums and Freshwater Paperbarks along the watercourse appeared to be suitable for it.

Tyto novaehollandiae novaehollandiae Masked Owl (southern)

The Masked Owl (southern) is classified as Priority 3 by CALM and Near Threatened by Garnett and Crowley (2000). Although loss of habitat through land-clearing for agriculture has had a significant impact on the population, the reason for continued population decline is unknown (Garnett and Crowley, 2000). In the South-West, it is commonly associated with tall eucalypt woodland, such as Tuart *Eucalyptus gomphocephala*. While tall eucalypts were not a feature of the site, there were areas of eucalypt woodland that may have been suitable for the species.

2.8.7.3 Conservation Significance Level 3.

Eopsaltria griseogularis Western Yellow Robin

The Western Yellow Robin is not recognised under legislation or conservation lists, but it has declined in abundance across much of its range in the Wheatbelt (Robinson and Traill 1996). There appears to be a population in remnant vegetation from Bunbury to Dunsborough, and the species was seen along the route of the proposed road into the development area.

2.8.8 Mammals

Thirty mammal species may be present on site, of which seven are introduced. Five species were observed during the site inspection (Appendix D – Table 4). A number of additional mammal species are considered to be locally extinct (Appendix D - Table 5).

Most of the mammals rely on native vegetation although the Grey Kangaroo, Brush Wallaby and some of the introduced species will utilise farmland. Some of the bats will also forage over open areas, but rely on tree hollows for shelter. Species of conservation significance are discussed in more detail below.

2.8.8.1 Conservation Significance Level 1.

Dasyurus geoffroii Chuditch

The Chuditch is classified as Vulnerable under both the EPBC Act and the WA Wildlife Conservation Act, and also by Maxwell *et al.* (1996). The main threat to the species is thought to be a loss of habitat productivity, resulting in a reduced food base for this carnivorous species. Other threats include increased competition and predation from introduced predators e.g. cats and foxes, hunting and poisoning (Maxwell *et al.* 1996).

Pseudocheirus occidentalis Nguara, Western Ringtail Possum

The Nguara is classified as Vulnerable under both the EPBC Act and the WA Wildlife Conservation Act, and also by Maxwell *et al.* (1996). The main threats to the species include predation by introduced predators, loss/alteration of habitat and changing fire regimes (Maxwell, 1996). It is

locally common around Dunsborough, and two dreys (nests) were found in the project area. Both were along the watercourse in the south of the property, one in a Peppermint and the other in a Freshwater Paperbark. The species is commonly associated with the Peppermint and the area of Peppermints along the watercourse would appear to be important for it.

2.8.8.2 Conservation Significance Level 2.

Phascogale tapoatafa tapoatafa

Brush-tailed Phascogale (southern)

The Brush-tailed Phascogale (southern) is classified as Priority 3 by CALM and Lower Risk (near threatened) by Maxwell *et al.* (1996). Current threats to the species include habitat loss/alteration, decline in availability of hollowing-bearing trees and predation by foxes and cats (Maxwell *et al.* 1996). The phascogale is locally common between Bunbury and Busselton (M. Bamford unpubl. data) and is very likely to be present in the study area.

Isodon obesulus fusciventer

Quenda, Southern Brown Bandicoot

The Quenda is classified as Priority 4 by CALM and Lower Risk (near threatened) by Maxwell *et al.* (1996). Current threats to the species includes fragmentation and loss of habitat and increased predation by introduced predators e.g. foxes, cats and dogs (Maxwell *et al.* 1996). The Quenda is often associated with dense vegetation around wetlands but also occurs in upland areas, particularly where there is dense understorey. Characteristic diggings of this species were found in upland areas on the property.

Macropus irma

Kwoora, Brush Wallaby

The Brush Wallaby is classified as Priority 4 by CALM and Lower Risk (near threatened) by Maxwell, *et al.* (1996). Maxwell *et al.* (1996) suggest that the current threats to the species include fox predation and illegal hunting. This species is very likely to be present in the study area.

Falsistrellus mackenziei

Western False Pipistrelle

The Western False Pipistrelle is classified as Priority 4 by CALM and Lower Risk (near threatened) by Duncan *et al.* (1999). The main threat to the species is habitat loss, predominantly through logging of forested areas (Duncan *et al.* 1999). The distribution of this species in the general region of the study area is not well known.

Hydromys chrysogaster

Rakali, Water Rat

The Rakali is classified as Priority 4 by CALM and although Lee (1995) classifies the species as whole as being secure, he recognises that the population in southwestern Australia has suffered a substantial decline. This decline is associated with a loss of habitat quality e.g. salinisation and clearance of riparian vegetation (Lee 1995). This is an aquatic species and it may be a seasonal visitor to the watercourse in the south of the property. However, the mouth of this watercourse at Eagle Bay was examined for tracks, and none was found.

2.9 CONSERVATION RESERVES

The conservation of significant flora and fauna, and regionally significant ecosystems is an important component, which affects development proposals. Aesthetic and property values are partly dependent on the retention of rare and endangered flora and fauna.

There are no System 1 reserves within the study area (EPA 1976). The Leeuwin-Naturaliste National Park lies to the west and stretches from Bunker Bay to Augusta, approximately 120 kilometres. The National Park is of considerable conservation and recreational value.

The Meelup Regional Park lies to the south east of site. There is a small corridor at the south of Eagle Bay townsite that connects the Meelup Regional Park to Location 580 and ultimately Lot 50 and the Leeuwin Naturaliste National Park.

2.10 ABORIGINAL HERITAGE

The protection and management of Aboriginal sites in Western Australia is administered by the Department of Indigenous Affairs in accordance with the Western Australian *Aboriginal Heritage Act 1972* as amended. The Department of Indigenous Affairs was consulted as to the possibility of any Aboriginal sites within the study area. No sites of Aboriginal significance occur within the site, however the results of this register search are presented in **Appendix D**.

The site has been held as private land for agricultural purposes for many years. A recognisance survey for potential Aboriginal heritage sites did not reveal any potential sites.

Table 5: Listed Aboriginal Heritage Sites within the Site

Site Reference	Category of Site	Site Type
5853 (Cape Naturaliste)	Archaeological	Artefacts, Midden/Scatter
5854 (Cape Naturaliste)	Archaeological	Artefacts, Midden/Scatter
15924 (Bunker Bay 08)	Archaeological	Artefacts

A targeted Aboriginal Heritage Survey carried out adjacent to the survey area by McDonald, Hales & Associates (2000) as part of a survey of a pipeline alignment from Dunsborough to Bunker Bay. The report recorded a potential Aboriginal Heritage site to the west of the site, in agricultural land however it was reported that the area had been disturbed and the significance of the site was difficult to determine. The only other Aboriginal Heritage site located along the alignment was south of Eagle Bay, along Naturaliste Terrace. A survey of part of the Jingarmup Brook did not identify any Aboriginal Heritages sites.

2.11 EUROPEAN HERITAGE

A search of the Heritage Council of Western Australia's inventory of listed heritage sites (2000) revealed no listed site within Lot 50 or Locations 1348 and 580. Visual inspection of the site confirmed no surface evidence of European heritage artefacts.

3. ENVIRONMENTAL IMPACTS AND MANAGEMENT

3.1 LAND CAPABILITY

3.1.1 Soils

The land capability characteristics of the landform soil units of the site have been described by Tille and Lantzke (1990). In assessing land capability, the study considers both the effect of land on the proposed use and the effect of that use on the land. A land capability rating is determined whereby land rated Class I has a very high capability for a proposed activity ranging through to land rated as Class V, which has a very poor capability for a particular land use. The land capability class is determined by the most limiting factor. Within the Shire of Busselton there is an impetus to not develop land with high agricultural capability. In land capability mapping data provided by the Shire of Busselton, more than 60% of the entire site is rated as prime agricultural land. It is assumed that this is not a major limitation as the Shire of Busselton has approved the rezoning of the area to "Rural Residential".

In terms of rural residential blocks, all soil types on site had moderate limitations such a flood potential and steep slopes for road access. Consideration of such limitations can ensure that no detrimental effects occur to local population and the environment. It is recommended that areas prone to flooding (**Figure 3**) are not developed and reserved as recreational areas or Public Open Space (POS).

3.1.2 Erosion

The site does not display any visible indications of water or wind erosion and there is no visible indication of slope instability. Minimising clearing, revegetation and sustainable stormwater handling can diminish potential limitation.

The site is sheltered from the prevailing south westerly winds and has little potential for wind erosion, however uncontrolled disturbance could lead to large-scale degradation. Tille and Lantzke (1990) detailed the erosion potential of the soil types on the site and determined that they do not possess any major erosional limitations. It is preferred that any clearing for development be structuralised within building envelopes and landowners encouraged to preserve and protect remaining remnant vegetation

3.1.3 Nutrients

Soils with a low Phosphorus Retention Index (PRI), such as deep sands and granite outcropping, have the potential to be a major contributor to increased nutrient levels in drainage lines and groundwater. Cowaramup Flats (C) and Wilyabrup Flat (Ww2) have moderate limitations with regard to effluent disposal. Potential nutrient sources include garden and on-site effluent systems.

It is preferable that any development on the site is connected to the reticulated sewer, however this option has not been widely supported by the residents of Eagle Bay and the entire townsite conducts

on-site sewerage treatment. Alternative treatment units are recommended over traditional septic tanks and leech drains. Areas with granite outcropping should not be used with traditional septic tanks or leech drains as the impermeable layer is likely to encourage surface seepage of effluent.

Property owners should be educated on effects of garden nutrients on creeks and lakes to ensure that gardens do not adversely effect Jingarmup Brook or associated drainage lines. Native gardens, in keeping with surrounding vegetation should be encouraged.

3.2 JINGARMUP BROOK AND MINOR CREEKLINES

The site has three drainage lines, which generally run from west to east, down slope. Any development to the area should avoid Jingarmup Brook and the associated waterlogged/overflow areas. The smaller seasonal creekline which runs through the cleared area in Lot 50 does not possess such a restriction. It is possible that this creekline can run through lots in the north east without effecting either the natural flow or quality of land in the area. Building envelopes in the area should be located away from the creekline to prevent disturbance of the natural hydrological cycle and erosion and flood mitigation undertaken.

The Wetlands Conservation Policy for Western Australia (Government of Western Australia 1997) stated as one of its primary objectives "*to prevent the further loss or degradation of wetlands and wetland type, and promote wetland conservation, creation and restoration*". The EPA's advice on the Leeuwin-Naturaliste Ridge Planning Policy (EPA 1998) stated the importance of protection of significant water resources.

The Jingarmup Brook and vegetated creekline should be excluded from the development process and rehabilitated. These areas do not support a diverse native understorey but are of importance to the hydrology of the area and water quality. Jingarmup Brook supports a healthy population of Priority 4 flora species, *Eucalyptus rudis* subsp. *cratyantha*. A 50m buffer either side of Jingarmup Brook should be revegetated and fenced. An additional benefit of this practice is the protection of wildlife corridors to encourage and maintain native fauna in the area.

The potential for disruption to the natural hydrology of the area and nutrient import are the primary concerns. Disruptions to the surface hydrology and altered landuse can potentially bring about an increase in pollutant loads into surface of groundwater within the site, Jingarmup Brook and ultimately Eagle Bay. Currently a rudimentary dam on Jingarmup Brook slows flow and diverts under a track, adjacent to the southern boundary of Lot 50. For the construction of a sealed road, the dam area would require modification, potentially with a pipe and culvert allowing water to flow under the road without a conventional dam-style holding pond.

It is recommended that storm water runoff is not diverted to the existing drainage lines but is locally infiltrated to groundwater. The Water and Rivers Commission (1998) proposed best management practice manual for urban stormwater in *A Manual for Managing Urban Stormwater Quality in*

Western Australia. The practices outlined in this manual should be used to develop an environmentally sensitive stormwater strategy.

3.3 FLORA AND VEGETATION

Removal of natural vegetation can disrupt the water balance of landscapes, disrupt long established patterns of nutrient cycling, reduce habitat for native fauna, exacerbate land degradation and reduce visual amenity.

The site has a total area of 63 hectares. If the proposed subdivision in **Figure 1** is implemented, approximately 9.2 hectares of native vegetation will be cleared. Of the 9.2 hectares, 4.5 hectares occurs in vegetation in excellent condition, 1.2 hectares in very good condition vegetation, 1.2 hectares in good condition vegetation, 0.3 hectares in degraded condition vegetation and 1.7 hectares in completely degraded condition vegetation. The previous estimations assume a 1000 m² building envelope for each lot and take into account roads, right of ways, easements and other infrastructure. Clearing of native vegetation should be avoided outside of building envelopes to maintain existing stands of remnant vegetation where possible. Larger block sizes should be located within the areas of excellent vegetation condition to minimise disturbance. Smaller blocks should be located on disturbed and cleared areas.

Revegetation of disturbed and cleared areas, particularly the creekline, should be undertaken. It is suggested that a Rehabilitation Plan is completed for areas of limited potential for development such as Jingarmup Brook and flood prone areas and those already cleared (in accordance with the Meelup to Bunker Bay Structure Plan). The cleared area and Jingarmup Brook POS available for rehabilitation are approximately 4.2 hectares. The western boundary forms a 30 metre corridor of POS of 1.7 hectares however this area is not available for rehabilitation as it also forms part of the strategic firebreak network. Approximately 4.9 hectares of good and completely degraded vegetation is to be retained in the area in Location 1348 (zoned for Recreation) and could be included in the rehabilitation plan to achieve a no net loss of vegetation in the area.

No Declared Rare Flora (DRF) and one Priority Flora species was identified on site. This site has been subject to two flora and vegetation assessments over three years and it is considered that the vascular species list provided as Appendix A is representative of the area. Although 12 orchid species are found in the area, no species listed under the EPBC Act (1999) were located in the area.

One Priority 4 Flora species was recorded on site. *Eucalyptus rudis* subsp. *cratyantha* (P4) was identified in association with Jingarmup Brook, entering site from private property to the south (**Figure 6**). This area should not be developed to protect the presence of a Priority 4 flora species.

To help facilitate revegetation across the site, it would be beneficial to heighten community awareness of the value of native vegetation on rural and special rural lots. The community's awareness and use of the Soil and Land Conservation Act (1945-1982) and Remnant Vegetation Protection Scheme could also be heightened. This may be achieved in a number of ways, for example, through an information

day held on site by representatives of Agriculture WA and any local Landcare groups, or through the distribution of leaflets to the prospective landowners. This revegetation awareness programme could also be utilised to provide information on the wise use of water.

3.4 FAUNA

The study area has a substantially intact vertebrate fauna, which reflects the good quality of much of the available habitat, and the juxtaposition of reserves. The proposed development will inevitably result in some habitat loss, but consideration of a number of factors should minimise these impacts: Overall, Lot 50 Eagle Crescent lies between larger reserves and probably has a linkage function for wildlife. Maintenance of fauna habitats across the area will be important to protect that function.

The watercourse and associated vegetation in the south of the property is important for a number of species. The Western Ringtail Possum is of particular note and probably relies upon Peppermints that grow in sandy soil close to the watercourse. Disturbance along the watercourse should be minimised. Much of the watercourse should be held as Public Open Space, but available plans show the road into the subdivision going across the small dam. This dam supports some waterbirds and a small area of Freshwater Paperbark swamp.

As in some other areas of the Eagle Bay townsite, development within each lot that results from subdivision will most likely be restricted to a building envelope. While this retains much fauna habitat on each property, it increases the chance of gradual habitat deterioration due to weed invasion. It also relies on cooperation from landholders.

3.5 VISUAL AMENITY

Maintaining the landscape and visual appeal of the study area is important to the environmental stability of the area as well as providing an attraction to would-be purchasers of the lots. It is obvious from the site visit that the area is used by surrounding properties as a visual attraction with many balconies facing directly to site. It is expected that some opposition to the proposal will come from these stakeholders.

Rehabilitation strategies for areas of limited potential for development such as Jingarmup Brook and flood prone areas and those already cleared (in accordance with the Meelup to Bunker Bay Structure Plan) should be considered to further enhance and retain the amenity in the area, as well as provide natural habitat for local fauna and reduce potential problems associated with surface runoff.

Any buildings constructed on site should be of a scale, colour and material consistent with other developments, landscape features and any Shire direction. The traditional 30-50 metre buffer planting which normally surrounds Special Rural and residential developments is not recommended as the area is bordered by land reserved for recreation which will satisfy buffer requirements.

3.6 FIRE MANAGEMENT

Fire control in timbered country is a major consideration for any rural-residential development in the valleys or on the scarp. Clearing and cultivation for firebreaks predisposes steeper slopes (and areas subject to their runoff) to soil erosion.

Strategic firebreaks should be provided to the satisfaction of the Shire of Busselton. Access gates for these strategic firebreaks will also be provided, and it is recommended that provision of access from the subdivision into the adjoining property for fire fighting purposes also be developed. Management of the firebreak area should be controlled to ensure it does not encroach or disturb the POS reserve around the boundary. The proposal for a narrow strip of Public Open Space along the western boundary of the property may result in the gradual deterioration of that strip of habitat due to rubbish dumping and firebreak maintenance.

Other fire control provisions such as water supply and landowners education can be further developed in a Bushfire Management Plan as part of preliminary approval. This plan will be based on the boundary of the subject land but will also include fire management strategies for each of the proposed lots.

The plan would take into account the following:

- long term maintenance of access;
- strategic firebreak systems;
- water supply; and
- fuel reduction management.

The plan would also deal with identification or responsibility for funding and installing the various fire protection measures and long term maintenance of those measures.

3.7 FERAL ANIMALS

One maintained rabbit warren was located in the cleared area of Lot 50. No other evidence of feral animals was identified on site and is not expected to be a major issue.

Cats and other domestic pets will reduce the value of native vegetation on the private properties for fauna. If cats are kept on site as pets, it is recommended that pamphlets available from the Shire of Busselton called "Local Law on the Keeping and Welfare of cats" be offered to residents. The Shire of Busselton requires all cats to be registered and charges an increased registration fee to keep unsterilised animals. A \$50 voucher to subsidise sterilisation for cats is available from Shire offices on application. Voluntary cat curfews have widespread support among people who chose to live in a bushland setting and should be encouraged.

4. CONCLUSION AND RECOMMENDATIONS

The site presents a unique opportunity to protect the environmental values of the area while offering quality lifestyle rural residential blocks. Due to the nature of the site and its place in the landscape, there appears significant opportunity to accommodate innovative development which is sensitive and in keeping with the character of the area.

The following recommendations provide guidance as how specific constraints and opportunities could be addressed in a development context:

1. Where possible retain and protect all remnant vegetation on site.
2. Clearing should be restricted to designated building envelopes and designed to minimise disturbance to good condition vegetation.
3. Larger block sizes should be located within the areas of excellent vegetation condition to minimise disturbance.
4. Smaller blocks should be located on disturbed and cleared areas.
5. Revegetation of disturbed and cleared areas, particularly the creekline, should be undertaken.
6. Any development to the site should avoid Jingarmup Brook and seasonally waterlogged/overflow areas and a 50m revegetation buffer and fencing introduced.
7. Revegetation strategies for areas of limited potential for development such as Jingarmup Brook and flood prone areas and those already cleared (in accordance with the Meelup to Bunker Bay Structure Plan) should be considered to further enhance and retain the amenity in the area.
8. The development should be connected to reticulated sewer and mains water, if feasible.
9. If on-site effluent treatment is necessary, ATUs are preferable over conventional leach treatment.
10. Storm water runoff should not be diverted to the existing drainage lines but locally infiltrated to groundwater. Practices outlined in *A Manual for Managing Urban Stormwater Quality in Western Australia* (Water and Rivers 1998) should be used to develop an environmentally sensitive stormwater strategy.
11. Property owners should be educated on effects of garden nutrients on creeks and lakes to ensure that gardens do not adversely effect Jingarmup Brook or associated drainage lines.
12. Any buildings constructed on site should be of a scale, colour and material consistent with other developments and landscape features.
13. Native gardens, in keeping with surrounding vegetation should be encouraged on site.
14. Fire control and provisions for fire fighting such as water supply and landowner education should be developed in a Bushfire Management Plan as part of preliminary approval.
15. A pamphlet on domestic cat issues is available from the Shire of Busselton called "Local Law on the Keeping and Welfare of cats" should be offered to residents.

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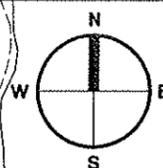
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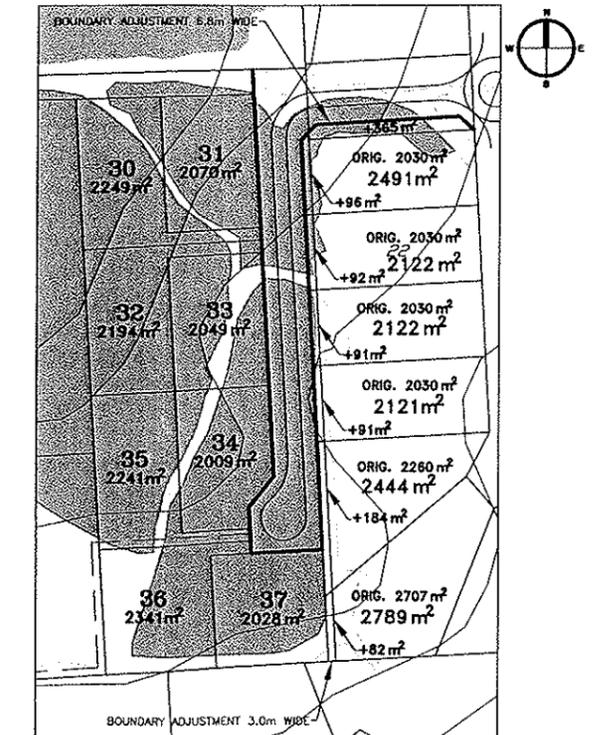
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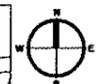


PLANNING POLICY STATEMENTS

1. This Development Guide Plan provides a framework for future subdivision and development of the land. Actual subdivision, which may vary from the Development Guide Plan, requires approval from the W.A. Planning Commission.
2. The Revegetation area will be planted with native species of a type and density to the satisfaction of the Shire of Busselton prior to the issue of clearances for the subdivision of the land.
3. This Development Guide Plan shall be read in conjunction with the Fire Management Plan adopted by Council for the land.
4. All buildings shall be limited to a maximum height of 7.5m, measured vertically from any point on a building to natural ground level.



INSET
EAGLE CRESCENT RESIDENTIAL PRECINCT
 SCALE 1:2000



Adopted by Council pursuant to Clause 85 of the Shire of Busselton District Town Planning Scheme No. 20, on
 (Date of Council Resolution) _____
 Chief Executive Officer _____

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT
LOT 50 EAGLE CRES, EAGLE BAY

DRAWING TITLE
DEVELOPMENT GUIDE PLAN

PRINCIPAL
EAGLE BAY JOINT VENTURE

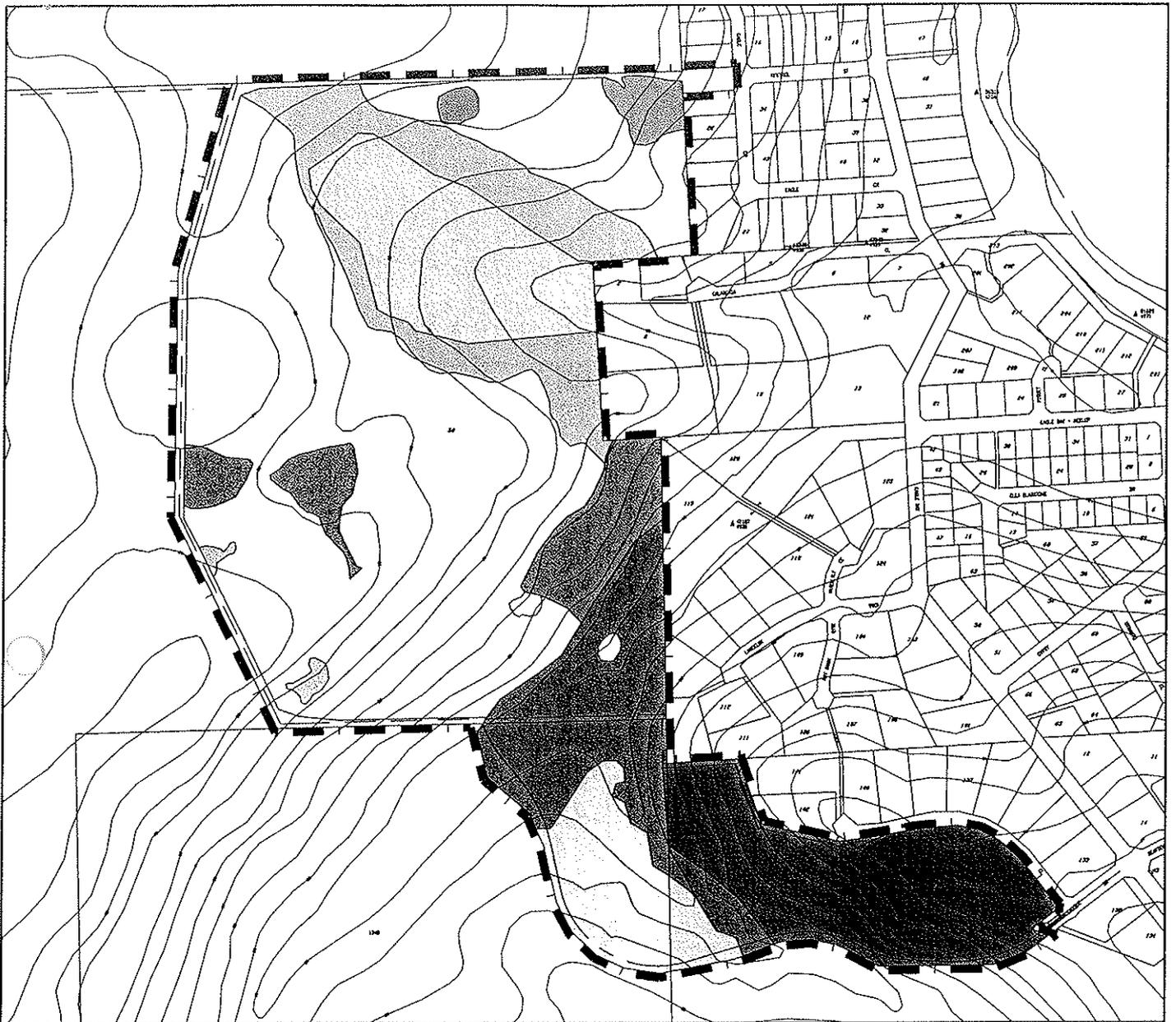
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Date 24.06.03 Scale 1:4,000
 Designed MJC Checked
 Drawn MJC Approved
 Local Authority SHEET OF
 SHIRE OF BUSSELTON
 Project Number Drawing Number Revision
 P03019 P708-C01



LEGEND

Vegetation Community 1 - *Eucalyptus* Forests and Woodlands

- 1a Low Open Forest of *Corymbia calophylla* and *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea preissii* and *Acacia pulchella* over *Hibbertia hypericoides* and *Burchardia umbellata* in sandy gravel.
- 1b Low Woodland of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Acacia pulchella*, *Hakea lissocarpha* and *Xanthorrhoea preissii* over *Hibbertia hypericoides*, *Calothamnus sanguineus* and *Chamaescilla corymbosa* in brown sandy clay loam.
- 1c Low Woodland of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Hakea trifurcata* and *Allocasuarina humilis* over *Calothamnus sanguineus*, *Hibbertia hypericoides* and *Dryandra lindleyana* subsp. *lindleyana* in brown sandy clay loam on granite outcropping.
- 1d Disturbed Low Woodland of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Acacia pulchella*, *Hakea lissocarpha* and *Xanthorrhoea preissii* over *Hibbertia hypericoides*, *Calothamnus sanguineus* and *Chamaescilla corymbosa* in brown sandy clay loam.

Site Boundary

Vegetation Community 2 - *Agonis* Forests

- 2a Low Open Forest of *Agonis flexuosa* var. *flexuosa*, *Corymbia calophylla* and *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea preissii* and *Acacia pulchella* over *Hibbertia hypericoides*, *Sowerbaea laxiflora* and pastoral weeds in grey sands.
- 2b Low Open Forest of *Agonis flexuosa* var. *flexuosa*, *Melaleuca raphiophylla* and *Eucalyptus rudis* subsp. *cratyantha* (P4) over *Juncus pallidus* and *Xanthorrhoea preissii* over **Zantedeschia aethiopicum* and pastoral weeds in brown sandy loam in association with watercourses.

Vegetation Community 3 - Mixed Shrublands

- 3a Open Heath of *Xanthorrhoea preissii*, *Hakea lissocarpha*, *Phyllanthus calycinus* and *Calothamnus sanguineus* over *Stylidium bulbiferum*, *Hovea trisperma* and *Burchardia umbellata* in red sandy clay soils on granite outcropping.
- 3b Open Heath of *Hakea trifurcata* with *Xanthorrhoea preissii* over *Hibbertia hypericoides* and *Stylidium bulbiferum* on granite outcropping.

Cleared Land

1:8000 0 80m 160 240 320 400 480 560 640 720 800

PROJECT **LOT 50 EAGLE CRESCENT, EAGLE BAY**

DRAWING TITLE **FIGURE 5: VEGETATION COMMUNITY MAP**

PRINCIPAL **EAGLE BAY JOINT VENTURE**

ORIGINAL **A4**

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Local Authority	Sheet 01
SHIRE OF BUBBELTON	
Project Number	Drawing Number
V03015	V168-SK09
	Revision



LEGEND

- | | | | |
|---|---------------|--|---------------------|
|  | PRISTINE |  | GOOD |
|  | EXCELLENT |  | DEGRADED |
|  | VERY GOOD |  | COMPLETELY DEGRADED |
|  | SITE BOUNDARY | | |

1:8000 

PROJECT **LOT 50 EAGLE CRESCENT, EAGLE BAY**

DRAWING TITLE **FIGURE 6: VEGETATION CONDITION MAP**

PRINCIPAL **EAGLE BAY JOINT VENTURE**

ORISIAL
A4

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Project Number **V03015** Drawing Number **V168-SK08** Revision

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Approved
Sheet Of

PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003



Photograph 1: Community 1a

Low Open Forest of *Corymbia calophylla* and *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea preissii* and *Acacia pulchella* over *Hibbertia hypericoides* and *Burchardia umbellata* in sandy gravel.



Photograph 2: Community 1b

Low Woodland of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Acacia pulchella*, *Hakea lissocarpa* and *Xanthorrhoea preissii* over *Hibbertia hypericoides*, *Calothamnus sanguineus* and *Chamaescilla corymbosa* in brown sandy clay loam.

PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003



Photograph 3: Community 1c

Low Woodland of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Hakea trifurcata* and *Allocasuarina humilis* over *Calothamnus sanguineus*, *Hibbertia hypericoides* and *Dryandra lindleyana* subsp. *lindleyana* in brown sandy clay loam with granite outcropping.



Photograph 4: Community 1d

Disturbed Low Woodland of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over *Acacia pulchella*, *Hakea lissocarpa* and *Xanthorrhoea preissii* over *Hibbertia hypericoides*, *Calothamnus sanguineus* and *Chamaescilla corymbosa* in brown sandy clay loam.

PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003



Photograph 5: Community 2a

Low Open Forest of *Agonis flexuosa* var. *flexuosa*, *Melaleuca raphiophylla* and *Eucalyptus rudis* subsp. *cratyantha* (P4) over *Juncus pallidus* and *Xanthorrhoea preissii* over **Zantedeschia aethiopica* and pastoral weeds in brown sandy loam in association with watercourses.



Photograph 6: Community 2b

Low Open Forest of *Agonis flexuosa* var. *flexuosa*, *Corymbia calophylla* and *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea preissii* and *Acacia pulchella* over *Hibbertia hypericoides*, *Sowerbaea laxiflora* and pastoral weeds in grey sands.

PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003



Photograph 7: Community 3a

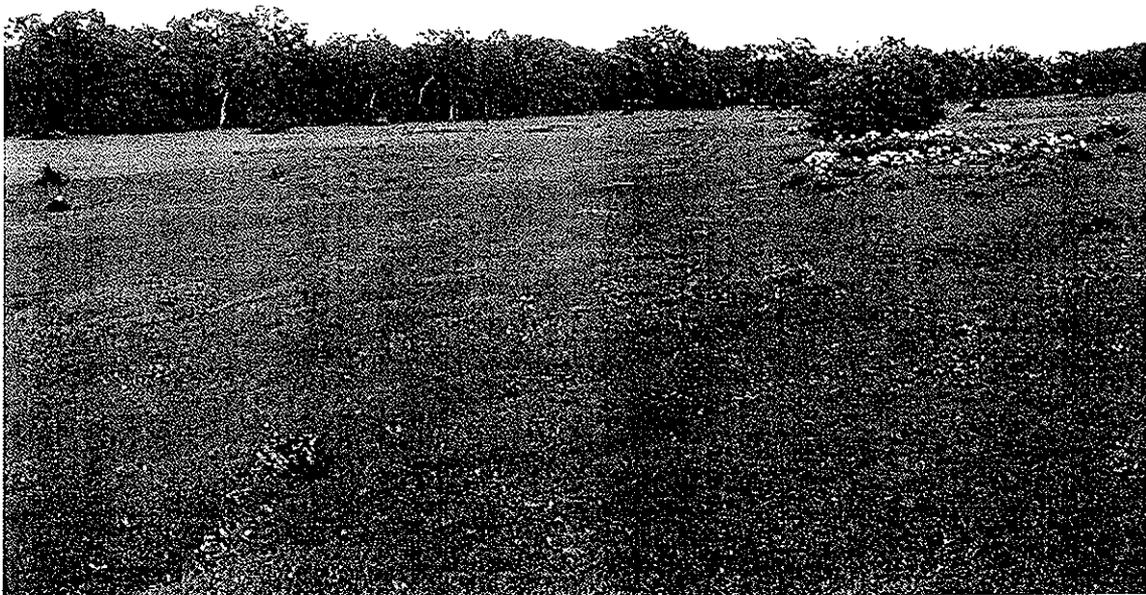
Open Heath of *Xanthorrhoea preissii*, *Hakea lissocarpha*, *Phyllanthus calycinus* and *Calothamnus sanguineus* over *Stylidium bulbiferum*, *Hovea trisperma* and *Burchardia umbellata* in red sandy clay soils with granite outcropping.



Photograph 8: Community 3b

Open Heath of *Hakea trifurcata* with *Xanthorrhoea preissii* over *Hibbertia hypericoides* and *Stylidium bulbiferum* on granite outcropping.

**PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003**



Photograph 9: Cleared Land



Photograph 10: Excellent Condition Vegetation

**PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003**



Photograph 11: Very Good Condition Vegetation



Photograph 12: Good Condition Vegetation

**PHOTO PLATES: PHOTOGRAPHIC RECORD OF COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003**



Photograph 13: Degraded Condition Vegetation.



Photograph 14: Completely Degraded Vegetation

APPENDIX A

**VASCULAR PLANT SPECIES RECORDED DURING SITE VISIT ON
SEPTEMBER 2003 AND ECOSCAPE (2000)**

APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT LOT 50 EAGLE CRESCENT
EAGLE BAY BY ECOSCAPE (Oct 2000) AND BSD CONSULTANTS (Sept 2003)

NB: * denotes introduced (weed) species

Family	Species	Ecoscape (2000)	BSD (2003)
ADIANTACEAE	<i>Cheilanthes austroenuifolia</i>	+	+
ANTHERICACEAE	<i>Agrostocrinum scabrum</i>	+	+
	<i>Caesia ?parviflora</i>	+	
	<i>Chamaescilla corymbosa</i>		+
	<i>Sowerbaea laxiflora</i>	+	+
	<i>Thysanotus manglesianus</i>		+
	<i>Thysanotus patersonii</i>	+	
	<i>Tricoryne elatior</i>	+	
APIACEAE	<i>Pentapeltis peltigera</i>	+	+
	<i>Platysace tenuissima</i>		+
	<i>Trachymene pilosa</i>	+	+
	<i>Xanthosia candida</i>	+	+
ARACEAE	* <i>Zantedeschia aethiopica</i>	+	+
ASTERACEAE	* <i>Arctotheca calendula</i>	+	+
	<i>Craspedia variabilis</i>		+
	<i>Hyalosperma simplex</i>		+
	* <i>Hypochoeris glabra</i>	+	+
	<i>Lagenophora huegelii</i>	+	+
	<i>Olearia axillaris</i>	+	
	<i>Trichocline spathulata</i>	+	+
BRASSICACEAE	* <i>Rorippa nasturtium-aquaticum</i>	+	
CARYOPHYLLACEAE	* <i>?Cersatium sp.</i>	+	
	* <i>Petrorhagia dubia</i>	+	
	* <i>Silene gallica</i>	+	
	* <i>Silene gallica</i> var. <i>quinquevulnea</i>	+	
CASUARINACEAE	<i>Allocasuarina humilis</i>		+
	<i>Allocasuarina sp.</i>	+	
CENTROLEPIDACEAE	? <i>Centrolepis sp.</i>	+	
COLCHICACEAE	<i>Burchardia umbellata</i>	+	+
		+	
CRASSULACEAE	<i>Crassula ?exserta</i>	+	
CYPERACEAE	? <i>Isolepis sp.</i>	+	
	<i>Juncus pallidus</i>	+	+
	<i>Lepidosperma leptostachyum</i>	+	
	<i>Lepidosperma squamatum</i>		+
	<i>Lepidosperma tenue</i>		+

APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT LOT 50 EAGLE CRESCENT
EAGLE BAY BY ECOSCAPE (Oct 2000) AND BSD CONSULTANTS (Sept 2003)

NB: * denotes introduced (weed) species

Family	Species	Ecoscope (2000)	BSD (2003)
GOODENIACEAE	<i>Dampiera alata</i>		+
	<i>Dampiera linearis</i>	+	+
	<i>Scaevola calliptera</i>	+	+
HAEMODORACEAE	<i>Anigozanthos humilis</i>	+	+
	<i>Anigozanthos manglesianus</i>		+
	<i>Conostylis ?setigera</i>	+	
	<i>Conostylis aculeata</i> subsp. <i>gracilis</i>		+
	<i>Conostylis setigera</i> subsp. <i>setigera</i>	+	+
	<i>Haemodorum discolor</i>	+	
	<i>Haemodorum</i> sp.	+	+
IRIDACEAE	* <i>Gladiolus caryophyllaceus</i>	+	
	<i>Patersonia occidentalis</i>	+	+
	<i>Patersonia umbrosa</i> var. <i>umbrosa</i>	+	+
	<i>Patersonia</i> sp.	+	
	* <i>Romulea rosea</i>		+
* <i>Watsonia</i> sp.		+	
LAURACEAE	<i>Cassytha</i> sp.	+	+
LOBELIACEAE	<i>Isotoma hypocrateriformis</i>	+	
LORANTHACEAE	<i>Nuytsia floribunda</i>	+	+
MIMOSACEAE	<i>Acacia alata</i>		+
	<i>Acacia nervosa</i>		+
	<i>Acacia pulchella</i>	+	+
	<i>Acacia</i> sp.	+	
MYRTACEAE	<i>Agonis flexuosa</i>	+	
	<i>Agonis flexuosa</i> var. <i>flexuosa</i>	+	+
	<i>Calothamnus ?sanguineus</i>	+	
	<i>Calothamnus sanguineus</i>		+
	<i>Corymbia calophylla</i>	+	+
	<i>Darwinia citriodora</i>		+
	<i>Eucalyptus marginata</i>	+	
	<i>Eucalyptus marginata</i> subsp. <i>marginata</i>		+
	<i>Eucalyptus rudis</i>	+	
	<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i> (P4)		+
	<i>Eucalyptus todiana</i>	+	
	<i>Hypocalymma angustifolium</i>		+
	<i>Hypocalymma robustum</i>	+	+
	<i>Melaleuca raphiophylla</i>	+	+
<i>Melaleuca</i> sp.	+		

APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT LOT 50 EAGLE CRESCENT
EAGLE BAY BY ECOSCAPE (Oct 2000) AND BSD CONSULTANTS (Sept 2003)

NB: * denotes introduced (weed) species

Family	Species	Ecoscape (2000)	BSD (2003)
PLANTAGINACEAE	* <i>Plantago lanceolata</i>	+	+
	* <i>Plantago</i> sp.	+	
POACEAE	* <i>Aira caryophylla</i>	+	
	<i>Austrodanthonia caespitosa</i>	+	
	<i>Austrostipa campylachne</i>		+
	<i>Austrostipa flavescens</i>	+	
	<i>Austrostipa</i> sp.	+	
	* <i>Briza maxima</i>	+	
	* <i>Briza minor</i>	+	
	* <i>Bromus</i> sp.	+	
	<i>Ehrharta longiflora</i>	+	
	<i>Neurachne alopecuroidea</i>	+	+
	<i>Tetrarrhena laevis</i>	+	
	Poaceae sp.		+
POLYGALACEAE	<i>Comesperma ?confertum</i>	+	
	<i>Comesperma ciliatum</i>	+	
	<i>Comesperma confertum</i>	+	+
	<i>Comesperma virgatum</i>	+	+
	* <i>Rumex</i> sp.	+	
PRIMULACEAE	* <i>Anagallis arvensis</i>	+	+
PROTEACEAE	<i>Adenanthos barbiger</i>	+	
	<i>Adenanthos obovatus</i>	+	+
	<i>Banksia grandis</i>	+	+
	<i>Dryandra bipinnatifida</i>	+	
	<i>Dryandra bipinnatifida</i> subsp. <i>bipinnatifida</i>		+
	<i>Dryandra lindleyana</i>	+	+
	<i>Dryandra lindleyana</i> subsp. <i>lindleyana</i>		+
	<i>Grevillea quercifolia</i>	+	+
	<i>Hakea amplexicaulis</i>	+	+
	<i>Hakea lissocarpa</i>	+	+
	<i>Hakea trifurcata</i>	+	+
	<i>Persoonia longifolia</i>	+	+
	<i>Petrophile linearis</i>	+	
	<i>Synaphea gracillima</i>	+	+
<i>Synaphea</i> sp.	+	+	
RANUNCULACEAE	<i>Clematis pubescens</i>	+	+
RESTIONACEAE	<i>Desmocladius fasciculatis</i>		+
RHAMNACEAE	<i>Cryptandra arbutiflora</i>		+
	<i>Cryptandra arbutiflora</i> var. <i>tubulosa</i>	+	

APPENDIX B

**VASCULAR PLANT SPECIES RECORDED IN VEGETATION
COMMUNITIES, LOT 50 EAGLE BAY – SEPTEMBER 2003**

APPENDIX B: VASCULAR PLANT SPECIES RECORDED IN VEGETATION COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003

NB: * denotes introduced (weed) species

Species	1a	1b	1c	1d	2a	2b	3a	3b
<i>Acacia alata</i>		+						
<i>Acacia nervosa</i>		+						
<i>Acacia pulchella</i>		+	+	+	+	+		
<i>Adenanthos obovatus</i>		+						
<i>Agonis flexuosa</i> var. <i>flexuosa</i>					+	+		
<i>Agrostocrinum scabrum</i>		+						
<i>Allocasuarina humilis</i>		+	+					
<i>Anagallis arvensis</i> var. <i>caerulea</i>	+			+				+
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>				+				
<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>		+						
* <i>Arctotheca calendula</i>					+			
<i>Astroloma ciliatum</i>		+						
<i>Astroloma pallidum</i>	+			+				
<i>Austrostipa campylachne</i>		+						
<i>Banksia grandis</i>		+						
<i>Bossiaea aquifolium</i>					+			
<i>Bossiaea eriocarpa</i>		+						
<i>Bossiaea linophylla</i>		+						+
<i>Bossiaea ornata</i>	+	+	+			+		
<i>Burchardia umbellata</i>	+			+		+	+	
<i>Caladenia flava</i> subsp. <i>flava</i>	+							
<i>Caladenia longicauda</i> subsp. <i>longicauda</i>		+						
<i>Caladenia macrostylis</i>	+	+						
<i>Calothamnus sanguineus</i>	+	+	+	+		+	+	
<i>Cassytha</i> sp.		+						
<i>Chamaescilla corymbosa</i>	+	+	+	+	+	+	+	
<i>Cheilanthes austrotenuifolia</i>					+			
<i>Chorizema aciculare</i> subsp. <i>aciculare</i>		+	+					+
<i>Chorizema ilicifolium</i>						+		
<i>Chorizema rhombeum</i>	+	+	+	+				
<i>Clematis pubescens</i>	+	+						
<i>Comesperma confertum</i>			+					
<i>Comesperma virgatum</i>				+				
<i>Conostylis aculeata</i> subsp. <i>gracilis</i>						+		
<i>Conostylis setigera</i> subsp. <i>setigera</i>	+	+	+	+				
<i>Corymbia calophylla</i>	+	+	+	+	+	+		
<i>Craspedia variabilis</i>		+		+				
<i>Cryptandra arbutiflora</i>		+	+		+			
<i>Dampiera alata</i>		+	+		+			
<i>Dampiera linearis</i>		+	+					
<i>Darwinia citriodora</i>		+						
<i>Daviesia angulata</i>		+		+			+	

APPENDIX B: VASCULAR PLANT SPECIES RECORDED IN VEGETATION COMMUNITIES,
LOT 50 EAGLE CRESCENT, SEPTEMBER 2003

NB: * denotes introduced (weed) species

Species	1a	1b	1c	1d	2a	2b	3a	3b
<i>Lepidosperma tenue</i>	+	+	+					
<i>Leucopogon capitellatus</i>	+	+		+			+	
<i>Leucopogon propinquus</i>	+	+		+		+		
<i>Lomandra ?micrantha</i>		+						
<i>Lomandra ?suaveolens</i>		+	+				+	
<i>Lomandra micrantha</i>	+						+	
<i>Lomandra nigricans</i>			+					
<i>Lomandra preissii</i>		+						
<i>Lomandra sericea</i>		+						
<i>Lomandra sonderi</i>		+	+				+	
<i>Lomandra sp.</i>			+					
<i>Macrozamia riedlei</i>	+	+		+	+	+		
<i>Melaleuca raphiophylla</i>					+			
<i>Mesomelaena tetragona</i>		+		+				
<i>Neurachne alopercuroidea</i>	+	+					+	
<i>Nuytsia floribunda</i>		+	+					
<i>Oligochaetochilus vittatus</i>	+	+		+				
<i>Opercularia echinocephala</i>				+				
<i>Opercularia hispidula</i>		+						
<i>Opercularia volubilis</i>		+						
Orchidaceae sp.	+							
Papilionaceae sp.		+						
<i>Patersonia occidentalis</i>		+				+		
<i>Patersonia umbrosa</i> var. <i>umbrosa</i>	+	+						
<i>Pentapeltis peltigera</i>	+	+		+				
<i>Persoonia longifolia</i>		+						
<i>Philothea spicata</i>		+	+					
<i>Phyllanthus calycinus</i>	+	+	+	+		+	+	
<i>Pimelea ferruginea</i>	+			+				
<i>Pimelea sp.</i>		+						
<i>Plantago lanceolata</i>	+	+			+			
<i>Platysace tenuissima</i>		+						
<i>Plumatichilos barbatus</i>		+						
Poaceae sp.	+	+				+		
* <i>Romulea rosea</i>	+							+
<i>Scaevola calliptera</i>	+	+		+				
* <i>Solanum linnaeanum</i>	+							
<i>Sollya fusiformis</i>		+						
<i>Sowerbaea laxiflora</i>				+		+		
<i>Spyridium globulosum</i>				+				
<i>Stylidium amoenum</i>		+						
<i>Stylidium bulbiferum</i>		+	+		+		+	+

APPENDIX C

**FAUNA OBSERVED OR LIKELY TO BE PRESENT AT LOT 50 EAGLE
CRESCENT (TABLES 1-5)**

Table 1. Frogs observed (+) or expected to be present at Lot 50 Eagle Crescent (see Methods for sources of information). Conservation status is indicated where applicable.

Species	25/08/'03	Cons. Status
Hylidae		
<i>Litoria adelaidensis</i>	Slender Tree-Frog	
<i>Litoria moorei</i>	Motorbike Frog	+
Myobatrachidae		
<i>Crinia georgiana</i>	Quacking Frog	+
<i>Crinia glauerti</i>	Glauert's Froglet	+
<i>Crinia insignifera</i>	Sandplain Froglet	
<i>Crinia pseudinsignifera</i>	Bleating Froglet	
<i>Geocrinia leai</i>	Lea's Frog	
<i>Heleioporus eyrei</i>	Moaning Frog	
<i>Heleioporus psammophilus</i>	Sand Frog	
<i>Limnodynastes dorsalis</i>	Banjo Frog	
<i>Pseudophryne guentheri</i>	Gunther's Toadlet	

Table 2 (cont.)

Species	25/08/03	Cons. status
Elapidae		
<i>Echiopsis curta</i> Bardick		
<i>Elapognathus coronatus</i> Crowned Snake		
<i>Elapognathus minor</i> Short-nosed Snake		CS3
<i>Notechis scutatus</i> Tiger Snake		
<i>Parasuta gouldii</i> Gould's Snake		
<i>Parasuta nigriceps</i>		
<i>Pseudonaja affinis</i> Dugite		
<i>Rhinoplocephalus bicolor</i> Square-nosed Snake		CS3

Table 3 (cont.)

Species	25/08/03	Cons. status
Falconidae		
<i>Falco berigora</i>	Brown Falcon	
<i>Falco longipennis</i>	Australian Hobby	
<i>Falco peregrinus</i>	Peregrine Falcon	CS1
<i>Falco cenchroides</i>	Nankeen Kestrel	
Rallidae		
<i>Gallirallus philippensis</i>	Buff-banded Rail	
<i>Porzana pusilla</i>	Baillon's Crake	
<i>Porzana fluminea</i>	Australian Spotted Crake	
<i>Porzana tabuensis</i>	Spotless Crake	
Turnicidae		
<i>Turnix varia</i>	Painted Button-quail	
Charadriidae		
<i>Vanellus tricolor</i>	Banded Lapwing	
<i>Elsayornis melanops</i>	Black-fronted Dotterel	
Columbidae		
<i>Phaps chalcoptera</i>	Common Bronzewing	
<i>Phaps elegans</i>	Brush Bronzewing	
<i>Ocyphaps lophotes</i>	Crested Pigeon	
Cacatuidae		
<i>Calyptorhynchus banksii</i>	Red-tailed Black-Cockatoo	CS2
<i>Calyptorhynchus latirostris</i>	Carnaby's Black-Cockatoo	CS1
<i>Calyptorhynchus baudinii</i>	Baudin's Black-Cockatoo	+ CS1
Psittacidae		
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	
<i>Platycercus icterotis</i>	Western Rosella	
<i>Polytelis anthopeplus</i>	Regent Parrot	
<i>Barnardius zonarius</i>	Australian Ringneck	+
<i>Purpureicephalus spurius</i>	Red-capped Parrot	+
<i>Neophema elegans</i>	Elegant Parrot	
Cuculidae		
<i>Cuculus pallidus</i>	Pallid Cuckoo	
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	
<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo	
<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo	+
Strigidae		
<i>Ninox connivens</i>	Barking Owl	CS2
<i>Ninox novaeseelandiae</i>	Southern Boobook	

Table 3 (cont.)

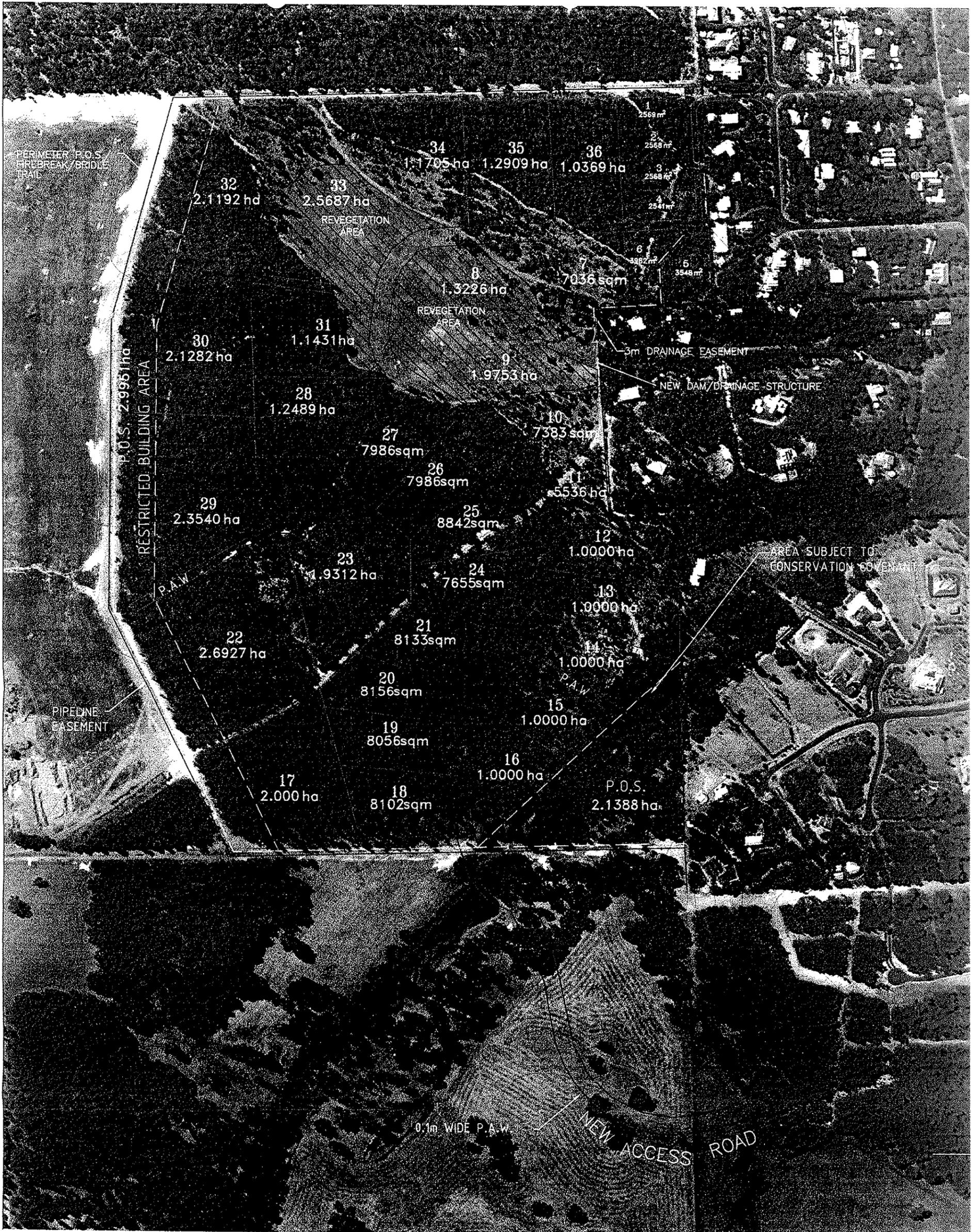
Species	25/08/03	Cons. status
Petroicidae		
<i>Petroica multicolor</i>	Scarlet Robin	
<i>Eopsaltria griseogularis</i>	Western Yellow Robin	+
<i>Eopsaltria georgiana</i>	White-breasted Robin	+
Neosittidae		
<i>Daphoenositta chrysoptera</i>	Varied Sittella	+
Pachycephalidae		
<i>Pachycephala pectoralis</i>	Golden Whistler	+
<i>Pachycephala rufiventris</i>	Rufous Whistler	
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	+
Dicruridae		
<i>Myiagra inquieta</i>	Restless Flycatcher	
<i>Grallina cyanoleuca</i>	Magpie-Lark	
<i>Rhipidura fuliginosa</i>	Grey Fantail	+
Dicruridae		
<i>Rhipidura leucophrys</i>	Willie Wagtail	
Campephagidae		
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-Shrike	+
<i>Lalage sueurii</i>	White-winged Triller	
Artamidae		
<i>Artamus cinereus</i>	Black-faced Woodswallow	
<i>Artamus cyanopterus</i>	Dusky Woodswallow	
<i>Cracticus torquatus</i>	Grey Butcherbird	
<i>Gymnorhina tibicen</i>	Australian Magpie	+
<i>Strepera versicolor</i>	Grey Currawong	
Corvidae		
<i>Corvus coronoides</i>	Australian Raven	+
Motacilidae		
<i>Anthus novaeseelandiae</i>	Richard's Pipit	
Passeridae		
<i>Stagonopleura oculata</i>	Red-eared Firetail	
Dicaeidae		
<i>Dicaeum hirundinaceum</i>	Mistletoebird	
Hirundinidae		
<i>Cheramoeca leucosternum</i>	White-backed Swallow	
<i>Hirundo neoxena</i>	Welcome Swallow	
<i>Hirundo nigricans</i>	Tree Martin	
Sylviidae		
<i>Cinclorhampus mathewsi</i>	Rufous Songlark	
<i>Cinclorhampus cruralis</i>	Brown Songlark	
Zosteropidae		
<i>Zosterops lateralis</i>	Silvereye	+

Table 4 (cont.)

Species	25/08/03	Cons. status
Muridae		
<i>Mus musculus</i> House Mouse		Int.
<i>Rattus fuscipes</i> Moodit, Bush Rat		
<i>Rattus norvegicus</i> Brown Rat		Int.
<i>Rattus rattus</i> Black Rat		Int.
Canidae		
<i>Vulpes vulpes</i> Fox		Int.
Felidae		
<i>Felis catus</i> Feral Cat		Int.
Leporidae		
<i>Oryctolagus cuniculus</i> Rabbit	+	Int.
Suidae		
<i>Sus scrofa</i> Feral Pig		Int.

APPENDIX D

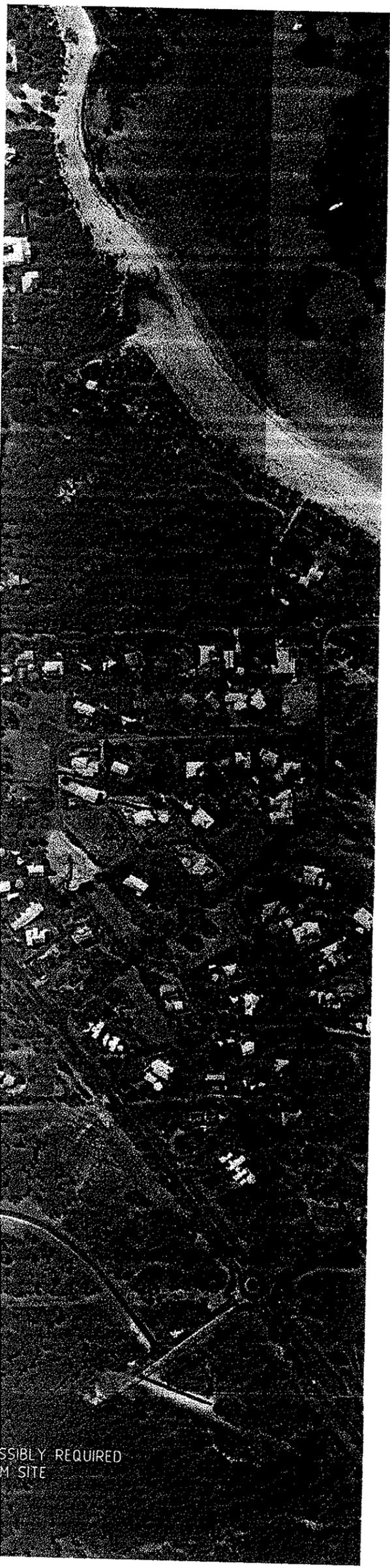
REVISED DEVELOPMENT GUIDE PLAN



DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT: EAGLE BAY RURAL RESIDENCE
DRAWING TITLE: DEVELOPMENT GUIDE PLAN
PRINCIPAL: EAGLE BAY JOINT VENTURE

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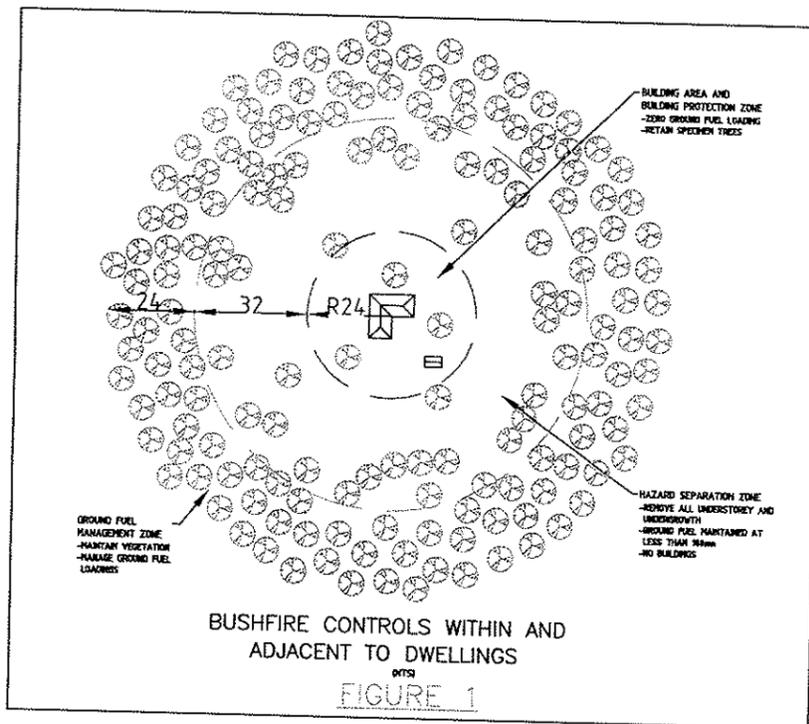
PLANNING POLICY STATEMENTS

1. This Development Guide Plan provides a framework for future subdivision and development of the land. Actual subdivision, which may vary from the Development Guide Plan, requires approval from the W.A. Planning Commission.
2. The Revegetation area will be planted with native species of a type and density to the satisfaction of the Shire of Busselton prior to the issue of clearances for the subdivision of the land.
3. This Development Guide Plan shall be read in conjunction with the Fire Management Plan adopted by Council for the land.
4. All buildings shall be limited to a maximum height of 7.5m, measured vertically from any point on a building to natural ground level.
5. No Buildings will be permitted in the Restricted Building Area.
6. The area to be subject to a Conservation Covenant will be fenced and revegetated (where necessary) with appropriate riparian vegetation and with a positive covenant placed on Lot titles as a protective mechanism to ensure that these works are maintained.
7. Effluent disposal to be handled via A.T.U systems appropriate to the locality.
8. The proposed new Dam / Drainage Structure is subject to detailed examination within a separate Development Application for consideration under the Dams Policy of the Shire of Busselton.

BUSHFIRE MANAGEMENT NOTES:

This plan incorporates a Bushfire Management Plan to be implemented to the satisfaction of the FESA and the Council. The plan represents minimum requirements. Proponents are to examine supplementary hazard reduction and fire suppressant strategies for consideration and approval by FESA and the Shire of Busselton, prior to the issue of Subdivision Approval.

- (a) Those dwellings constructed within vegetated areas will be protected by a perimeter hazard management regime as shown on Figure 1 below, and which is to be established prior to the occupation of the dwelling and thereafter maintained by the landowner.
- (b) All Strategic Firebreaks are to be located within a minimum 8 metre wide PAW and are to consist of a 4 metre wide 2 wheel drive trafficable surface within a 6 metre wide cleared corridor and with vehicle passing bays at 200 metre intervals.
- (c) Fire Hydrants, connected to a reticulated water supply, are to be installed in all public roadways to the satisfaction of FESA and The Shire of Busselton.



DEVELOPMENT TABLE LOT 50 EAGLE CRES

DEVELOPMENT TABLE LOCATION 1348 & 580 CARNARVON CASTLE DVE

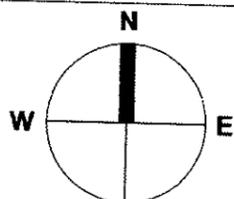
AT A2 1:4000 0 4.0m 80 120 160 200 240 280 320 360 400

NOTE - SOUTHEASTERN PORTION OF THE PLAN SUPPLIED BY KOLTASZ SMITH FOR MR. JOHN d'ESPEISSIS (LAND OWNER)

Adopted by Council pursuant to Clause 85 of the Shire of Busselton District Town Planning Scheme No. 20. on

(Date of Council Resolution)

Chief Executive Officer



ORIGINAL A2



**CONSULTING ENGINEERS
TOWN PLANNERS
PROJECT MANAGERS
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Facsimile (08) 9386 3831

Date 11.06.04	Scale 1 : 4,000
Designed JMR	Checked
Drawn JMR	Approved
Local Authority SHIRE OF BUSSELTON	Sheet 01
Project Number P03019	Drawing Number P708-C08
	Revision D