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# PRELIMINARY DOCUMENTATION

## ATTACHMENT J

## RESPONSE TO THE DEPARTMENT OF AGRICULTURE, WATER AND THE ENVIRONMENT REF: 2020/8704 (28 JULY 2020)

[redacted]

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28 July 2020

**Re: Response to the Department of Agriculture, Water and the Environment requesting additional information (referral: 2020/8704).**

[redacted]

I have reviewed the requested information in relation to threatened ecological communities, threatened species, and indigenous heritage, which was received via email on 20th July 2020. The information requested is reproduced below together with Ecoplanning responses. More detailed assessments for certain responses are attached to this letter. Where more detailed information has been provided in a previous submission to the Department, the relevant sections of the document(s) are cited herein for ease of reference.

The additional information on matters of national environmental significance (MNES) as listed in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially impacted by the 182 lot residential subdivision (the action) at Lot 172 // DP 755923 & Lot 823 DP // 247285, Berringer and Cunjurong Point Roads, Manyana (the site) is as follows:

*Threatened ecological communities*

From review of your referral and MNES report and documents previously provided to the Department in 2017/2018, there is uncertainty about whether two EPBC-listed TECs are located on site: Illawarra and South Coast Lowland Forest and Woodland and Littoral Rainforest and Coastal Vine Thickets of Eastern Australia.

Can you please advise:

- Have there been any other surveys of the vegetation communities onsite other than those undertaken in 2004? if so please provide details of survey methods and effort, including whether the area has been classified into plant community types (PCTs) and whether plot data has been recorded.

*Bangalay Paperbark Woodland* and *Northern Coastal Sands Shrub/Fern Forest*

Two BioBanking Assessment Methodology (BBAM) vegetation plots were completed on 6th May 2020, one within the Bangalay Paperbark Woodland and one in the Northern Coastal Sands Shrub/Fern Forest. Both plots are in the retained Bushland Reserve. The intent of these plots is to provide a baseline for monitoring vegetation condition within the Bushland Reserve following development. An additional two BBAM plots were completed off site in similar vegetation on 7th

May. The two additional plots are control plots for comparison against the plots in the Bushland Reserve.

Plot data for these vegetation communities has not been used for PCT classification, however, confirms the accuracy of the BES (2006) vegetation community descriptions. Refer to **Attachment 1** for the location of BBAM plots on site.

*Bangalay Moist Woodland/Open Forest*

Random meander vegetation surveys were undertaken within the Bangalay Moist Woodland/Open Forest (BMWOF). Surveys in this vegetation community aimed to confirm the vegetation community description found in Section 3.3.2 of BES (2006). Surveys confirmed that the BMWOF is a open woodland formation, as opposed to a closed rainforest with scattered emergents, and has likely been burned on an intermittent basis prior to the 1990s but has been subject to anthropogenic fire suppression to the present date, which has resulted in an increased component of hardier mesic species in the mid-storey such as *Acmena smithii* and *Pittosporum undulatum*.

BES (2006) recorded *Acacia parramattensis* (Parramatta Green Wattle) and *Acacia mearnsii* (Black Wattle) in the BMWOF. Both are short-lived 'pioneer' species with germination stimulated by fire. Senescing individuals of these trees were observed throughout the BMWOF during Ecoplanning surveys – stags, trees with dead or mostly dead canopies, as well as a few live trees which are now growing amongst dense mats of vines and mesic understorey species. The senescing *Acacia mearnsii* are estimated to be approximately 20 to 30 years old. This is consistent with BES (2006) observation that a fire had gone through the area seven years previously, so in the late 1990s. The area was likely burnt on a more regular basis prior to that time (and prior to residential development in adjacent parts of Manyana) and therefore may have displayed fewer mesic or rainforest components historically. Anthropogenic fire suppression in the period from the late 1990s to the present date, as noted and described in detail in Section 3.3.2 of BES (2006), is consistent with the condition of the BMWOF observed by Ecoplanning.

Vegetation plots were undertaken in this community by BES (2006) and the random meander surveys carried out by Ecoplanning in May-June 2020 were considered sufficient to confirm the accuracy of BES (2006) mapping to the present date. Fire suppression appears to be the dominant influence driving vegetation succession towards more mesic species in this area.

- To date, has there been any targeted survey effort undertaken to identify EPBC listed ecological communities that have the potential to occur onsite including reference to the TEC description(s) and the Key Diagnostic Characteristics.

Random meander surveys were conducted within the Bangalay Moist Woodland/ Open Forest and aimed to confirm the vegetation community description found in BES (2006). An assessment of this vegetation community with reference to the TEC description and Key Diagnostic Characteristics is found in **Attachment 3**.

Random meander surveys throughout the site are sufficient to confirm earlier assessments with regard to Illawarra and South Coast Lowland Forest and Woodland. More detailed discussion of this vegetation community including reference to the TEC description and Key Diagnostic Characteristics can be found on pp. 2–5 of *Response to the Department of the Environment and Energy requesting additional information regarding EPBC Act application to the 182 lot residential*

*subdivision at Berringer and Cunjurong Point Roads, Manyana* letter dated 27 July 2018 and supplied to the Department with the referral submission.

- Koala. Please provide information on the presence and extent of occurrence of Koala feed trees onsite.

DoPIE (2019) *Koala habitat and feed trees* and DECC (2008) *Recovery Plan for the Koala (Phascolarctos cinereus)*, which are referenced by DoE (2014) *EPBC Act referral guidelines for the vulnerable koala*, both list the same koala food trees for the South Coast region (Koala Management Area 3), of which only *Eucalyptus globoidea* is found on site. Table 3 of OEH (2018) *A review of Koala tree use across NSW* lists additional species used by koalas in the South Coast. Those which occur on site are *E. globoidea* (documented high use), *Angophora floribunda* (documented significant use), *Corymbia gummifera* (documented irregular use), *Allocasuarina littoralis* (documented low use), and *Acmena smithii* (documented low use). None of these species form a dominant component of the canopy on site (or greater than 15% of the canopy), apart from *Acmena smithii* which forms a closed midstorey in parts of the Bangalay Moist Woodland/ Open Forest. *E. globoidea* and *C. gummifera* are the most numerous, mostly occurring in the Northern Coastal Sands Shrub/Fern Forest.

- Regent honeyeater. Please provide information on the extent of potential habitat for the Regent Honeyeater onsite (i.e. occurrence of winter-flowering trees)?

Refer to **Attachment 1** showing the location of trees found to be in flower during the most recent survey period (May-June). The *National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia)* Section 3.4.5 lists key tree species, none of which occur on site. *Eucalyptus paniculata* (Grey Ironbark) is the only species considered to be 'winter-flowering' which occurs on site. Other Eucalypts on site have flowering phenology which may occasionally overlap with the winter months. Notably only *Eucalyptus globoidea* was observed in flower at the time of surveys, and this is not generally considered a 'winter-flowering' species (flowering time April-June (Robinson 2003)). *Eucalyptus paniculata* was recorded on site by BES (2006) in Northern Coastal Sands Shrub/Fern Forest and Bangalay Moist Woodland/Open Forest, and Ecoplanning confirmed presence in these areas during surveys for Swift Parrot habitat. BES (2006) notes that *E. paniculata* is a minor component of the canopy of both these communities, and elsewhere notes that it is not abundant on site. Ecoplanning surveys confirmed a widely scattered occurrence, with most individuals found in the transition zone between the two communities.

The flowering period of all Eucalypts found on site is listed in Table 9.1 of the MNES report (Ecoplanning 2020). Note the discussion below regarding the misidentification of *Eucalyptus robusta*.

- GHFF and Swift parrot. The MNES report states that Eucalyptus robusta may occur on site in low numbers but that this species was not found in previous or recent surveys. However, the Flora and Fauna Management Plan states that the sub-canopy of the Bangalay Paperbark Woodland vegetation community in the referral area is dominated by E. robusta. Please clarify whether or not E. robusta is present

*Eucalyptus robusta* is not present on site. The trees which are dominant in the sub-canopy of the Bangalay Paperbark Woodland are *Eucalyptus botryoides* and/or *Eucalyptus saligna* x *botryoides* hybrids with a more dominant expression of the *E. botryoides* phenotype. NSW PlantNET notes the following in relation to *Eucalyptus saligna*:

*'All populations south of Port Jackson show some genetic influence from E. botryoides, typically manifested as a scattering of stomates on the upper surface of the leaves (leaves of E. saligna have the stomates more strictly confined to the lower surface with stomates on the upper surface only along the midrib) and some rough bark. Local introgression of these populations with E. botryoides has also produced a number of more recent hybrid swarms. Plants with the general appearance of E. saligna extend as far south as Batemans Bay, then becoming more like E. botryoides south into East Gippsland in Victoria.'*

The site is within the range of the hybrid swarm of these species. The hybrids are known to vary widely in many characters. The trees which the MNES report states are '*possible mis-identification of E. botryoides*' are in fact *E. saligna* x *botryoides* hybrids, with the following characters observed in the field:

- Full, thick, spongy bark on the trunk and main limbs
- Smooth bark on only the smaller outer branches
- Broad-lanceolate leaves
- Fruits large (ca. 8-10mm) and shortly pedicellate

The identification of *E. robusta* from the Flora and Fauna Management Plan (FFMP) is likely to have been made based on the hybrid *E. saligna* x *botryoides* specimens on site having broad-lanceolate leaves, rough, fibrous, flaky bark extending to the outermost branches, and shortly pedicellate fruits. The outermost branches are bare on specimens found on site, but this is only apparent when viewed through binoculars. Fruits of the *E. saligna* x *botryoides* found on site are large and pedicellate. The fruits are larger (ca. 8-10mm) but still within the recorded dimensions of both *E. botryoides* (7-12mm x 5-9mm) and *E. robusta* (10-18mm x 6-11mm). Fruits are also shortly pedicellate (*E. robusta* is generally shortly pedicellate; *E. botryoides* is generally sessile). *E. saligna* x *botryoides* are shortly pedicellate (Harden 1991). Therefore, superficial observations of the bark and leaves and the large, pedicellate fruits of trees found on site could have been mistaken for diagnostic characteristics of *Eucalyptus robusta*.

Section 3.3.3 of BES (2006) notes the absence of Swamp Mahogany:

*'However the paperbarks occur as a sub-canopy beneath Bangalay and there is no Swamp Mahogany Eucalyptus robusta. The substrate is clayey rather than the sands usually associated with Swamp Mahogany – Paperbark Forest.'*

Ecoplanning's May-June 2020 surveys for winter flowering Eucalypt species confirm the accuracy of BES (2006) and the erroneous *E. robusta* record in the FFMP. The MNES report used a precautionary approach when stating that *E. robusta* may occur on site based on the FFMP record, as comprehensive searches for *E. robusta* were carried out only in suitable habitat (the Bangalay Paperbark Woodland) however were not undertaken throughout the entire site.

- Leafless Tongue-orchid. Please provide an updated assessment of significance for this species. We note that the Leafless Tongue-orchid has been ruled out based on survey conducted in 2005, when the nearby population 'appeared to be in lower abundance' during the 2004/5 season which is when the surveys were undertaken (other orchids and flora species that may occur are not discussed in documentation). We note also that the local population is 1150 m from site.

An updated assessment of significance has been provided as **Attachment 4**.

- Large-eared Pied Bat. Please provide information on the presence of potential roosting habitat for the Large-eared Pied Bat (i.e. sandstone cliff/escarpments) within close proximity of the site.

Refer to **Attachment 2** which shows the nearest escarpments approximately 14 kilometres west of the site near Pointer Gap. Aerial imagery (Nearmap) and finer contour layers (10m contour intervals) were also used to assess proximity of escarpments. **Attachment 2** accurately displays the location of the nearest sandstone cliffs/ escarpments.

No other areas of potential roosting habitat are found in close proximity to the site.

- Green and Golden Bell Frog. Please provide an updated assessment of significance for this species. We note that 7 records for the species occur within 5 km of site and that species or species habitat known is known to occur in the development area.

An assessment against Significant impact guidelines for the vulnerable green and golden bell frog (Litoria aurea) (DEWHA 2009) and Matters of National Environmental Significance Significant impact guidelines 1.1 (DoE 2011) are provided in **Attachment 5**.

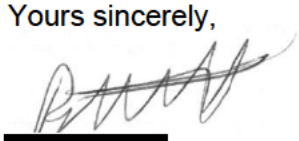
*Indigenous heritage*

- Please send through a copy of the Cultural Heritage Management Plan prepared for the site, as well as any information on recent consultation with indigenous groups undertaken since the environmental assessment?

Refer to **Attachment 6** Cultural Heritage Management Plan and details of recent consultation with indigenous groups.

Please don't hesitate to contact Lucas McKinnon or the undersigned should the Department require any further information.

Yours sincerely,



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## References

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Department of Environment (DoE) (2013). Matters of National Environmental Significance Significant impact guidelines 1.1 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

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PlantNET (The NSW Plant Information Network System). Royal Botanic Gardens and Domain Trust, Sydney. Accessed July 2020

Robinson, Les (2003) Field Guide to the Native Plants of Sydney Third Edition.

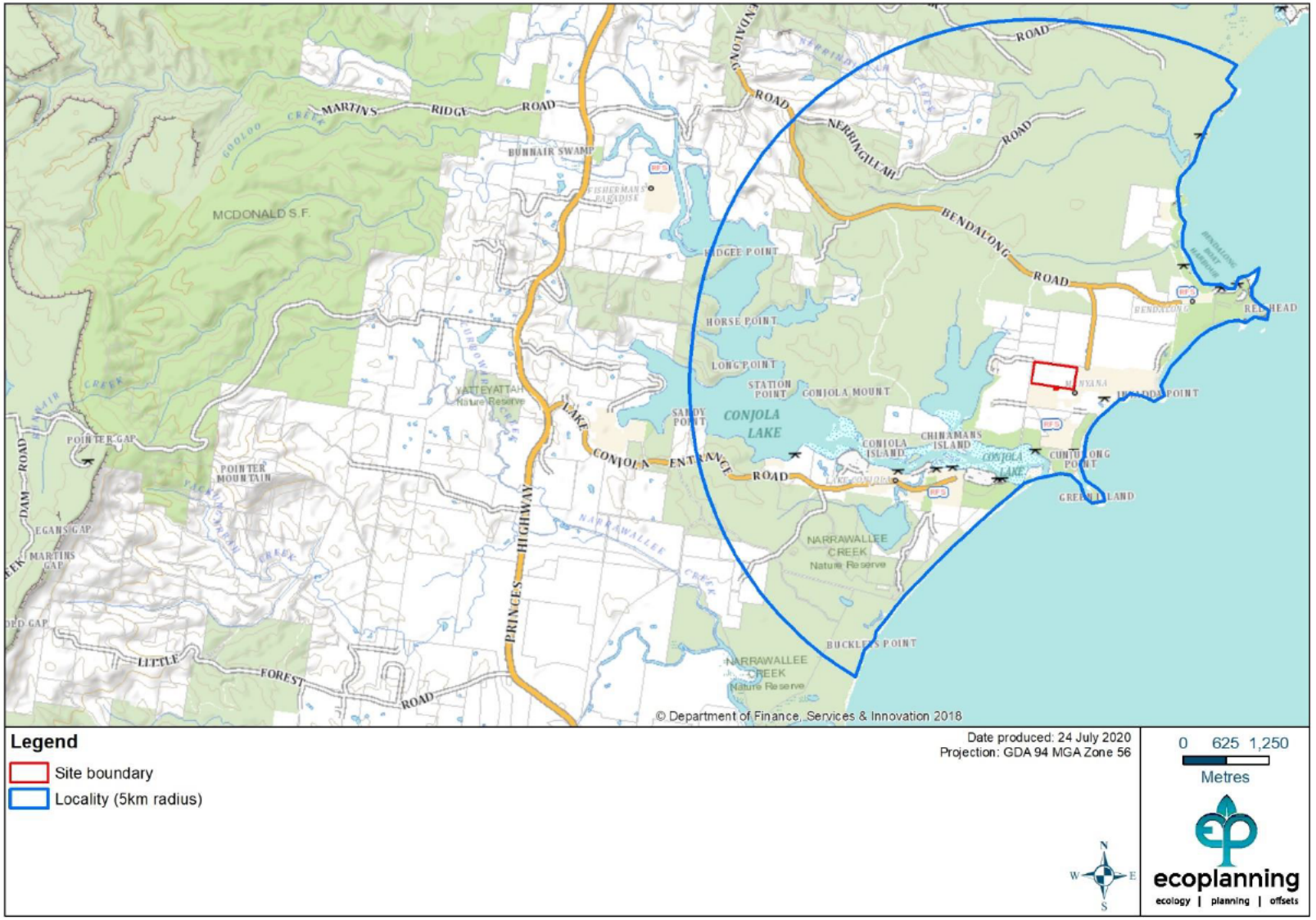
Sivertsen, D (2009). Native Vegetation Interim Type Standard. Department of Environment, Climate Change and Water NSW, Sydney.

Threatened Species Scientific Committee (TSSC) (2008a). Commonwealth Listing Advice on Littoral Rainforest and Coastal Vine Thickets of Eastern Australia. Department of the Environment, Water, Heritage and the Arts.

Threatened Species Scientific Committee (TSSC) (2008b). Attachments A, B and C to the Listing Advice for the Littoral Rainforest & Coastal Vine Thickets ecological community. Department of the Environment, Water, Heritage and the Arts.

## Attachment 1: Vegetation plots and eucalypts in flower

## Attachment 2: Escarpments



**Attachment 3: Littoral Rainforest and Coastal Vine Thickets of Eastern Australia**

| **To date, has there been any targeted survey effort undertaken to identify EPBC listed ecological communities that have the potential to occur onsite including reference to the TEC description(s) and the Key Diagnostic Characteristics.** | |
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| **Conservation advice (DoE 2015)** | **Response in relation to the study area** |
| When making a determination as to whether the nationally listed Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community is present at a particular site, the 'Description' (including the 'General Features' and 'Key Diagnostic Characteristics') and 'Condition Thresholds' of the listed ecological community as outlined in the Listing Advice (TSSC 2008a) must be used as the primary factor for determination rather than any other classification system | The three ecological communities in the study area described by BES (2006) were confirmed during targeted MNES surveys in May-June 2020. Descriptions include floristics and soil characteristics.<br>The Bangalay Moist Woodland/ Open Forest (BMWOF) found in the northeast corner of the site has been discussed below with relation to the 'Description' and 'Condition Thresholds' as required in the Listing advice (TSSC 2008a).<br>Only Bangalay Moist Woodland/ Open Forest is discussed in relation to these criteria as the remainder of the site is either a dry sclerophyll forest community (the Coastal Sands Shrub/Fern Forest (BES 2006)) or has been previously assessed and found to be commensurate with *Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (the Bangalay Paperbark Woodland (BES 2006)) and is not commensurate with an EPBC Act listed ecological community. |
| **Listing advice (TSSC 2008a)** | **Response in relation to the study area** |
| *General Features (page 1-2)* | |
| The ecological community represents a complex of rainforest and coastal vine thickets, including some that are deciduous, on the east coast of Australia. Typically, the ecological community occurs within two kilometres of the coast or adjacent to a large saltwater body, such as an estuary and, thus, is influenced by the sea. | The site is within two kilometres of the coast, but is not adjacent to a saltwater body (approximately 600m at closest point) and is in a relatively sheltered position in an area of low coastal hills.<br>Refer to *Key diagnostic characteristics* below for further detail. |

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| It is naturally distributed as a series of disjunct and localised stands occurring on a range of landforms derived from coastal processes that can include dunes and flats, cheniers, berms, cobbles, headlands, scree, seacliffs, marginal bluffs, spits, deltaic deposits, coral rubble and islands. As a result, the ecological community is not associated with a particular soil type and can occur on a variety of geological substrata. | The landform of the site is not derived from coastal processes. Sandy soils derived from Tertiary sediments predominate over the site, and not sands derived from coastal processes such as marine or estuary derived fluvial or aeolian deposits. Notably, the far northeast corner of the site contains an area of more fertile, weathered reddish-brown soils, likely a small igneous intrusion. Generally, the landform of the site is a result of weathering Tertiary sandy or red loamy soils.<br>Shoalhaven 1:100 000 Coastal Quaternary Geology Map was used as a reference. It is noted that this large scale mapping does not capture the smaller scale variability found on site and ground-truthing was used to verify mapping. |
| The ecological community occurs from Princess Charlotte Bay, Cape York Peninsula to the Gippsland Lakes in Victoria as well as on offshore islands on the east coast. The latitudinal range where the ecological community occurs encompasses warm temperate, sub-tropical and tropical climate zones. In terms of temperature and humidity, the climate is more equable than sites further inland. | The site occurs within this geographic range in a warm temperate climate zone. The climate is moderated by proximity to the ocean.<br>The site does not occur in an area of mapped by DEWHA (2008) or the NSW SEPP (Coastal Management) as Littoral Rainforest under either the state or Commonwealth definition. |
| The ecological community is defined by habitat expressed in terms of structure, floristic composition and ecology in response to coastal processes. The unifying feature of its habitat is the salinity, derived from the ecological community's proximity to the sea. Saline influence is delivered via aerosols, saline water-tables or occasional inundation. | *Structure*<br>The BMWOF is of a woodland/ open forest structure with patches of closed forest subcanopy in a mosaic with more open areas of dense groundcover bordered by dense mats of vines and creepers. This contrasts with a closed forest subcanopy beneath an emergent layer as found in a rainforest structure. The vegetation community formation is a woodland/ open forest with a canopy layer dominated by *Eucalyptus botryoides* (Bangalay) together with a mix of stringybark eucalypts, large, senescing acacias, and mesophyllous species such as *Alphitonia excelsa*. This open canopy layer is found above a mosaic of open areas dominated by dense, tall *Gahnia*, which are surrounded by mats of vines, which transition to patches dominated |

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| | hardier rainforest species such as *Acmena smithii* and *Pittosporum undulatum*.<br>*Floristic composition*<br>The floristic composition of the site consists of a depauperate assemblage of mesic species which often occur in rainforests. While it is noted that Littoral Rainforests decline in species diversity in more southerly areas, the species assemblage of the BMWOF is dominated by a small number of hardier species, notably *Acmena smithii* and *Pittosporum undulatum*, as well as very old (ca. 20 to 30 years) individuals of short-lived species which are indicative of burnt sites, such as *Acacia parramattensis* and *Acacia mearnsii*.<br>The floristic composition is discussed in further detail under *Key diagnostic criteria*.<br>*Coastal processes*<br>The dominant factor driving the mesic assemblage of the BMWOF is anthropogenic fire suppression. Notably, the site does not occur in a position where maritime influences would naturally suppress fire, is surrounded by regularly burnt sclerophyll forests and woodlands, and shows signs of historic fire events.<br>Also, the mosaic structure of dense groundcover – closed subcanopy is not a result of coastal processes such as wind shear and subsequent regeneration of rainforest gap species.<br>*Salinity*<br>There is no evidence of saline influence in the BMWOF. While the site is in close proximity to the ocean (approximately 700m at closest point), it lies in a sheltered, leeward position in the landscape in an area of low hills. No part of the site is subject to saline water-tables or occasional inundation, and only limited saline aerosols may reach the site. |
| Whilst the ecological community's canopy species are well adapted to | The vegetation community formation is an open forest/ woodland with a |

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| coastal exposure (e.g. strong and persistent salt-laden winds and storm events), the canopy protects less tolerant species and propagules in the understorey. The canopy height varies with the degree of exposure and can range from dwarf to medium (<1-25 m; Specht 1970). Due to extreme exposure to salt laden winds, the canopy often demonstrates a continuum of heights. Highly exposed patches will display the effect of windshear in the canopy. In more sheltered sites, for example, around estuaries, wind shear may not be evident in the canopy. | canopy layer dominated by Bangalay together with a mix of stringybark eucalypts, large, senescing Acacias, and mesophyllous species such as *Alphitonia excelsa*. This open canopy layer is found above a mosaic of open areas dominated by dense, tall *Gahnia*, which are surrounded by mats of vines, which transition to patches of closed, mesic mid-storey small trees. This variability in upper-stratum vegetation height is not a result of coastal exposure or windshear. The open canopy and fire suppression appears to have allowed mesic species to take hold, and notably in some areas tall stags and tall, senescing *Acacia mearnsii* trees are covered in vines and growing above a closed canopy of *Acmena smithii* and *Pittosporum undulatum* which appear to be in the process of out-competing these shorter-lived pioneer species. |
| The canopy is typically closed but may also be patchy and may include emergents. Those stands that occur in exposed coastal situations can have many rainforest gaps caused by storm events which, in turn, may lead to canopy decapitation. In these exposed sites, there is often a secondary canopy that has developed below the old canopy. | The open, Bangalay dominated canopy layer is too dense to be described as an emergent lager. Emergents are by definition isolated individuals which do not form a stratum or layer and are generally <5% crown cover (Sivertsen 2009). BES (2006) records a projective foliage cover of the *Eucalyptus* dominated canopy of 20-30%.<br>Large patches of closed-canopy mid-storey composed of mesic species are found beneath the open canopy layer.<br>Canopy gaps show no signs of storm damage and no canopy decapitation is evident. The closed mid-storey layer is not a secondary canopy established beneath a storm-damaged older canopy, and the site is not exposed to coastal effects which would result in these processes. |
| The diversity of plant taxa (particularly canopy species) generally declines in a north to south direction, i.e. with increasing latitude. However, species richness of adjacent patches may vary considerably within one latitudinal zone. | The Bangalay Moist Woodland/ Open Forest contains a depauperate assemblage of hardier rainforest species, such as *Acmena smithii, Pittosporum undulatum*, *Synoum glandulosum*, *Cissus hypoglauca*, and *Morinda jasminoides*, as noted in Section 3.3.2 and Section 4.5 of BES (2006). |

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| | A full species list is found in Table 4 Section 3.3.4 of BES (2006).<br>Refer to *Key diagnostic characteristics* below for further detail regarding species richness. |
| *Key diagnostic characteristics (page 2-3)* | |
| The ecological community occurs in the following IBRA bioregions: Cape York Peninsula (from Princess Charlotte Bay southwards), Wet Tropics, Central Mackay Coast, South Eastern Queensland, NSW North Coast, Sydney Basin and South East Corner. | The site fits this diagnostic feature.<br>The proposal is within the Jervis IBRA subregion of the Sydney Basin Bioregion. |
| Patches of the ecological community occur within two kilometres of the east coast, including offshore islands, or adjacent to a large body of salt water, such as an estuary, where they are subject to maritime influence. | The site **does not** fit this diagnostic feature.<br>The site is within 2km of the coast, but is not subject to maritime influence.<br>It is not adjacent to a large body of water or in a position such as a headland or dune system where maritime influences would predominate. |
| The structure of the ecological community typically is a closed canopy of trees that can be interspersed with canopy gaps that are common in exposed situations or with storm events. Usually, several vegetation strata are present. However, where there is extreme exposure to salt laden winds, these strata may merge into a height continuum rather than occurring as distinct vegetation layers. The canopy forms a mosaic due to canopy regeneration, typically in the form of basal coppice following canopy decapitation due to prevailing salt laden winds and storm events. Wind sheared canopy can be present on the frontal section leading to closed secondary canopies. Emergents may be present, for example, species from the genera *Araucaria* (northern bioregions only), *Banksia* or *Eucalyptus*. The ground stratum of the vegetation typically is very sparse. | The site **does not** fit this diagnostic feature.<br>The BMWOF has an open forest/ woodland structure (20-30% PFC (BES 2006)) with a closed canopy mid-storey occurring in some areas. Some canopy gaps exist where pioneer tree species are senescing (20-30 year old *Acacia* species). Some large gaps are occupied by more stable ground cover assemblages of the moist woodland landscape, such as open patches of dense *Gahnia* and other graminoids which appear to be excluding regeneration of canopy species in some areas. The site lies in a relatively sheltered position and the canopy or mid-storey gaps are not related to winds, storm events or canopy decapitation. While *Eucalyptus botryoides* forms the highest stratum, it occurs frequently enough to be classed as a woodland formation and not an emergent layer. The ground stratum is very dense in some patches, mostly *Gahnia*. |
| The ecological community contains a range of plant life forms including trees, shrubs, vines, herbs, ferns and epiphytes. To the north, most | The site **does not** fit this diagnostic feature. |

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| plant species diversity is in the tree and shrub (i.e. canopy) layers rather than in lower strata. The converse generally occurs from the Sydney Basin Bioregion southwards. Feather palms, fan palms, large leaved vascular epiphytes and species that exhibit buttressing are generally rare. Ground ferns and vascular epiphytes are lower in diversity in littoral rainforests compared to most other rainforest types. | The BMWOF contains large areas dominated by a few species, with much of the diversity accounted for by the mosaic of open groundcover, vine mats, and closed mid-storey areas resulting in some of the hardier rainforest small tree species dominating some areas, while other areas contain a dense groundcover not associated with rainforest, such as *Gahnia radula, Gahnia sieberana, Lepidosperma laterale, Lomandra longifolia* and *Carex longebrachiata*. A variety of vines and understorey species occur in the transition between these two extremes. |
| Plants with xeromorphic and succulent features are generally more common in littoral rainforest than in hinterland rainforest types. Canopy stem sizes also tend to be smaller compared to that in hinterland rainforest. Trunks rarely host mosses though lichens are usually common. | The site **does not** fit this diagnostic feature.<br>Xeromorphic and succulent species are not common in the BMWOF. The canopy contains many large Bangalays, as well as large, older individuals of *Acacia mearnsii* and *Acacia parramattensis*. |
| Whilst species can be regionally predictable, there may be considerable variation in the composition of individual stands of the ecological community within any given bioregion. Attachment A provides a list of flora species for each relevant bioregion. | The site fits this diagnostic feature.<br>Of the 32 species listed under Sydney Basin in Appendix A, the following 17 are found on site:<br>*Acmena smithii, Banksia integrifolia* subsp. *Integrifolia, Eucalyptus botryoides, Glochidion ferdinandi*, *Livistona australis, Pittosporum undulatum, Synoum glandulosum* subsp. *glandulosum, Pittosporum revolutum, Breynia oblongifolia, Notelaea longifolia, Cissus hypoglauca, Eustrephus latifolius, Geitonoplesium cymosum, Hibbertia scandens, Marsdenia rostrata, Parsonsia straminea,* and *Stephania japonica*.<br>Notably only a smaller subset of the area mapped as BMWOF contains a closed canopy, which is dominated by *Acmena smithii* and *Pittosporum undulatum* among a less diverse assemblage including *Stenocarpus salignus*, *Notelaea longifolia*, *Synoum glandulosum,* several *Gahnia* species, *Carex pendula*, *Psychotria loniceroides*, *Morinda jasminoides*, *Parsonsia straminea*, and *Cissus hypoglauca*. The remainder of the 17 diagnostic species listed |

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|---|---|
| | above occur in a mosaic of open patches, vine mats, and closed mid-storey beneath an open Bangalay dominated canopy. |
| *Condition Thresholds (page 3-4)* | |
| Small patches can be resilient and viable, but the minimum size of a patch needs to be 0.1 ha; AND | The site fits this diagnostic feature.<br>The BMWOF is over 5ha and areas of closed mid-storey are approximately 0.15ha. |
| The cover of transformer weed species (as identified in Attachment A) is 70% or less. Transformer weeds are highly invasive taxa with the potential to seriously alter the structure and function of the ecological community. This threshold recognises the relative resilience and recoverability of the ecological community to invasion by weed species; AND | The site fits this diagnostic feature.<br>Transformer weed cover is less than 70%. |
| The patch must have:<br>at least 25% of the native plant species diversity characteristic of this ecological community in that bioregion (Attachment A);<br>OR<br>at least 30% canopy cover of one rainforest canopy (either tree or shrub) species (Attachment A, excluding Banksia and Eucalyptus species that may be part of the ecological community). | The site fits this diagnostic feature.<br>Of the 32 species listed in the Sydney Basin region in Appendix A, 17 are found on site.<br>The canopy is dominated by *Eucalyptus* species. |
| *Condition Threshold Notes* | |
| Where gaps in the canopy exist, they should be in the process of regenerating with the usual suite of rainforest gap species for the site. Where weed invasion is significant, natural regeneration of native gap species may be limited. | Canopy gaps are not regenerating with rainforest gap species. Large, open patches are dominated by *Gahnia* which is excluding regeneration of other species in these areas. |
| As species diversity diminishes from northern to southern latitudes, it is important to take into account the natural diversity of a patch in a | *Acmena smithii* and *Pittosporum undulatum* dominate most closed-canopy |

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| particular bioregion when examining specific sites. For example, it is possible to find littoral rainforest stands that are dominated by single tree species or a small number of species (Miles & Kendall 2006). If such patches are in good condition, they will also be representative of the ecological community and they may also contain rainforest dependent fauna species. | areas of the mid-storey. |

**Attachment 4: Leafless Tongue-orchid – Assessment of Significance**

| **Please provide an updated assessment of significance for this species. We note that the Leafless Tongue-orchid has been ruled out based on survey conducted in 2005, when the nearby population 'appeared to be in lower abundance' during the 2004/5 season which is when the surveys were undertaken (other orchids and flora species that may occur are not discussed in documentation). We note also that the local population is 1150 m from site.** | |
|---|---|
| **Species** | **Response in relation to the site** |
| lead to a long-term decrease in the size of an important population of a species | The proposal will not lead to a long-term decrease in the size of an important population. The site did not contain a population as of 2005 when impact assessments were carried out and state-level approvals were granted. Any colonisation of the site would have occurred after this date. Dispersal from known populations approximately 1km north of the site would have occurred across a landscape containing suitable habitat, including both areas of more open and more closed canopy. Notably the two closest known populations occur on the margins of disturbed areas with more open canopy. While it is possible for wind dispersal of seed from the known populations 1km to the north into the site through the forested landscape in-between in the 15 years since the time of targeted survey, the likelihood of this occurring, and of a population becoming established on the site, is low. Therefore, it is possible, though unlikely that the proposal could lead to a decrease in the size of the local population. However, notably no decrease in the size of the population as of the state-level assessment and approvals would occur.<br>With regard to the known local population as relates to criteria used to define an 'import population':<br>• *key source populations either for breeding or dispersal*<br>A population of a number of individuals is found approximately 1km north of the site and is likely to represent a source population for the locality. The site, if colonised since the time of targeted surveys, is not likely to have established a large, or locally significant source population for dispersal elsewhere in the locality.<br>• *populations that are necessary for maintaining genetic diversity, and/or*<br>The genetic diversity of the species in the local area is unknown, however two separate sites with a number of individuals recorded occur within 1km of the site and are likely to maintain the genetic diversity in the locality.<br>• *populations that are near the limit of the species range.*<br>The site is not near the limit of the species range. |

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| reduce the area of occupancy of an important population | The site was not occupied by this species as of 2005. While the habitat preferences of this species are broad and poorly understood, the site generally consists of either forest with a closed canopy or moist woodlands with a closed sub-canopy. More open habitats, including similar vegetation communities, are found between the site and the known local population, and the locations where the local population occurs are notably near the edge of disturbance. While it is possible for wind dispersal of seed from the known populations 1km to the north into the site through the forested landscape in-between in the 15 years since the time of targeted survey, the likelihood of this occurring, and of a population becoming established on the site, is low. Therefore, it is possible, though unlikely that the proposal could lead to a decrease in the area of occupancy of the local population.<br>The local population within 1km of the site occurs in two separate areas, both of which are likely to have formed small colonies, one is in an area in an area of GEEBAM mapped 'high' burnt class bordering 'low' burnt class. The other is in an unburnt area. Therefore, while the response of this species to fire is uncertain, nearby areas of known occupation are found in both burnt and unburnt areas. |
| fragment an existing important population into two or more populations | The development on site will expand the existing residential area of Manyana and will not fragment the wider landscape such that pollination or seed dispersal of this species may be impeded. |
| adversely affect habitat critical to the survival of a species | *'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:*<br>• *for activities such as foraging, breeding, roosting, or dispersal*<br>The site could represent an area of future dispersal for this species, however similar habitats, including unburnt and low/moderate burn class areas are found in the surrounding area, totalling approximately 812ha within 5km.<br>No population was present as of 2005, so the site is unlikely to be necessary for propagation.<br>• *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*<br>The long-term maintenance of this species in the area is likely to be secure, as the known locations in proximity to the site are found in both unburnt areas and areas of 'high' burnt class bordering 'low' burnt class.<br>• *to maintain genetic diversity and long term evolutionary development, or*<br>The existing, known population is capable of maintaining the local genetic diversity of the species. Any recent colonisation of the site is likely to represent a subset of the existing local genetic diversity as it is likely to represent |

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| | colonisation from an existing local population.<br>• *for the reintroduction of populations or recovery of the species or ecological community.*<br>Recovery of the species in the locality is possible via dispersal of seed from known populations both within 812ha of unburnt or low/medium burnt class vegetation within 5km of the site, or within areas where the forest has become more open as a result of recent high intensity fire. |
| disrupt the breeding cycle of an important population | The proposal will not disrupt the reproductive cycle of the species. As populations of *Cryptostylis hunteriana* and *Cryptostylis subulata* both occur in the area, the Ichneumon Wasp pollinator is expected to be present in the area and capable of pollinating *Cryptostylis* species regardless of clearing on site. |
| modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | Comprehensive systematic transects were undertaken in this species flowering period by BES (2006). The proposal will remove approximately 17ha of habitat which was not occupied by this species as of 2005. The removal of habitat on site would therefore represent a decline in the species potential extent since 2005, as any possible colonisation of the site would represent an expansion of its previous range in the area. |
| result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | The proposal will increase the likelihood of weed species becoming established in the retained vegetation areas of the site. An Environment Management Plan and Flora and Fauna Management Plan have been prepared for the site to mitigate this potential impact. |
| introduce disease that may cause the species to decline, or | The proposal will increase the likelihood of *Phytophthora cinnamomi* becoming established in the retained vegetation areas of the site. An Environment Management Plan and Flora and Fauna Management Plan have been prepared for the site to mitigate this potential impact. |
| interfere substantially with the recovery of the species. | The proposal will not interfere substantially with the recovery of the species. The species was not present on site at the time of environmental impact assessments and systematic survey for this species. The removal of habitat which was not occupied as of 2005 is not likely to substantially interfere with the recovery of the species in the locality. |

**Attachment 5: Green and Golden Bell Frog – Assessment of Significance**

| **Please provide an updated assessment of significance for this species. We note that 7 records for the species occur within 5 km of site and that species or species habitat known is known to occur in the development area.** | |
|---|---|
| **Species** | **Response in relation to the study area** |
| lead to a long-term decrease in the size of an important population of a species | All remaining populations of this species are considered important populations. The nearest known population occurs in Lake Conjola, which is within 5km of the site but is separated from the site by a saltwater inlet. Therefore, expansion of this population and dispersal into the site is unlikely.<br>No population currently occurs in the Manyana area. The species was last recorded in Manyana in 1988 (NSW BioNet) which is prior to or during broad scale population declines across NSW. |
| reduce the area of occupancy of an important population | A population does not currently occur in the Manyana area. The site does not contain aquatic habitat in which this species could breed, and therefore could only represent upland habitat. The dense forested areas of the site do not represent typical upland habitat for this species. |
| fragment an existing important population into two or more populations | No population currently occurs in the Manyana area. The nearest population occurs in the Lake Conjola area and is separated from the site by an exiting barrier to dispersal, being a saltwater inlet connecting Conjola Lake and the Pacific Ocean. |
| adversely affect habitat critical to the survival of a species | Regarding habitat assessment under the *Significant impact guidelines for the vulnerable Green and Golden Bell Frog (Litoria aurea)*:<br>*Is the site within the expected range of the species?*<br>Yes<br>*Are there records of the species within the local area/catchment?*<br>The only contemporary records of this species are in the area of Lake Conjola and separated from the site by a saltwater inlet which is a barrier to dispersal. Records from Manyana are very old (1988) and likely prior to broad scale population declines in NSW.<br>*Does the site support potentially suitable habitat for the species?* |

| **Please provide an updated assessment of significance for this species. We note that 7 records for the species occur within 5 km of site and that species or species habitat known is known to occur in the development area.** | |
|---|---|
| **Species** | **Response in relation to the study area** |
| | The site contains no aquatic habitats. This species is found in terrestrial habitats consisting of grassy areas and vegetation no denser than woodlands, and therefore the forests found on site would not represent suitable terrestrial habitat.<br>*Are there other frog species on site? If so, what species?*<br>*Crinia signifera, Limnodynastes peronii, Litoria peronii, Litoria tyleri, Litoria verreauxii,* and *Pseudophryne bibronii* have been recorded on site either by Ecoplanning or BES (2006). These are all widespread species.<br>*What vegetation occurs on and around the site?*<br>The site and surrounds are forested with more disturbed areas of open woodland or pasture found to the northeast.<br>*How close is the nearest water body?*<br>A number of farm dams are found on a rural property north of the site, as close as approximately 250m.<br>*How many water bodies occur within 10 kilometres?*<br>A number of farm dams and other artificial water bodies, as well as ephemeral creeks, occur to the north of the site within 10 kilometres. Suitable freshwater habitats also occur south of the site but are separated by a saltwater inlet which is a barrier to dispersal.<br>*Is there habitat connectivity (terrestrial or aquatic) between water bodies on site, and between on-site water bodies and those on neighbouring sites?*<br>No water bodies are found on site.<br>*Is there any evidence of disturbance on site?*<br>There is minimal disturbance on site however the site does not contain habitat for this species.<br>*Has this habitat been modified as a result of previous development actions?*<br>No. No habitat occurs on site.<br>*Are water bodies infested with mosquito fish or other predatory species that prey on green and golden bell frogs?*<br>No water bodies occur on site. |

| **Please provide an updated assessment of significance for this species. We note that 7 records for the species occur within 5 km of site and that species or species habitat known is known to occur in the development area.** | |
|---|---|
| **Species** | **Response in relation to the study area** |
| | *Are there other threats to green and golden bell frogs occurring on site (see page 7)?*<br>No threats are currently occurring on site. |
| disrupt the breeding cycle of an important population | No breeding habitat is found on site. The proposal will not disrupt the breeding cycle of any local population. |
| modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | No aquatic or terrestrial upland habitat is found on site. |
| result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | No invasive species which could harm this species may be introduced on site. |
| introduce disease that may cause the species to decline, or | This species has experienced declines due to Chytridiomycosis, however, the proposal will not increase the likelihood of the Chytrid fungus becoming established in local water bodies. |
| interfere substantially with the recovery of the species. | The site does not support a population of this species and does not contain habitat for the species. The proposal will not interfere with the recovery of the species. |

## Attachment 6: Indigenous heritage

ecoplanning
ecology | planning | offsets

# PRELIMINARY DOCUMENTATION

## ATTACHMENT K BES 2006 FLORA AND FAUNA ASSESSMENT

Environmental

Services

# Flora and Fauna Assessment

Proposed Subdivision
Lot 172 DP 755923 & Lot 823 DP
247285 Berringer Road and
Cunjurong Point Road,
Manyana
City of Shoalhaven

September 2006

Our Reference: 04383

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# FLORA AND FAUNA ASSESSMENT

Our Reference: 04383

## Proposed Subdivision

## Lot 172 DP 755923 & Lot 823 DP 247285

## Berringer Road and Cunjurong Point Road Manyana

## City of Shoalhaven

Prepared September 2006

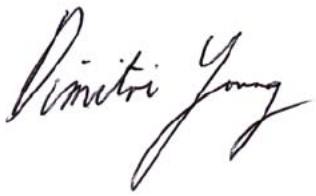
for

Malbec Properties Pty Ltd

PROJECT TEAM:

Dimitri Young
Ryan Smithers
David Coombes
Milton Lewis

**Document Tracking**

| Item | Details |
|---|---|
| **Project** | Flora and Fauna Assessment – Proposed Subdivision, Lot 172 DP 755923 & Lot 823 DP 247285 Berringer Road and Cunjurong Point Road, Manyana |
| **Reference Number** | 04383 |
| **Version Number** | 2 |
| **File Location** | 04383 FINAL PART 3A FFA REPORT LOT 172 Manyana 19 SEP 06.doc |
| **Date Last Saved** | 19 September 2006 |
| **Author** | Dimitri Young |
| **Reviewed by** | Ryan Smithers |
| **Approved by** |  <br>Dimitri Young<br>**Manager**<br>**Environmental Services Division** |
| **Licences and Other Approvals** | NPWS Scientific Licence Number: S10596, Animal Care and Ethics Approval from NSW Agriculture, Animal Research Authority from NSW Agriculture |

**Citation**

This report should be cited as:

Young, D. 2006, *Flora and Fauna Assessment – Proposed Subdivision, Lot 172 DP 755923 & Lot 823 DP 247285 Berringer Road and Cunjurong Point Road, Manyana*, BES (Bushfire and Environmental Services), St Georges Basin.



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This document may only be used by the client for the purposes for which it was commissioned. The scope of work was defined in consultation with the client, by ime and budgetary constraints imposed by the client, and the availability of other reports and data. The findings of this report have temporal limitations arising from the dynamic nature of available information, legislation, schedules, flora, fauna and habitats.

BES accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material in whole or in part by any third party. Information in this report is not intended to be a substitute for site specific assessment or legal advice in relation to any matter.

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# EXECUTIVE SUMMARY

This report has identified and described the biological environment of Lot 172 DP 755923 and Lot 823 DP 247285 Berringer Road and Cunjurong Point Road Manyana. The report has assessed the potential impacts on flora and fauna, including threatened and migratory species, endangered populations and threatened communities, or their habitats, of the proposal to undertake a residential subdivision on the property.

The development application will be assessed pursuant to Part 3A of the *NSW Environmental Planning and Assessment Act 1979* (*EP&A Act*) and will be determined by the Minister for Planning, so the Director General's Environmental Assessment Requirements were considered in preparing this report. Formal consultation was undertaken with the NSW Department of Environment and Conservation and the Commonwealth Department of Environment and Heritage.

The existing environment was described in detail from a literature review and from data gathered during fieldwork between December 2004 and August 2006. Flora and fauna surveys resulted in the detection of 184 flora species and 69 fauna species. Three vegetation communities, Northern Coastal Sands Shrub/Fern Forest, Bangalay Moist Woodland/Open Forest, and Bangalay Paperbark Woodland were identified.

Surveys targeting threatened species resulted in the detection of four threatened species, the Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl and Square-tailed Kite, listed on the schedules of the *NSW Threatened Species Conservation Act 1995,* and two migratory species, the Black-faced Monarch and Rufous Fantail, listed on the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999,* within the study area. In addition, the Bangalay Paperbark Woodland within the study area was determined to comprise the endangered ecological community *Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* as listed on the *NSW Threatened Species Conservation Act 1995.* No other threatened species, endangered populations or threatened ecological communities listed on the *NSW Threatened Species Conservation Act 1995*, the *NSW Fisheries Management Act 1994*, or the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* were recorded within the study area during the survey period.

The full development of the proposal will eventually involve the clearing or disturbance of approximately 18.22 ha of relatively undisturbed native vegetation and includes an extensive range of measures to mitigate impacts on flora and fauna.

An assessment pursuant to *NSW State Environmental Planning Policy No 44 – Koala Habitat Protection* was carried out, which concluded that the study area did not contain core Koala habitat and that a Plan of Management for Koala habitat was not required.

The impacts of the proposal on threatened species, endangered populations, threatened ecological communities, and migratory species listed on the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* were assessed under the administrative guidelines produced by Environment Australia. This assessment concluded that there would not be a significant impact on matters of national environmental significance resulting from the proposal, and that a referral to the Commonwealth Environment Minister is not required

The key biodiversity conservation issue associated with the proposal was identified as the endangered ecological community *Swamp sclerophyll forest on the coastal floodplains of the North Coast, Sydney Basin and South East Corner bioregions* and appropriate impact mitigation for this community was incorporated into the proposal by the retention of all of this vegetation with an appropriate vegetated buffer.

The extent, magnitude and significance of the impacts of the proposal on threatened species, populations and ecological communities listed on the *TSC Act* and *FM Act* were assessed in accordance with the Draft Guidelines for Threatened Species Assessment (Department of Environment and Conservation, Department of Planning, 2005) and it was concluded that:

- the proposal will maintain or improve biodiversity values;
- is unlikely to reduce the long-term viability of local populations of threatened species, populations or ecological communities;
- is unlikely to accelerate the extinction of threatened species, populations or ecological communities; and
- will not affect critical habitat.

# 1. INTRODUCTION

## *1.1 Background*

This report has been prepared by Bushfire and Environmental Services (BES) at the request of Allen Price and Associates, on behalf of Malbec Properties, to accompany a Major Project application (MP00_0059) to the Department of Planning for a proposed residential subdivision at Lot 172 DP 755923 & Lot 823 DP 247285 Berringer Road and Cunjurong Point Road, Manyana (hereafter referred to as Lots 172 & 823).

Lots 172 & 823 comprise approximately 20.3 ha of vacant freehold land situated to the west and north-west of Manyana village. The location of Lots 172 & 823 is shown in Figure 1 (Appendix A).

The development application will be assessed pursuant to Part 3A of the *NSW Environmental Planning and Assessment Act 1979* (*EP&A Act*) and will be determined by the Minister for Planning.

This report is the outcome of desktop studies and flora and fauna survey work undertaken by BES for this proposal between December 2004 and August 2006.

## *1.2 The Proposal*

### 1.2.1 Description

The proposal involves the subdivision of Lots 172 & 823 to create 179 residential allotments and associated infrastructure including roads, drainage and Public Reserves, as shown in Figure 2 (Appendix A).

This will involve clearing native vegetation at the subdivision stage for roads and other infrastructure, with clearing of the majority of the land except for a low-lying area associated with a drainage line in the central south occurring from subsequent development applications for individual dwellings. Cleared vegetation will be mulched on-site at the subdivision stage and re-used to assist in regeneration of disturbed areas. Cleared vegetation for future dwellings may be transported to an approved waste transfer facility for disposal.

Excavation will be undertaken to construct roads and drainage structures and to install services. This may involve minor levelling and/or filling of some parts of the land.

### 1.2.2 Direct and Indirect Impacts

The following direct impacts on flora and fauna are anticipated from the proposal:

a) Clearing of native vegetation for the subdivision;

b) Excavation of some earth material;

c) Compaction and covering of the soil within areas to be concreted and/or bitumen sealed;

d) Death or injury to native and introduced flora and fauna inhabiting the areas to be cleared and excavated for the proposal;

e) Improved management of retained native vegetation in one Public Reserve.

The following indirect impacts on flora and fauna are anticipated from the proposal:

a) Excavation for the under-grounding of services;

b) Microclimate changes to areas of vegetation to be retained arising from clearing of adjoining areas;

c) Changes to drainage characteristics from the concentration and redirection of stormwater;

d) Weed invasion into areas of native vegetation to be retained;

e) Increased potential for discharges of sediments into receiving waters during construction of the proposal;

f) Increased predation on native fauna arising from domestic pets to be kept by residents of the subdivision;

g) Increased human activities that may incur into areas of native vegetation to be retained;

h) Alteration to the flow regimes of the ephemeral drainage lines flowing through Lots 172 & 823.

## *1.3 The Study Area*

The study area for the purposes of this report is the whole of Lots 172 & 823 as shown in Figure 3 (Appendix A). It is bounded by residential development in the south and east, by vegetated freehold land in the north and vegetated Crown land in the west. The northern boundary is demarcated by Berringer Road and the western boundary by Cunjurong Point Road.

The locality for the purposes of this report is the land within a 10 km x 10 km grid centred on the study area.

## *1.4 Aim and Objectives*

The aim of this investigation was to assess the ecological impact of the proposal on the flora, fauna and habitats of the study area.

The objectives of this investigation were:

a) to identify and describe the flora species and vegetation communities present in the study area and their conservation significance;

b) to identify and describe the fauna habitats present in the study area and their condition;

c) to identify the fauna species which are present or likely to occur in the study area, and their conservation significance;

d) to evaluate and assess the magnitude, extent and significance of the impacts associated with the proposal in the context of the conservation importance of the flora, fauna, habitats and other environmental features to be affected;

e) to describe and justify measures to avoid, mitigate and/or offset any adverse effects of the proposal on flora, fauna, habitats and other environmental features of conservation importance;

f) to demonstrate and justify how the proposal meets the key thresholds identified in the Draft Guidelines For Threatened Species Assessment (Department of Environment and Conservation, DOP, 2005);

g) to address the Environmental Assessment Requirements of the Director-General of the DOP regarding flora and fauna issues;

h) to determine whether the proposal involves an action that has, will have, or is likely to have, a significant impact on a matter of national environmental significance under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*; and

i) to make recommendations regarding any environmental management and impact mitigation/amelioration measures, which can be implemented to limit the effects of the proposal on vegetation, fauna, habitats, and other environmental features as necessary.

## *1.5 Environmental Assessment Requirements*

A preliminary application has been successfully lodged with the DOP and various issues pertaining to flora and fauna have been raised in Director General's Environmental Assessment Requirements provided in correspondence from the department dated 6 March 2006 (Appendix B).

Consequently, the following flora and fauna issues raised by the DOP will be addressed by this report:

a) Impact on Threatened Species
    - Address threatened species impact having regard to the Threatened Species Assessment Guidelines and recommend offset measures to avoid or mitigate impacts of the project on threatened species and their habitat. A field survey of the site should be conducted. The assessment guidelines should specifically

report on the considerations listed in Step 3 of the draft guideline. The environmental assessment should clearly state whether it meets each of the key thresholds set out in Step 5 of the draft guideline. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

b) Matters of National Environmental Significance

- The Environmental Assessment must consider and address the impacts of the project, if any, on matters of National Environmental Significance under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

## *1.6 Consultation*

Consultation was undertaken with the Department of Environment and Conservation (DEC) by way of a teleconference held on 13 June 2006 and by way of written correspondence dated 22 June 2006 (Appendix C).

The biodiversity issues raised by the DEC in its response dated 27 June 2006 (Appendix C) are presented in Table 1 along with the relevant sections of this report where these issues are discussed in detail.

**Table 1: Biodiversity conservation issues raised by the DEC.**

| DEC ISSUE | SECTION |
|---|---|
| The *Swamp sclerophyll forest* on Lot 172 should be retained and protected from development. | 3.3.3<br>4.5<br>5.1.1<br>5.3<br>6.1 |
| The western portion of the immediate catchment of the *Swamp sclerophyll forest* on Lot 172 should be retained to minimise alteration to hydrology. | |
| A hard-edge (such as a road) and effective runoff control measures are required on the eastern side of the *Swamp sclerophyll forest* on Lot 172. | |
| The western portion of Lot 172 should be retained as part of a vegetated habitat corridor linking Crown land west of Lot 172 with Conjola National Park in the north. | 5.5, 6.2, Appendix D |

Consultation was also undertaken with the Commonwealth Department of Environment and Heritage (DEH) and correspondence dated 1 August 2006 was received from the Department. Apart from specifying the statutory requirements of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*, the correspondence states that the Giant Burrowing Frog *Heleioporus australiacus* may be present in the Manyana area. The issues raised by the DEH are discussed in sections 3.4, 4.2, 4.3 and 5.7 of this report.

## *1.7 Certification*

The contents of this report are certified by Dimitri Young, Manager – Environmental Services Division of BES, to comply with the *Draft Guidelines for Threatened Species Assessment* (Department of Environment and Conservation - Department of Primary Industries 2005).

# 2. METHODOLOGY

## *2.1 Review of Existing Data*

A review of relevant information was undertaken prior to the commencement of field studies, which involved:

a) reviewing available literature including relevant flora and fauna studies, legislation, environmental planning instruments, topographic maps, aerial photographs and draft plans pertaining to the proposal;

b) searching the Atlas of NSW Wildlife for threatened flora and threatened fauna species recorded in the locality; and

c) searching the Commonwealth Environment Protection & Biodiversity Conservation Act Protected Matters Search Tool for matters of national environmental significance recorded in the locality.

The data gathered during the field studies and from the review of literature were analysed and interpreted in accordance with the provisions of legislation and planning controls pertaining to flora and fauna.

## *2.2 Flora Survey Methods*

A detailed botanical survey was conducted in the study area by BES on 15, 16, 17 and 24 December 2004, 7 and 21 January 2005, and 2 August 2006 in the locations shown in Figure 3 (Appendix A).

**Community Identification and Floristic Audit**

The Random Meander technique documented by Cropper (1993) was used across the study area in general, to document the flora species present, including those of conservation significance, and the location and extent of vegetation communities.

A vegetation survey sheet was completed for nine 20 m x 20 m plots in locations that typified the vegetation communities present in the study area. The vegetation was surveyed at all levels present: the canopy (trees), middle canopy (trees), understorey (shrubs), and groundcover plants (plants less then one metre in height). A general description of the vegetation was then prepared. This technique was used to classify the vegetation communities. The native vegetation was assessed according to the structural classifications in Specht (1970), with characteristic and dominant plant species being identified and recorded. The boundaries of vegetation communities in the study area were marked onto a survey plan.

**Targeted Searches**

Specific searches for plant species of conservation significance known from the locality were conducted using the Random Meander method and by systematically walking along designated

transects, targeting areas of potential or suitable habitat. This technique was used to target the Austral Toad-flax *Thesium australe* in suitable habitats within the study area. Grid transects were used to target the Leafless Tongue Orchid *Cryptostylis hunteriana* in suitable habitats within the study area (Figure 3 Appendix A).

### Limitations

The floristic audit undertaken detected as many species as possible and provides a comprehensive but not definitive species list. More species would probably be detected during a longer survey over various seasons. Nevertheless, the techniques used in this investigation are considered adequate to gather the data necessary for the assessment of the effects of the proposal on flora species.

### Nomenclature

Most of the plant species names in this report are the current names published in the Flora of NSW (Harden 1990-2000). The taxonomic names have been supplemented with common names obtained from various sources. The scientific and conservation significance of individual plant species was established with reference to Briggs and Leigh (1996) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* in the national context, the *NSW Threatened Species Conservation Act 1995* in the state context, and after Mills (1993), KMA (1993, 1995 a & b), and PlantNET (accessed February 2005) in the regional context.

### Flora Survey Effort

The flora survey effort employed a total of 27.5 person-hours as documented in Table 2.

**Table 2: Flora survey effort employed over the study area.**

| DATE | METHOD | EFFORT | TARGET SPECIES |
|---|---|---|---|
| 15 December 2004 | Random meander | 1.5 person-hours | All flora species |
| 16 December 2004 | Vegetation Plots | 6 person-hours | Vegetation communities |
| 17 December 2004 | Vegetation plots | 0.5 person-hour | All flora species |
| 24 December 2004 | Targeted survey | 16 person-hours | *C. hunteriana* and *T. australe* |
| 7 January 2005 | Targeted survey | 0.5 person-hour | *C. hunteriana* and *T. australe* |
| 21 January 2005 | Random meander | 1.5 person-hours | All flora species |
| 2 August 2006 | Random meander | 1.5 person-hours | All flora species |
| **TOTAL FLORA SURVEY EFFORT** | | **27.5 person-hours** | |

## *2.3 Fauna Survey Methods*

Field investigations for fauna were conducted in the study area by BES on 15 December 2004 8, 9, 10, 11 and 17 February 2005, 12, 13, 14, 19, and 20 April 2005, 2 June 2005, 5 and 6 July 2005, and 2 August 2005 in the locations shown in Figure 4 (Appendix A).

**Opportunistic Diurnal Surveys**

Opportunistic fauna surveys involved observations of animal activity, habitat surveys and searches for indirect evidence of fauna.

Diurnal mammal searches were conducted in areas of potential habitat across the study area, with emphasis on searches for scats, tracks, burrows, diggings and scratchings. Specific bird, reptile and amphibian searches were conducted across the study area involving both visual and aural detection of species.

Specific searches were conducted for habitats or resources of relevance for those threatened fauna species known from the general region, or species, which might be anticipated to occur given the vegetation communities and habitats present. Opportunistic records of all fauna species observed were maintained throughout the survey period, and an inventory was compiled of all species recorded during the current investigations.

**Nocturnal Spotlighting and Call Playback Surveys**

Spotlighting was undertaken along a number of traverses throughout the study area. A Narva Colt 100 W hand-held spotlight with Faunatech battery pack was used in attempts to illuminate mammals, birds and amphibians.

The calls of the Sooty Owl, Powerful Owl, Masked Owl, Barking Owl, Squirrel Glider and Yellow-bellied Glider were broadcast through a Toa megaphone within areas of appropriate roosting, denning and foraging habitat in the study area. Calls were broadcast for a period of five minutes followed by a listening period of 15 minutes and spotlighting for a further twenty minutes. On 11 February 2005 the playback period commenced at 20:45h and on the 17 February 2005 playback commenced at 22:30h.

**Nocturnal Stagwatching Survey**

Thirty-three hollow-bearing trees located within the study area were watched at dusk for emerging nocturnal fauna species. These trees were stag-watched for up to one hour following dusk. Limited spotlighting was undertaken upon completion of stagwatching to enable positive identification of fauna within these trees.

**Nocturnal ANABAT Survey**

ANABAT echolocation recording was used to target microchiropteran bats in the study area. One ANABAT II bat detector linked to a Sanyo Walkman cassette recorder was used at several sites associated with potential roosting and foraging sites in the study area and along walking

transects to record microchiropteran bat echolocation calls on two nights. On 11 February 2005 the detector was employed from two hours between 20:30 and 22:30h and on 17 February 2005 the detector was employed for one hour between 22:30 and 23:30h when microchiropteran bat activity was considered to be high.

**Trapping Surveys**

Targeted surveys for terrestrial mammals were undertaken within all vegetation types in the study area. Thirty-five small cage traps and 50 Type A Elliott traps were set along five transects. Traps were spaced at 25 m intervals and were baited with a mixture of peanut butter, honey and rolled oats. Each trap was covered with plastic to protect captured animals from rain, and the Elliott traps were lined with cotton wool to provide insulation for trapped animals. Trapping transects were located with GPS and marked with numbered flagging tape. The traps were left in place for three consecutive nights yielding a trapping effort of 105 small cage trap-nights and 150 Elliott trap-nights and checked each morning soon after sunrise. Captured animals were identified quickly and with minimal handling, prior to release.

**Habitat Analysis**

A description of the fauna habitats in the study area was prepared because the type of habitat in an area influences which animals occur there, as well as diversity and abundance. This habitat assessment also has an important role in predicting threatened fauna likely to occur in an area. The information collected usually includes the type of vegetation present, the presence/absence of rock outcrops, tree hollows, dams, ponds, streams, foraging substrates and other features likely to attract threatened fauna. The study area was traversed along a number of transects to identify habitat components, which were recorded and described.

**Limitations**

The results of fauna surveys can be optimised by conducting investigations over a long period to compensate for the effect of unfavourable weather, seasonal changes and climatic variation. In general, the longer the survey the more species will be detected. Results can also be improved by using a wide range of techniques, since some species are more likely to be detected by a particular method. Such techniques include pitfall trapping, hair tubing and harp trapping. However, surveys are subject to constraints that determine the amount of time allocated, the methods used and the timing of the work. Thus, the results should be viewed in the light of these limitations. The fauna detected in current survey work are a guide to the native fauna present, but are by no means a definitive list of the species occurring in the study area. Nevertheless, the techniques used in this investigation are considered adequate to gather the data necessary for the assessment of the effects of the proposal on fauna species.

**Nomenclature**

The nomenclature in this report is based on the Mammals of Australia (Strahan 1995), Australian Bats (Churchill 1998), The Taxonomy and Species of Birds of Australia and its Territories (Christidis & Boles 1994) and Reptiles and Amphibians of Australia (Cogger 1996).

## Survey Conditions

Survey conditions throughout the study period are detailed in Table 3.

**Table 3: Fauna survey conditions.**

| DATE | TEMPERATURE | WIND | CLOUD | MOON | HUMIDITY | RAIN |
|---|---|---|---|---|---|---|
| 15 December 2004 | 25 °C – 28 °C | Light | 0/8 | - | - | None |
| 8 February 2005 | 20.2 °C – 33.2 °C | Moderate | - | - | 34 % | None |
| 9 February 2005 | 18.9°C – 21.7 °C | Light | - | - | 72 % | None |
| 10 February 2005 | 16.2 °C – 21.4 °C | Light | - | - | 64 % | Light |
| 11 February 2005 | 18 °C – 27 °C | None | 8/8 | None | 55 % | None |
| 17 February 2005 | 10 °C – 20 °C | None | 7/8 | 1/4 | 41 % | None |
| 12 April 2005 | ~18 °C – 19 °C | Moderate | - | - | - | None |
| 13 April 2005 | ~16 °C – 18 °C | Moderate | - | - | - | None |
| 14 April 2005 | ~14 °C – 19 °C | Light | - | - | - | None |
| 19 April 2005 | ~16 °C – 19 °C | Light | - | - | - | None |
| 20 April 2005 | ~16 °C – 17 °C | Moderate | - | - | - | None |
| 2 June 2005 | ~11 °C – 15 °C | Light | - | - | - | None |
| 5 July 2005 | ~13 °C – 16 °C | None | - | - | - | None |
| 6 July 2005 | ~11 °C – 15 °C | None | 2/8 | 1/4 | - | None |
| 2 August 2005 | ~11 °C – 15 °C | None | 1/8 | N/A | - | None |

## Survey Effort

The fauna survey effort employed a total of 61.75 person-hours and 231 trap-nights as documented in Table 3.

**Table 4: Fauna survey effort employed over the study area.**

| DATE | METHOD | EFFORT | TARGET SPECIES |
|---|---|---|---|
| 15 December 2004 | Diurnal habitat search | 2 person-hours | All species |
| 8 10 February 2005 | Elliott trapping | 150 trap-nights | Small terrestrial mammals |
| | Small cage trapping | 81 trap-nights | Medium terrestrial mammals |
| 11 February 2005 | Nocturnal spotlighting | 1.75 person-hours | Mammals, birds and amphibians |
| | Nocturnal call playback | 0.5 person-hours | Mammals, birds and amphibians |
| | Nocturnal ANABAT | 2 person-hours | Microchiropteran Bats |
| 17 February 2005 | Nocturnal spotlighting | 1.5 person-hours | Mammals, birds and amphibians |
| | Nocturnal call playback | 0.5 person-hours | Mammals, birds and amphibians |
| | Nocturnal ANABAT | 1 person-hour | Microchiropteran Bats |

| DATE | METHOD | EFFORT | TARGET SPECIES |
|---|---|---|---|
| 12 April 2005 | Nocturnal stag-watch | 10.5 person-hours | Microchiropteran Bats, Masked Owl and Glossy Black-cockatoo |
| 13 April 2005 | Nocturnal stag-watch | 4 person-hours | Microchiropteran Bats, Masked Owl and Glossy Black-cockatoo |
| 14 April 2005 | Nocturnal stag-watch | 4 person-hours | Microchiropteran Bats, Masked Owl and Glossy Black-cockatoo |
| 19 April 2005 | Nocturnal stag-watch | 5 person-hours | Microchiropteran Bats, Masked Owl and Glossy Black-cockatoo |
| 20 April 2005 | Nocturnal stag-watch | 4 person-hours | Microchiropteran Bats, Masked Owl and Glossy Black-cockatoo |
| 2 June 2005 | Nocturnal stag-watch | 10 person hours | Powerful Owl, Masked Owl, and Glossy Black-cockatoo |
| | Nocturnal spotlighting | 1 person-hour | Mammals, birds and amphibians |
| 5 July 2005 | Roost Search | 2 person-hours | Powerful Owl and Masked Owl |
| 6 July 2005 | Nocturnal stag-watch | 3 person-hours | Powerful Owl, Masked Owl, and Glossy Black-cockatoo |
| | Nocturnal spotlighting | 1 person-hour | Mammals, birds and amphibians |
| 2 August 2005 | Roost Search | 4 person hours | Powerful Owl and Masked Owl |
| | Nocturnal stag-watch | 3 person hours | Powerful Owl, Masked Owl, Glossy Black-cockatoo, and Gang-gang Cockatoo |
| | Nocturnal spotlighting | 1 person-hour | Mammals, birds and amphibians |
| | | **61.75 PERSON HOURS, 231 TRAP NIGHTS** | |

# 3. THE EXISTING ENVIRONMENT

## *3.1 Topography, Geology, and Soils*

The study area lies at an altitude of approximately 20-30 m Australian Height Datum (AHD) and is gently-sloping land with an aspect generally to the south. Two low-lying ephemeral drainage depressions are located within the property. The most westerly drainage runs in a south-easterly direction and henceforth will be referred to as Drainage A. The second drainage runs through the centre of the property in a southerly direction and will be referred to as Drainage B. Only Drainage A supports vegetation associated with drainage lines to any substantial degree. Both drainage lines form part of the upper catchment of a small coastal lagoon that discharges onto Manyana Beach.

The study area appears to be underlain by Tertiary undifferentiated sediments comprising gravel, sand, clay, quartzite, sandstone and conglomerate (Ulladulla 1:250000 Geological Series Sheet S1 56-13). These have weathered to form red loamy and sandy soils typical of the Manyana area. Soils throughout much of the study area are covered by a thick humus layer.

## *3.2 Disturbances*

The study area shows generally low levels of disturbance. There is a small clearing in the north where a cabin is situated and a number of walking trails leading to the south from this clearing. Access by members of the public along some of these tracks has resulted in rubbish accumulating in some locations.

Under-scrubbing is evident along the southern and eastern boundaries where a fire break with a width of about 10 m has been established and on Lot 823 where vegetation has been almost completely removed. Hazard reduction burning undertaken in the study area about 7 years ago has generally resulted in undeveloped understorey vegetation in the west and south-east of the study area. Some areas exhibit evidence of frequent fire. The study area appears to have been selectively logged in the past given the relatively low abundance of old growth elements. Weed invasion is generally minor and restricted to the margins of the study area.

## *3.3 Flora*

The study area supports three vegetation communities and their distributions are shown in Figure 5 (Appendix A). Whilst the study area is relatively undisturbed there are few old-growth elements and the vegetation appears to have been affected by historic selective logging, wildfire and prescribed fire.

Where possible the communities have been typed with reference to the classifications of Thomas *et al.* (2000) and Kevin Mills & Associates (KMA) (1999). However, the influence of clay soils in and adjacent to the study area on the vegetation found there does not appear to have been recognised by Thomas *et al.* (2000) or KMA (1999). Consequently, the vegetation within

the study area as identified below is, in places, significantly different from that modelled and mapped by those studies. Where appropriate, the nomenclature of Thomas *et al.* (2000) and KMA (1999) has been used to suggest affinities between the vegetation within the study area and the communities described by those studies.

### 3.3.1 Northern Coastal Sands Shrub/Fern Forest

This community occurs across the majority of the study area on sandy clay soils. It most closely resembles the Northern Coastal Sands Shrub/Fern Forest of Thomas *et al.* (2000). The community also has affinities with the Blackbutt Forest Sub-group of KMA (1999) particularly the Blackbutt Tall Forest (PIL-SYN) and Blackbutt – Bloodwood Forest (PIL-GUM), the Peppermint – Blackbutt Forest (PIP-PIL), and the Blackbutt – Peppermint Tall Open Forest of (KMA 1995b). However it is difficult to correlate the vegetation within the study area with the communities identified by Mills (1998) given the brevity of the community descriptions.

The community comprises an open-forest dominated by Sydney Peppermint *Eucalyptus piperita,* Blackbutt *E. pilularis*, and Red Bloodwood *Corymbia gummifera* but also includes Thin-leaved Stringybark *E. eugenioides,* White Stringybark *E. globoidea*, Grey Ironbark *E. paniculata* subsp. *paniculata* and Bangalay *E. botryoides*. The canopy height is approximately 25 m with foliage projective cover of approximately 35 %.

There is a sub-canopy dominated by Turpentine *Syncarpia glomulifera* subsp. *glomulifera*, to a height of approximately 14 m with variable foliage projective cover ranging between approximately 5-25%. Within this sub-canopy, there are dense, almost closed stands of Turpentine in places. Other sub-canopy species generally occur very sporadically and include Hickory *Acacia implexa*, Saw Banksia *Banksia serrata*, Coastal Banksia *B. integrifolia* subsp. *integrifolia*, Snow in Summer *Melaleuca linariifolia,* and Black She-oak *Allocasuarina littoralis*.

Parts of the community have been affected by relatively recent prescribed burning and consequently the understorey is often dominated by Common Hop Bush *Dodonaea triquetra*. Other common understorey species include Sunshine Wattle *Acacia terminalis*, Narrow-leaf Geebung *Persoonia linearis,* the Bog-rush *Schoenus melanostachys*, Handsome Flat-pea *Platylobium formosum*, Prickly Moses *A. ulicifolia*, Hair-pin Banksia *Banksia spinulosa* var. *spinulosa,* Sydney Golden Wattle *A. longifolia,* and Black Fruited Saw-sedge *Gahnia melanocarpa.* The understorey is usually to a height of up to 4-6 m with foliage projective cover of approximately 25-40%. In the southern parts of the study area species such as Hairy Psychotria *Psychotria loniceroides,* Scentless Rosewood *Synoum glandulosum* subsp. *glandulosum,* Blueberry Ash *Elaeocarpus reticulatus,* Mock Olive *Notelaea venosa*, Coffee Bush *Breynia oblongifolia* and Mutton Wood *Rapanea variabilis* also occur patchily in the understorey.

The groundcover includes a diverse range of native grasses, shrubs, ferns, forbs and climbers such as Germander Raspwort *Gonocarpus teucrioides,* Rough Guinea-flower *Hibbertia aspera,* Bordered Panic *Entolasia marginata*, Common Bracken Fern *Pteridium esculentum*, False

Bracken *Calochlaena dubia,* Wiry Panic *Entolasia stricta,* Variable Sword-sedge *Lepidosperma laterale,* Spiny-headed Mat-rush *Lomandra longifolia,* Milkwort Boronia *Boronia polygalifolia,* Showy Guinea-flower *Hibbertia linearis,* Two Colour Panic *Panicum simile*, Dwarf Trumpet *Brunoniella pumilio,* Kidney Weed *Dichondra repens*, Whiteroot *Pratia purpurascens*, Lilac Lily *Schelhammera undulata*, Bonnet Orchid *Cryptostylis erecta,* Large Tongue Orchid *Cryptostylis subulata,* Asian Pennywort *Centella asiatica*, Basket Grass *Oplismenus imbecillis*, Thyme Spurge *Phyllanthus hirtellus*, Leafy Purple Flag *Patersonia glabrata,* Holly Lomatia *Lomatia ilicifolia*, Common Stinkweed *Opercularia aspera,* Blue Flax-lily *Dianella caerula* var. *producta*, Blady Grass *Imperata cylindrica,* Slender Tick-Trefoil *Desmodium varians*, Slender Oxalis *Oxalis exilis,* Hedgehog Grass *Echinopogon caespitosus* var. *caespitosus,* Kangaroo Grass *Themeda australis*, and Gristle Fern *Blechnum cartilagineum* to a height of approximately 1.5 m with foliage projective cover of approximately 30-40%.

The understorey also includes climbers such as Apple Berry *Billardiera scandens,* Love Creeper *Glycine clandestina,* Polymeria *Polymeria calycina,* Trailing Guinea-flower *Hibbertia scandens,* Old Man's Beard *Clematis aristata,* Bearded Tylophora *Tylophora barbata*, Native Sarsaparilla *Smilax glyciphylla*, Common Milk Vine *Marsdenia rostrata,* Wombat Berry *Eustrephus latifolius*, Snake Vine *Stephania japonica*, and Scrambling Lily *Geitonoplesium cymosum.*

### 3.3.2 Bangalay Moist Woodland/Open Forest

This community occurs in the eastern, primarily north-eastern, parts of the study area which is mapped by KMA (1999) as Blackbutt Tall Forest (PIL-SYN). However the community resembles the Bangalay Forest (BOT-BAN) and Bangalay – Rainforest (BOT-LRF) communities of Mills (1998) and has affinities with the Bangalay Open Forest / Closed Forest (Rainforest) of KMA (1995b).

The abundance of rainforest elements in the understorey appears to be the result of the relative infrequence of fires, with more frequently burnt occurrences of the community being described as Bangalay Forest (BOT-BAN) by Mills (1998). As such the vegetation within the study area is more accurately described as intermediate between the Bangalay Forest (BOT-BAN) and the Bangalay – Rainforest (BOT-LRF) of Mills (1998), with continued protection from fire driving the succession towards the Bangalay – Rainforest. The location of the Bangalay Moist Woodland / Open Forest within the study area does not occur in a part of the landscape where it would naturally have been afforded protection from fire. The protection from fire in recent times has likely been the result of anthropogenic factors such as the location of prescribed burns in adjacent areas. Similar vegetation in the locality such as that at Cunjurong Point and behind Monument Beach in Conjola National Park is mapped by KMA (1999) as Bangalay Forest (BOT-BAN), although particularly at Cunjurong Point it would appear that a similar process of largely anthropogenic fire exclusion is driving a succession towards the Bangalay – Rainforest (BOT-LRF).

The community also appears to have affinities with Coastal Sands Shrub / Fern Forest of Thomas *et al.* (2000), but it does not support the abundance of diagnostic species such as Saw Banksia, Tree Broom-heath *Monotoca elliptica*, and *Cyperus laevigatus*.

For the purposes of this report the community is described as Bangalay Moist Woodland / Open Forest.

The canopy is dominated by Bangalay but also includes Blackbutt, Thin-leaved Stringybark, Grey Ironbark and Rough-barked Apple *Angophora floribunda* to a height of approximately 20 m with foliage projective cover of approximately 20-30%. There is a moist sub-canopy to a height of approximately 10-15 m with foliage projective cover of approximately 20-40% comprising species such as Sweet Pittosporum *Pittosporum undulatum*, Scentless Rosewood, Black She-oak, Lilly Pilly *Acmena smithii,* Coastal Banksia, Hairy Clerodendrum *Clerodendrum tomentosum,* Blueberry Ash, Mock Olive *Notelaea* spp., and Parramatta Green Wattle *Acacia parramattensis.* Parramatta Green Wattle is often present to approximately 15 m with foliage projective cover of approximately 10%.

The understorey is dominated by Black Fruited Saw-sedge, Rough-fruit Pittosporum *Pittosporum revolutum*, Scentless Rosewood, Bolwarra *Eupomatia laurina*, Senna *Senna* ssp., Coffee Bush and Wallaby Weed *Olearia viscidula* to a height of approximately 2.5 m with foliage projective cover of approximately 60%.

Groundcovers include Bordered Panic, Native Violet *Viola hederacea*, Drooping Sedge *Carex longebrachiata*, Variable Sword-sedge, Basket Grass *Oplismenus imbecillis,* Spiny-headed Mat-rush, Common Bracken Fern, Common Maidenhair Fern *Adiantum aethiopicum,* Slender Tick-trefoil, and Pastel Flower *Pseuderanthemum variabile* to a height of approximately 1.5 m with foliage projective cover of approximately 40-60%. Climbers and scramblers include Jasmine Morinda *Morinda jasminoides*, which is prolific in the groundcover, Giant Water Vine *Cissus hypoglauca*, Bearded Tylophora, Snake Vine, Wonga-wonga Vine *Pandorea pandorana,* Wombat Berry, Scrambling Lily, and Common Milk Vine.

In the north-eastern extremities of the study area there is an area of approximately 0.15 ha where there is a closed sub-canopy dominated by Lilly Pilly to a height of approximately 6 m. The understorey and groundcover is very sparse and comprises just a few individuals of Scrub Beefwood *Stenocarpus salignus*, Mock Olive *Notelaea* spp., Scentless Rosewood, Spiny-headed Mat-rush, Hairy Psychotria, Drooping Sedge, and the climbers Jasmine Morinda, Giant Water Vine, and Common Silkpod *Parsonsia straminea*.

### 3.3.3 Bangalay Paperbark Woodland

This community occurs primarily in Drainage A which drains the western parts of the study area, flowing to the southern study area boundary (Figure 5 Appendix A). This vegetation most closely equates with the Paperbark Forest (MEL-FOR) or Swamp Mahogany – Paperbark

Forest (ROB-MEL) of KMA (1999). However the paperbarks occur as a sub-canopy beneath Bangalay and there is no Swamp Mahogany *Eucalyptus robusta*. The substrate is clayey rather than the sands usually associated with Swamp Mahogany – Paperbark Forest. Thomas *et al.* (2000) similarly describe a Northern Coastal Lowlands Swamp Forest which appears floristically and structurally similar apart from the absence of Swamp Mahogany.

The upper stratum is dominated by Bangalay which forms a canopy to a height of approximately 22 m with foliage projective cover of approximately 25%. There is a sub-canopy to a height of 12 m with foliage projective cover of between approximately 20-30% dominated by Snow in Summer, but also including Black Wattle *Callicoma serratifolia*, and Parramatta Green Wattle, with Mutton Wood *Rapanea variabilis* and Black She-oak occurring occasionally on the community margins.

The understorey is generally dense to a height of 4 m with foliage projective cover of approximately 40%. The understorey is dominated by Tall Saw-sedge *Gahnia clarkei* which is abundant in clumps to approximately 2.5 m. Other understorey species include Yellow Tea-tree *Leptospermum polygalifolium* subsp. *polygalifolium*, Swamp Paperbark *Melaleuca ericifolia*, Rough Tree Fern *Cyathea australis,* the Bog-rush *Schoenus melanostachys,* the Saw-sedge *Gahnia radula* and a few individuals of Coastal Wattle *Acacia sophorae* and Cheese Tree *Glochidion ferdinandi*.

The groundcover includes a range of predominantly forbs, ferns and climbers such as False Bracken, Native Violet, the Pennywort *Hydrocotyle peduncularis,* Basket Grass *Oplismenus imbecillis*, Asian Pennywort, the Water Fern *Blechnum camfieldii,* Fishbone Fern *Blechnum nudum,* and seedlings of Scentless Rosewood and Hairy Psychotria to a height of approximately 1 m. The density of the groundcover is influenced by the density of the understorey but is generally very sparse with foliage projective cover averaging approximately 5%. Climbers include Trailing Guinea-flower, Broad-leaved Bramble *Rubus moluccanus* var. *trilobus* and Common Silkpod. This community also includes several individuals of Christmas Orchid *Calanthe triplicata*.

### 3.3.4 Flora Species

A total of 184 flora species were identified during the flora surveys, and these are listed in Table 4. One hundred and sixty-four native species and 20 exotic species were identified.

**Table 4: Flora species identified in the study area (* denotes exotic species).**

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Acacia binervata* | Two-veined Hickory |
| *Acacia elata* | Mountain Cedar Wattle |
| *Acacia implexa* | Hickory |

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Acacia longifolia* | Sydney Golden Wattle |
| *Acacia mearnsii* | Black Wattle |
| *Acacia parramattensis* | Parramatta Green Wattle |
| *Acacia sophorae* | Coastal Wattle |
| *Acacia suaveolens* | Sweet Wattle |
| *Acacia terminalis* | Sunshine Wattle |
| *Acacia ulicifolia* | Prickly Moses |
| *Acmena smithii* | Lilly Pilly |
| *Adiantum aethiopicum* | Common Maidenhair Fern |
| *Allocasuarina littoralis* | Black She-oak |
| *Alphitonia excelsa* | Red Ash |
| *Amperea xiphoclada* var. *xiphoclada* | Broom Spurge |
| *Angophora floribunda* | Rough-barked Apple |
| *Arthropodium milleflorum* | Vanilla Lily |
| *Asparagus asparagoides** | Bridal Creeper* |
| *Austrodanthonia fulva* | A wallaby grass |
| *Austrostipa pubescens* | Tall Speargrass |
| *Banksia integrifolia* subsp. *integrifolia* | Coastal Banksia |
| *Banksia serrata* | Saw Banksia |
| *Banksia spinulosa* var. *spinulosa* | Hair-pin Banksia |
| *Bidens pilosa** | Cobblers Pegs* |
| *Billardiera scandens* | Apple Berry |
| *Blechnum camfieldii* | A water fern |
| *Blechnum cartilagineum* | Gristle Fern |
| *Blechnum nudum* | Fishbone Fern |
| *Boronia polygalifolia* | Milkwort Boronia |
| *Breynia oblongifolia* | Coffee Bush |
| *Brunoniella pumilio* | Dwarf Trumpet |
| *Calanthe triplicata* | Christmas Orchid |
| *Callicoma serratifolia* | Black Wattle |
| *Calochlaena dubia* | False Bracken |
| *Cassinia aculeata* | Dolly Bush |
| *Carex longebrachiata* | Bergalia Tussock |

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Centella asiatica* | Asian Pennywort |
| *Cissus hypoglauca* | Water Vine |
| *Clematis aristata* | Old Man's Beard |
| *Clerodendrum tomentosum* | Hairy Clerodendrum |
| *Comesperma ericinum* | Matchheads |
| *Corymbia gummifera* | Red Bloodwood |
| *Crassula multicava** | A stonecrop* |
| *Cryptostylis erecta* | Bonnet Orchid |
| *Cryptostylis subulata* | Large Tongue Orchid |
| *Cyathea australis* | Rough Tree Fern |
| *Cymbidium suave* | Snake Flower |
| *Desmodium rhytidophyllum* | Rusty Tick-trefoil |
| *Desmodium varians* | Slender Tick-trefoil |
| *Dianella caerula* var. *caerula* | Blue Flax-lily |
| *Dianella caerula* var. *producta* | Blue Flax-lily |
| *Dicanthium sericeum* | Queensland Bluegrass |
| *Dichondra repens* | Kidney Weed |
| *Dipodium variegatum* | Blotched Hyacinth Orchid |
| *Dodonaea triquetra* | Common Hop Bush |
| *Doodia aspera* | Rasp Fern |
| *Echinopogon caespitosus* var. *caespitosus* | Hedgehog Grass |
| *Elaeocarpus reticulatus* | Blueberry Ash |
| *Entolasia marginata* | Bordered Panic |
| *Entolasia stricta* | Wiry Panic |
| *Epacris pulchella* | NSW Coral Heath |
| *Eucalyptus botryoides* | Bangalay |
| *Eucalyptus eugenioides* | Thin-leaved Stringybark |
| *Eucalyptus globoidea* | White Stringybark |
| *Eucalyptus paniculata* | Grey Ironbark |
| *Eucalyptus pilularis* | Blackbutt |
| *Eucalyptus piperita* | Sydney Peppermint |
| *Eucalyptus sclerophylla* | Hard-leaved Scribbly Gum |
| *Eustrephus latifolius* | Wombat Berry |

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Exocarpos cupressiformis* | Cherry Ballart |
| *Gahnia clarkei* | Tall Saw-sedge |
| *Gahnia melanocarpa* | Black Fruit Saw-sedge |
| *Gahnia radula* | a saw-sedge |
| *Gahnia sieberana* | Red-fruited Saw-sedge |
| *Geitonoplesium cymosum* | Scrambling Lily |
| *Gleichenia dicarpa* | Pouched Coral-fern |
| *Glochidion ferdinandi* | Cheese Tree |
| *Glycine clandestina* | Love Creeper |
| *Gompholobium latifolium* | Broad-leaf Wedge-pea |
| *Gonocarpus teucrioides* | Germander Raspwort |
| *Goodenia bellidifolia* subsp. *bellidifolia* | Daisy-leaved Goodenia |
| *Hakea salicifolia* | Willow-leaved Hakea |
| *Hardenbergia violacea* | Twining Pea |
| *Hedychium gardnerianum** | Ginger Lily* |
| *Hibbertia aspera* | Rough Guinea-flower |
| *Hibbertia linearis* | Showy Guinea-flower |
| *Hibbertia scandens* | Trailing Guinea-flower |
| *Holcus lanatus** | Yorkshire Fog* |
| *Hydrocotyle peduncularis* | A pennywort |
| *Hypericum gramineum* | Small St John's Wort |
| *Hypochaeris radicata** | Flatweed* |
| *Hypoxis hygrometrica* | Golden Star |
| *Impatiens balsamina** | Busy Lizzie* |
| *Imperata cylindrica* | Blady Grass |
| *Indigofera australis* | Austral Indigo |
| *Kennedia rubicunda* | Dusky Coral-pea |
| *Kunzea ambigua* | White Kunzea |
| *Lagenifera gracilis* | Slender Lagenophora |
| *Lepidosperma laterale* | Variable Sword-sedge |
| *Lepidosperma neesi* | A rapier sedge |
| *Leptocarpus tenax* | A twine-rush |
| *Leptomeria acida* | Native Currant |

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Leptospermum polygalifolium* subsp. *polygalifolium* | Yellow Tea-tree |
| *Leucopogon juniperinus* | Juniper Beard-heath |
| *Leucopogon lanceolatus* subsp. *lanceolatus* | Lance Beard-heath |
| *Lilium formosanum** | Formosan Lily* |
| *Livistona australis* | Cabbage Palm |
| *Lobelia alata* | A lobelia |
| *Lomandra longifolia* | Spiny-headed Mat-rush |
| *Lomatia ilicifolia* | Holly-leaved Lomatia |
| *Lonicera japonica** | Japanese Honeysuckle* |
| *Marsdenia rostrata* | Common Milk Vine |
| *Marsdenia suaveolens* | Sweet-scented Doubah |
| *Melaleuca ericifolia* | Swamp Paperbark |
| *Melaleuca linariifolia* | Snow-in-Summer |
| *Microlaena stipoides* | Weeping Meadow Grass |
| *Microtis parviflora* complex | Slender Onion Orchid |
| *Monotoca elliptica* | Tree Broom-heath |
| *Morinda jasminoides* | Jasmine Morinda |
| *Nephrolepis cordifolia** | Fishbone Fern* |
| *Notelaea longifolia* | Mock Olive |
| *Notelaea venosa* | Mock Olive |
| *Olearia viscidula* | Wallaby Weed |
| *Opercularia aspera* | Common Stinkweed |
| *Opercularia varia* | A stinkweed |
| *Oplismenus aemulus* | Basket Grass |
| *Oplismenus imbecillis* | Basket Grass |
| *Oxalis exilis* | Slender Oxalis |
| *Ozothamnus diosmifolium* | Everlasting |
| *Pandorea pandorana* | Wonga-wonga Vine |
| *Panicum simile* | Two Colour Panic |
| *Parsonsia straminea* | Common Silkpod |
| *Patersonia glabrata* | Leafy Purple Flag |
| *Pennisetum clandestinum** | Kikuyu* |
| *Persoonia linearis* | Narrow-leaf Geebung |

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Persoonia mollis* subsp. *caleyi* | Soft Geebung |
| *Petrophile pedunculata* | Stalked Conesticks |
| *Phyllanthus hirtellus* | Thyme Spurge |
| *Pimelea linifolia* subsp. *linifolia* | Slender Rice-flower |
| *Pittosporum revolutum* | Rough-fruit Pittosporum |
| *Pittosporum undulatum* | Sweet Pittosporum |
| *Platylobium formosum* | Handsome Flat-pea |
| *Poa labillardieri* var. *labillardieri* | Tussock |
| *Podolobium ilicifolium* | Native Holly |
| *Polymeria calycina* | Polymeria |
| *Pratia purpurascens* | Whiteroot |
| *Protasparagus aethiopicus** | Asparagus Fern* |
| *Pseuderanthemum variabile* | Pastel Flower |
| *Psychotria loniceroides* | Hairy Psychotria |
| *Pteridium esculentum* | Common Bracken |
| *Pultenaea daphnoides* | Large-leaf Bush-pea |
| *Pultenaea linophylla* | Halo Bush-pea |
| *Pultenaea retusa* | A bush-pea |
| *Rapanea variabilis* | Mutton Wood |
| *Rhodamnia rubescens* | Scrub Turpentine |
| *Rubus hillii* | Native Raspberry |
| *Rubus moluccanus* var. *trilobus* | Broad-leaved Bramble |
| *Rubus parvifolius* | Native Raspberry |
| *Rubus ulmifolius** | Blackberry* |
| *Sambucus nigra** | Common Elder* |
| *Santalum obtusifolium* | Sandalwood |
| *Scaevola ramosissima* | Snake-flower |
| *Schelhammera undulata* | Lilac Lily |
| *Schoenus melanostachys* | A bog-rush |
| *Senecio hispidulus* var. *hispidulus* | A groundsel |
| *Senna floribunda** | Senna* |
| *Senna pendula** | Senna* |
| *Smilax glyciphylla* | Native Sarsaparilla |

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| *Sonchus sp** | A sowthistle* |
| *Stenocarpus salignus* | Scrub Beefwood |
| *Stenotaphrum secundatum** | Buffalo Grass* |
| *Stephania japonica* | Snake Vine |
| *Syncarpia glomulifera* subsp. *glomulifera* | Turpentine |
| *Synoum glandulosum* subsp. *glandulosum* | Scentless Rosewood |
| *Taraxacum officinale** | Dandelion* |
| *Tetratheca thymifolia* | Black-eyed Susan |
| *Thelymitra* sp. | A Sun Orchid |
| *Themeda australis* | Kangaroo Grass |
| *Thysanotus tuberosus* | Fringe Lily |
| *Trema aspera* | Native Peach |
| *Tylophora barbata* | Bearded Tylophora |
| *Vernonia cinerea* var. *cinerea* | Vernonia |
| *Viola hederacea* | Native Violet |
| *Watsonia meriana** | Wild Watsonia* |
| *Xanthorrhoea* sp. | A grass tree |

* Denotes introduced species or planting.

## *3.4. Fauna*

### 3.4.1 Fauna Habitats

The fauna habitats present in the study area are those generally associated with coastal open forests and broad ephemeral drainage depressions in the coastal parts of the locality.

The study area contains foraging resources in the form of scattered Red Bloodwood sap trees and a reasonable abundance of winter-flowering trees such as Grey Ironbark. There is an abundance of fleshy fruit provided by fruit-bearing plant species such as Lilly Pilly, Water Vine, Native Peach, Sweet Pittosporum, Rough-fruit Pittosporum and Wombat Berry. There are also many flowering acacias, occasional tree or shrub banksias, and concentrations of *Melaleuca* spp. throughout the study area. These could provide foraging substrates for arboreal mammals, flying mammals and birds. Some of the Red Bloodwood trees contained incisions and chew marks consistent with those made by the Sugar Glider *Petaurus breviceps*.

There are about 40 trees containing hollows of varying sizes some of which could provide nest sites for birds such as the Gang-gang Cockatoo *Callocephalon fimbriatum* and Glossy Black-cockatoo *Calyptorhynchus lathami,* or mammals including the Common Brushtail Possum

*Trichosurus vulpecula* or Common Ringtail Possum *Pseudocheirus peregrinus*, which were both recorded in the study area. Several very large hollows provide potential roosting or nesting sites for forest owls such as the Powerful Owl *Ninox strenua*. The locations of trees with hollows are shown in Figure 6 (Appendix A).

There are a moderate number of fallen logs within the study area. About half of these contain hollows, limiting the amount of shelter provided for terrestrial fauna species. Shelter for such species provided by understorey and groundcover vegetation, is limited in the west probably as a result of prescribed burning. The groundcover in the east is greater because of a dense vegetative layer formed by Drooping Sedge, Variable Sword-sedge, Basket Grass, Spiny-headed Mat-rush, and Common Bracken Fern. This groundcover provides excellent shelter and foraging resources for small ground dwelling mammals and birds and a large variety of insectivorous birds. The thick understorey of Yellow Tea-tree and Snow in Summer in the Bangalay Paperbark Woodland would also provide nesting habitat for birds.

Drainage A contained water in its southern margins at times during the survey period but appears to remain mostly dry. This limits the availability of habitats for amphibians in the study area. Rock habitats were not observed within the study area.

The study area is connected to adjacent vegetated habitats along the western and northern boundaries. The roads in these locations do not appear to provide significant barriers to faunal dispersal.

### 3.4.2 Fauna Species

Targeted fauna surveys and opportunistic observations during the survey period resulted in the detection of 69 faunal species inhabiting the study area. All of these species are native and none are introduced. Four threatened species, the Greater Broad-nosed Bat *Scoteanax rueppellii,* Gang-gang Cockatoo *Callocephalon fimbriatum*, Powerful Owl *Ninox strenua,* and Square-tailed Kite *Lophoictinia isura* were recorded during the survey period.

Fourteen mammals, 50 birds and two reptiles and three amphibians were recorded within the study area during the survey period and these are listed in Table 5.

**Table 5: Fauna species identified during this study.**

| CATEGORY | COMMON NAME | SCIENTIFIC NAME | DETECTION METHOD |
|---|---|---|---|
| Mammals | Agile Antechinus | *Antechinus agilis* | Direct observation |
| | Bush Rat | *Rattus fuscipes* | Direct observation |
| | Common Brushtail Possum | *Trichosurus vulpecula* | Direct observation |
| | Common Ringtail Possum | *Pseudocheirus peregrinus* | Direct observation |
| | Dusky Antechinus | *Antechinus swainsonii* | Direct observation |
| | Eastern Broad-nosed Bat | *Scotorepens orion* | ANABAT |

| CATEGORY | COMMON NAME | SCIENTIFIC NAME | DETECTION METHOD |
|---|---|---|---|
| | Greater Glider | *Petauroides volans* | Direct observation |
| | Gould's Wattled Bat | *Chalinolobus gouldii* | ANABAT |
| | Greater Broad-nosed Bat | *Scoteanax rueppellii* | ANABAT |
| | A Freetail Bat | *Mormopterus sp1.* | ANABAT |
| | Large Forest Bat | *Vespadelus darlingtoni* | ANABAT |
| | Little Forest Bat | *Vespadelus vultumus* | ANABAT |
| | Sugar Glider | *Petaurus breviceps* | Call recognition |
| | Swamp Wallaby | *Wallabia bicolor* | Direct observation |
| Birds | Australian King Parrot | *Alisterus scapularis* | Call recognition |
| | Australian Magpie | *Gymnorhina tibicen* | Direct observation |
| | Australian Raven | *Corvus coronoides* | Call recognition |
| | Azure Kingfisher | *Alcedo azurea* | Direct observation |
| | Black-faced Cuckoo-shrike | *Coracina novaehollandiae* | Direct observation |
| | Black-faced Monarch | *Monarcha melanopsis* | Direct observation |
| | Brown Pigeon | *Macropygia amboinensis* | Direct observation |
| | Brown Thornbill | *Acanthiza pusilla* | Direct observation |
| | Channel-billed Cuckoo | *Scythrops novaehollandiae* | Call recognition |
| | Common Koel | *Eudynamys scolopacea* | Direct observation |
| | Crimson Rosella | *Platycercus elegans* | Direct observation |
| | Dollarbird | *Eurystomas orientalis* | Call recognition |
| | Eastern Spinebill | *Acanthorhynchus tenuirostris* | Direct observation |
| | Eastern Whipbird | *Psophodes olivaceus* | Call recognition |
| | Eastern Yellow Robin | *Eopsaltria australis* | Call recognition |
| | Fan-tailed Cuckoo | *Cacomantis flabelliformis* | Direct observation |
| | Galah | *Cacatua roseicapilla* | Direct observation |
| | Gang-gang Cockatoo | *Callocephalon fimbriatum* | Call recognition |
| | Grey Butcherbird | *Cracticus torquatus* | Direct observation |
| | Grey Shrike-Thrush | *Colluricincla harmonica* | Call recognition |
| | Grey Fantail | *Rhipidura fuliginosa* | Direct observation |
| | Laughing Kookaburra | *Dacelo novaeguineae* | Call recognition |
| | Leaden Flycatcher | *Myiagra rubecula* | Direct observation |
| | Lewin's Honeyeater | *Meliphaga lewinii* | Direct observation |
| | Magpie-lark | *Grallina cyanoleuca* | Direct observation |

| CATEGORY | COMMON NAME | SCIENTIFIC NAME | DETECTION METHOD |
|---|---|---|---|
| | Mistletoebird | *Dicaeum hirundinaceum* | Direct observation |
| | Musk Lorikeet | *Glossopsitta concinna* | Direct observation |
| | Noisy Friarbird | *Philemon corniculatus* | Direct observation |
| | Olive-backed Oriole | *Oriolus sagittatus* | Direct observation |
| | Pallid Cuckoo | *Cuculus pallidus* | Direct observation |
| | Pied Currawong | *Strepera graculina* | Direct observation |
| | Powerful Owl | *Ninox strenua* | Direct observation |
| | Rainbow Lorikeet | *Trichoglossus haematodus* | Direct observation |
| | Red Wattlebird | *Anthochaera lunulata* | Direct observation |
| | Red-browed Finch | *Neochmia temporalis* | Direct observation |
| | Rufous Fantail | *Rhipidura rufifrons* | Direct observation |
| | Rufous Whistler | *Pachycephala rufiventris* | Direct observation |
| | Satin Bowerbird | *Ptilonorhynchus violaceus* | Direct observation |
| | Silvereye | *Zosterops lateralis* | Direct observation |
| | Spotted Pardalote | *Pardalotus punctatus* | Direct observation |
| | Square-tailed Kite | *Lophoictinia isura* | Direct observation |
| | Striated Pardalote | *Pardalotus striatus* | Direct observation |
| | Sulphur-crested Cockatoo | *Cacatua galerita* | Direct observation |
| | Superb Fairy-wren | *Malurus cyaneus* | Direct observation |
| | White-browed Scrubwren | *Sericornis frontalis* | Direct observation |
| | White-throated Treecreeper | *Cormobates leucophaeus* | Direct observation |
| | Willie Wagtail | *Rhipidura leucophrys* | Direct observation |
| | Wonga Pigeon | *Leucosarcia melanoleuca* | Direct observation |
| | Yellow-faced Honeyeater | *Lichenostomus chrysops* | Direct observation |
| | Yellow-tailed Black-Cockatoo | *Calyptorhynchus funereus* | Direct observation |
| Reptiles | Diamond Python | *Morelia spilota* | Direct observation |
| | Garden Sun-Skink | *Lampropholis delicata* | Direct observation |
| Amphibians | Bibron's Toadlet | *Pseudophryne bibronii* | Call recognition |
| | Common Eastern Froglet | *Crinia signifera* | Call recognition |
| | Peron's Tree Frog | *Litoria peronii* | Call recognition |

# 4. CONSERVATION SIGNIFICANCE

The *NSW Threatened Species Conservation Act 1995* (*TSC Act*) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) provide for the listing of threatened flora and fauna species. The *EPBC Act* also provides for the listing of migratory species. The *NSW Fisheries Management Act 1994* (*FM Act*) provides for the listing of threatened fish species and marine vegetation.

The *TSC Act* classifies threatened flora and fauna species as Endangered (Schedule 1, Part 1), Vulnerable (Schedule 2), or Presumed Extinct (Schedule 1, Part 4). Records of these species may be obtained by searching the Atlas of NSW Wildlife.

The *EPBC Act* classifies threatened flora and fauna species as Extinct, Critically Endangered, Endangered or Vulnerable. An indication of the threatened and migratory species likely to be encountered in a locality may be obtained by using the *EBPC Act* Protected Matters Search Tool. Both of these databases were searched on 4 February 2005 for records of threatened flora, threatened fauna and migratory species within an area of 10 km x 10 km centred on the study area. The *FM Act* classifies threatened fish and marine vegetation as Endangered, Vulnerable, or Presumed Extinct. An indication of the species likely to be encountered in a locality may be obtained by reviewing the recommendations for threatened species listed on the schedules of the *FM Act*.

## *4.1 Threatened Flora*

The outcome of database searches for threatened flora is shown in Table 6 below with the status of each species listed as endangered (E) or Vulnerable (V). The potential for each of these species to occur in the study area and the importance of the habitats to be affected by the proposal are discussed in Table 6 and a decision made regarding the need or otherwise for further assessment in this report.

**Table 6: Threatened flora species recorded or likely to occur in the locality.**

| THREATENED FLORA SPECIES | STATUS | | POTENTIAL TO OCCUR IN THE STUDY AREA AND IMPORTANCE OF HABITATS TO BE AFFECTED BY THE PROPOSAL | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|---|---|
| | TSC Act | EPBC Act | | |
| *Cryptostylis hunteriana*<br>Leafless Tongue Orchid | V | V | This terrestrial orchid is known from swamp-heath and open forest on sandy soils in coastal districts. The species is known from a population approximately 1150 m to the north of the study area. Targeted surveys for the species undertaken during the flowering period failed to detect the species within the study area so it is considered unlikely that the species occurs there. | Yes |

| THREATENED FLORA SPECIES | STATUS | | POTENTIAL TO OCCUR IN THE STUDY AREA AND IMPORTANCE OF HABITATS TO BE AFFECTED BY THE PROPOSAL | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|---|---|
| | TSC Act | EPBC Act | | |
| *Thesium australe* Austral Toad-flax | V | V | This species is associated with native grasslands and is a hemi-parasite of Kangaroo Grass which occurs in very low densities within the study area. Kangaroo Grass occurs sporadically throughout the study area and targeted surveys for the species were undertaken in conjunction with surveys for *C. hunteriana*. The species was not detected within the study area despite considerable survey effort and it is considered highly unlikely that the species would occur there. | No |

Note: Habitat requirements for flora species in Table 6 have been sourced from: Bishop (2000), Clarke *et al.* (2004), and Harden (1994).

The proposal will not impact any threatened flora species but further consideration will be given to the Leafless Tongue-orchid *Cryptostylis hunteriana* in subsequent sections of this report as a population of the species occurs in similar habitat near the study area.

## *4.2 Threatened Fauna*

The outcomes of database searches for threatened fauna and the review of recommendations for threatened species listed on the schedules of the *FM Act* are shown in Table 7 below with the status of each species listed as endangered (E) or Vulnerable (V). The potential for each of these species to occur in the study area and the importance of the habitats to be affected by the proposal are discussed in Table 7 and a decision made regarding the need or otherwise for further assessment in this report. Additional species that may inhabit the study area have also been included by correlating habitat requirements with the attributes of the study area. Marine and oceanic species have been omitted as they would not occur in the study area.

**Table 7: Threatened fauna species recorded or likely to occur in the locality.**

| THREATENED FAUNA SPECIES | STATUS | | POTENTIAL TO OCCUR IN THE STUDY AREA AND IMPORTANCE OF HABITATS TO BE AFFECTED BY THE PROPOSAL | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|---|---|
| | TBC Act | EPBC Act | | |
| Mammals | | | | |
| Greater Broad-nosed Bat *Scoteanax rueppellii* | V | - | This bat roosts in tree hollows and forages in forests. Suitable habitat is present in the study area for foraging and roosting. Echolocation calls attributed to this species were detected on one occasion during the survey period. | Yes |
| Eastern Freetail Bat *Mormopterus norfolkensis* | V | - | This bat roosts in tree hollows and forages in forests. Suitable foraging habitat and trees with hollows are present in the study area. It was not detected within the study area during the survey period. | No |

| THREATENED FAUNA SPECIES | STATUS | | POTENTIAL TO OCCUR IN THE STUDY AREA AND IMPORTANCE OF HABITATS TO BE AFFECTED BY THE PROPOSAL | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|---|---|
| | TBC Act | EPBC Act | | |
| Koala *Phascolarctos cinereus* | V | - | No primary feed trees for this species occur in the study area. However there are individuals of supplementary feed tree species. There are no recent records of the species in the locality or evidence of the species within the study area. The species was not detected during the survey period and is unlikely to occur there. | No |
| Southern Brown Bandicoot *Isoodon obesulus* | E | E | This species requires thick contiguous undergrowth where the soil is light and sandy. The site contained both thick undergrowth and appropriate sandy substrate in places. Bandicoot diggings were observed in the study area but the species was not detected despite targeted cage trapping. The digging signs observed are likely to have been attributable to the Long-nosed Bandicoot *Perameles nasuta* which is common in the locality. It is considered unlikely that the species occurs within the study area. | No |
| Squirrel Glider *Petaurus norfolcensis* | V | - | The species dens in tree hollows and forages in open forests where it's preferred feed trees are found. There are few records of the species in the locality. The study area contains hollows that provide potential denning and breeding habitat for the species however it does not appear to provide high quality foraging habitat. The species was not detected despite numerous stagwatching and spotlighting surveys. | No |
| Yellow-bellied Glider *Petaurus australis* | V | - | The species dens in tree hollows and forages in open forests where preferred feed trees are found. The preferred feed tree Red Bloodwood is reasonably abundant within the study area but no evidence of sap feeding activity was observed. The species was not detected despite targeted survey techniques such as call playback, stagwatching and spotlighting within the study area. | No |
| **Birds** | | | | |
| Gang-gang Cockatoo *Callocephalon fimbriatum* | V | - | Gang-gang cockatoos live as pairs inhabiting the woodlands and forests of south-eastern Australia. They feed on the seeds of eucalypts and acacias and occasionally fruits of plant species such as *Persoonia* spp. Nest sites are usually within medium sized hollows in living eucalypts and generally are located in the tall montane forests and woodlands where the species is concentrated during the summer months. Egg-laying occurs from late spring to early summer with one or two young being raised per clutch. Roosting and foraging resources are available within the study area and the species was recorded from its call immediately adjacent to the study area in December 2004. | Yes |

| THREATENED FAUNA SPECIES | STATUS | | POTENTIAL TO OCCUR IN THE STUDY AREA AND IMPORTANCE OF HABITATS TO BE AFFECTED BY THE PROPOSAL | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|---|---|
| | TBC Act | EPBC Act | | |
| Glossy Black-cockatoo<br>*Calyptorhynchus lathami* | V | - | This species occurs in forests and woodlands where She-oak feeding resources are prevalent and large tree hollows exist for breeding. It is known to forage in the residential parts of Manyana from time to time (Smithers pers. obs.). The study area does contain some She-oak feeding resources although no evidence of these resources being utilised by the species was observed during the survey period despite targeted searches. It is possible that the species may forage or potentially breed in the study area from time to time however no Glossy Black-cockatoos were recorded during the survey period despite targeted survey of potential breeding sites and searches for foraging evidence. Superior quality foraging and breeding habitat is available elsewhere in the large areas of bushland that occur in the locality. | No |
| Masked Owl<br>*Tyto novaehollandiae* | V | - | This species breeds in hollow trees and forages predominantly on terrestrial mammals. The species may hunt for prey in the open forests in the study area from time to time but the vegetation would form a very small amount of the species' vast home range. Open forest occurs within the study area but the shrub layer is too thick over much of the study area to allow useful foraging. There were several large hollows suitable for roosting and breeding within the study area, although the species was not detected during the survey period despite targeted survey of these potential resources. | No |
| Powerful Owl<br>*Ninox strenua* | V | - | Habitat for this species tends to be within eucalypt forest containing a diverse array of understorey plants. Preferred prey species include Ringtail Possums and Greater Gliders. Investigations during the survey period suggest that prey densities within the study area are moderate at best, probably as a result of the relatively low abundance of suitable hollow bearing trees. Targeted call playback surveys during the survey period failed to illicit a response from the species despite an individual being observed within the study area at dusk on two occasions. Marginal quality potential breeding habitat and associated roosting habitat occurs in the western parts of the study area, but targeted surveys failed to detect any evidence of it breeding there during the survey period. | Yes |
| Regent Honeyeater<br>*Xanthomyza phrygia* | E | E | This migrant to the region forages in winter-flowering trees such as Spotted Gum, Woollybutt, and Swamp Mahogany. Winter-flowering trees such as Grey Ironbark occur within the study area but they are not abundant. The species may forage was not recorded in the study area and the foraging resources there are insignificant relative to those available elsewhere in the locality and Shoalhaven local government area. | No |

| THREATENED FAUNA SPECIES | STATUS | | POTENTIAL TO OCCUR IN THE STUDY AREA AND IMPORTANCE OF HABITATS TO BE AFFECTED BY THE PROPOSAL | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|---|---|
| | TBC Act | EPBC Act | | |
| Sooty Owl<br>*Tyto tenebricosa* | V | - | This species is generally associated with closed forests and tall wet open forests. The study area provides marginal roosting and nesting habitat for this species, and relatively low quality foraging habitat. The species was not detected within the study area during the survey period despite the use of targeted call playback and spotlighting surveys and no roosting sites were observed. It is unlikely that the species would occur within the study area regularly nor be dependent upon the habitats there. | No |
| Square-tailed Kite<br>*Lophoictinia isura* | V | - | This summer migrant to the Shoalhaven hunts for passerines in coastal open forests and breeds in mature trees near waterways. This species was observed flying over the study area and foraging in the more disturbed and open habitats to the north and northeast during the survey period. The species may hunt for prey in the study area from time to time but the vegetation would form a very small amount of the species large foraging range. There is no high quality nesting habitat for the species as there are only a few large, mature trees. None of these trees are adjacent to substantial waterways and no evidence of raptor nests was observed. The species may forage in the study area from time to time, however it is unlikely to rely on the habitats there for foraging or nesting. | Yes |
| **Amphibians** | | | | |
| Green and Golden Bell Frog<br>*Litoria aurea* | E | V | This species prefers permanent, unshaded water bodies containing emergent vegetation such as Cumbungi. Such habitats do not occur in the study area. | No |

Note: Habitat requirements for fauna species in Table 7 have been sourced from Blakers *et al.* (1984), Churchill (1998), Clout (1989), Cogger (1996), Commonwealth DEH (1999), Daly and Murphy (1996), Ehmann (1997), McDowell (1996), NSW NPWS (1996), NSW NPWS (1998), NSW NPWS (2000), NSW NPWS www.npws.nsw.gov.au (accessed 2005), and Strahan (1995).

The Greater Broad-nosed Bat, Gang-gang Cockatoo, Square-tailed Kite and Powerful Owl were recorded in the study area during the survey period. The effects of the proposal on these threatened fauna species will be assessed in subsequent sections of this report.

## *4.3 Migratory Species*

The outcome of the database search for migratory species is shown in Table 8 below. The potential for each of these species to occur in the study area is discussed in Table 8 and a decision made regarding the need or otherwise for further assessment in this report. Species encountered in marine and wetland environments have been omitted as these habitats do not occur in the study area.

**Table 8: Migratory species recorded or likely to occur in the locality**

| SPECIES | OCCURRENCE OR POTENTIAL FOR MIGRATORY SPECIES TO OCCUR IN THE STUDY AREA | FURTHER ASSESSMENT REQUIRED IN THIS REPORT |
|---|---|---|
| Black-faced Monarch<br>*Monarcha melanopsis* | This migratory species is known to breed in damp forest types and forage in rainforest and eucalypt forest. The species was detected breeding in the moist vegetation in the north-eastern parts of the study area during the survey period. | Yes |
| Regent Honeyeater<br>*Xanthomyza phrygia* | This migrant to the region forages in winter-flowering trees such as Spotted Gum, Woollybutt, and Swamp Mahogany. Individuals of winter-flowering trees such as Grey Ironbark occur within the study area but they are not abundant. It is poss ble that the species may forage in the study area from time to time, however the foraging resources within the study area are insignificant relative to those available elsewhere in the locality and Shoalhaven local government area. | No |
| Rufous Fantail<br>*Rhipidura rufifrons* | This migratory species is known to utilise dense understorey in damp forests or beside rivers. Suitable habitat occurs within the moist vegetation in the north-eastern and central parts of the study area. The species was detected in the north-east during the survey period. | Yes |
| Satin Flycatcher<br>*Myiagra cyanoleuca* | This species inhabits lowland eucalypt forests. It is known to nest in dense gully vegetation. Suitable habitat is present within the study area but the species was not detected during the survey period. | No |
| White-bellied Sea-eagle<br>*Haliaeetus leucogaster* | This migratory species inhabits coastal environments such as islands, reefs, headlands, beaches, bays, estuaries, mangroves, inland swamps, lagoons, rivers and floodplains. The species is known to forage and breed in the locality however the species is unlikely to forage within the study area and there is no evidence of the species nesting there. | No |
| White-throated Needletail<br>*Hirundapus caudacutus* | This migratory species is associated with hillsides and is thought to spend all of its time in the air whilst in Australia. The study area is not on a prominent hillside so the species is unlikely to occur there. It was not detected during the survey period. | No |

The Black-faced Monarch and Rufous Fantail were recorded in the study area during the survey period in the locations shown in Figure 6 (Appendix A). The impacts of the proposal on these species will be assessed in a subsequent section of this report.

## *4.4 Endangered Populations*

The *TSC Act* provides for the listing of endangered populations on Schedule 1, Part 2. There are no endangered populations listed on the schedules of the *TSC Act* found in the Shoalhaven local government area.

## *4.5 Threatened Ecological Communities*

The *TSC Act* and *EPBC Act* provide for the listing of threatened ecological communities. None of the threatened ecological communities listed by the EPBC Act occur in the study area. Two communities in the study area, Bangalay Paperbark Woodland and Bangalay Moist Woodland/Open-forest appear to have affinities with endangered ecological communities listed by the *TSC Act*. The characteristics of these communities are discussed below in the context of the Final Determinations of the NSW Scientific Committee for endangered ecological communities.

The Bangalay Paperbark Woodland identified in this report shows floristic and structural affinities with the endangered ecological community *Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (NSW Scientific Committee 2005), hereafter referred to as *Swamp sclerophyll forest*.

Fieldwork in this community recorded 25 of the 59 (approximately 42%) characteristic species identified in the final determination for the community (NSW Scientific Committee 2004b) in the study area. The Bangalay Paperbark Woodland resembles the structural and floristic description of the *Swamp sclerophyll forest* (NSW Scientific Committee 2004b) as;

- it has a canopy dominated by Bangalay;
- it has a sub-canopy of small trees including Snow in Summer a bipinnate Acacia, Parramatta Green Wattle, and rainforest elements such as Black Wattle and Mutton Wood;
- it includes shrubs such as Yellow Tea-tree and Swamp Paperbark;
- it includes the vines Common Silkpod and Jasmine Morinda; and
- it as a groundcover and understorey dominated by sedges, ferns, forbs and grasses such as Tall Saw-sedge, Common Bracken, False Bracken, Spiny-headed Mat-rush, Blue Flax Lily, Native Violet, Bordered Panic and Blady Grass.

The Bangalay Paperbark Woodland within the study area occurs along a drainage line that is associated with the floodplain of a small coastal lagoon and occurs primarily below 20 m elevation. Given the characteristics of the Bangalay Paperbark Woodland within the study area it is considered to be representative of the *Swamp sclerophyll forest* and its location is shown in Figure 6 (Appendix A).

The study area also supports a small area within the Bangalay Moist Woodland/Open-forest where there is a low closed sub-canopy (to 6 m high) of Lilly Pilly over an area of approximately 0.15 ha. This small area of closed sub-canopy is unique within the study area in that whilst elsewhere within this community there is often a patchy sub-canopy including the hardier

species associated with littoral rainforest such as Lilly Pilly, Mock Olive and Scrub Turpentine *Rhodamnia rubescens*, this is the sole location where there is a closed sub-canopy.

Whilst this community is a small occurrence of a depauperate sub-canopy rainforest or closed forest it is not considered to comprise the endangered ecological community *Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions* as:

- the closed forest is a sub-canopy below a woodland / open forest of eucalypts. It does not comprise a closed forest canopy with scattered emergent individuals of eucalypt species;
- the structure of the closed forest sub-canopy is not strongly influenced by proximity to the ocean and there is no wind pruning on the windward side of the stand.
- the occurrence is not on a headland or hind dunes;
- the community is a small isolated closed sub-canopy of Lilly Pilly within a much more extensive community characterised by a more open sub-canopy dominated by Lilly Pilly. The work of KMA (1999), KMA (1995a) and Mills (1993) identify that forests dominated by Bangalay with sub-canopies dominated by hardier rainforest species are reasonably widespread in the Shoalhaven, whilst littoral rainforests are very restricted in distribution south of Jervis Bay and occur primarily on headlands and sands;
- the community does not occur in a part of the landscape where it would naturally have been afforded protection from fire. The protection from fire in recent times has likely been the result of anthropogenic factors such as the location of prescribed burns in adjacent areas.
- the community is not particularly species diverse, containing only 19 of the 78 species listed in the final determination for Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions (NSW Scientific Community 2004a);
- The community does not include Cheese Tree *Glochidion ferdinandi* or Guioa *Guioa semiglauca* of the Simple Littoral Rainforest of Mills (1998);
- The community would represent a depauperate example of the Coastal Lowland Sub Tropical / Littoral Rainforest of Thomas *et al.* (2000), as it contains only nine of the 28 positive diagnostic species and does not include the co-dominant canopy species Brittlewood *Claoxylon australe*, Giant Stinging Tree *Dendrocnide excelsa*, or Sandpaper Fig *Ficus coronata*; and
- The community does not contain the Figs *Ficus* spp. or Kurrajong *Brachychiton populneus* characteristic of the Bunga Head Rainforest of Keith and Bedward (1999).

## *4.6 Flora Species of Regional Conservation Significance*

The study area includes a number of plant species of local or regional conservation significance after Mills (1993), KMA (1993, 1995 a & b), and PlantNET (accessed February 2005). These species include:

**Christmas Orchid *Calanthe triplicata*** – The occurrence of between two and four individuals of this species within the Bangalay-Paperbark Woodland in the study area is an extension of the southern limit of the species known range (P. Hind, pers. comm., 2005) which is currently described as the Illawarra (PlantNET accessed February 2005). However anecdotal evidence suggests the species occurs as far south as Lemon Tree Creek south of Lake Tabourie (A. Findlay pers. comm., 2004).

**Willow-leaved Hakea *Hakea salicifolia*** – This species is near the southern limit of its known range within the study area. The southern limit is thought to be at Narrawallee (KMA 1995a).

**Hard-leaved Scribbly Gum *Eucalyptus sclerophylla*** - The species is near its southern known limit within the study area which is listed as Jervis Bay (Mills 1993, PlantNET accessed February 2005). However the species has also been recorded in the Mollymook – Ulladulla area (KMA 1995a) and occurs at least as far south as Burrill Lake (D. Young pers. comm., 2005).

# 5. EVALUATION OF IMPACTS

## *5.1 Impacts on Flora*

### 5.1.1 Vegetation Community Impacts

The full development of the proposal will eventually involve the removal or modification of up to approximately 18.22 ha of relatively undisturbed vegetation comprising approximately 12.90 ha of Northern Coastal Sands Shrub/Fern Forest and 5.32 ha of Bangalay Moist Woodland/Open-forest.

Vegetation communities in the Shoalhaven LGA have been mapped and their extent calculated (KMA 1999). KMA (1999) indicates that Blackbutt Tall Forest and Blackbutt – Bloodwood Forest, which most closely resemble the Northern Coastal Sands Shrub/Fern Forest are well-represented in lands managed for conservation purposes with approximately 63% and 50% of the estimated 15220 ha and 5845 ha of the communities respectively within the Shoalhaven occurring in National Parks estate, protective zonings, or lands managed by the Commonwealth for conservation purposes. Thomas *et al*. (2000) estimate that 13245 ha or approximately 78% of the original extent of the Northern Coastal Sands Shrub/Fern Forest community within the southern tablelands and south coast region is still extant and that 2920 ha or approximately 22% of the extant community is in conservation reserves. The impacts of the proposal on this community are acceptable in this context.

The Bangalay Moist Woodland/Open Forest within the study area appears to be intermediate between the Bangalay Forest and the Bangalay – Rainforest of Mills (1998) with continued protection from fire driving the succession towards the Bangalay – Rainforest. Communities dominated by Bangalay with an understorey dominated by rainforest species Bangalay – Rainforest whilst relatively limited in extent [a total area mapped in the Shoalhaven of approximately 106 ha (KMA 1999)], appear well conserved with an estimated 97% of the community within the Shoalhaven occurring in National Parks estate, protective zonings, or lands managed by the Commonwealth for conservation purposes. Bangalay Forest where the understorey is not dominated by rainforest elements as a result of more frequent fires is more common in the Shoalhaven and well conserved with an estimated 85% of the 1968 ha of the community occurring in National Parks estate, protective zonings, or lands managed by the Commonwealth for conservation purposes.

The 5.32 ha of Bangalay Moist Woodland/Open Forest within the study area equates to approximately 5 % of the estimated 106 ha of Bangalay – Rainforest and 0.28 % of the estimated 1968 ha of Bangalay Forest within the Shoalhaven according to the mapping of KMA (1999). However the Bangalay Moist Woodland/Open Forest within the study area was not mapped as a Bangalay dominated community by KMA (1999) and similar vegetation in the locality is mapped by KMA (1999) as Bangalay Forest, which would suggest that the extent of

these communities within the Shoalhaven LGA is greater than that mapped and that the impact of the proposal on these vegetation communities may be over-estimated.

In the context of the extent of Bangalay dominated communities within the Shoalhaven, the high proportion of these communities conserved in National Parks estate, protective zonings, or lands managed by the Commonwealth for conservation purposes, and the likely underestimation of the extent of the Bangalay – Rainforest of Mills (1998) within the locality and potentially within the Shoalhaven as a whole, the impacts of the proposal on the Bangalay Moist Woodland/Open Forest within the study area are considered acceptable.

Communities dominated by Bangalay with a sub-canopy of *Melaleuca* spp., and species associated with poorly drained areas do not appear to be common or well reserved within the Shoalhaven. Neither KMA (1999) nor Thomas *et al.* (2000) describe such a vegetation community. However forests or woodlands with emergent eucalypts [*i.e*. Swamp Mahogany or Woollybutt *E. longifolia*] and a paperbark sub-canopy, occupy approximately 1565 ha in the Shoalhaven with 58% of such communities occurring in National Parks estate, protective zonings, or lands managed by the Commonwealth for conservation purposes (KMA 1999). The Northern Coastal Lowlands Swamp Forest of Thomas *et al.* (2000) is estimated to currently occupy 459 ha or approximately 98.7% of the original extent of the community within the southern tablelands and south coast region with approximately 14 % of the extant community in conservation reserves.

It is likely that communities where a paperbark sub-canopy is present below a canopy of emergent eucalypts are more widespread and well reserved within the Shoalhaven than suggested by KMA (1999). Many occurrences are likely to be restricted to narrow bands along drainage lines or around the fringes of water bodies and to have gone unmapped. As such, communities dominated by Bangalay with a sub-canopy of paperbarks are also likely to be more widespread than suggested by KMA (1999), and this is supported by anecdotal evidence (author's personal observation).

However, in the context of the limited known extent of communities where a paperbark sub-canopy exists below an emergent eucalypt dominated canopy within the Shoalhaven, the estimated large reduction in extent of these communities since European settlement, and their subsequent classification as an endangered ecological community, the removal or modification of 0.92 ha of Bangalay Paperbark Woodland within the study area is considered unacceptable. As such the proposal includes the retention of the Bangalay Paperbark Woodland within the study area with a 10 m vegetated buffer to the community.

In summary, the proposal will not impose significant impacts on vegetation of high conservation value in the study area. The vegetation of conservation significance, Bangalay Paperbark Woodland, will be retained, provided with a vegetated buffer and dedicated to Shoalhaven City

Council. Strategies to mitigate the impacts on vegetation in the study area are discussed in a subsequent section of this report.

### 5.1.2 Threatened Flora Species Impacts

The proposal will not impact on threatened flora species. No threatened flora species were recorded in the study area during the survey period despite intensive survey coverage and they are not expected to occur there. However, the study area lies near a population of the Leafless Tongue-orchid *Cryptostylis hunteriana.*

**Leafless Tongue-orchid *Cryptostylis hunteriana***

With respect to the Leafless Tongue-orchid *Cryptostylis hunteriana*, the species is known from a small population approximately 1150 m to the north of the study area. The population to the north of the study area occurs in dry sclerophyll woodland / open-forest on clay with a heathy understorey.

Approximately 16.5 hours of targeted survey for the species was conducted within the study area during the survey period. Targeted surveys were timed to coincide with confirmation of flowering in the known population to the north of the study area. In addition to targeted surveys approximately 9.5 hours of random meander and quadrat flora surveys were also undertake throughout the study area during the species flowering period. Despite these surveys the species was not detected within the study area.

Targeted surveys for the species focused on those parts of the study area that provided potentially better quality habitat for the species such as those areas where the understorey includes a greater abundance of heathy species. However, targeted surveys were also undertaken in other parts of the study area that appeared less suitable as the species habitat requirements are not known precisely. Large numbers of other orchids in the genus (*C. subulata* and *C. erecta*) were detected within the study area. Where flowering stems were detected that were without leaves, and flowers were still in bud, these stems were marked and subsequently checked when the flowers had opened.

Given the survey effort for the species in the study area, it is considered reasonable to expect that the species would have been detected if it occurred there, even though the number of flowering stems at the nearby known population of the species appeared to be in lower abundance during the 2004/5 flowering season than in 2003/4.

It is considered very unlikely that the species occurs within the study area hence the proposal will not have any impacts on *Cryptostylis hunteriana*.

### 5.1.3 Regionally Significant Flora Species Impacts

The impact of the proposal on regionally significant flora will generally be relatively minor. Neither Hard-leaved Scribbly Gum nor Willow-leaved Hakea are abundant within the study area.

Hard-leaved Scribbly Gum is reasonably abundant elsewhere locally within Conjola National Park (KMA 1995b). Willow-leaved Hakea occurs on private property immediately to the north of the study area, in Conjola National Park (KMA 1995b), and at Narrawallee (KMA 1995a), and is likely to occur elsewhere in the locality.

The impact of the proposal on the Christmas Orchid will generally be relatively minor as the individuals of the species within the study area and their habitat within the remnant vegetation along Drainage A will be retained in a drainage reserve. Notwithstanding the potential to protect the species within the proposal, the impacts of the proposal are unlikely to be substantial given the likelihood that the species occurs elsewhere in the locality, or further south, in similar habitats.

In summary, the proposal will not impose significant impacts on any flora species of high conservation value in the study area. Flora species of regional conservation significance will be retained, provided with a vegetated buffer and dedicated to Shoalhaven City Council. Strategies to mitigate the impacts on vegetation in the study area are discussed in a subsequent section of this report.

## *5.2 Impacts on Fauna*

### 5.2.1 Fauna Habitat Impacts

The fauna habitats to be removed or modified for the proposal consist of a variety of foraging resources and potential roosting, denning, breeding or sheltering sites throughout the study area. These include approximately 36 hollow bearing trees that provide potential roosting and denning habitat for a range of common fauna species. Tree hollow roost or nest sites suitable for threatened owls, cockatoos, gliders and microchiropteran bats are very limited in the study area and represent relatively low quality resources for these species. Targeted surveys during the known breeding seasons of the Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl and Square-tailed Kite did not record breeding by any of these species in the study area. None of the hollow-bearing trees were inhabited by threatened hollow-dependent fauna during the survey period. Other shelter includes limited and relatively low quality diurnal roosting resources for the Powerful Owl, and patchy groundcover containing a reasonable abundance of fallen logs, some of which contain hollows.

The foraging habitat to be removed includes approximately 18.22 ha of open forests and woodlands containing a reasonable abundance of blossom, sap and nectar resources, Black She-oak cones and fleshy fruits. The habitats within the study area also support a moderate abundance of fauna that provide potential prey for threatened species such as the Powerful Owl and Square-tailed Kite. The vegetation within the study area, and in particular flowering eucalypts, are also likely to attract an abundance of insect prey for microchiropteran bats and may also attract foraging Grey-headed Flying–foxes from time to time.

Notwithstanding the presence of a reasonably diverse array and abundance of fauna habitats within the study area, the fauna habitats to be removed or modified by the proposal are not important in the context of the extent of similar habitats available elsewhere, both adjacent to the study area and in the locality. Lands nearby to the west of the study area appear to be less disturbed and support a greater abundance of old-growth elements consequently providing superior and more abundant fauna habitats than those observed within the study area.

BES inspected Crown land adjacent to the western boundary of the study area and confirmed that the Crown land has significant scenic and habitat values (Appendix D). The Crown land contains tall, old growth trees with a range of hollows and these trees could provide breeding resources for hollow-dependent fauna species. There is dry forest with a relatively open understorey on the mid-slopes and crests and damp forest with a dense understorey at lower elevations. The southern part of the Crown land exhibits high integrity and structural complexity and contains some very tall, old Blackbutt trees. Habitat complexity is high with micro-habitats such as rock outcrops, gullies, ephemeral drainage lines, trees with hollows, dry forests, moist forests and extensive leaf litter evident in places.

In summary, the proposal will not impose significant impacts on fauna habitats, given the context of the study area, the conservation value of the habitats found there and the presence of similar habitats of superior quality on adjacent and nearby lands with high conservation value. Strategies to mitigate the impacts on fauna habitats in the study area are discussed in a subsequent section of this report.

## 5.5 Threatened Fauna Species Impacts

The Greater Broad-nosed Bat, Gang-gang Cockatoo, Square-tailed Kite and Powerful Owl were recorded in the study area during the survey period.

**Greater Broad-nosed Bat *Scoteanax rueppellii***

The study area provides foraging resources for the Greater Broad-nosed Bat and there are at least 40 trees with hollows within the study area that could provide roosting habitat for this species. ANABAT surveys during the survey period resulted in the detection of the Greater Broad-nosed Bat foraging in the study area. Approximately 13 person-hours of stag watching surveys coupled with ANABAT recording failed to detect the species utilising any of the potential maternity roosting habitat within the study area.

The proposal involves the modification of up to 18.22 ha of potential foraging habitat which is a small proportion of the expected home range of this species and the extensive area of similar habitats available to this species elsewhere in the Manyana area.

There was no evidence of utilisation of the potential maternity roosting habitat within the study area during the survey period despite 13 person-hours of stag watching surveys over three

separate nights. The loss of this resource within the study area will not constitute a significant impact in the context of the abundance of similar potential habitat available to these species elsewhere in the locality. At least four trees with hollows will be retained within the Bangalay-Paperbark Woodland in the study area.

The proposal will not disrupt habitat connectivity for this species as the proposed vegetation modification will be located predominantly at the interface with existing residential development and the species is a highly mobile species capable of flying.

**Gang-gang Cockatoo *Callocephalon fimbriatum***

The study area provides foraging resources and potential nesting resources for the species. The species was recorded from its characteristic calls adjacent to the study area on one occasion.

Targeted surveying throughout the nesting period of this species did not detect the presence of nests in the study area or the immediate surrounds, hence the study area does not appear to be utilised by the species for breeding.

The proposal will remove a very small area of foraging habitat for the species relative to its home range but this will not sever habitat connections for the species as it is capable of flying. About 36 trees with hollows will be removed, but the species was not recorded breeding in any of these hollows despite targeted nesting assessment during the breeding season. Four trees with hollows will be retained within the Bangalay Paperbark Woodland.

The proposal is unlikely to disrupt the life cycle of the Gang-gang Cockatoo such that a viable local population of the species is likely to be placed at risk of extinction.

**Powerful Owl *Ninox strenua***

A single Powerful Owl was detected just after dusk on two occasions flying from the central to the outer margins of the study area. The study area includes an approximately 5 ha sized area in the western parts that is interspersed with moderate quality roosting habitat and associated with one stag that provides relatively low quality potential breeding habitat for the species. However, no evidence of the species breeding within the study area was observed despite targeted surveys during the survey period. No calls were heard from the species, nor did it respond to call playback surveys, which suggests that the individual observed within the study area may not be a territory-holding bird.

The proposal involves the modification of a relatively small amount of lower quality foraging habitat for the species relative to its large home range and the extent of better quality habitat available elsewhere in the locality. The study area appears to support a relatively low abundance of prey species for the Powerful Owl which is probably the result of the relatively low abundance of tree hollows. Prey species such as the Greater Glider are relatively abundant in suitable habitats elsewhere in the locality.

Targeted surveys during the survey period suggest that the potential roosting and breeding habitat within the study area is not particularly important for this species. Whilst a Powerful Owl was observed in the study area just after dusk on two occasions, the species was not heard calling and did not respond to call playback suggesting that the individual was not a territory holding bird. Neither the roosting nor potential breeding habitat for the Powerful Owl within the study area appeared to be of particularly good quality relative to that available elsewhere in the locality.

The removal of vegetation from the study area will not sever habitat connections for this species as it is a highly mobile species capable of flying and the study area is located at the interface of bushland and residential areas.

**Square-tailed Kite *Lophoictinia isura***

The Square-tailed Kite is a summer breeding migrant to the Shoalhaven where it prefers coastal and sub-coastal forests, especially on fertile soils with an abundance of small birds, reptiles and foliage insects. The species was observed flying over the study area and foraging in the more disturbed and open habitats to the north and northeast of the study area during the survey period. No nests were observed during the survey period.

The small area of foraging habitat to be modified by the proposal is insignificant in terms of the size of the foraging range of the species.

There is no high quality nesting habitat for the species within the study area as there are only a few large, mature trees. None of these trees are adjacent to substantial waterways and no evidence of raptor nests was observed during the survey period.

The removal of vegetation from the study area will not sever habitat connections for the species as it is highly mobile and capable of flying, and the study area is located at the interface of bushland and residential areas.

**Summary**

The impacts of the proposal on threatened fauna species are highly unlikely to be significant. The proposal will impact only a small area of foraging resources. No known breeding habitat will be impacted. The impacts will not affect areas of high conservation value and will be highly unlikely to disrupt the long-term viability of any local population of the Greater Broad-nosed Bat, Gang-gang Cockatoo, Square-tailed Kite and Powerful Owl. The proposal will remove trees with hollows that provide potential breeding habitat for these species, but these habitats were not utilised by these species during the survey period, are not restricted to the study area and occur abundantly on nearby lands of higher conservation value.

## *5.3 Impacts on Endangered Ecological Communities*

The study area supports approximately 0.92 ha of partly disturbed Bangalay Paperbark Woodland, a form of the endangered ecological community *Swamp sclerophyll forest* listed on

the *TSC Act*. The community occurs within the broad drainage line that drains the central and western parts of the study area flowing to the central parts of the southern study area boundary. This drainage line is referred to within this report as Drainage A.

The remnant is in reasonably good condition with little evidence of invasion by weed species or other evidence of anthropogenic disturbance, except along its southern edge. It is reasonably diverse with at least 25 of the 59 (approximately 42%) characteristic species identified in the final determination for the community (NSW Scientific Committee 2004b) recorded there.

The Bangalay Paperbark Woodland within the study area occurs along a drainage line that is associated with the floodplain of a small coastal lagoon and occurs primarily below 20 m elevation. This remnant is not contiguous with other areas of *Swamp sclerophyll forest* or other endangered ecological communities. Beyond the southern property boundary the community abuts cleared land associated with the existing Manyana residential area which includes a road, tennis court, community hall and playing field. Other endangered ecological communities listed on the *TSC Act*, such as the *Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (hereafter referred to as *Swamp oak floodplain forest*), are likely to occur in the lower catchment of the coastal lagoon behind Manyana Beach. However these areas are separated from the *Swamp sclerophyll forest* in the study area by over 400 m of clearing and urban development.

According to the NSW Scientific Committee Final Determination (NSW Scientific Committee 2004a) there was considered to be less than 1000 ha of remnant *Swamp sclerophyll forest* in the Sydney/South Coast region in the 1990s. The final determination suggests that the *Swamp sclerophyll forest* includes the Northern Coastal Lowlands Swamp Forest of Thomas *et al.* (2000), which is estimated to currently occupy 459 ha or approximately 98.7% of the original extent of the community within the southern tablelands and south coast region, with approximately 14 % of the extant community in conservation reserves. The Northern Coastal Lowlands Swamp Forest is described as being characterised by a canopy of Swamp Mahogany and does not mention Bangalay specifically as a canopy species. Mills (1998) also does not describe a community dominated by Bangalay with a sub-canopy of *Melaleuca* spp. within the Shoalhaven. However, Mills (1998) describes forests dominated by Paperbarks, or woodlands or forests with emergent eucalypts [*i.e*. Swamp Mahogany or Woollybutt *E. longifolia*] and a paperbark sub-canopy, and estimates that they occupy approximately 1716 ha in the Shoalhaven with 41% and 58% respectively occurring in National Parks estate, protective zonings, or lands managed by the Commonwealth for conservation purposes (KMA 1999).

As discussed above, the mapping of KMA (1999) does not include communities dominated by Bangalay with a sub-canopy of *Melaleuca* spp. Evidence suggests that such communities do occur elsewhere in the locality (Appendix D, Young 2003, Young 2006) and are also likely to comprise *Swamp sclerophyll forest*. This would suggest that the distribution of the extant area of *Swamp sclerophyll forest* in the region as stated by the NSW Scientific Committee (2004a) may

have been substantially underestimated. Much larger occurrences of *Swamp sclerophyll forest* occur elsewhere in the Shoalhaven particularly in the Jervis Bay area in association with Currambene Creek, Black Swamp, Moona Moona Creek, Carama Creek and Coonemia Creek which is the largest tributary of Lake Wollumboola. Some of these occurrences include contiguous areas of more than 250 ha (KMA 1999).

In this context, the 0.92 ha of *Swamp sclerophyll forest* within the study area is a small occurrence of the community with limited importance at a regional level.

The mapping of KMA (1999) suggests that *Swamp sclerophyll forest* within the locality is limited to occurrences associated with Pattimores Lagoon and Narrawallee Inlet, although anecdotal evidence suggests that the community is also likely to occur in association with the small coastal lagoons behind Washerwomans Beach, Monument Beach, Inyadda Beach and in association with Berringer Lake and Lake Conjola. KMA (1999) maps approximately 20 ha of Swamp Mahogany Paperbark Forest (ROB-MEL) in association with Narrawallee Inlet and approximately 13 ha in association with Pattimores Lagoon. BES recorded additional areas of *Swamp sclerophyll forest* on the shores of Berringer Lake and Lake Conjola to the west and south-west of the study area (Appendix C), and on sites west of Narrawallee Inlet (Smithers 2006), but the sizes of these occurrences have not been calculated.

In this context the 0.92 ha of *Swamp sclerophyll forest* within the study area is a small but important occurrence of the community at a local level.

The *Swamp sclerophyll forest* within the study area does not retain connectivity with other endangered ecological communities. Beyond the southern property boundary the community abuts cleared land associated with the existing Manyana residential area which includes a road, tennis court, community hall and playing field.

Connectivity with other vegetation in general will be affected in as much as the proposal will result in disturbance to or removal of the majority of the Northern Coastal Sands Shrub/Fern Forest within the study area, which abuts the *Swamp sclerophyll forest* in all directions except to the south. The impacts of this disruption to connectivity will be mitigated by the retention of a 10 m vegetated buffer around the remnant *Swamp sclerophyll forest*, and are considered to be acceptable in the context of the existing lack of connectivity to other remnant native vegetation lower in the catchment of the small coastal lagoon behind Manyana Beach, which has lead to a subsequent reduction in the ecological integrity and conservation value of *Swamp sclerophyll forest* within the study area.

The *Swamp sclerophyll forest* within the study area provides foraging resources for a range of non-threatened fauna in the canopy, mid-canopy and shrub strata, and nesting, breeding or roosting habitat in the four hollow-bearing trees that occur there. These resources will be retained within the proposal, although connectivity to these resources will be disrupted,

particularly for less mobile fauna that are not capable of flying. This impact is considered acceptable in the context of the extensive areas of similar resources available elsewhere, both adjacent to the study area and in the locality.

The proposal will not modify or remove any of *Swamp sclerophyll forest*. The community will be retained within the proposal along with a vegetated buffer that will appropriately minimise the potential for any adverse indirect impacts. The proposal may have indirect impacts on the community, mainly arising from edge effects, and changes in hydrology, however appropriate management practices, including the provision of a vegetated buffer and water sensitive urban design principles, have been incorporated into the proposal to control such effects. Other management practices to be implemented include appropriate fencing, sympathetic landscaping, and weed control as well as the preparation of a vegetation management plan for the long-term management of the community by Shoalhaven City Council.

In summary the impacts of the proposal on *Swamp sclerophyll forest* associated with the proposal are considered to be negligible at the regional/landscape and local levels.

## *5.4 Impacts on Endangered Populations*

The proposal will not impact any endangered populations as none are listed in the Shoalhaven local government area.

## *5.5 Impacts on Threatened Fish*

The proposal will not impact any threatened fish or marine vegetation listed by the *NSW Fisheries Management Act 1994*, as none are expected to occur there.

## *5.5 Impacts on Habitat Connectivity*

The study area provides known habitat for the Powerful Owl, Greater Broad-nosed Bat, Gang-gang Cockatoo and Square-tailed Kite. The proposal will not isolate currently interconnecting or proximate areas of habitat for these species or any other threatened species as all disturbances associated with the proposal will occur at the interface with residential areas. An exception is the vegetation that will be retained to minimise the impacts of the proposal on *Swamp sclerophyll forest*. The *Swamp sclerophyll forest* provides a small amount of potential foraging, nesting, breeding, hibernating or roosting habitat for these species. The investigations undertaken during the survey period suggest that these resources are not important resources for these species in the context of the extensive areas of similar resources available elsewhere, both adjacent to the study area and in the locality. However these potential resources will not be isolated by the proposal as all of these species are highly mobile as they are capable of flight.

The proposal will not isolate *Swamp sclerophyll forest* within the study area from interconnecting or proximate areas of this vegetation community, as it is currently isolated from other areas of the community as a result of the impacts of the existing residential development in the locality.

BES has recorded areas of *Swamp sclerophyll forest* on the shores of Berringer Lake and Lake Conjola a few hundred metres to the west and south-west of the study area. The nearest other occurrences of the community are more than 3.3 km away at Pattimores Lagoon although anecdotal evidence suggests that some *Swamp sclerophyll forest* occurs approximately 1 km to the north-east in association with the coastal lagoon behind Inyadda Beach and a few hundred metres to the south-east behind Manyana Beach. This suggests that existing disturbances have already restricted genetic exchange and access to this community on Lot 172 for species residing within *Swamp sclerophyll forest*. Even though, the proposal will isolate *Swamp sclerophyll forest* within the study area from other areas of native vegetation, this is not considered critical to the continued survival of the community given the current isolation regime. Some genetic exchange is likely to continue to be facilitated by highly mobile fauna species that will continue to inhabit the community from time to time after the proposal has been constructed.

With respect to the habitat corridor issues raised by the DEC, the proposal will not disrupt habitat connectivity between the Crown land in the west and Conjola National Park in the north. Habitat connectivity is currently sustained by a corridor with a minimum width of approximately 400 m (Figure 7 Appendix A). The minimum width of this habitat corridor will be reduced to approximately 250 m as a result of the proposal, which retains 62% of the existing corridor width. This extent of the habitat corridor will be adequate for the provision of habitat connectivity for the Powerful Owl, Greater Broad-nosed Bat, Gang-gang Cockatoo and Square-tailed Kite and other threatened species that may inhabit the Crown land. Kelly and Barry (1986) have shown that along watercourses, a habitat corridor with a width of 80-100 m is the minimum requirement for the long-term retention of higher order consumers such as birds and mammals, which can reside in corridors with such widths. This suggests that the 250 m wide habitat corridor remaining post-development of Lot 172, will be more than adequate to connect and sustain key threatened species and flora and fauna in general.

Observations of the Crown land west of Lot 172 undertaken by BES (Appendix D) indicated that only low level disturbances arising from adjacent urban development in Manyana are present and that these were limited to the periphery of the Crown land and to the small number of existing vehicle tracks through it. The Crown land is not currently subject to conservation management plans and its conservation value has not been significantly diminished by adjacent urban uses. This suggests that urban uses arising from the proposal are also unlikely to significantly diminish the conservation value of the Crown land and hence its integrity as a habitat corridor.

The DEC indicates that the initial analysis for the development of the Regional Conservation Guidelines to precede the Regional Conservation Plan has identified the retention and enhancement of the vegetated corridor that connects Crown lands in the Manyana area to nearby Conjola National Park as a regionally important conservation outcome.

The reduction of the current corridor width from 400 m to 250 m as a result of the proposal is unlikely to significantly diminish the habitat corridor values of the remaining vegetation in the corridor and would not jeopardise the conservation outcome identified by the DEC. Despite the proposal, the remaining vegetation could still function adequately as a habitat corridor and the enhancement of the corridor would still be able to occur via active management of the Crown land to sustain its corridor and habitat values.

## *5.6 Impacts on Koala Habitat (SEPP No. 44)*

*State Environmental Planning Policy No 44 – Koala Habitat Protection (SEPP No. 44)* was gazetted by the NSW Government in 1995. The aims of SEPP No. 44 are:

> *"to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline."*

It requires a judgement to be made about whether the land in a study area is potential and/or core koala habitat based on the proportion of trees present that are listed as Koala Feed Tree Species in Schedule 2 of the policy and/or the presence of koalas. These listed feed trees must constitute at least 15 % of the total number of trees in the upper or lower strata of the tree component for the vegetation to be classified as *potential koala habitat*. *Core koala habitat* is land where there is a resident population of koalas including breeding females.

The policy requires the preparation of plans of management before development consent can be granted in relation to areas of *core koala habitat*, encourages the identification of areas of *core koala habitat*, and encourages the inclusion of areas of *core koala habitat* in environment protection zones.

The policy applies to this proposal because:

- the land is within the Shoalhaven Local Government Area;
- the land has an area of more than 1 ha; and
- a development application has been made for the proposal.

The study area does not contain tree species that are listed as koala feed trees on Schedule 2 of *SEPP No. 44* and thus, the study area does not contain *potential koala habitat*. There is no evidence of koalas occurring within the study area and they were not detected during surveying either through direct observation, call recognition or through characteristic scratchings or scats.

The proposal will not impact on Koala habitat and a Plan of Management for Koala habitat is not required.

## *5.7 Impacts on Matters of NES (Commonwealth EPBC Act 1999)*

The *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) contains provisions to protect Commonwealth Land and matters of national environmental significance (NES) listed by the Act, including World Heritage properties, Ramsar wetlands, threatened species, migratory species, nuclear actions and the Commonwealth marine environment.

Under this Act a person may require assessment and/or approval from the Commonwealth Environment Minister if they are undertaking an action that has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

Administrative guidelines have been produced to assist proponents in determining whether an action should be referred to the Commonwealth Environment Minister for a decision on whether approval is required.

The proposal involves the clearing and/or modification of indigenous vegetation, and construction works, which may constitute an action defined by the *EPBC Act*.

The study area provides suitable habitat for the following matters of National Environmental Significance listed on the schedules of the *EPBC Act*:

- the Vulnerable Species *Cryptostylis hunteriana*; and
- the Migratory Species Black-faced Monarch, Rufous Fantail and Satin Flycatcher.

There are no Commonwealth Endangered Species, World Heritage Properties, Wetlands of National Importance, Commonwealth Marine Areas, or Commonwealth Land to be affected by the proposal.

The Department of Environment and Heritage raised the Giant Burrowing Frog *Heleioporus australiacus* as a potential issue for the study area, but the fieldwork undertaken for this report demonstrated that the study area does not provide suitable habitat for this species and it was not recorded there during the survey period.

**Commonwealth Vulnerable Species**

The study area is unlikely to contain any important populations of *Cryptostylis hunteriana*; necessary for the species' long-term survival and recovery. No individuals of this species were detected there despite approximately 16.5 person-hours of targeted surveys focusing on suitable habitat when the species was known to be flowering approximately 1 km to the north.

The 18.22 ha of native vegetation to be affected by the proposal is unlikely to contain a key source population of this species. Nor would it be likely to contain any potential populations likely to be necessary for maintaining genetic diversity, or near the limit of the species' range.

Thus, with respect to Commonwealth Vulnerable Species, the proposal is unlikely to:

- lead to a long-term decrease in the size of an important population of a species; or,
- reduce the area of occupancy of an important population; or,
- fragment an existing important population into two or more populations; or,
- adversely affect habitat critical to the survival of the species; or,
- disrupt the breeding cycle of an important population; or,
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; or,
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat; or,
- interfere substantially with the recovery of the species.

The proposal is unlikely to have a significant impact on Commonwealth Vulnerable Species listed by the *EPBC Act* that may occur in the study area.

**Commonwealth Migratory Species**

The Black-faced Monarch, Rufous Fantail and Satin Flycatcher are likely to utilise the mesic understorey and sub-canopy in the north-eastern parts of the study area from time to time for foraging and potentially breeding. The Black-faced Monarch and Rufous Fantail were detected within this part of the study area during the survey period and one pair of Black-faced Monarchs appeared to be breeding there. In the context of the extent of similar habitats available to these species elsewhere in the locality and region, the proposal is too small to adversely impact these species. The proposal will not substantially modify, destroy or isolate an area of important habitat, result in invasive species becoming established in such habitat, or seriously disrupt the life cycle of an ecologically significant proportion of these species' populations.

The proposal is unlikely to have a significant impact on Commonwealth Migratory Species listed by the *EPBC Act* that occur in the study area. The retention of vegetation along Drainage A will provide some potential breeding and foraging habitat for these species within the study area, albeit of lower quality than that in the north-east. As an ameliorative measure it is recommended that any clearing in the north-eastern parts of the study area be undertaken outside of the summer breeding season for these species to minimise potential impacts.

**EPBC Act Conclusion**

Following consideration of the administrative guidelines for determining significance for matters of national environmental significance that may occur in the study area, it is concluded that the proposal is unlikely to have a significant impact on any matter of national environmental significance, and that a referral to the Commonwealth Environment Minister is not required.

# 6. IMPACT MITIGATION

## *6.1 Threatened Species, Populations and Ecological Communities*

The extent, magnitude and significance of the impacts of the proposal on threatened species, populations and ecological communities listed on the *TSC Act* and *FM Act* have been assessed in sections 4 and 5 of this report in relation to the conservation importance of the habitat, populations and individuals likely to be affected by the proposal.

The affected threatened species, populations and ecological communities were identified as the Leafless Tongue-orchid, Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl, Square-tailed Kite and *Swamp sclerophyll forest*.

The Leafless Tongue-orchid was not recorded in the study area despite intensive targeted surveys during the known flowering season. The Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl and Square-tailed Kite were not recorded breeding in the study area despite targeted surveys during their known breeding seasons. The study area provides a very small area of foraging habitat for all of these highly mobile species.

In this context, the impacts of the proposal on the Leafless Tongue-orchid, Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl and Square-tailed Kite were not considered significant. About 1.5 ha of habitat for these species will be retained on Lot 172 by the proposal. This area comprises some foraging resources and potential breeding resources and will be managed in accordance with a vegetation management plan.

The assessment identified that the key biodiversity conservation issue for the proposal in the study area is *Swamp sclerophyll forest* and the proposal has been designed to avoid direct impacts on this endangered ecological community and mitigate indirect effects via appropriate hydrological and vegetation management. The following impact mitigation measures will be implemented for *Swamp sclerophyll forest*:

a) Retention of all *Swamp sclerophyll forest* on the site as Public Reserve.

b) Provision of a vegetated buffer generally with a minimum width of 10 m around the community;

c) Provision of roads adjoining the vegetated buffer to the community;

d) Provision of an appropriate perimeter fence for the vegetated buffer and/or the Public Reserve in which it is located;

e) Preparation of a vegetation management plan for the community and the Public Reserve in which it is located to address issues such as protection and maintenance of the vegetation and constructed wetlands, weed control, vegetation enhancement, control of access, monitoring and fire management;

f) Dedication of the community, the buffer and the Public Reserve in which it is located to Shoalhaven City Council;

g) Design of water cycle management and water quality treatment systems for the proposal that maintain the existing hydrologic regime in the area of the *Swamp sclerophyll forest* and protect the community from adverse water quality impacts (Storm Consulting 2006).

The requirement of the DEC to retain all vegetation west of the *Swamp sclerophyll forest* for the purposes of buffering the community from disturbances is not necessary to achieve protection of the community. Appropriate hydrologic and vegetation management is a viable alternative to the retention of the vegetation proposed by the DEC. The 10 m wide vegetated buffer in concert with the perimeter roads and appropriate fencing is considered adequate for the mitigation of edge effects on the community. Observations of edge effects arising from urban development on Lot 172 and in other areas of *Swamp sclerophyll forest* in Mollymook (Young 2006) indicate that edge effects extend for only a few metres into this community.

The provision of roads along the buffer perimeter accords with the requirements of the DEC. This will provide a clear line of demarcation between the urban area and the conservation area.

The vegetation management plan (VMP) will be prepared by a suitably qualified person and funded by the applicant. The VMP will be approved by the consent authority prior to its implementation. Responsibility for implementation of the VMP will rest with Shoalhaven City Council as the land containing the community is required to be dedicated to Council.

The water cycle management and water quality treatment systems are described in detail by Storm Consulting (2006), and its report concludes that:

> *The proposed stormwater management systems mitigate the increases in runoff due to the increase in impervious area and maintain similar flow patterns into the EEC area. The average annual flow is maintained at similar level to existing and the cumulative frequency distribution of flows greater than 10L/s (frequent storm flows) is similar. Peak flows for the 1 year ARI event into the EEC area are reduced from 0.942 m3/s in the pre-development case, to 0.7 m3/s in the post-development case.*
>
> *The MUSIC modelling shows that the proposed stormwater treatment systems collect a large amount of pollutants contained in runoff from the site. Annual pollutant loads for suspended solids and phosphorous are reduced to below pre-development levels. Nitrogen loads are increased by a small amount (6.7%). Average concentrations for TSS, TP and TN are all less than pre-development levels.*

The 7% increase in Nitrogen load is unlikely to significantly alter the composition of *Swamp sclerophyll forest* on Lot 172. Increased Nitrogen has been implicated with the invasion of exotic grasses into native vegetation (Badgery et. al. 2005), but this appears to be limited to areas of disturbance. Maintaining native vegetation biomass via appropriate vegetation management should ensure that the potential invasion of such grasses stimulated by slightly higher Nitrogen levels will be effectively mitigated.

The measures identified by Storm Consulting (2006) will be implemented by the applicant during the construction phase of the proposal and they have been devised by Storm Consulting in consultation with BES to achieve the desired outcome of minimising hydrological changes in order to sustain the integrity of the retained *Swamp sclerophyll forest* on Lot 172 in the long-term.

## *6.2 Other Components of Biodiversity*

The extent, magnitude and significance of the impacts of the proposal on other components of biodiversity have been assessed in sections 4 and 5 of this report as related to the conservation value of the habitat, populations and individuals likely to be affected by the proposal.

In this context, the impacts on vegetation communities, regionally significant flora species, fauna habitats, habitat connectivity, and matters of national environmental significance arising from the proposal are not considered significant.

The vegetation communities to be affected by the proposal are not restricted to the study area and are widespread and well–reserved in the Shoalhaven local government area and the region. No impact mitigation is required for the affected vegetation.

The regionally significant Christmas Orchid will be retained within the *Swamp sclerophyll forest* community and managed for conservation via an approved vegetation management plan. Drainage for the proposal will be designed to mimic as closely as possible the existing drainage regime for this vegetation in terms of water quality and quantity.

The fauna habitats to be affected by the proposal are not restricted to the study area. There are limited foraging substrates for fauna species and trees with hollows were inhabited by common and widespread fauna species. Superior habitats occur on adjacent and nearby lands. Some foraging resources and breeding habitats will be retained within the *Swamp sclerophyll forest* community and managed for conservation via an approved vegetation management plan.

The proposal will not impede or disrupt habitat connectivity in the Manyana area. Habitat connectivity to the north with a minimum width of 250 m will remain through adjacent lands to the west. The proposal includes the prohibition of cats from the new allotments in recognition of the habitat corridor values of the adjacent Crown land. No further impact mitigation is required for habitat connectivity.

The matters of national environmental significance to be affected by the proposal are the Black-faced Monarch and Rufous Fantail. These species were recorded in the north-east of the study area and could also utilise the *Swamp sclerophyll forest*. Although, the Black-faced Monarch was recorded breeding in the study area, the proposal is too small to seriously disrupt the life cycle of an ecologically significant proportion of this species population. Some foraging resources and breeding habitats will be retained within the *Swamp sclerophyll forest* community

and managed for conservation via an approved vegetation management plan. In addition, any clearing in the north-eastern parts of the study area will be undertaken outside of the summer breeding season for these species to minimise potential direct impacts.

# 7. CONCLUSIONS AND RECOMMENDATIONS

## *7.1 Conclusions*

This report has identified and described the biological environment of Lot 172 DP 755923 and Lot 823 DP 247285 Berringer Road and Cunjurong Point Road Manyana. The report has assessed the potential impacts on flora and fauna, including threatened and migratory species, endangered populations and threatened communities, or their habitats, of the proposal to undertake a residential subdivision on the property.

The affected threatened species, populations and ecological communities were identified as the Leafless Tongue-orchid, Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl, Square-tailed Kite and *Swamp sclerophyll forest*.

The key biodiversity conservation issue associated with the proposal was identified as the endangered ecological community *Swamp sclerophyll forest on the coastal floodplains of the North Coast, Sydney Basin and South East Corner bioregions*.

It is concluded that:

a) The proposal includes actions to avoid and mitigate impacts on *Swamp sclerophyll forest* that will maintain or improve the biodiversity values of this endangered ecological community. Some of these actions also provide impact mitigation for threatened fauna species, migratory species and flora species of regional conservation significance.

b) The proposal is unlikely to reduce the long-term viability of a local population of the Leafless Tongue-orchid, Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl, Square-tailed Kite or *Swamp sclerophyll forest*. The hydrologic and vegetation management practices to be implemented for the proposal along with the design of roads will provide appropriate long-term protection for the *Swamp sclerophyll forest.*

c) The proposal is unlikely to accelerate the extinction of the Leafless Tongue-orchid, Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl, Square-tailed Kite or *Swamp sclerophyll forest*. No populations of the Leafless Tongue-orchid were recorded in the study area. No evidence of breeding by the Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl and Square-tailed Kite was recorded in the study area. The extent of foraging resources for the Greater Broad-nosed Bat, Gang-gang Cockatoo, Powerful Owl and Square-tailed Kite to be affected by the proposal is very small relative to the home ranges of these highly mobile fauna species.

d) The proposal will not affect critical habitat as none is listed in the Shoalhaven local government area.

e) The study area does not contain any potential Koala habitat pursuant to *NSW State Environmental Planning Policy No 44 – Koala Habitat Protection*.

f) Following consideration of the administrative guidelines for determining significance under the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999*, the proposal is unlikely to have a significant impact on matters of National Environmental Significance, and a referral to the Commonwealth Environment Minister is not necessary.

## *7.2 Recommendations to Mitigate Impacts on Biodiversity Values*

The proposal will incorporate the following measures to mitigate the impacts on threatened species, populations, ecological communities, migratory species or their habitats, and minimise the impacts of the proposal on the flora and fauna values of the study area in general.

**Vegetation and Habitat Management**

1. *Swamp sclerophyll forest* within the study area will be retained within the proposal.

2. Generally, a buffer of undisturbed vegetation with a minimum width of 10 m will be provided to the *Swamp sclerophyll forest*.

3. The extent of *Swamp sclerophyll forest* will be marked in the field by an appropriately qualified person and the community and the buffer surveyed by a registered surveyor.

4. Trees will be retained within the proposal wherever possible.

5. Trees with hollows will be retained within the *Swamp sclerophyll forest* and its buffer and within the Public Reserve wherever possible.

6. All trees and vegetation to be retained will be appropriately protected from compaction of root systems, damage to trunks, and the build-up of soil around tree bases, by appropriate work practices during the construction phase of the proposal.

7. All vegetation to be retained will be protected from unauthorised access during the construction phase of the proposal. An induction program for workers will be developed and implemented to inform them of the limitations of the construction site. Temporary fencing will be installed along the edges of vegetation to be retained and workers will be instructed to avoid encroaching into such vegetation.

8. Trees with hollows to be felled during the construction phase, will be felled in accordance with the following procedures:

   a) Felling will be supervised by a fauna specialist appropriately licensed under the *NSW National Parks and Wildlife Act 1974*, for the purpose of rescuing displaced fauna.

   b) The fauna specialist will be suitably attired with protective clothing and have suitable equipment to undertake the work. A “green card” from an Occupational Health and

Safety Induction Training Course for Construction Work will also be held by the fauna specialist, who may also need to be suitably vaccinated (especially if there is potential for handling bats).

c) An appropriately skilled local wildlife carer must be notified at least 24 hours prior to the tree felling, that animals may be captured and that these animals may need care.

d) Any non-hollow-bearing trees around those with tree hollows to be felled will be removed first. At least one day will be left between clearing of the non-hollow-bearing trees and the hollow-bearing trees to allow fauna time to vacate the trees.

e) Prior to felling of the identified and marked hollow-bearing trees, the trees will be shaken or nudged by tree-felling equipment to encourage any fauna to vacate the trees.

f) If no animals emerge from the hollows after shaking or nudging, then the tree will be felled and lowered to the ground if possible.

g) If an animal emerges from a hollow following shaking or nudging of the tree, then at least 30 minutes will be allowed for the animal to leave the tree. If the animal comes to the ground, or when it is on the lower trunk, attempts will be made to capture the animal using a net. Captured animals will be immediately transferred to a suitably sized cotton bag and checked for obvious injury during the transfer process.

h) Captured animals will be placed in individual bags unless they are a family group to which separation would risk the survival of the young (i.e. a lactating female with young).

i) Once the tree has been felled, a search will be made of the branches around the tree for any fleeing fauna and hollows should be inspected with a torch for the presence of any animals. Attempts will be made to capture any fleeing fauna with a net, and animals inside hollows should be extracted by hand. Captured animals will be immediately transferred to a suitably sized cotton bag and checked for obvious injury during the transfer process.

j) Injured, shocked or immature captured animals will be placed in a cotton bag secured at the top. Bags will be wrapped in appropriate insulating material such as blankets and placed in a quiet, warm and preferably dark place until the wildlife carer can collect them. Details on the location of the capture and proposed release areas will be provided to the wildlife carer.

k) Uninjured animals will be released in appropriate habitat as soon as practicable (at night for nocturnal species).

9. Individuals of the Christmas Orchid *Calanthe triplicata* within the study area will be retained and protected within a vegetated corridor along Drainage A.

10. A Vegetation Management Plan (VMP) will be prepared by a suitably qualified person for the Public Reserve containing the *Swamp sclerophyll forest* and its vegetated buffer to be retained within the proposal. The VMP will address a number of matters including, but not limited to, protection and maintenance of the *Swamp sclerophyll forest*, Christmas Orchid *Calanthe triplicata* individuals, weed control, vegetation enhancement, control of access, monitoring and fire management.

11. Any clearing in the Bangalay Moist Woodland/Open Forest in the north-eastern parts of the study area will not be undertaken between the beginning of October and the end of February in any year to minimise potential impacts on breeding by the migratory species Black-faced Monarch and Rufous Fantail. If any clearing is to be undertaken during the breeding season then it will be preceded by targeted surveys for these species to assess potential impacts on breeding habitat.

12. Approximately 2.87 ha of land will be dedicated to Shoalhaven City Council as Public Reserve, in accordance with Council's contributions plan pursuant to Section 94 of the *EP&A Act*, including the 2.5 ha of Public Reserve containing the *Swamp sclerophyll forest* and its vegetated buffer.

**Drainage Management**

13. Drainage management within the proposal will be designed to minimise alterations to the hydrological regime of the catchment of the small coastal lagoon downstream of the study area.

14. Four constructed wetlands will be established by the proposal. Each of these will provide a high level of treatment to runoff from the proposed developed urban environment and will contain the following key features:

    a) Open water inlet area to collect sediment;

    b) Maintenance access to allow for collection of accumulated sediment;

    c) Shallow water, reed bed area to provide surface area for pollutant filtration; and

    d) Water level control at the outlet.

15. The principles of Water Sensitive Urban Design have been incorporated into the proposal and include the use of reclaimed water from the northern wastewater treatment plant of the Conjola Regional Sewerage Scheme for outdoor uses and toilet flushing, the provision of rainwater tanks for each household, the provision of infiltration devices on each lot to collect surface runoff, the construction of roadside swales to convey flows to the closest constructed wetland whilst removing pollutants, the construction of bio-retention trenches

running adjacent to the *Swamp sclerophyll forest* buffer to promote infiltration and interflow into the soil profile and maintain moisture for the vegetation, and the provision of a gross pollutant trap above the constructed wetland on the southern boundary to reduce suspended solids entering the wetland.

**Sediment Controls**

16. Appropriate sediment control measures will be established before the commencement of work on the proposal and retained in place until all bare areas have been revegetated.

17. An Erosion and Sediment Control Plan will be prepared in accordance with the Blue Book.

**Landscaping**

18. Exotic perennial grasses will not be sown in any areas that abut vegetation to be retained within the proposal. If grasses are to be used in these areas, for landscaping or soil stabilisation purposes, then indigenous native species or non-invasive exotic species will be used.

19. Native plants from the species list in Table 4 of this report will be included in any landscaping for the proposal.

20. No known environmental weeds or known invasive plant species will be planted within the study area in association with the proposal.

**Domestic Pet Management**

21. Any domestic pets to be kept within the sub-division will be restrained wholly within the dwelling curtilage at all times, or secured on a leash.

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**Personal communications/observations**

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# PRELIMINARY DOCUMENTATION

## ATTACHMENT L DETERMINATION OF MAJOR PROJECT NO. 05-0059 (2008)

**ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979**

**DETERMINATION OF MAJOR PROJECT NO. 05-0059**

**(FILE NO. 9040674)**

**182 LOT RESIDENTIAL SUBDIVISION OF LOT 172 DP 755923 & LOT 823 DP 247285 BERRINGER ROAD, CUNJURONG POINT ROAD AND SUNSET STRIP, MANYANA**

I, the Minister for Planning, having considered the following, pursuant to Part 3A of the *Environmental Planning & Assessment Act, 1979*, Section 75J Clause (2) determine the major project referred to in the attached Director-General's Environmental Assessment Report, by **granting approval** to the major project referred to in the attached Schedule 1 subject to the conditions of approval in the attached Schedule 2.

This approval applies to the plans, drawings and documents cited by the Proponent in their Environmental Assessment and amended plans, drawings and documents and the Proponent's amended Statement of Commitments in Schedule 3, subject to the conditions of approval in the attached Schedule 2.

Frank Sartor MP
**Minister for Planning**

Sydney, 8/7 2008

## SCHEDULE 1

### PART A—TABLE

| | |
|---|---|
| **Application made by:** | Allen, Price, and Associates<br>75 Plunkett Street, Nowra NSW 2541 |
| **Application made to:** | Minister for Planning |
| **Major Project Application:** | MP No. 05_0059 |
| **On land comprising:** | Lot 172 DP 755923 & Lot 823 DP 247285<br>Berringer Road, Cunjurong Point Road and Sunset Strip, Manyana |
| **Local Government Area** | Shoalhaven City Council |
| **For the carrying out of:** | Residential subdivision to create 182 residential allotments |
| **Estimated Cost of Works** | $5,200,000 |
| **Type of development:** | Major Project |
| **S.119 Public inquiry held:** | No |
| **Determination made on:** | |
| **Date consent is liable to lapse** | 5 years from the date of determination |

### PART B—NOTES RELATING TO THE DETERMINATION OF MP NO. 05_0059

#### *Responsibility for other approvals / agreements*

The Proponent is solely responsible for ensuring that all additional consents and agreements are obtained from other authorities, as relevant.

#### *Appeals*

The Proponent has the right to appeal to the Land and Environment Court in the manner set out in the *Environmental Planning and Assessment Act, 1979* and the *Environmental Planning and Assessment Regulation, 2000* (as amended).

#### *Appeals—Third Party*

A third party right to appeal to this development consent in the manner set out in the *Environmental Planning and Assessment Act, 1979* and the *Environmental Planning and Assessment Regulation, 2000* (as amended).

#### *Legal notices*

Any advice or notice to the consent authority shall be served on the Director-General.

#### *Section 94 Conditions*

This Major Project approval contains levies for development imposed under section 94 of the Act. The imposing of levies is in accordance with Shoalhaven City Council's Section 94 Contribution Plan 1993. The Contribution Plan may be inspected at Shoalhaven City Council, City Administrative Centre, Bridge Road, Nowra 2541 during normal business hours.

## PART C—DEFINITIONS

In this consent,

***Act*** means the *Environmental Planning and Assessment Act, 1979* (as amended).

***Advisory Notes*** means advisory information relating to the approved development but do not form a part of this consent.

***Council*** means Shoalhaven City Council.

***CPI*** means Consumer Price Index.

***Department*** means the Department of Planning or its successors.

***DECC*** means Department of Environment and Climate Change

***Director-General*** means the Director-General of the Department.

***Environmental Assessment*** means the Environmental Assessment and Technical Volumes prepared by Allen, Price & Associates and associated consultants dated September 2006 and additional reports of various dates.

***Minister*** means the Minister for Planning.

***MP No. 05_0059*** means the Major Project described in the Proponent's Environmental Assessment.

***PCA*** means a Principal Certifying Authority and has the same meaning as Part 4A of the Act.

***Proponent*** means Allen, Price & Associates or any party acting upon this consent.

***Regulation*** means the *Environmental Planning and Assessment Regulation, 2000* (as amended).

***Subject Site*** has the same meaning as the land identified in Part A of this schedule.

## SCHEDULE 2

## DRAFT RECOMMENDED CONDITIONS OF APPROVAL

## MAJOR PROJECT NO. 05_0059

## PART A—ADMINISTRATIVE CONDITIONS

### *A1 Development Description*

Approval is granted only to carrying out the development described in detail below:

(1) The staged subdivision of Lot 172 DP 755923 and Lot 823 DP 247285 into 182 residential lots, 1 playground space and playground area, 1 open space area including the Endangered Ecological Community and its associated buffer zones, new roads and associated drainage and subdivision works;

(2) Construction of physical infrastructure and services, including interallotment drainage, pedestrian/cycle pathways, bus stop and bus bay, safety control measures within the development and on Sunset Strip and a fully channelised left turn lane on Berringer Road;

(3) Construction of water sensitive urban design measures, including a stormwater quality system incorporating on-site detention and infiltration, 3 water quality control ponds, grassed road side swales and biofiltration trenches and a gross pollutant trap;

(4) Landscaping, vegetation management and associated works of the playground area, the Endangered Ecological Community and associated bushland reserve and public spaces along streets;

(5) Removal of trees within the residential lots (except the 10m buffer to rear of lots along proposed Road No. 4 and 6 which back onto existing residential properties) and subject to (7), the timing of removal of the trees shall be commensurate with development of each stage of the project;

(6) Removal of trees for the purposes of construction of civil and infrastructure works (as per Condition B7) and subject to (7), the timing of removal of the trees shall be commensurate with development of each stage of the project;

(7) Removal of trees and vegetation identified on Drawing No.24256-07 – Tree Details within the buffer referred to in (5) for the purpose of construction of infrastructure and services is permitted only with the consent of Council;

(8) Removal of trees within reserves for the construction of 3 water quality control ponds and commensurate with the respective stage of the development; and,

(9) Revegetation of the Endangered Ecological Community and associated maintenance as specified in Condition E17.

## *A2 Development in Accordance with Plans*

The development will be undertaken in accordance with the following drawings:

| Subdivision Layout Drawings prepared by Allen, Price & Associates and Specified below. | | |
|---|---|---|
| **Drawing No** | **Name of Plan** | **Date** |
| 24256-09 Layout H | Plan Showing Proposed Residential Subdivision on Lot 172 DP 755923 & Lot 823 DP 247285 at Berringer Road & Cunjurong Point Road, Manyana for Malbec Properties Pty Limited. | 9 November 2007 |
| 24256-07 – Tree Details | Plan Showing Tree Details & Building Line Setbacks Over Lot 172 DP 755923 & Lot 823 DP 247285 at Berringer Road & Cunjurong Point Road, Manyana for Malbec Properties Pty Limited. | 12 November 2007 |

## *A3 Development in Accordance with Documents*

The development will be undertaken in accordance with the following documents:

(1) Environmental Assessment Report – Project Approval 179 Lot Residential Subdivision - Lot 172 DP 755923 and Lot 823 DP 247285 Berringer Road, Cunjurong Point Road and the Sunset Strip, Manyana prepared by Cowman Stoddart Pty Ltd, September 2006;

(2) Transport Report for Proposed Residential Subdivision, Manyana prepared by Colston Budd Hunt & Kafes Pty Ltd, August 2006;

(3) Bushfire Protection Assessment - Proposed Residential Subdivision of Lot 172 (Portion 172) and Lot 823 Manyana (Ref: 04279) prepared by BES Bushfire + Environmental Services, August 2006;

(4) Flora and Fauna Assessment Proposed Residential Subdivision of Lot 172 DP 755923 and Lot 823 DP 247285 Berringer Road and Cunjurong Point Road, Manyana (Ref: 04383) prepared by BES Bushfire + Environmental Services, September 2006;

(5) Water Cycle Management – Report for Proposed Subdivision - Lot 172 DP 755923 and Lot 823 DP 247285 at Berringer Road and Cunjurong Point Road, Manyana (Project No. 555) prepared by Storm Consulting, September 2006;

(6) Design Guidelines – Cunjurong Point Road – Lot 172 DP 755923 Manyana, NSW prepared by Malbec Properties, August 2006

(7) A Heritage Impact Assessment of Malbec Properties' Proposed Residential Subdivision of Lot 172 DP 755923 and Lot 823 DP 247285, Manyana, South Coast of New South Wales prepared by Peter Kuskie and Edward Clarke, South East Archaeology, October 2006; and

(8) A Heritage Impact Assessment of Malbec Properties' Proposed Residential Subdivision of Lot 172 DP 755923 and Lot 823 DP 247285, Manyana, South Coast of New South Wales: Sub-Surface Archaeological Investigation prepared by Peter Kuskie and Edward Clarke, South East Archaeology, May 2007.

(9) The Preferred Project Report dated 20 November 2007 and associated Statement of Commitments, Bushfire Protection Report prepared by BES and

dated November 2007 and the Water Cycle Management Report prepared by Storm Consulting and dated October 2007.

### *A4 Inconsistency between documents*

In the event of any inconsistency between conditions of this approval and the drawings/documents referred to above, the conditions of this approval prevail.

### *A5 Prescribed Conditions*

The Proponent shall comply with the prescribed conditions of development consent under Clause 98 of the Regulation.

## PART B—PRIOR TO ISSUE OF CONSTRUCTION CERTIFICATE

### *Staging – Construction Certificates*

### *B1 Staging of Construction and Subdivision Works*

Separate Construction Certificates shall be obtained relating to the following stages of development, as approved:

**Stage 1**

Subdivision and creation of 30 residential lots and passive open space.

Infrastructure works: earthworks, removal of trees; roads, stormwater and drainage, services; civil works; water sensitive urban design measures including a water quality control pond; pedestrian/cycle pathways and link to pedestrian/cycle safety measures on Sunset Strip.

Construction of traffic safety measures within Stage 1 and pedestrian/cycle safety measures and two (2) speed control facilities on Sunset Strip.

Vegetation management and rehabilitation of the Endangered Ecological Community and associated buffer zone, involving removal of weeds, erection of appropriate fencing and undertaking landscaping measures within the buffer area in accordance with the requirements of Conditions B8 and B9.

**Stage 2**

Subdivision and creation of 32 residential lots.

Infrastructure works: earthworks, removal of trees; roads, stormwater and drainage, services; civil works; pedestrian/cycle pathways.

**Stage 3**

Subdivision and creation of 29 residential lots.

Infrastructure works: earthworks, removal of trees; roads, traffic calming device on Road 4, stormwater and drainage, services; civil works; water sensitive urban design measures; pedestrian/cycle pathways.

**Stage 4**

Subdivision and creation of 31 residential lots and passive open space.

Infrastructure works: earthworks, removal of trees; roads, stormwater and drainage, services, a water quality control pond; civil works; traffic calming devices on Road 3, pedestrian/cycle pathways.

Embellishment of playground area with enhanced landscaping, play equipment, drainage; walking paths and signage

Construction of a left turn lane (Type A) along Berringer Road at the Berringer Road-Inyadda Drive-Curver Drive intersection.

**Stage 5**

Subdivision and creation of 33 residential lots and passive open space.

Infrastructure works: earthworks, removal of trees; roads, stormwater and drainage, services; civil works; a water quality control pond, traffic calming device on Road 2, pedestrian/cycle pathways.

Construction of bus stop, bus bay and signage on Berringer Road.

**Stage 6**

Subdivision and creation of 27 residential lots.

Infrastructure works: earthworks, removal of trees; roads, stormwater and drainage, services; civil works.

The following conditions relate to each stage and must be completed, unless otherwise stated, prior to the issue of a Construction Certificate for each stage. Clearing of vegetation associated with Construction Certificate approval for each stage is permitted commensurate with that stage only, unless otherwise approved by Council.

## *Earthworks*

### *B2 Erosion and Sedimentation Control*

Soil erosion and sediment control measures shall be designed in accordance with the document *Managing Urban Stormwater–Soils & Construction Volume 1 (2004) by Landcom.* Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate for each stage.

## *Construction Management*

### *B3 Construction Management Plan*

Prior to the issue of Construction Certificate for each stage, a Construction Management Plan shall be submitted to and approved by the Certifying Authority. The Plan shall address, but not be limited to, the following matters where relevant:

(1) hours of work,

(2) contact details of site manager,

(3) erosion and sediment control (see also B2),

(4) traffic management (see also B4 below),

(5) noise and vibration management (see also B5 below),

(6) waste management (see also B6 below),

(7) flora and fauna management (see also B7 and B8 below).

The Proponent shall submit a copy of the approved plan to Council, if Council is not the Certifying Authority.

### *B4 Traffic & Pedestrian Management Plan*

Prior to the issue of Construction Certificate for each stage, a Traffic and Pedestrian Management Plan prepared by a suitably qualified person shall be submitted to and approved by the Certifying Authority. The Plan shall address, but not be limited to, the following matters:

(1) ingress and egress of vehicles to the site,

(2) loading and unloading, including construction zones,

(3) predicted traffic volumes, types and routes, and

(4) pedestrian and traffic management methods.

The Proponent shall submit a copy of the approved plan to Council, if Council is not the Certifying Authority.

### *B5 Noise and Vibration Management Plan*

Prior to the issue of Construction Certificate for each stage, a Noise and Vibration Management Plan prepared by a suitably qualified person shall be submitted to and approved by the Certifying Authority. The Plan shall address, but not be limited to, the following matters:

(1) Identification of the specific activities that will be carried out and associated noise sources,

(2) Identification of all potentially affected sensitive receivers including residences, schools, and properties containing noise sensitive equipment,

(3) The construction noise objective specified in the conditions of this consent,

(4) The construction vibration criteria specified in the conditions of this consent,

(5) Determination of appropriate noise and vibration objectives for each identified sensitive receiver,

(6) Noise and vibration monitoring, reporting and response procedures,

(7) Assessment of potential noise and vibration from the proposed construction activities including noise from construction vehicles and any traffic diversions,

(8) Description of specific mitigation treatments, management methods and procedures that will be implemented to control noise and vibration during construction,

(9) Justification of any proposed activities outside the construction hours specified in the conditions of this consent,

(10) Construction timetabling to minimise noise impacts including time and duration restrictions, respite periods, and frequency,

(11) Procedures for notifying residents of construction activities that are likely to affect their amenity through noise and vibration, and

(12) Contingency plans to be implemented in the event of non-compliances and/or noise complaints.

The Proponent shall submit a copy of the approved plan to Council, if Council is not the Certifying Authority.

### *B6 Construction Waste Management Plan*

Prior to the issue of Construction Certificate for each stage, the Proponent shall submit to the satisfaction of the Certifying Authority a Construction Waste Management Plan prepared by a suitably qualified person in accordance with Shoalhaven City Council's requirements. The Proponent shall submit a copy of the plan to Council.

## *Vegetation Management*

### *B7 Tree Removal*

(1) Removal of trees identified on APA Plan No. 24256-07 – Tree Details dated 12 November 2007 within the 10m wide Tree Preservation Buffer to the rear of lots along proposed Road No. 4 and 6 which back onto existing residential properties is permitted only with the consent of the Council (refer to Condition E2 in this regard).

(2) With the exception of vegetation affected by construction of civil and infrastructure works and subject to B7(1), broad clearing of vegetation for the entire site is strictly prohibited, the removal of vegetation shall be carried out commensurate with the construction of each stage of the development.

### *B8 Vegetation Management Plans*

A Vegetation Management Plan (VMP) is to be prepared for each stage of the subdivision and must address protective measures during the construction phase, potential impacts of the adjoining residential development, means of weed control, weed removal, revegetation, threatened species protection, habitat creation, propagation and translocation and shall be approved by the Council prior to the issue of Construction Certificate for each stage. The VMP is to provide details on the following matters:

(a) the proposed tree removal method including inspection of hollows by a suitably qualified person prior to felling, and

(b) safeguards for the protection of fauna both prior to, during and following the works, including the presence of a suitably qualified person during the entire felling operation to ensure that proper management of any nocturnal animals or otherwise can be effectively managed (refer also to Condition D9 requirements).

A copy of the approved plans shall be provided to the Department.

### *B9 Vegetation Management Plan - EEC*

A Vegetation Management Plan (VMP) is to be prepared specifically for the EEC, adjoining buffer area and bushland reserve and is to be submitted for the approval of Council (with a copy forwarded to the Department at this time) prior to the issue of the Construction Certificate for Stage 1 of the development. The VMP must address a range of protective measures during the construction phase and for post-construction, potential impacts of the adjoining residential development, means of weed control, weed removal, revegetation, threatened species protection, habitat creation, means to control access, propagation and translocation. The VMP must address appropriate interpretive signage for the buffer zone edges, particularly where it adjoins or comes close to pedestrian pathways informing residents of the restriction applying to the area and the special characteristics of the EEC. The VMP must specifically address long term monitoring of the EEC and establish criteria that can inform necessary changes to the VMP over time. Specific impacts that should be monitored include:

a) Impacts from change in hydrological regimes caused by the increase in hard stand area;

b) Changes in the fire regime and impacts on the EEC;

c) Impacts from invasion by weeds, including garden escapes from residences and associated removal of weed species;

d) Increase in pedestrian traffic through the area, increase in resulting soil compaction and increases in soil erosion;

e) Predation by cats, dogs and feral animals;

f) Reduction in the diversity and population size of fauna resident within the EEC;

g) Water quality management, particularly focussing on nutrient management levels;

h) the number and location of nest boxes in the EEC (at a rate of 3 nest boxes for every hollow-bearing tree removed on the broader site, equivalent to hollow size and maintained until suitable hollows develop);

i) the period and method of ongoing management of nest boxes, including six monthly inspections to ensure that nest boxes are not occupied by rodents and the like, until all construction works are completed and in accordance with Condition E16.

The VMP must be peer reviewed by an appropriately qualified ecologist prior to submission to the Council for approval. A copy of the approved VMP shall be provided to the Department.

### *B10 Plans to be Submitted – Tree Protection*

Plans to be submitted for an application for a Construction Certificate for each stage of the development are to include a detailed plan of management incorporating the following:

(a) details of the means of protecting trees nominated for retention, including hollow bearing trees during construction of all works. All areas that are to be left undisturbed are to be cordoned off from areas of construction works;

(b) retention of all trees within roads and public reserves (with such trees to be retained to be identified on engineering construction plans), except where required to be removed to provide services and construction of roads, and

(c) a report prepared by a suitably qualified person indicating that the proposed tree retention will comply with the Rural Fire Service's *Planning for Bushfire Protection 2006.*

## *Environmental Management Plan*

### *B11 Preparation and Submission*

(1) An Environmental Management Plan (EMP) is to be prepared and submitted to the satisfaction and approval of the Council prior to the issue of Construction Certificate for Stage 1. The EMP is to identify the location of Asset Protection Zones, the Endangered Ecological Community and associated buffer zone, and the provision of ameliorative measures for flora and fauna to demonstrate compliance with the recommendations contained within the following reports, referred to in Condition A3:

(a) Environmental Assessment and as amended on 20 November 2007,

(b) Bushfire Protection Assessment and as amended 20 November 2007, and

(c) Flora and Fauna Assessment.

(2) The EMP is to document the management and maintenance measures required, including the details for habitat restoration and mitigation measures.

(3) The EMP is to be prepared by a suitably qualified person.

(4) The EMP shall address any other relevant requirements of this approval, including stormwater management works and the requirements of the NSW Rural Fire Service.

## *Traffic, Roads & Parking*

### *B12 Road Design, Traffic Safety Measures and Bus Bay*

Plans to be submitted for an application for a Construction Certificate for each stage of the development are to incorporate the following elements at the stages indicated in bold:

a) Kerb and gutter, stormwater drainage, full road width pavement including traffic facilities and paved footpaths shall be constructed along the full length of the new roads in all stages of the development, with the exception of roads adjoining reserves where grass swales are to be used. All roads shall be designed in accordance with the relevant requirements of the Shoalhaven City Council's DCP 100 (Subdivision Code). Final road design plans shall be prepared by a practising engineer and submitted to the Council prior to the issue of a Construction Certificate for **Stage 1**;

b) The street designs are to incorporate traffic calming principles in accordance with DCP 100 and to the satisfaction of Council – **Stages 1-6;**

c) Appropriate physical barriers shall be installed around the roadside perimeter of the EEC and passive open space with restricted access for maintenance vehicles and separate access for pedestrians at appropriate locations determined by the VMP (refer to Condition B9) – **Stages 1, 4, 5 and 6;**

d) A "Stop" signage and hold-line shall be provided on Road No. 1 at its intersection with Sunset Strip, and at The Barbette at its intersection with Sunset Strip – **Stage 1**;

e) Two signposted bus zones (R5-20 signs) located on both sides of Berringer Road shall be constructed to the immediate east of Berringer Road/Road No. 2 intersection, with the final location to be determined in consultation with Council. Road carriageway width shall be 9.5m wide (allowing a 3m wide kerbside lane for parking and bus stops, 2 x 3m unobstructed through lanes and 0.5m for pavement protection) and 3m wide indented bus bays shall be provided in accordance with Austroads Part 11 – **Stage 5**;

f) Two symbolic "Caution Children" (W6-3A) warning signs shall be installed, one on the south side of Berringer Road, mid-way between Road No. 4 and The Companionway and the second on the west side of Cunjurong Point Road at the southern boundary of the site, midway between Road 6 and the Sunset Strip – **Stage 3 and Stage 6 respectively**;

g) Two "Wildlife Crossing" signs are to be provided on Berringer Road in the proximity of where the bushland reserve meets Berringer Road – **Stage 1**;

h) Two speed control facilities in the form of ramped-thresholds shall be provided on Sunset Strip on the approaches to its staggered intersections with Road No. 1 and The Barbette, one approximately 100m west and the other approximately 100m to the east of The Barbette - **Stage 1**;

i) Construct a cycle/pedestrian crossing on Sunset Strip, to the immediate east of Sunset Strip/The Barbette intersection, involving kerb-extension blisters, kerb ramps and shared-path connections to both sides, grab-rails to accommodate cyclists and a 2m wide shared-path linking to the facility to Road No. 1 and integrated with the proposed internal pathways of the development - **Stage 1**;

j) A 1.2m wide footpaths shall be installed on the development's entire frontage along Berringer Road and Cunjurong Point Road - **Stage 3/4 and Stage 5/6 respectively**;

k) Shared cyclist/pedestrian pathway shall be constructed of concrete and shall be 2m wide and signposted, linemarked and provided with safe crossing points in accordance with Austroads Part 14 and in the locations shown on the approved plan of subdivision (Drawing No.24256-09 Layout H Rev.02) – **all Stages**;

l) The cyclist/pedestrian pathway forming the extension of Road 3 where it crosses the bushland reserve shall be raised above natural ground level and be of timber/metal construction and be no closer than 400mm to the ground at any point – **Stage 5**;

m) Pedestrian pathways shall be constructed of concrete and shall be 1.2m wide - **all Stages**;

n) All internal roads, Berringer Road and Cunjurong Point Road shall be provided to Council DCP 100 Standards- **all Stages**;

o) Street lighting shall be provided in accordance with Australian standards to all internal roads within the subdivision - **all Stages**;

p) Street lighting shall be provided in accordance with Australian standards to Berringer Road and Cunjurong Point Road – **Stage 4 and Stage 6 respectively;**

q) A left turn lane (Type A) to Austroads standards shall be constructed on Berringer Road at the Berringer Road/Inyadda Drive/Curvers Drive intersection - **Stage 4**;

r) Details of pedestrian facilities, speed control devices, bus zones and regulatory signs and markings shall be submitted for the approval of Council at the construction certificate stage- **all Stages**; and,

s) All costs incurred in the installation of pedestrian facilities, speed control devices, bus zones and regulatory signs and markings shall be borne by the proponent - **all Stages**.

## *Aboriginal Heritage*

### *B13 Item of Cultural Significance – 'Manyana 1'*

The known artefacts comprising the Aboriginal heritage site identified as 'Manyana 1' in the Aboriginal Archaeological Assessment carried out by South East Archaeology Pty Limited and dated May 2007 are to be either: (1) relocated away from the development area; (2) repositioned within the development area; or (3) collected by the Aboriginal community. The course of action to be taken is to be determined by the Aboriginal community. A program of salvage shall also be undertaken in the area of 'Manyana 1' in accordance with the recommendations of the report by South East Archaeology Pty Limited and dated May 2007. The proponent is to liaise with the Jerrinja Local Aboriginal Land Council (LALC) and determine the details of the course of action to be taken for the known surface artefacts and in relation to the subsequent salvage operations. The written confirmation of the Jerrinja LALC as to the course of action to be taken with regard to 'Manyana 1' is to be obtained and a copy of this advice supplied to the Department.

### *B14 Aboriginal Heritage Management*

A Cultural Heritage Management Plan (CHMP) shall be prepared and approved by the Department. The CHMP shall be informed by the findings of the report by South East Archaeology Pty Limited and dated May 2007 and shall specify the policies and actions to mitigate and manage the potential impacts on Aboriginal Heritage within the proposed development. The CHMP should include:

a) the management and mitigation measures proposed for those Aboriginal heritage items to be impacted during the construction works in consultation with the Aboriginal stakeholders (refer to Condition B13 in this regard);

b) the management measures proposed for those Aboriginal heritage items that will not be impacted during the construction works in consultation with the Aboriginal stakeholders and DECC;

c) the proposed fencing and signposting of any excluded Aboriginal heritage items should be undertaken in consultation with the Aboriginal stakeholders to ensure that the management measures are appropriate for each site;

d) the process that will be followed for continuing consultation with the Aboriginal stakeholders and DECC, where required; and,

e) a commitment to the immediate stop work for any potential human skeletal remains that may be uncovered during construction activities.

A copy of the final report on the results of the proposed archaeological salvage program must be forwarded to the DECC to allow for entry on the AHIMS report database and updating of the AHIMS Register.

If any Aboriginal objects are to be relocated as part of any proposed management and mitigation measures, the proponent is to advise DECC of the details of the location of objects by providing DECC Aboriginal Heritage Information Management System (AHIMS) Site Recording forms for entry on the AHIMS Register. If any Aboriginal objects are to be returned to or otherwise dealt with by an Aboriginal owner or transferred to an Aboriginal person or group, as part of any proposed management mitigation measures, details of the transfer of objects is to be provided to the DECC and a care agreement must be arranged and issued under Section 85A of the National Parks and Wildlife Act 1974. A copy of the approved CHMP shall be provided to the Council.

## *Stormwater Works*

### *B16 Stormwater Design*

(1) The stormwater design shall be in accordance with the recommendations as contained in Water Cycle Management – Report for Proposed Subdivision - Lot 172 DP 755923 and Lot 823 DP 247285 at Berringer Road and Cunjurong Point Road, Manyana (Project No. 555) prepared by Storm Consulting, September 2006 and the modifications report contained in the Preferred Project Report dated October 2007 and in accordance with the DCP 100 and to the satisfaction of the Certifying Authority.

(2) Stormwater drainage is to be routed through a suitable gross pollutant trap to remove gross pollutants as well as fine sediments as per the Storm Report (i.e. Storm Consulting, September 2006 and the modifications report contained in the Preferred Project Report dated October 2007).

(3) The stormwater detention basins are to be equipped with public safety measures such as fencing, side slopes, depth indicators and hazard signage. Details of proposed safety measures are to be submitted to the Certifying Authority for approval prior to the issue of a Construction Certificate for **Stage 1.**

(4) A Certificate from a Consultant Engineer is to be submitted to the Certifying Authority prior to the issue of a Construction Certificate for **Stage 1**, certifying that the proposed detention and associated structures have been designed in accordance with relevant Australian Standards and recommendations as contained in Water Cycle Management – Report for Proposed Subdivision - Lot 172 DP 755923 and Lot 823 DP 247285 at Berringer Road and Cunjurong Point Road, Manyana (Project No. 555) prepared by Storm Consulting, September 2006 and the subsequent modifications report contained in the Preferred Project Report dated October 2007.

(5) The Proponent shall submit details of maintenance and access to the drainage reserve, to the satisfaction of the Certifying Authority prior to issue of a Construction Certificate for **Stage 1.**

(6) The drainage of Road No. 1 to Sunset Strip, with minor filling (maximum of 200mm) in the front and centre of the two lots on the north western corner of Road No. 1 and Sunset Strip is to contain major flows within the road reserve, with minor encroachment only onto those two lots, to the satisfaction of the Certifying Authority.

## *Civil Works*

### *B17 Completion of Civil Work*

All civil work shown in the engineering plans is to be constructed in accordance with Council's Construction Specifications.

### *B18 Approval of Engineering Plans*

The applicant is to submit engineering plans providing for all civil works for each stage of the development to the Certifying Authority for approval and prior to the issue of a Construction Certificate.

### *B19 Alterations of Public Utility Services*

Any necessary alterations to or relocations of public utility services are to be carried out at no cost to Council.

## *Water Supply and Sewerage Works*

### *B20 Water Supply*

(1) Council's existing water mains are to be extended to each proposed lot within the subdivision from the existing water main in Cunjurong Point Road.

(2) Water reticulation designs for the development and augmentation of the existing system shall be approved by Shoalhaven Water and all works shall be installed in accordance with Shoalhaven Water's Water Reticulation Specification and Construction Standards.

(3) Easements shall be created over Council's water mains that are located within private property (including public reserves)

### *B21 Reclaimed Water Supply*

(1) A reclaimed water reticulation system is to be constructed to serve each proposed lot subject to Council proceeding with a reclaimed water supply system. Consultation with Shoalhaven Water is required during the design of this system.

(2) All plans and specifications for the proposed reclaimed water construction works are to be submitted to and approved by Shoalhaven Water.

### *B22 Sewerage Services*

(1) Sewerage system shall be extended and junctions provided to fully serve each lot. Mains shall be extended from sewer gravity mains proposed for construction within the subdivision along the southern boundary of Lot 172 DP 755923.

(2) Sewerage designs shall be approved and works shall be constructed in accordance with Shoalhaven Water's requirements.

(3) The design for the required sewer extension shall take into account large trees, and other constraints in adjoining properties and in the vicinity of the proposed sewer main. Matters such as an arborist report, the need for tree removal, requirement for underpinning of any affected structures shall be taken into account in the sewer design. Relevant details shall be submitted with the sewer designs.

(4) All plans and specifications for the proposed sewerage works shall be submitted to and approved by Shoalhaven Water.

(5) Where works are carried out in the road/road reserve or in private lands, respective approvals shall be obtained from the Roads Management Engineer of Council's City Services Group in consultation with Shoalhaven Water and affected private landowners for sewer main construction work to take place within those respective lands.

(6) Easement to drain sewage shall be created over all lots which have gravity sewer running through it. The easement shall be located centrally over the sewer pipes. The minimum widths of the easement shall be as follows:

- sewer depth to invert less than 2.50m - easement 2.40m wide
- sewer depth to invert greater than 2.50m - easement 4.0m wide

### *B23 Cost of Construction of Water Supply and Sewerage Works*

All water supply and sewerage works internal to the subdivision are to be constructed at the cost of the developer.

## *NSW Rural Fire Services Requirements*

### *B24 Bushfire Protection and Management*

Provision of services and access are to comply with the following requirements:

(1) Water, electricity and gas are to comply with section 4.1.3 of Planning for Bushfire Protection 2006.

(2) Public road access shall comply with section 4.1.3(1) of Planning for Bushfire Protection 2006.

Details of compliance with these requirements are to be submitted to and approved by the Certifying Authority prior to the issue of a Construction Certificate for Stage 1.

### *B25 Fire Management Plan*

A Fire Management Plan is to be prepared that addresses the following requirements:

1) Contact person, position and contact details;

2) Schedule and description of works for the construction of asset protection zones and their continued maintenance.

The plan is to be prepared by a suitably qualified person shall be submitted to and approved by the Certifying Authority prior to the issue of a Construction Certificate for Stage 1. A copy of the approved plan is to be provided to Council.

### *B26 Temporary Asset Protection Zones*

(1) A 49 metre Asset Protection Zone shall be provided around each stage of the proposed development and shall be managed as outlined within Planning for Bushfire Protection 2006. The Asset Protection Zone can be removed once adjoining stages have been developed and the bushfire threat removed. The temporary Asset Protection Zone requirement is not applicable to the EEC or its associated buffer zone. Details of compliance with this condition shall be submitted to and approved by the Certifying Authority prior to the issue of a Construction Certificate for Stage 1.

(2) A perimeter fire trail shall be provided temporarily around each stage of the proposed development and shall comply with Section 4.1.3(3) of Planning for Bushfire Protection 2006. The fire trail can be removed once adjoining stages have been developed and the bushfire threat removed. The construction of a fire trail for each stage of the development shall be met prior to the issue of the Subdivision Certificate for each stage.

## *Landscaping*

### *B27 Landscape Plan – Subdivision*

A detailed landscape plan prepared in accordance with Shoalhaven City Council's Landscape Guidelines shall be submitted to and approved by the Council prior to the issue of the Construction Certificate for Stage 1 and shall address the following issues:

1) a species list including only local native species and other native species as appropriate to the site and circumstances, as approved by Council;
2) a species list of plants which will be provided to purchasers of lots;
3) street tree planting and verge landscaping;
4) consideration of the requirements for asset protection zones;
5) security for open space, property and neighbouring residents taking into consideration visibility and lines of sight, lighting and open space;
6) all parks and open space (excluding the EEC and associated buffer – refer to Vegetation Management Plan requirements)) are to be suitably embellished to the satisfaction of Council. Embellishments may include (but are not limited to) grass cover, soft landscaping and garden beds (local indigenous species), toilets, playground equipment, shade shelters, seating, picnic/barbeque facilities, paths drinking water facilities and vehicle control measures; and,
7) provision for the storage of garbage/recycling and green bins in accordance with Council's requirements.

All landscaping works within the subdivision shall be completed in accordance with the approved plans. A copy of the approved Landscape Plan shall be submitted to the Department.

### *B28 Additional Contributions*

### *Voluntary Planning Agreement*

Prior to the issue of the Construction Certificate, the Proponent shall enter into a Planning Agreement with Shoalhaven City Council under Section 93F of the Act. The Agreement must be consistent with commitments outlined in Commitments 43-45 of the Statement of Commitments (Schedule 3), and specifically provide for the works and costs outlined in the table below:

| Item | Description | Amount |
|---|---|---|
| 1. | Extension of the Community Hall, Yulunga Reserve. | $36,134.00 |
| 2. | Upgrade Foreshore Facilities, Including the Provision of Car Parking. | $15,265.00 |
| 3. | Upgrade Works to Bendalong Road and Inyadda Drive. | $56,160.00 |
| 4. | Construction of a Rural Road Type B Intersection, Bendalong Road and Inyadda Drive. | $12,721.00 |
| **Total** | | **$120,280.00** |

The Planning Agreement must address staging of the payment of the contributions generally in accordance with the staging specified in Condition B1 of this determination. The Planning Agreement must be registered on the title of the land in accordance with the *Real Property Act 1900.*

## PART C—PRIOR TO COMMENCEMENT OF WORKS

### *Excavation Works*

### *C1 Notice to be Given Prior to Excavation*

The PCA and Council shall be given written notice, at least 48 hours prior to the commencement of excavation, shoring or underpinning works on the site.

### *Local Aboriginal Land Council*

### *C2 Notification*

The Proponent shall notify the Local Aboriginal Land Council prior to the commencement of works at each stage of the development and provide it with an opportunity to view the works. Evidence of such notification and the response of the Local Aboriginal Land Council shall be submitted to the satisfaction of the PCA.

### *Contact Details*

### *C3 Contact Telephone Number*

Prior to the commencement of the works, the Proponent shall forward to the Department and Council a 24 hour telephone number to be operated for the duration of the construction works.

### *Vegetation Clearing*

### *C4 Bangalay Moist Woodland/Open Forest*

Any clearing to be undertaken as part of this approval in Stages 2, 3 or 4 of the development and affecting the Bangalay Moist Woodland/Open Forest will not be undertaken between the beginning of October and the end of February in any year to minimise potential impacts on breeding by the migratory species Black-faced Monarch and Rufous Fantail.

## PART D—DURING CONSTRUCTION

### *Site Maintenance*

### *D1 Erosion and Sediment Control*

All erosion and sediment control measures, as designed in accordance with Condition B2, are to be effectively implemented and maintained at or above design capacity for the duration of the construction works and until such time as all ground disturbed by the works has been stabilised and rehabilitated so that it no longer acts as a source of sediment.

### *D2 Disposal of Seepage and Stormwater*

Any seepage or rainwater collected on-site during construction shall not be pumped to the street stormwater system unless separate prior approval is given in writing by Council.

## *Construction Management*

### *D3 Approved Plans to be On-site*

A copy of the approved and certified plans, specifications and documents incorporating conditions of approval and certification shall be kept on the site at all times and shall be readily available for perusal by any officer of the Department, Council or the PCA.

### *D4 Site Notice*

A site notice(s) shall be prominently displayed at the boundaries of the site for the purposes of informing the public of project details including, but not limited to the details of the Builder, Principal Certifying Authority and Structural Engineer. The notice(s) is to satisfy all but not be limited to, the following requirements:

(1) Minimum dimensions of the notice are to measure 841mm x 594mm (A1) with any text on the notice to be a minimum of 30 point type size;

(2) The notice is to be durable and weatherproof and is to be displayed throughout the works period;

(3) The approved hours of work, the name of the site/project manager, the responsible managing company (if any), its address and 24 hour contact phone number for any inquiries, including construction/noise complaint are to be displayed on the site notice; and

(4) The notice(s) is to be mounted at eye level on the perimeter hoardings/fencing and is to state that unauthorised entry to the site is not permitted.

### *D5 Contact Telephone Number*

The Proponent shall ensure that the 24 hour contact telephone number is continually attended by a person with authority over the works for the duration of the development.

### *D6 External Lighting*

External Lighting shall comply with AS4282: 1997 *Control of the Obtrusive Effects of Outdoor Lighting* and AS1158-1997 Road Lighting. Upon installation of lighting, but before it is finally commissioned, the Proponent shall submit to the consent authority evidence from an independent qualified practitioner demonstrating compliance in accordance with this condition.

### *D7 Protection of Trees – Street Trees*

Identified trees along road reserves (refer to Condition B10), within the 10m buffer referred to in Condition B7, within the EEC and its buffer shall be protected at all times during construction. Any tree on road reserves, which is damaged or removed during construction, shall be replaced, to the satisfaction of Council.

### *D8 Protection of Trees – On-site Trees*

All trees on the site that are not approved for removal are to be suitably protected by way of tree guards, barriers or other measures as necessary are to be provided to protect root system, trunk and branches, during construction.

## *Fauna Management*

### *D9 Protocols for Trees With Hollows*

Trees with hollows to be felled during the construction phase will be felled in accordance with the following procedures:

1) Felling will be supervised by a fauna specialist appropriately licensed under the NSW National Parks and Wildlife Act 1074, for the purpose of rescuing displaced fauna;
2) The fauna specialist will be suitably attired with protective clothing and have suitable equipment to undertake the work. A "Green Card" from an Occupational Health and Safety Induction Training Course for Construction Work will also be held by the fauna specialist, who may also need to be suitably vaccinated (especially if there is potential for handling bats);
3) An appropriately skilled local wildlife carer must be notified at least 24 hours prior to the tree felling, that animals may be captured and that these animals may need care;
4) Any non-hollow bearing trees around those with tree hollows to be felled will be removed first. At least 1 day will be left between clearing of the non-hollow-bearing trees and the hollow bearing trees to allow fauna time to vacate the trees;
5) Prior to felling of the identified and marked hollow-bearing trees, the trees will be shaken or nudged by tree felling equipment to encourage any fauna to vacate the trees;
6) If no animals emerge from the hollows after shaking or nudging, then the tree will be felled and lowered to the ground if possible;
7) If an animal emerges from a hollow following shaking or nudging of the tree, then at least 30 minutes will be allowed for the animal to leave the tree. If the animal comes to the ground, or when it is on the lower trunk, attempts will be made to capture the animal using a net. Captured animals will be immediately transferred to a suitably sized cotton bag and checked for obvious injury during the transfer process;
8) Captured animals will be placed in individual bags unless they are a family group to which separation would risk the survival of the young (i.e. lactating female with young);
9) Once the tree has been felled, a search will be made of the branches around the tree for any fleeing fauna and hollows should be inspected with a torch for the presence of any animals. Attempts will be made to capture any fleeing fauna with a net, and animals inside hollows should be extracted by hand. Captured animals will be immediately transferred to a suitably sized cotton bag and checked for obvious injury during the transfer process;
10) Injured, shocked or immature captured animals will be placed in a cotton bag secured at the top. Bags will be wrapped in appropriate insulating material such as blankets and placed in a quiet, warm and preferably dark place until the wildlife carer can collect them. Details on the location of the capture and proposed release areas will be provided to the wildlife carer; and,
11) Uninjured animals will be released in appropriate habitat as soon as practicable (at night for nocturnal species).

### *D10 Dust Control Measures*

Adequate measures shall be taken to prevent dust from affecting the amenity of the neighbourhood during construction. In particular, the following measures must be adopted:

(1) Physical barriers shall be erected at right angles to the prevailing wind direction or shall be placed around or over dust sources to prevent wind or activity from generating dust emissions,

(2) Earthworks and scheduling activities shall be managed to coincide with the next stage of development to minimise the amount of time the site is left cut or exposed,

(3) All materials shall be stored or stockpiled at the best locations,

(4) The surface should be dampened slightly to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs,

(5) All vehicles carrying spoil or rubble to or from the site shall at all times be covered to prevent the escape of dust or other material,

(6) All equipment wheels shall be washed before exiting the site using manual or automated sprayers and drive-through washing bays,

(7) Gates shall be closed between vehicle movements and shall be fitted with shade cloth, and

(8) Cleaning of footpaths and roadways shall be carried out regularly.

## *Noise and Vibration*

### *D11 Hours of Work*

The hours of construction, including the delivery of materials to and from the site, shall be restricted as follows:

(1) between 7:00 am and 6:00 pm, Mondays to Fridays inclusive;

(2) between 7:00 am and 12:00 pm, Saturdays;

(3) no work on Sundays and public holidays.

Works may be undertaken outside these hours where:

(4) the delivery of materials is required outside these hours by the Police or other authorities;

(5) it is required in an emergency to avoid the loss of life, damage to property and/or to prevent environmental harm;

(6) the work is approved through the Construction Noise and Vibration Management Plan; and

(7) residents likely to be affected by the works are notified of the timing and duration of these works at least 48 hours prior to the commencement of the works.

### *D12 Construction Noise Objective*

The construction noise objective for the Project is to manage noise from construction activities (as measured by a $L_{A10\ (15minute)}$ descriptor) so it does not exceed the background $L_{A90}$ noise level by:

(1) For the first four weeks of the construction period, not more than 20dB(A):

(2) From the 5$^{th}$ week to the 26$^{th}$ week (inclusive) of the construction period, not more than 10dB(A); and

(3) For construction periods greater than 26 weeks, not more than 5dB(A).

Background noise levels are those identified in the approved Construction Noise and Vibration Management Plan. The Proponent shall implement all feasible noise mitigation and management measures with the aim of achieving the construction noise objective.

Any activities that have the potential for noise emissions that exceed the objective must be identified and managed in accordance with the approved Construction Noise and Vibration Management Plan.

If the noise from a construction activity is substantially tonal or impulsive in nature (as described in Chapter 4 of the NSW Industrial Noise Policy), 5dB(A) must be added to the measured construction noise level when comparing the measured noise with the construction noise objective.

### *D13 Construction Noise Management*

The Proponent shall:

(1) schedule rock breaking, rock hammering, sheet piling, pile driving and any similar activity only between the following hours unless otherwise approved in the Construction Noise and Vibration Management Plan:

  (a) 9.00 am to 12.00 pm, Monday to Friday;

  (b) 2.00 pm to 5.00 pm Monday to Friday; and

  (c) 9.00 am to 12.00 pm, Saturday

(2) ensure that wherever practical, and where sensitive receivers may be affected, piling activities are completed using bored piles. If driven piles are required they must only be installed where approved in the Construction Noise and Vibration Management Plan.

### *D14 Vibration Criteria*

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

(1) for structural damage vibration, German Standard DIN 4150 Part 3 Structural Vibration in Buildings. Effects on Structures; and

(2) for human exposure to vibration, the evaluation criteria presented in British Standard BS 6472- Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80 Hz) for low probability of adverse comment.

These limits apply unless otherwise approved in the Construction Noise and Vibration Management Plan.

### *D15 Vibration Management*

Vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified above.

### *Heritage*

### *D16 Impact of Below Ground (Sub-surface) Works – Aboriginal Objects*

If any Aboriginal archaeological objects are exposed during construction works, the developer shall immediately notify DECC. The developer shall comply with any request made by DECC to cease work for the purposes of archaeological recording.

## PART E—PRIOR TO ISSUE OF SUBDIVISION CERTIFICATES

### *Building and Landscape Design Details*

### *E1 Specific Design Objectives and Criteria*

Details of design objectives and criteria are to be prepared for all stages of the development. These design objectives and criteria are to provide sufficient detail that enables a consistent theme and character for future development on all lots. The design objectives and criteria are to be prepared in consultation with Council to ensure compatibility with Council's relevant development control plan. These design objectives and criteria must conform to the guiding themes of the "Cunjurong Point Road – Design Guidelines August 2006" prepared by Malbec Properties and other relevant reports listed in Condition A3, and include:

(1) Overall site design objectives

(2) Specific residential design objectives, including consideration of different built forms, energy efficiency, water management, materials, colours and finishes;

(3) Landscape design objectives, including references to suggested indigenous species for different locations;

(4) Details, requirements and responsibilities for designated Asset Protection Zones; and,

(5) Details of local water cycle management, including rainwater tanks, infiltration beds and management responsibilities.

Details shall be submitted to and approved by the Department prior to the issue of a Subdivision Certificate for Stage 1. A Section 88B instrument is to be created over all residential lots in all stages of the subdivision restricting the design and character to that specified in the approved Design Objectives and Criteria document. The draft wording of the instrument is to be lodged with Council for approval and Council is to be made a party to the instrument, whose approval is required for any alterations to the instrument. The instrument is to be registered with the registration of the subdivision plan.

### *E2 Tree Retention – Preservation Zone*

A restriction as to user is to be created for all lots affected by the 10 Metre Tree Preservation Zone (Plan Reference 24256-07 Tree Details) showing the location of trees and indicating that they are to be retained unless an arborist report finds the tree to be dangerous. The Council shall have the sole authority to release, vary or modify this encumbrance.

### *Easements*

### *E3 Instruments*

Copies of any instruments under Section 88B or 88E of the *Conveyancing Act 1919* are to be submitted with the final plan of subdivision, as relevant to any restrictive covenants, easements, rights of way created or affected by this development and shall be to the satisfaction of the Council.

### *E4 Services*

Documentary easements for services, drainage, support and shelter, repairs, maintenance or any other encumbrances and indemnities required for joint or reciprocal use of part or all of the proposed lots as a consequence of the subdivision, must be created over the appropriate lots in the subdivision pursuant to Section 88B of the *Conveyancing Act 1919*.

## *E5 Part 4A Certificate*

Prior to the registration of final subdivision plan in the Office of the Registrar-General, a Part 4A certificate shall be obtained under section 109D(1)(d) of the *Environmental Planning and Assessment Act* 1979.

## *Bushfire Safety*

## *E6 Asset Protection Zones*

The following requirements of the NSW Rural Fire Service shall be met prior to the issue of a Subdivision Certificate for each stage of the development as outlined within Planning for Bushfire Protection 2006 and the Service's document, Standards for Asset Protection Zones'.

The creation of a suitable restriction as to user, where they affect individual allotment allowing for the creation and maintenance of the following Bushfire Asset Protection Zones:

(a) West from allotments along the western boundary for a distance of 20 metres as an inner protection zone (i.e. Cunjurong Point Road road reserve).

(b) North from allotments along the northern boundary for a distance of 20 metres as an inner protection zone (i.e. Berringer Road road reserve).

(c) East of allotments adjacent to the western edge of the bushland reserve for a distance of 25 metres as an inner protection area.

(d) West of allotments adjacent to the eastern edge of the bushland reserve for a distance of 25 metres as an inner protection zone.

(e) West of the two most southern allotments to the eastern edge of the bushland reserve to a distance of 20 metres as an inner protection area.

The restrictions are to be clearly marked on the plan of subdivision. Council is to be nominated as the sole party to vary, modify and/or extinguish the restrictions. A suitable restriction as to user is to be created prohibiting the erection of any dwelling within the specified areas.

## *E7 Bushfire Attack and Required Construction Standards*

The following requirements are to be in accordance with the Bushfire Protection Assessment prepared by BES Bushfire + Environmental dated November 2007, specifically Figure 3 *AS3959-1999 building construction standards*, as well as the requirements of the NSW Rural Fire Service as set out in its letter dated 14 December 2007, and shall be met prior to the issue of a Subdivision Certificate for each stage of the development. Construction standards referred to are required under Australian Standard AS3959. The creation of a suitable restriction as to user, where they affect individual allotment allowing for the following construction standards:

(a) Allotments along the western boundary (i.e. with a frontage to Cunjurong Point Road) are to be constructed to Level 3 standard.

(b) Allotments along the northern boundary (i.e. with a frontage to Berringer Road) are to be constructed to Level 3 standard.

(c) Allotments with a frontage to Road 2 are to be constructed to Level 3 standard.

(d) Allotments with a frontage to Road 6 and adjacent the EEC/bushland reserve are to be constructed to Level 3 standard.

(e) Allotments with a frontage to Road 1, between Road 5 and Sunset Strip are to be constructed to Level 1 standard.

(f) The 3 allotments on the eastern side and with a frontage to Road 4, between Road 3 and Berringer Road are to be constructed to Level 1 standard.

(g) All remaining allotments located between Berringer Road and Road 3 are to be constructed to Level 1 standard.

(h) All remaining allotments (i.e. not already identified in 'a' and 'd') located between Cunjurong Point Road and Road 6 are to be constructed to Level 1 standard.

(i) All remaining lots with a frontage to Road 1 and those with a frontage to Road 3, between Road 1 and Road 2 are to be constructed to Level 1 standard.

The restrictions are to be clearly annotated on the plan of subdivision. Council is to be nominated as the sole party to vary, modify and/or extinguish the restrictions.

## *Section 94 and Other Monetary Contributions*

### *E8 Section 94 Contributions*

In accordance with Division 6 of Part 4 of the Act, the Proponent shall pay the following monetary contributions:

**(1) Amount of Contribution under Section 94 Contributions Plan**

| Project | Description | Rate | Qty | Total(GST Inc) |
|---|---|---|---|---|
| 05 AREC 0001 | Tennis, Football, Cricket & Netball ( Area 5 ) | $1,206.75 | 180 | $217,215.00 |
| 05 AREC 0002 | Leisure Centre Heated Indoor Swimming Pool | $138.69 | 180 | $24,964.20 |
| 05 CFAC 0010 | S94 CP AMENDMENT No.67: Southern Shoalhaven Branch Library | $236.93 | 180 | $42,647.40 |
| 05 ROAD 2020 | Bendalong Road + Inyadda Drive | $108.99 | 180 | $19,618.20 |
| CW AREC 0003 | Hockey Facilities | $192.64 | 180 | $34,675.20 |
| CW CFAC 0001 | S94 CP AMENDMENT No.67: Stage 1: Shoalhaven City Library Extensions | $264.43 | 180 | $47,597.40 |
| CW CFAC 0001 | S94 CP AMENDMENT No.67: Stage 2: Shoalhaven City Arts Centre | $23.92 | 180 | $4,305.60 |
| CW CFAC 0001 | S94 CP AMENDMENT No.67: Stage 3: Shoalhaven Mobile Children's Services | $7.84 | 180 | $1,411.20 |
| CW CFAC 0002 | Shoalhaven Multi Purpose Cultural & Convention Centre | $236.41 | 180 | $42,553.80 |
| CWFIRE0001 | Citywide Fire and Emergency Services | $146.53 | 180 | $26,375.40 |
| CWFIRE0002 | Shoalhaven Fire Control Centre | $191.84 | 180 | $34,531.20 |
| CW MGMT | Section 94 Administration | $398.10 | 180 | $71,658.00 |

| | | | | |
|---|---|---|---|---|
| 2001 | | | | |
| CW OREC 0001 | Embellishment of Icon and District Parks and Walking Tracks | $153.32 | 180 | $27,597.60 |
| **Grand Total** | | $3,306.39 | | **$595,150.20** |
| | | | | |
| **Totals Stages** | Stage 1 | $3,306.39 | 30** | $92,578.92 |
| | Stage 2 | $3,306.39 | 32 | $105,804.48 |
| | Stage 3 | $3,306.39 | 29 | $95,885.31 |
| | Stage 4 | $3,306.39 | 31 | $102,498.09 |
| | Stage 5 | $3,306.39 | 33 | $109,110.87 |
| | Stage 6 | $3,306.39 | 27 | $89,272.53 |

** less 2 credits for existing lots.

**(3) Timing and Method of Payment**

The contribution shall be paid in the form of cash or bank cheque, made out to Council. For accounting purposes, the contribution may require separate payment for each of the categories above and you are advised to check with Council.

Evidence of the payment to Council shall be submitted to the Certifying Authority prior to the issue of the Subdivision Certificate for each of the 6 Stages outlined above.

**(4) Indexing**

Contribution rates are adjusted annually on 1st July in accordance with the indexation formula indicated in the Contributions Plan (currently the implicit price deflator) and the total contribution levied **will be adjusted accordingly at the time of payment** (i.e. contributions are calculated on the rate applicable at the date of payment, **not** the date of development consent).

A total contribution, currently assessed at the sum of $595,150.20 (i.e. 2007/2008 rate) or as indexed in future years shall be paid to Council **before the issue of a Construction Certificate.**

## *Utility Contributions*

### *E9 Certificate of Compliance – Headworks Charges*

(1) Prior to the release of the Subdivision Certificate/s, an application for a Certificate of Compliance pursuant to Section 307 of Division 5 of Part 2 of Chapter 6 of the *Water Management Act 2000* is to be obtained to verify that all requirements relating to water supply and sewerage for the development have been made with Shoalhaven Water. A Certificate of Compliance shall be obtained from Shoalhaven Water indicating that the requirements of Section 306 of that Act have been met. A copy of the Certificate of Compliance must accompany the application for Subdivision Certificate for each stage of the development.

(2) A Certificate of Compliance pursuant to Division 5 of the *Water Management Act 2000* will be issued by Shoalhaven Water prior to the issue of Subdivision Certificate/s, subject to the following matters being complied with:

(a) a Section 64 (Water Headworks – 44WATR0002) contribution of $5,274.00 per ET (01/07/07-30/06/08) is payable for this application and is based on 180 ET's with a total contribution payable of **$949,320.00** and with staged payment in the following manner:

| Stage | ET's | Contribution |
|---|---|---|
| 1 | 29 | $152,946.00 |
| 2 | 31 | $163,494.00 |
| 3 | 29 | $152,946.00 |
| 4 | 31 | $163,494.00 |
| 5 | 33 | $174,042.00 |
| 6 | 27 | $142,398.00 |

(b) payment for 20mm metered service for each lot. The cost for a 20mm service is $560.00 per lot (01/07/07-30/06/08) with a total contribution payable of **$101,920.00**. The connection fee for a 20mm metered service is $100.00 (01/07/07-30/06/08) and is paid by the person making application for connection, with staged payment in the following manner:

| Stage | ET's | Contribution |
|---|---|---|
| 1 | 30 | $16,800.00 |
| 2 | 32 | $17,920.00 |
| 3 | 29 | $16,240.00 |
| 4 | 31 | $17,360.00 |
| 5 | 33 | $18,480.00 |
| 6 | 27 | $15,120.00 |

(c) a Section 64 (Sewerage Headworks – 73SEWR0001) contribution of $5,274.00 per ET (01/07/07-30/06/08) is payable for this application and is based on 182 ETs with a total contribution payable of **$959,868.00**, with staged payment in the following manner:

| Stage | ET's | Contribution |
|---|---|---|
| 1 | 30 | $158,220.00 |
| 2 | 32 | $168,768.00 |
| 3 | 29 | $152,946.00 |
| 4 | 31 | $163,494.00 |
| 5 | 33 | $174,042.00 |
| 6 | 27 | $142,398.00 |

## *Utilities and Services*

### *E10 Telstra*

The developer is to make satisfactory arrangements with Telstra Australia for the provision of underground telephone plant to each lot. A letter from Telstra stating that satisfactory arrangements have been made for the provision of underground telephone plant is to be lodged with the Certifying Authority prior to the release of the Subdivision Certificate linen plan.

### *E11 Electricity*

The developer is to make satisfactory arrangements with Integral Energy for the supply of electricity to each lot. A letter from Integral Energy stating that satisfactory arrangements have been made for the provision of underground electricity plant is to be lodged with the Certifying Authority prior to the release of the linen plan.

### *E12 Testing of Sewer Lines*

All sewer lines in each stage are to be tested to the satisfaction of the relevant Water Authority.

## *Roads*

### *E13 Street Naming*

The Proponent is to submit to Council a list of at least three (3) names in respect to each of the internal roads in accordance with Council's policy on Street Naming, prior to the issue of a Subdivision Certificate each stage of the development where a new road is proposed.

## *NSW Rural Fire Service*

### *E14 Bushfire Protection*

All of the relevant requirements of the NSW Rural Fire Service are to be met prior to the issue of a Subdivision Certificate/s to the satisfaction of the PCA.

## *Work as Executed Plan*

### *E15 Civil Work*

A Work as Executed Plan is to be prepared for all of the civil work undertaken for each Precinct as work is completed excluding roads where longitudinal grades are in excess of 1%. The Work as Executed Plan is to be prepared by a Registered Surveyor and lodged with Council for approval prior to issue of the Practical Completion Certificate and Subdivision Certificate/s.

## *Dedication of EEC, Bushland Reserve, Playground Area and Roads*

### *E16 Dedication of Land*

The Proponent will ensure the dedication to Council of the following components at the stages indicated:

a) the Endangered Ecological Community, associated buffer area and bushland reserve upon registration of the plan of subdivision for **Stage 1** and **Stage 5**;

b) the playground area and open space upon registration of the plan of subdivision for **Stage 3**; and,

c) the drainage network and all internal roads upon registration of the plan of subdivision for each stage of the subdivision.

## *Maintenance of EEC and Bushland Reserve*

### *E17 Maintenance Period*

The Proponent will manage and maintain the EEC, associated buffer area and bushland reserve (including water quality control ponds) in accordance with the provisions and

requirements of the Vegetation Management Plan (refer to Condition B9) for a period of 3 years following the registration of the plan of subdivision for the final stage of the subdivision.

### *Protection of Native Fauna*

### *E18 Restriction as to User – Pets*

A Section 88B instrument is to be created over all residential lots in all stages of the subdivision requiring that cats and dogs cannot be kept within the subdivision (with the exception of companion and assistance animals). The draft wording of the instrument is to be lodged to Council for approval and Council is to be made a party to the instrument, whose approval is required for any alterations to the instrument. The instrument is to be registered with the registration of the subdivision plan.

### *Filling*

### *E19 Certification*

A Certificate issued by the Geotechnical Engineer is to be lodged with the Certifying Authority at the time a Subdivision Certificate/s is applied for, for each stage, certifying that the fill materials, when placed in accordance with the Geotechnical Specification, will be suitable for future residential development and are in accordance with AS2870.

# SCHEDULE 3

## MAJOR PROJECT NO. 05_0059

## 182 LOT RESIDENTIAL SUBDIVISION OF LOT 172 DP 755923 & LOT 823 DP 247285, BERRINGER ROAD, CUNJURONG POINT ROAD AND SUNSET STRIP, MANYANA

## STATEMENT OF COMMITMENTS

Final received 17.3.08

# COWMAN STODDART PTY LTD

Town Planning, Agricultural & Environmental Consultants

Cowman Stoddart Pty Ltd

ABN 29 057 616 896

The amended Statement of Commitments listed below has been compiled based on the current Preferred Project Report, the Environmental Assessment undertaken, the constraints and opportunities available at the site and the comments made by Shoalhaven City Council, various state government agencies and the public. They provide a commitment from the developer indicating their responsibilities in developing the site as proposed to ensure that the development is environmentally, socially, and economically sustainable.

In developing the subdivision, the developer gives the following commitments in order to minimise the impact on the environment:

| Item | Commitment | Timing |
|---|---|---|
| General | The developer will carry out the development in accordance with this Environmental Assessment Report (EAR), prepared by Cowman Stoddart dated September 2006, the Preferred Project Report prepared by Cowman Stoddart dated October 2007, supporting reports and Subdivision Layout prepared by Allen Price & Associates Reference No 24256-09 Layout H Rev 02 dated 23 May 2007 (as amended 9/11/07) proposing 182 residential allotments, and two open space allotments. | For the duration of the subdivision. |
| Legislative Controls/Requirements | The developer will obtain and maintain the following licences, permits and approvals for the residential subdivision:<br>• Shoalhaven City Council - Construction Certificates for engineering works for each stage of the subdivision. The application for Construction Certificates will contain Design Drawings submitted containing, where relevant, detailed designs relating to earthworks, drainage, Soil erosion and Sediment Control and site rehabilitation, tree clearing and site stability, roadworks, footpaths/cycleways, water supply (both potable and use of reclaimed water) and sewerage works, and landscaping.<br>• Shoalhaven City Council - Road Opening Permit from Shoalhaven City Council as required;<br>• Shoalhaven City Council - Section 138 Consent for roadworks (Roads Act 1993);<br>• Integral Energy - Design Certification;<br>• Integral Energy - Notification of Arrangement;<br>• Telstra - Compliance Certificate;<br>• Shoalhaven Water - Compliance Certificate;<br>• Shoalhaven City Council – Subdivision Certificates for each stage;<br>• Department of Land and Property Information - registration of the subdivision. | For the duration of the subdivision works. |

| Item | Commitment | Timing |
|---|---|---|
| Final Plan of Subdivision | The developer will prepare a final plan of subdivision and Section 88B instrument for each stage of the development in accordance with the recommendations of the Environmental Assessment, as amended by the Preferred Project Report and requirements of Shoalhaven City Council. | Prior to the release of Subdivision Certificates for each stage. |
| Ecological | **Endangered Ecological Community** | |
| | The developer will prepare a Vegetation Management Plan (VMP) in relation to that part of the site containing the Endangered Ecological Community (EEC) for approval by Shoalhaven City Council. | Prior to the release of the Construction Certificate for that stage of the development. |
| | The developer will implement the recommendations and prepare the site in accordance with the VMP prior to its dedication to Shoalhaven Council. | Prior to the release of the Subdivision Certificate which creates the lot(s) containing the EEC. |
| | The developer will maintain the Endangered Ecological Community in accordance with the recommendations of the approved Vegetation Management Plan after its dedication to Shoalhaven Council. | For a period of three (3) years, commencing upon the dedication of the land to Shoalhaven City Council. |
| | **Other** | |
| | The developer will impose a restriction on the title of each allotment requiring that any dogs or cats are kept only within the curtilage of a dwelling house, however dogs may be kept outside of the curtilage if secured on a leash. | Prior to the release of the Subdivision Certificate for that stage of the development. |
| Public Open Space | The developer will prepare and embellish all public reserves in accordance with the Vegetation Management Plan (for EEC) and detailed landscape design plans to be approved by Shoalhaven Council as part of the Construction Certificate. | Prior to release of certificate for subdivision for each stage/s containing public reserve. |
| | The developer will dedicate all public/drainage reserves to Shoalhaven City Council. | Prior to release of Subdivision Certificate and dedicated upon registration. |
| Waste Minimisation and Management | The developer will prepare a Waste Minimisation and Management Plan for subdivision construction works in accordance with Development Control Plan No. 93 for approval by Shoalhaven City Council for implementation. | Prior to the release of the Construction Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Construction | The developer will prepare a Construction Management Plan for approval by Shoalhaven Council including education of workers in the approvals and conditions requiring compliance (including soil erosion and sediment controls, flora and fauna and aboriginal archaeological issues), details of the environmental management procedures during the development and measures relating to waste minimisation and management. | Prior to the commencement of construction and for the duration of the subdivision works. |
| Urban Design | The developer will prepare detailed design objectives and criteria to enable a consistent theme and character to be established for future development on all lots. The design objectives and criteria will be generally in accordance with the document "Cunjurong Point Road – Design Guidelines August 2006" prepared by Malbec Properties, and will be developed in consultation with the Council to ensure compatibility with Council's existing Development Control Plans.<br>The final document will submitted to the Department of Planning for approval.<br>A restriction as to user will be placed over all future lots to restrict development to that which complies with the design objectives and criteria. | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will show a tree preservation zone on the title of those allotments which adjoin the existing village in accordance with the plan prepared by Allen Price and Assoc - Drawing 24256-07 Rev 02. | Prior to the release of the Subdivision Certificate for each stage. |
| Bushfire Management | **Provision of Asset Protection Zones** | |
| | The developer will establish and maintain Asset Protection Zones (APZs) for relevant allotments in accordance with the Bushfire Assessment, November 2007, prepared by Bushfire and Environmental Services Pty Ltd whilst under the developers ownership. | Prior to the release of the Subdivision Certificate for each stage and until sale or transfer of ownership of each relevant allotment. |
| | The developer will install relevant infrastructure as required, including fire hydrants. | Prior to the release of the Subdivision Certificate for each stage. |
| | **Restriction as to User** | |
| | The developer will impose a Section 88B Restriction as to User on the title of relevant allotments specifying a Level of Construction in accordance with AS 3959 and as shown in Figure 3 in the Bush Fire Assessment prepared by Bushfire and Environmental Services dated November 2007. | Prior to the release of the Subdivision Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Water Quality Management and Soil Control | The developer will design and install water quality control measures in accordance with the Construction Certificate Plans approved by Shoalhaven City Council. | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will maintain the water quality control measures for a period after dedication to Shoalhaven Council. | For a period of three (3) years, commencing upon the dedication to Shoalhaven City Council of the land containing the water quality control measures. |
| | The developer will prepare a soil and water management plan to control run off during construction in accordance with the principles of the Landcom publication Managing Urban Stormwater (MUS): Soils and Construction Volume 1, 4th Edition and Construction Certificate Plans approved by Shoalhaven City Council and DCP 100. | Prior to release of the Construction Certificate for each stage. |
| Cultural Heritage | The developer will undertake measures as recommended in the report prepared by South East Archaeology Pty Ltd, and implement its findings. | For the duration of the subdivision works. |
| | The developer will inform the Jerrinja Local Aboriginal Land Council of progress of the development. | Ongoing through the construction of the subdivision. |
| Infrastructure | **Roads** | |
| | The developer will construct all roads and intersections with Berringer Rd, Cunjurong Point Rd and The Sunset Strip in accordance with DCP 100 and approved Construction Certificates. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will provide a minor street drainage system to accommodate the 5 year A.R.I. storm event in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will provide a major street drainage system to accommodate the 100 year A.R.I. storm event in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will construct footpaths and cycleways as shown on the plans prepared by Allen Price and Assoc and approved Construction Certificates. | Prior to the release of the Subdivision Certificate for each relevant stage. |

| Item | Commitment | Timing |
|---|---|---|
| Infrastructure (continued) | The developer will provide street signs in accordance with the requirements of Shoalhaven City Council. | Prior to the release of the Subdivision Certificate for each stage. |
| | **Traffic Calming** | |
| | The developer will install two traffic calming devices within road number 3. Such works shall be in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for Stage 4. |
| | The developer will install one traffic calming device within roads numbered 2. Such works shall be in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for Stage 5. |
| | The developer will install one traffic calming device within roads numbered 4. Such works shall be in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for Stage 2. |
| | **Bus Stop and Signage** | |
| | The developer will provide a bus stop and appropriate signage on the southern side of Berringer Road adjoining the subdivision, generally in the location shown on the (APA Drawing 24256-09 Layout H dated 25.9.07) to the requirements of Shoalhaven City Council and the Shoalhaven Local Traffic Committee. Such works shall be in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for Stage 5 |
| | The developer will install bus stop signage on the northern side of Berringer Road at a location to be agreed with Shoalhaven City Council and the Shoalhaven Local Traffic Committee. | Prior to the release of the Subdivision Certificate for Stage 5. |
| | **Electricity and Telecommunications** | |
| | The developer will provide underground power to each residential lot in the subdivision accordance with the requirements of Integral Energy | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will provide underground telecommunications infrastructure to each lot in the subdivision in accordance with requirements of Telstra. | Prior to the release of the Subdivision Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Infrastructure (continued) | **Drainage** | |
| | The developer will install street and interallotment drainage as necessary in accordance with plans approved by Shoalhaven City Council. | Prior to the release of the Subdivision Certificate for each stage as applicable. |
| | **Water and Sewer Services – Residential Allotments** | |
| | The developer will provide reticulated water and sewerage services to each lot in the subdivision in accordance with the requirements of Shoalhaven Water | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will provide infrastructure to allow each lot in the subdivision to allow each lot to connect to the reclaimed water from the Conjola Regional Sewerage Scheme. | Prior to the release of the Subdivision Certificate for each stage. |
| | **Water and Sewer Services - Public Reserves** | |
| | Within the public reserves, the developer will provide access to both the potable water and reclaimed water supplies. | Prior to the release of the Subdivision Certificate for each stage/s containing public reserve |
| Landscaping Plans | The developer will use native species, endemic to the locality in the preparation of landscaping plans, and subsequent works undertaken in conjunction with this subdivision. | For the duration of the subdivision works |
| Geotechnical | The developer will provide a lot classification geotechnical report to Shoalhaven City Council for each stage of development prior to the release of the final plan of subdivision for that stage. | Prior to the release of the Subdivision Certificate for each stage. |
| Staging | The developer will construct the subdivision in accordance with the Proposed Staging Plan prepared by Allen Price and Associates or as otherwise approved in Construction Certificate plans approved by Shoalhaven City Council. | For the duration of the subdivision works. |
| Developer Contributions | The developer will pay Section 94 developer contributions in accordance with Shoalhaven City Council's Section 94 Contributions Plan on a "per ET" basis for each stage of the residential subdivision. | Prior to the release of the Subdivision Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Developer Contributions (continued) | The developer will pay Section 64 water and sewer developer contributions in accordance with the development servicing plan applicable at the time of payment. | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will enter into a Voluntary Planning Agreement with Shoalhaven City Council under Section 93F of the EP&A Act to fund the costs of the improvement works outlined below for the sums stated as follows:<br>* Extension of Community Hall, Yalunga Reserve - $36,134<br>* Upgrade of foreshore facilities including carparking - $15,265<br>* Road upgrade works to Bendalong Rd and Inyadda Drive - $56,160<br>* Construction of rural Type B intersection at intersection of Bendalong Rd and Inyadda Drive - $12,721<br>The Agreement will address the staging of payment of contributions in accordance with Condition B1 and will be registered on the title of the land in accordance with the Real Property Act 1900. | Prior to the release of the Construction Certificate for the first stage. |
| Signage | The developer will provide estate marketing signs in accordance with the provisions of DCP 89 – Exempt and Complying Development or as otherwise approved by Shoalhaven City Council. | For the duration of the subdivision works. |

## ADVISORY NOTES

### *AN1 Compliance Certificate,* Water Supply Authority Act, 2000

Prior to issuing a subdivision certificate, a Compliance Certificate shall be provided to the consent authority showing that the development has met with the detailed requirements of the relevant water supply authority for the region that the subject site is located within.

The developer shall obtain the Compliance Certificate from the relevant local water supply authority and produce this to the satisfaction of:

(1) the certifying authority before release of the Construction Certificate, and

(2) the consent authority before the release of the subdivision certificate.

### *AN2 Requirements of Public Authorities for Connection to Services*

The Proponent shall comply with the requirements of any public authorities (e.g. Integral Australia, Shoalhaven Water, Telstra Australia, AGL, etc) in regard to the connection to, relocation and/or adjustment of the services affected by the construction of the proposed structure. Any costs in the relocation, adjustment or support of services shall be the responsibility of the Proponent. Details of compliance with the requirements of any relevant public authorities are to be submitted to the satisfaction of the PCA prior to the issue of the Construction Certificate.

### *AN3 Movement of Trucks Transporting Waste Material*

The Proponent shall notify the Roads and Traffic Authority's Traffic Management Centre (TMC) of the truck route(s) to be followed by trucks transporting waste material from the site, prior to the commencement of the removal of any waste material from the site.

### *AN4 Noise Generation*

Any noise generated during the construction of the development shall not exceed limits specified in any relevant noise management policy prepared pursuant to the *Protection of the Environment Operations Act, 1997* or exceed approved noise limits for the site.

### *AN5 Other Details Required prior to Issue of Subdivision Certificate*

The Proponent shall submit to the satisfaction of the consent authority or the council, the following information, prior to the issue of the Subdivision Certificate:

(1) Documentary evidence of the payment of section 94 contributions,

(2) An Occupation Certificate, and

(3) Documentary evidence that the property has been developed in accordance with plans approved by Major Project No. 05_0059 and of compliance (or a Compliance Certificate) with the conditions of that consent.

### *AN6 Street Numbering*

Street numbers and the building name(s), if any, will need to be clearly displayed at either end of the ground level frontages in accordance with Council's relevant policy, prior to the occupation of the building(s) or commencement of the use.

If street numbers or a change to street numbers is required, a separate application shall be made to Council.

### *AN7 Stormwater drainage works or effluent systems*

A construction certificate for works that involve any of the following:

(1) water supply, sewerage and stormwater drainage work

(2) management of waste

as defined by Section 68 of the Local Government Act, 1993 will not be issued until prior separate approval to do so has been granted by Council under Section 68 of that Act. Applications for these works must be submitted on Council's standard Section 68 application form accompanied by the required attachments and the prescribed fees.

### *AN8 Temporary Structures*

An approval under Section 68 of the Local Government Act 1993 must be obtained from the Council for the erection of the temporary structures. The application must be supported by a report detailing compliance with the provisions of the Building Code of Australia.

Structural certification from an appropriately qualified practicing structural engineer must be submitted to the Council with the application under Section 68 of the Local Government Act 1993 to certify the structural adequacy of the design of the temporary structures.

### *AN9 Disability Discrimination Act*

This application has been assessed in accordance with the Environmental Planning and Assessment Act 1979. No guarantee is given that the proposal complies with the Disability Discrimination Act 1992. The Proponent/owner is responsible to ensure compliance with this and other anti-discrimination legislation. The Disability Discrimination Act 1992 covers disabilities not catered for in the minimum standards called up in the Building Code of Australia which references AS 1428.1 - Design for Access and Mobility. AS1428 Parts 2, 3 & 4 provides the most comprehensive technical guidance under the Disability Discrimination Act 1992 currently available in Australia.

### *AN10 Commonwealth Environment Protection and Biodiversity Conservation Act 1999*

The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 provides that a person must not take an action which has, will have, or is likely to have a significant impact on a matter of national environmental significance (NES) matter; or Commonwealth land, without an approval from the Commonwealth Environment Minister.

This application has been assessed in accordance with the New South Wales Environmental Planning & Assessment Act, 1979. The determination of this assessment has not involved any assessment of the application of the Commonwealth legislation. It is the proponent's responsibility to consult Environment Australia to determine the need or otherwise for Commonwealth approval and you should not construe this grant of consent as notification to you that the Commonwealth Act does not have application. The Commonwealth Act may have application and you should obtain advice about this matter. There are severe penalties for non-compliance with the Commonwealth legislation.

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ecology | planning | offsets

# PRELIMINARY DOCUMENTATION

## ATTACHMENT M COWMAN STODDART 2006 ENVIRONMENTAL ASSESSMENT REPORT

Cowman Stoddart Pty Ltd

ABN 29 057 616 896

# ENVIRONMENTAL ASSESSMENT REPORT

## PROJECT APPROVAL
## 179 LOT RESIDENTIAL SUBDIVISION

## LOT 172 DP 755923 AND LOT 823 DP 247285 BERRINGER ROAD, CUNJURONG POINT ROAD AND THE SUNSET STRIP MANYANA

Prepared for:

MANYANA ESTATES PTY LTD

SEPTEMBER 2006

**The Holt Centre, 29 Kinghorne Street, Nowra NSW**
Telephone (02) 4423 6198 Facsimile (02) 4423 1569
Email – info@cowmanstoddart.com.au

PROJECT APPROVAL

179 LOT RESIDENTIAL SUBDIVISION

LOT 172 DP 755923 AND LOT 823 DP 247285.

BERRINGER ROAD, CUNJURONG POINT ROAD

AND SUNSET STRIP, MANYANA

Cowman Stoddart Pty Ltd

ABN 29 057 616 896

PETER COWMAN, B.Sc.Agr., M.A.I.A.S.T.
STEPHEN RICHARDSON, M. Appl. Sc., B.T.P., Grad. Dip. Env. Mgt
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The Holt Centre
29 Kinghorne Street
Nowra NSW 2541

Postal Address:
PO Box 738
Nowra NSW 2541

# SUBMISSION OF ENVIRONMENTAL ASSESSMENT

Prepared under the Environmental Planning and Assessment Act 1979

| | |
|---|---|
| **EA prepared by** | |
| Name | Stuart Dixon |
| Qualifications | B. of Urb. & Reg. Plan., MPIA |
| Address | 29 Kinghorne Street, Nowra |
| **Part 3A activity** | |
| Proponent Name | Allen Price & Associates on behalf of Manyana Estates Pty Ltd |
| Proponent Address | 75 Plunkett Street, Nowra |
| Land on which activity to be carried out | Berringer and Cunjurong Point Roads and The Sunset Strip, Manyana |
| Project | 179 Lot Residential Subdivision |
| **Environmental Assessment** | An Environmental Assessment (EA) is attached |
| **Declaration** | I declare that I have prepared this Environmental Assessment to the best of my knowledge:<br>• It has been prepared in accordance with the relevant provisions of the Environmental Planning and Assessment Regulation 2000;<br>• The information which it contains is neither false or misleading information. |
| Signature |  |
| Name | Stuart Dixon |
| Date | 28th September 2006 |

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| **Annexure 10** | Submissions from Government Agencies |

# EXECUTIVE SUMMARY

This Environmental Assessment Report has been prepared in support of a project application for a residential subdivision at Manyana, located within the City of Shoalhaven. The application is made pursuant to Part 3A of the Environmental Planning and Assessment Act, 1979 (EP&A). The development is a major project given the location of the site within the Coastal Zone, and the scale of this subdivision, which proposes in excess of 25 allotments.

A Preliminary Assessment was submitted to the Department of Planning and this Environmental Assessment considers the issues raised by the Director-General of the Department of Planning in the Environmental Assessment Requirements, issued January 2006.

The plan provides for the development of 179 allotments in a traditional Torrens Title scheme, ultimately allowing for the residential expansion of the existing village in a manner that appropriately considers the relevant issues that apply to the site, including ecological, statutory, social, and scenic.

The development will be undertaken in stages, developed over a number of years dependent on market conditions. In addition, staging is considerate of infrastructure provision, and the provision of progressive clearing in order to meet bushfire risk mitigation requirements and allow for growth of replacement landscaping. It is envisaged that development will take between 7 and 10 years to complete.

In preparing this Environmental Assessment Report, the following separate reports have been prepared to address the Environmental Assessment requirements and are relied upon:

- *Transport Report for Proposed Residential Subdivision, Manyana* – Colston Budd Hunt & Kafes Pty Ltd;
- *Flora and Fauna Assessment* – Bushfire and Environmental Services;
- *Bushfire Protection Assessment* - Bushfire and Environmental Services;
- *Water Cycle Management Report*- Storm Consulting Pty Ltd;
- *Heritage Impact Assessment* – South-East Archaeology Pty Ltd;
- *Draft Design Guidelines* - Malbec Properties Pty Ltd.

In addition, urban design advice has been sought from Cox Richardson, Architects and Planners, who have guided the final subdivision pattern.

### *Site and Surrounds*

The subject site is legally described as Lot 172 DP 755923 and Lot 823 DP 247285. The site has a total area of approximately 20.4 ha.

The site is bounded generally by Berringer and Cunjurong Point Roads to the north and west respectively, and the rear of residential properties along the eastern and southern boundaries. A narrow frontage is provided to the south providing access to The Sunset Strip. The site is located adjoining the north-west of the existing village of Manyana.

Manyana is located on the coast approximately 12 kilometres north in a direct line of the Ulladulla township.

The site is zoned Residential 2(a1) under the provisions of Shoalhaven Local Environmental Plan 1985. The site has been zoned for urban purposes since 1972 when amendment No. 3 to IDO No. 1 zoned the land for Village purposes however development of the site has not been possible in the past due to the lack of reticulated sewer.

The majority of the subject site is currently in its third generation of ownership by the Bertram family, who have owned the site for approximately 70 years. The current owners are the son and grandson of the original purchaser. During ownership by the Bertram's the site has been mostly used to provide weekend and holiday accommodation for the family, however occasional timber felling has taken place.

### *Environmental Assessment*

The proposed development has been designed in response to the environmental constraints that have been identified by the Director-General's Environmental Assessment Requirements and in the reports prepared to accompany the application. It is intended that this will create a sustainable extension to the existing village that will be appropriate in its village setting.

### *Statutory and Other Requirements*

The site and proposed development are subject to a number of State Environmental Planning Policies (SEPP No 71, SEPP Major Projects), the Illawarra Regional Environmental Plan, Shoalhaven Local Environmental Plan 1985, and Development Control Plan No 100 – Subdivision Code. The proposal is considered to be consistent with the relevant requirements however it is noted that 2 of the 179 lots are marginally below Council's requirements outlined in DCP 100 – Subdivision Code.

The development is identified as a Major Project under State Environmental Planning Policy - Major Projects given the location of the property within the Coastal zone and the scale of the project, which proposes in excess of 25 residential allotments, and as such, the provisions of

Part 3A of the Environmental Planning and Assessment Act, 1979 (EP&A) apply to this proposal.

The site is zoned Residential 2(a1) under the provisions of Shoalhaven Local Environmental Plan 1985 (SLEP) and the development is permissible with development consent.

The site is not subject to any area specific, place-based, Development Control Plan adopted by Shoalhaven City Council.

***Cumulative Impacts***

In preparing this Environmental Assessment Report, consultation has been had with relevant service providers including Shoalhaven Council, the Department of Education and Training, Department of Health (Illawarra Area Health Service), Telstra, Shoalhaven Water and Integral Energy. This revealed that the proposed subdivision can be adequately serviced without significant cumulative impacts.

***Traffic and Transport***

The proposed subdivision includes vehicular and pedestrian access to Berringer and Cunjurong Point Roads and The Sunset Strip. Accompanying this Environmental Assessment Report is a *"Transport Report for Proposed Residential Subdivision, Manyana"* prepared by Colston Budd Hunt & Kafes Pty Ltd. This report has examined the impacts of the development at a micro level within the site, at a local level within the village, and further afield at the intersection of Bendalong Road and the Princes Highway, including consideration of future growth and holiday peaks.

This report indicates that the development will not have an unsatisfactory impact on local road network or the intersection of Princes Highway and Berringer Road and the proposed access arrangements are satisfactory.

The recommendations of this report are supported in this Environmental Assessment Report.

***Bushfire***

The subject site is identified as being bushfire prone by mapping prepared by Shoalhaven Council and endorsed by the Rural Fire Service. An assessment of the bushfire threat has been conducted by Bushfire and Environmental Services which recommends the provision of Asset Protection Zones, various levels of construction dependent on proximity to unmanaged bushland, along with staging and access requirements.

The recommendations of this assessment are supported in this Environmental Assessment Report.

### *Urban Design, Visual Impact and Sustainability*

The proposed subdivision layout has been designed in order to provide an arrangement that is permeable for both pedestrians, cyclists and motorists in order to encourage 'out of car' trips.

Accompanying this Environmental Assessment Report are Draft Design Guidelines and these address issues such as the built form, external colours, setback for garages, standardised letterboxes, use of awnings and eaves, and uniform fencing. It is intended to finalise the Design Guidelines and determine the appropriate method to implement these in consultation with Shoalhaven City Council.

Visual impacts to the actual coastline are not significant given the location of the site to the west of the existing village area, and the existence of vegetation which screens views of the site. Visual impacts are therefore limited to public roads and other private properties located closer to the site. A Visual Analysis has been undertaken as part of this Environmental Assessment, in conjunction with a photographic assessment from the key vantage points in the locality.

Mitigation of the local visual impacts is proposed by provision of larger lots to allow greater retention of vegetation, more spacious building setbacks on the perimeter of the site and preservation of vegetation within an Endangered Ecological Community (EEC).

The measures contained in the layout and outlined in the Draft Design Guidelines are supported in this Environmental Assessment Report.

### *Flora and Fauna*

The subject site currently contains native vegetation over its area and its consideration has greatly influenced the final footprint of the development. In this regard, Bushfire and Environmental Services (BES) were engaged to undertake a review of the site in accordance with the Threatened Species Guidelines. In this regard, no specific individual threatened flora or fauna were considered to be a constraint to development, however an Endangered Ecological Community, the *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* was identified within a drainage depression in the western portion of the site. The key mitigation measures involve the preservation of this land and a suitable buffer in an allotment having an area of approximately 2.5 ha, appropriately edged by public roads to be dedicated as public reserve. In addition to this, other mitigation measures including the provision of a Vegetation Management Plan for the retained EEC, controlling drainage through the EEC, restricting the removal of other vegetation within the site, prohibiting the keeping of cats within the site and imposing controls

on the keeping of dogs, controlling sediment and the carrying out of appropriate landscaping within the development.

The measures recommended are supported in this Environmental Assessment Report.

***Infrastructure (Sewerage and Water)***

Shoalhaven Water is the supply authority responsible for water and sewerage for the Shoalhaven Local Government Area. In formulating this Environmental Assessment Report, discussions were held with Shoalhaven Water to establish the adequacy of the existing water supply and sewerage systems to cater for the proposed development.

Water supply is available to service the development however careful consideration is required in the staging of the development to ensure pressure and supply is maintained. It is considered that this can be addressed in further detailed designs in due course.

Having regard to sewerage services, Shoalhaven Water has advised that *"this site has been allowed for in the current design of the Conjola Sewerage Scheme".*

The supply of water and sewerage services is unlikely to be a constraint to this development.

***Stormwater and Water Quality***

The site drains generally from the north towards the south through the subject site, thence through the existing village to Manyana Beach via an un-named creek.

Storm Consulting Pty Ltd were engaged to investigate the impact of the proposed development on surface and groundwater and the retained vegetation within the EEC. This report recommended the provision of constructed wetlands to provide a high level of treatment of runoff, gross pollutant traps to allow for the collection of pollution and coarse sediment, the provision of detention on all proposed allotments, the use of swale drains where grades allow, infiltration trenches adjacent to the EEC area to ensure appropriate drainage is maintained and the use of recycled water from the Conjola Regional Sewerage Scheme for outdoor use and toilet flushing. These measures also ameliorate the impacts of increased run off during peak flows.

The recommendations of this report are supported in this Environmental Assessment Report.

***Aboriginal and Cultural Heritage***

A Heritage Impact Assessment has been undertaken by South-East Archaeology investigating the heritage significance of the site and the presence of indigenous cultural items. This work revealed the existence of two sites, one indigenous (artefact scatter) and one non-indigenous (timber weekender/fisherman's hut). Fieldwork was constrained because of limited visibility due to the dense vegetative cover, extent of leaf litter and sediment deposits, and as such,

whilst a number of potential management strategies were raised, additional field work requiring test excavations was considered necessary to better understand the site. Initial advice is that for the majority of items, the potential is negligible for finding additional items of significance, however some potential does exist due to the limited visibility outlined above. As such, approval under Section 87 of the National Parks and Wildlife Act is being sought to allow further investigations to be carried out.

The recommendations of this assessment are supported in this Environmental Assessment Report.

***Contamination***

The subject site has continually been owned by the family of the current owner for three generations. The site, apart from a small clearing containing an abandoned timber weekender cottage, contains native vegetation and has not been the subject of any intensive activities, with past use being limited to selective logging, with no on-site milling or treatment of timber. As such, the site is unlikely to be the subject of any site contamination.

***Consultation***

In preparing this Environmental Assessment Report, the following consultation was undertaken:

Community Consultation

Shoalhaven Council formally acknowledges Principal Consultative Bodies (PCB) which are formally notified of development applications and other relevant information relating to Council business. In relation to Manyana, the Manyana District Citizens Association is the formal PCB. In considering matters such as this development proposal, the Manyana District Citizens Association goes outside of its direct members in order to obtain input and feedback from a wider cross section of the community.

The Project Team met with this group on two occasions, firstly during the infancy of investigations (26th April 2006) and secondly when site constraints were more fully understood and a subdivision layout had been prepared (13thSeptember 2006).

In addition to the local community group, consultation was had with the Jerrinja Local Aboriginal Land Council and Jerrinja Consultants in relation to indigenous cultural issues.

State Government Agencies

In formulating the design, the following consultation was undertaken with State Government: Agencies:

- Department of Environment and Conservation – two meetings and one teleconference call with Project Team, plus correspondence providing opportunity for input in relation to

threatened species matters, plus communication with Storm Consulting having regard to drainage and stormwater control;

- Roads and Traffic Authority – consultation by Colston Budd Hunt and Kafes during the preparation of traffic assessment;
- Department of Natural Resources – communication between local office and Storm Consulting during preparation of Water Cycle Management Report;
- Department of Health – written consultation;
- Department of Education – written consultation.

Shoalhaven City Council (SCC)

Shoalhaven Council have been informed of the project throughout its design as follows:

- informal meeting with Council's Subdivision Planner prior to seeking Clause 6 declaration of Major Project Status;
- consideration of Preliminary Assessment and inclusion of SCC requirements in the Director General's Environmental Assessment Requirements;
- meeting with various Council Officers on 25th July 2006 to discuss relevant environmental constraints and the proposed subdivision layout;
- meeting with Subdivision Manager to discuss layout and long-term management of proposed Public Reserve Area on 19th September 2006;
- meetings, telephone conversations and correspondence as necessary with Shoalhaven Water.

Others

In preparing supporting documentation, consultants working on the project have consulted with:

- local public transport providers; and
- medical practitioner.

Further detailed analyses of consultation undertaken in the preparation of this Environmental Assessment are outlined in Section 7.0.

***Conclusion***

The proposed subdivision has properly addressed the relevant statutory requirements applying to this Major Project in addition to consideration of the relevant environmental, ecological, natural hazards and social constraints that apply to the site and surrounds.

The various sub consultants reports that have been prepared properly address those matters raised in the Director-General's Environmental Assessment Requirements.

The proposal represents a good balance between the reasonable development of a residential resource on lands that have been identified for this purpose for in excess of 30 years, and the appropriate consideration of ecological issues.

The design is well thought out and gives due regard to both modern subdivision design and the established character within the Manyana village and will contribute in a positive sense to the planned expansion of the existing village. The development will also see the use of significant existing infrastructure that has already been invested into the locality to cater for planned additional growth.

Given compliance with the Statement of Commitments, which include, but are not limited to, the preservation of the Endangered Ecological Community; finalisation of the Draft Design Guidelines; use of reclaimed water; provision of water quality control ponds; provision of public open space for dedication to Shoalhaven Council; payment of monetary contributions for public facilities and water and sewerage infrastructure; and the implementation of a landscaping scheme, the subdivision is suitable for approval.

# 1.0 INTRODUCTION

This Environmental Assessment Report has been prepared in support of an application proposing a residential subdivision into 179 lots of the subject site which has frontage to Berringer and Cunjurong Point Roads and The Sunset Strip located in Manyana, within the City of Shoalhaven. The subdivision proposed is a conventional Torrens Title scheme and it is expected that it will take approximately 7-10 years to complete.

The development is a Major Project as the site is located in the coastal zone and the subdivision proposes in excess of 25 allotments for residential development. Accordingly, the provision of Part 3A of the Environmental Planning and Assessment Act, 1979 (EP&A) apply in the consideration of this application.

In preparing this Environmental Assessment, consideration has been given to the following plans and reports:-

- *Subdivision Sketch Plan and Staging Plans* – Allen, Price and Associates
- *Transport Report for Proposed Residential Subdivision, Manyana* – Colston Budd Hunt & Kafes Pty Ltd;
- *Flora and Fauna Assessment* – Bushfire and Environmental Services;
- *Bushfire Protection Assessment* - Bushfire and Environmental Services;
- *Water Cycle Management Report*- Storm Consulting Pty Ltd;
- *Heritage Impact Assessment* – South-East Archaeology Pty Ltd;
- *Draft Design Guidelines* - Malbec Properties Pty Ltd.

In addition, this report has given consideration to consultation that has been undertaken with a variety of persons and agencies, including State Government Agencies, Shoalhaven City Council, and the local community.

The Environmental Assessment has been prepared in accordance with the Director-General's Environmental Assessment Requirements and addresses those matters considered to have relevance to the proposal include ecological, infrastructure, traffic and visual impacts.

The application is considered to comply with the relevant State, Regional and Local environmental planning policies that apply to the site. The application is generally compliant with the relevant Development Control Plans that apply, however it is noted that minor departure is proposed to Council's Subdivision Code, DCP 100, in relation to the lot sizes associated with two of the 179 lots.

The proposal includes an appropriate lot layout and other measures to mitigate the impacts of the subdivision, including the preservation of all significant ecological areas, provision of open space in accordance with Council's Section 94 Contributions Plan, use of reclaimed waste water and Draft Design Guidelines to control the final built form.

The proposal is recommended for support.

# 2.0 DEVELOPMENT PROPOSAL AND JUSTIFICATION

## 2.1 DEVELOPMENT PROPOSAL – PROJECT APPLICATION

This application is seeking consent to the subdivision of the subject site into 179 residential allotments, creating an additional 177 lots, in a traditional Torrens Title scheme. Accompanying this application as **Annexure 1** is a subdivision sketch plan prepared by Allen Price & Associates which shows the following:

- A road pattern loosely based on a traditional grid pattern.
- Larger allotments on the periphery of the site to enable greater front setbacks to improve visual amenity and provide suitable bushfire mitigation.
- A variety of lot sizes ranging in area from 485 $m^2$ to 1520 $m^2$, with an average size of approximately 720 $m^2$.
- Provision of public open space with an area of 2.5 ha to allow the retention of an Endangered Ecological Community (EEC) identified on the site. Such reserve will be edged within the subject site with bollard type fencing and sealed roads. A number of pedestrian/cycle pathways are proposed to be provided in order to control access and to minimise impacts. It is intended to dedicate this land to Shoalhaven City Council for the enjoyment of all residents within Manyana.
- Provision of centrally located playground space with an area of 3,320$m^2$ to complement the large area comprising the EEC. It is intended to present this reserve in a more formal structured manner with trees retained where possible, with the site embellished with play equipment to suit a variety of age groups. This reserve is also intended to be dedicated to Council and as such, will be available for the enjoyment of all local residents.
- Water quality control ponds and other drainage infrastructure to manage stormwater prior to its discharge at the south of the site. These features will be designed and constructed in order that fencing will not be required.

In addition to the information depicted on the sketch plan, the proposal provides:-

- Servicing by way of reticulated water and sewerage. It is intended to provide for the reuse of treated wastewater from the Conjola Regional Sewerage Scheme for toilet flushing and garden irrigation by future residents.
- A requirement for on site detention for all proposed allotments to minimise downstream impacts.

- Electricity and telephone are to be provided underground.
- Site landscaping through the planting of street trees and works within the proposed public open space.

In addition to the physical features of the subdivision, it is intended to prepare separate Design Guidelines which will guide the built form on the lots to be created. A copy of 'Draft Design Guidelines' are provided in **Annexure 2**.

The proposed subdivision has been designed to accommodate single dwellings and dual occupancies only. The zoning of the land does not permit higher density housing such as villas, townhouses or residential flat buildings and as such, it is not appropriate to provide larger allotments to accommodate these forms of development.

## 2.2 STAGING

The development will be completed in stages, contingent on the buoyancy of the residential market and take up rates. Accompanying the subdivision sketch plan in **Annexure 1** is an 'indicative staging plan' which shows the development of 6 stages, each accommodating approximately 30 allotments. It is anticipated that development would commence in the southern portion of the site at its frontage to The Sunset Strip where access to existing services are readily available. It is expected that development would then continue generally in an anti-clockwise direction around the site.

Dedication of the public reserves and drainage infrastructure will occur at various stages throughout the construction of the subdivision as it is not practical, nor desirable, to dedicate all areas up front. Despite this, all essential drainage infrastructure will be in place when required to serve upstream properties, whilst public reserves will be provided incrementally commensurate with growth in the subdivision.

The staging is mindful of the need to provide relevant services for residential development, particularly having regard to water supply pressure, along with appropriate maintenance of Asset Protection Zones in order to mitigate bushfire risk and allow reasonable residential development of lots upon their release.

## 2.3 JUSTIFICATION

Justification for the proposal is provided as:

- The site has been identified by Shoalhaven City Council as one suitable for residential development for some time and has zoned it entirely Residential 2(a1)

under the provisions of Shoalhaven Local Environmental Plan. Further, the site was zoned Village under IDO No. 1 in 1972.

- The site is well located, being close to the coast in an area experiencing high amenity with a village character.
- Although close to the coast, the site is not prominent from the actual coastline and visual impacts can be properly mitigated.
- The site is in close proximity to important existing community facilities including the community hall (play group/pre-school) and existing active open space (tennis court, basketball and soccer field).
- Shoalhaven City Council and the State Government have already invested in considerable infrastructure in the locality which is necessary for residential development, most recently in the form of sewerage works but more generally in the provision of sealed roads, reticulated water, power, telephone and community facilities.
- The Shoalhaven Local Government Area has limited land available for residential purposes and it is appropriate that lands that are currently zoned for this purpose are properly developed at appropriate densities to provide land for orderly residential development consistent with the established village character.
- The development of additional land into residential allotments will lead to greater availability of land for housing purposes, thereby reducing pressure on housing cost.
- The development of the site for residential purposes will provide appropriate asset protection and bushfire mitigation along the north-western edge of the existing village, and allow for its ongoing management in an appropriate manner.
- It will provide for the implementation of Council's plans for the locality, including LEP and relevant Section 94 projects, achieving growth targets and residential strategies.
- Increased economic opportunities for the region with increased employment in the building and allied industries, and increased demand for building materials, landscaping supplies and white goods.
- The development will provide greater residential population to support the planned commercial facilities for the village, located to the north-east some 150 metres from the subject site, and

- The development can be undertaken in a fashion that is considerate of the relevant ecological and environmental constraints applying to the site.

## 2.4 CONSEQUENCES OF NOT DEVELOPING

In the event that this development is not undertaken, the generally restrictive nature of the Residential 2(a1) zone that applies to the site is such that other permissible uses are very limited. Demand for other forms of development that are both economically viable and consistent with the requirements of SLEP appears low. Consequently, if residential development is not undertaken, it is likely that this will lead to a valuable community resource remaining idle, leading to a reduced supply of residential land in Manyana and the southern Shoalhaven generally. The effects of this would see further increases in the value of residential land and reduced housing affordability in the locality.

In addition, the full benefit of investment already undertaken to provide significant infrastructure in the locality, in the form of the Lake Conjola Sewerage System, reticulated water, telephone and power, will not be properly realised.

# 3.0 SITE ANALYSIS

## 3.1 MANYANA AND SURROUNDS

The subject site is located at Manyana on the south coast of NSW in the City of Shoalhaven, approximately 12 kilometres (straight line) generally north of Ulladulla. Manyana is generally bordered by the coast to the east, bushland to the north and bushland then Berringer Lake (which flows into Lake Conjola) to the west, and bushland thence Cunjurong Point to the south.

Manyana is sited partly on a small headland, Inyadda Point, which projects out into the Pacific Ocean. Inyadda Point is already developed with residential dwellings and is well removed from the land the subject of this application. The remainder of Manyana is developed on land which is more gently sloping or level.

Vehicular access to Manyana is provided via Bendalong Road, which intersects with the Princes Highway approximately 12 kilometres to the west. Bendalong Road has a sealed carriageway and is two lanes in width.

**Figure 1** below is an aerial photo of the locality which shows the siting of the property in relation to the existing village and coastline.

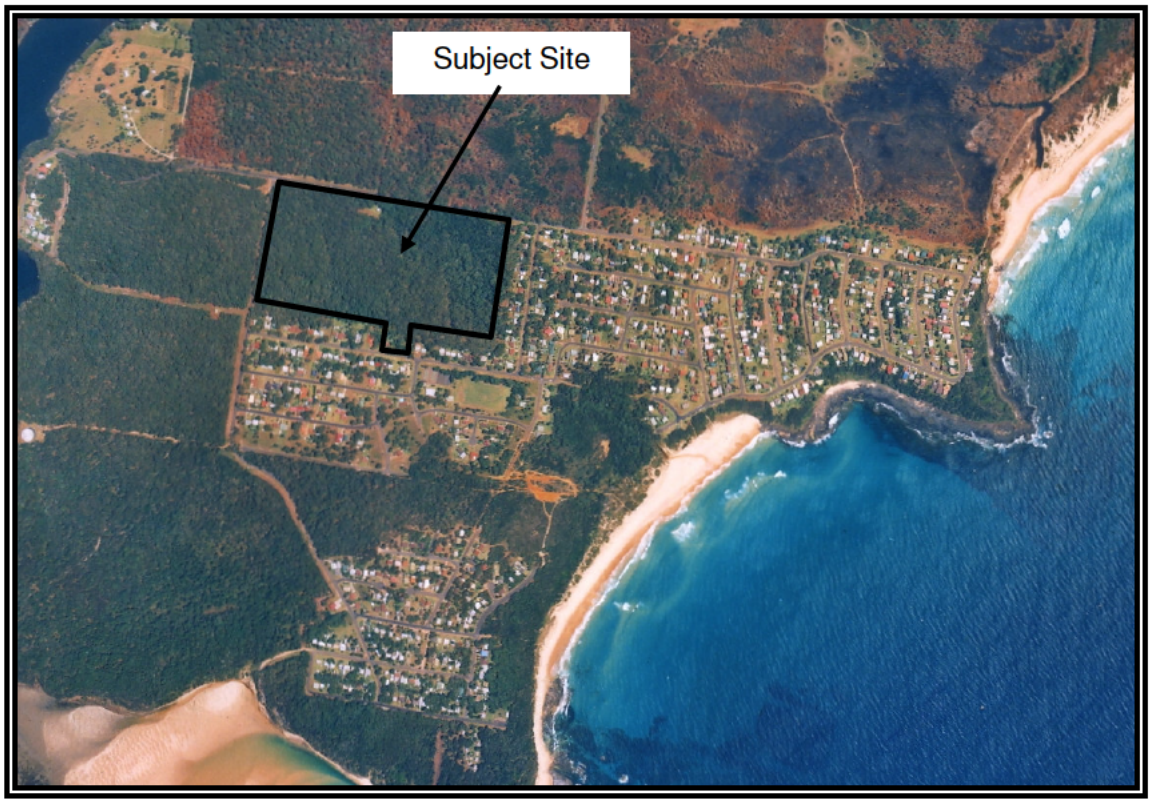


**Figure 1 – Aerial Photo of Manyana showing the Subject Site**

**Figure 2** over page shows the location of the subject site within the region along with the cadastral layout of the Manyana and Cunjurong Point Villages.

Existing development at Manyana consists of predominantly single detached housing. Although principally single housing predominates, a variety of forms are present, from modest weekender type accommodation with simple design finished in light weight materials, through to more substantial two storey dwellings, particularly closer to the actual coast.

Manyana is relatively permeable for pedestrians and motorists alike given the street layout, which is loosely based on a traditional grid pattern, the relatively small size of the village and the location of existing public reserve and foreshore.

Commercial services for the locality are limited to general stores, providing convenience type goods being sited at Cunjurong Point (see **Plate 1**) and Bendalong (see **Plate 2**). The township of Ulladulla provides wider retail and commercial opportunities, with this being approximately 35 kilometres from Manyana by road.

Within Manyana itself, the only commercial property is a Real Estate Agency and **Plate 3** shows this site.

Land zoned for commercial purposes under Shoalhaven Local Environmental Plan 1985 is located at the corner of Inyadda Drive and Curvers Drive at the entrance to town however this is currently undeveloped. **Plate 4** shows the general location of this site. The subject property is sited approximately 170 metres from this land which is expected to provide neighbourhood shopping facilities in the future.

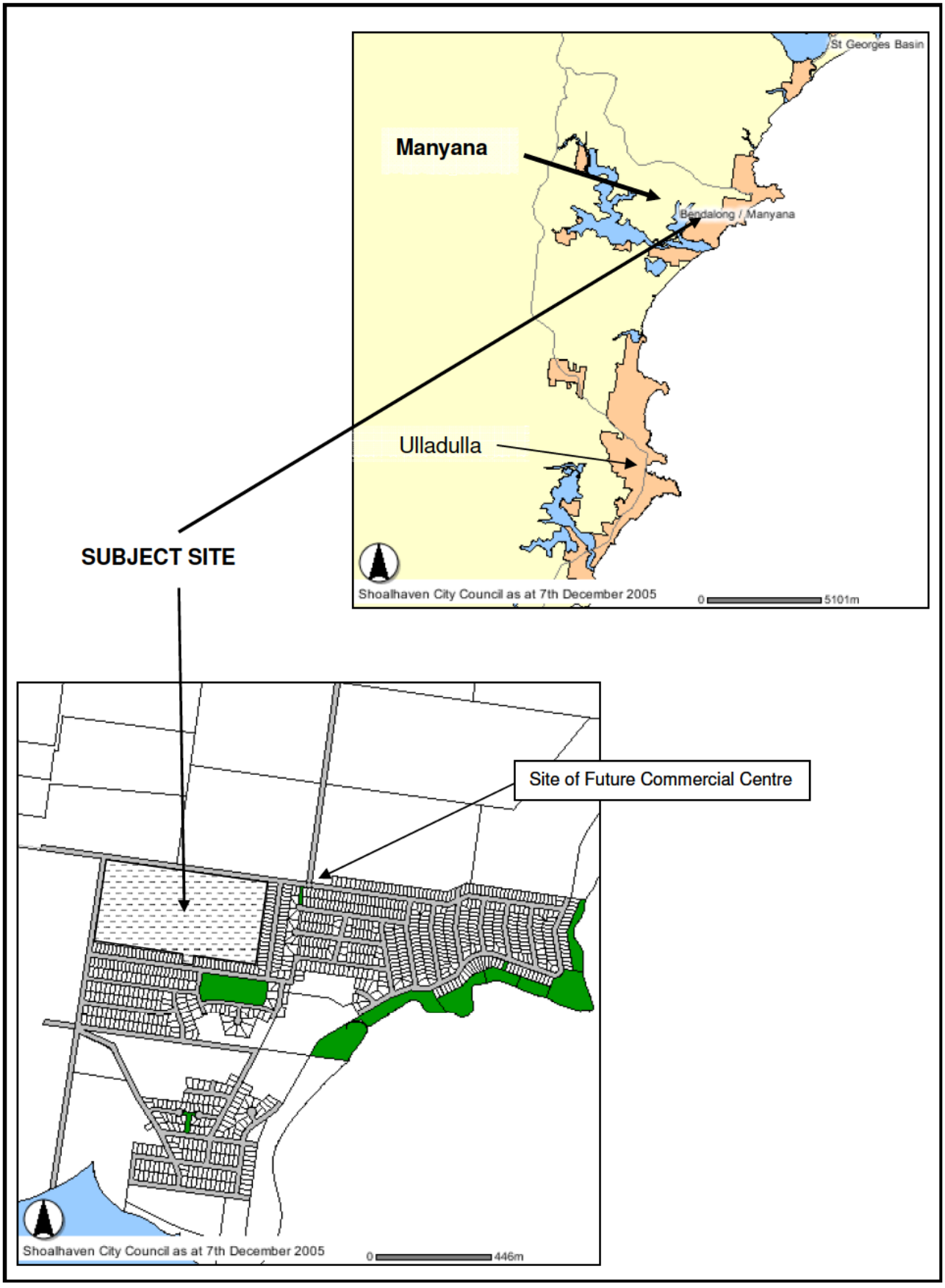


**Figure 2: Locality Plan (Extract from SCC GIS)**

**Plate 1 – Existing Shop at Cunjurong Point**

**Plate 2: Existing Shop at Bendalong**

**Plate 3: Existing Commercial Premises – Manyana**

**Plate 4: Site of Future Commercial Development.
Corner of Inyadda and Curvers Drives.**

Community facilities for the village are provided in the form of a Community Hall (including pre-school and play group), tennis courts, basketball court and soccer oval in a central area known as Yulunga Reserve, which is bounded generally by The Sunset Strip, The Barbette and The Palisade. **Plates 5** to **7** inclusive show the community facilities available in this area. In addition, a Volunteer Fire Brigade Shed is provided along Cunjurong Point Rd to service both Manyana and Cunjurong Point.

**Plate 5: Community Hall – Yulunga Reserve**

**Plate 6: Playing Fields and amenities – Yulunga Reserve**

**Plate 7: Tennis Court Facilities – Yulunga Reserve**

In addition to the subject site, Manyana contains the following stock of significant land which is vacant and zoned for residential development:

- land to the east of Inyadda Drive owned by Kylor Pty Ltd which is zoned mostly Residential 2(a2) (low-density residential with lot size of 2000m$^2$) and partly 2(c) Residential Living Area;
- land on the south-eastern edge of the Manyana village owned by Vacenta Pty Ltd which is also zoned Residential 2(a1); and
- Crown Land land to the west of the subject site in the catchments of Berringer Lake which is zoned Village.

Manyana is provided with water, power and telephone services. A reticulated sewerage system is not available, however is currently under construction, with development in the village relying on a combination of on-site disposal systems and pump out collections. The reticulated sewerage scheme is expected to be available for connection in mid 2007.

## 3.2 SUBJECT SITE

The subject site itself is located adjoining the north-west of the existing village, bordered by existing residential allotments on its eastern and southern boundaries, and undeveloped lands to the north and west. The site is generally bordered by Berringer Road to the north, Cunjurong Point Road to the west, the rear of allotments fronting The Sunset Strip to the south and the rear of allotments fronting The Companionway to the east. Photographs of the subject site when viewed from a variety of public places are contained within **Annexure 3**. These photos are also used in the Visual Analysis undertaken in Section 6.5 of this Report. The photos illustrate the remoteness of the site from the actual coast and the generally forested nature of the site.

The subject site has an area of approximately 20.4 hectares, and is made up of two (2) allotments legally described as Lot 172 DP 755923 (20.234282 ha) and Lot 823 DP 247285 (1688 m$^2$).

The land is generally regular in shape and is currently vacant, apart from a rustic timber slab cabin sited in a small clearing in the northern section of the property near Berringer Road, and this building is depicted in **Plate 8**. This has provided basic weekender/holiday accommodation in the past however does not appear to have been recently used.

**Plate 8: Existing timber weekender on subject Site**

The site has road frontage to both Berringer Road (approximately 630 metres frontage) and Cunjurong Point Road (approximately 322 metres), whilst a narrow frontage of approximately 45 m is provided to The Sunset Strip. All of these roads are public roads, provided with a sealed surface, maintained by the local authority, Shoalhaven City Council.

The site slopes generally from the Cunjurong Point Rd and Berringer Road frontages down to the Sunset Strip. In this regard, the site has a fall of some 25 metres from the highest point along Berringer Rd, and some 19 metres from the highest point along Cunjurong Point Rd.

Drainage channels are located in the central and western portions of the site, running generally in a north-south fashion, joining near the subject property's southern boundary with the Sunset Strip.

The site predominantly comprises a cover of native vegetation which is identified as being bushfire prone, consisting of Category 1 vegetation.

The site is entirely zoned Residential 2(a1) under the provisions of SLEP. The site has been zoned for urban purposes since 1972 when IDO Amendment No 3 zoned the subject site and adjoining lands Village.

The site is located in close proximity to the north-west of Yulunga Reserve which contains active and passive recreation facilities.

The 20.2 ha allotment (Lot 172 DP 755923) is currently in its third generation of ownership by the Bertram family, who have enjoyed ownership of the site for approximately 70 years. The current owners are the son and grandson of the original Bertram purchaser. During ownership by the Bertram's the site has been used to provide weekend and holiday accommodation for the family. The other property has been added to the development property in order to provide a preferable subdivision layout which allows an alternative access point and provision of additional drainage opportunities.

# 4.0 KEY ASSESSMENT REQUIREMENTS

The Director-General in correspondence dated January 2006 has identified the following key issues requiring assessment:-

- Statutory and Other Requirements,
- Cumulative Impacts,
- Traffic Impacts (Construction and Operational),
- Bushfire,
- Urban Design, Visual Impact and Sustainability,
- Threatened Species and Matters of National Environmental Significance,
- Impact on Sewerage and Water Infrastructure,
- Impacts on Water Quality and Drainage,
- Aboriginal and Cultural Heritage, and
- Contamination.

A full copy of the Director-General's Environmental Assessment Requirements is provided as **Annexure 4.**

# 5.0 STATUTORY FRAMEWORK

The following section considers the various statutory matters requiring consideration in the assessment of this proposal.

## 5.1 STATE LEGISLATION/POLICIES

### *NSW Coastal Policy*

The NSW Coastal Policy applies:

- three nautical miles seaward of the mainland and offshore islands;
- one kilometre landward of the open coast high water mark;
- a distance of one kilometre around:
  - ⇒ all bays, estuaries, coastal lakes, lagoons and islands;
  - ⇒ tidal waters of coastal rivers to the limit of mangroves, as defined by NSW Fisheries (1985) maps or the tidal limit whichever is closer to the sea.

The subject site is located within the coastal zone and as such the NSW Coastal Policy 1997 applies. The Policy guides the management and planning of the coastal zone and has a strong emphasis on ecologically sustainable development. The Policy essentially brings together all policies, programs and standards that apply to the coastal zone into the one document. In addition, the Policy seeks to co-ordinate the multiple agencies and authorities, and various levels of government, to ensure consistency in application of the Policy, outlining who is responsible for implementing the Policy, and at what stage in the development process. The Coastal Policy culminates in a series of Strategic Actions and objectives. In relation to the consideration of Development Applications is Strategic Action 3.2.4 which requires:-

> *"In preparing and amending regional and local environmental plans and development control plans and when assessing **development applications**, consideration of the design and locational principles contained in the Coastal Policy (Appendix C Table 3) will be required."*

Table 3 in Appendix C of the Coastal Policy outlines a number of principles that require consideration when development applications are considered. These principles are outlined as follows:-

- *Only developments which do not compromise the natural and cultural values of the area will be permitted on beaches and frontal dunes.*

Comment – the site the subject of this subdivision proposal does not contain a beach or frontal dune and as such, this principle will not apply.

- *Works to protect, restore and rehabilitate beaches and frontal dunes may be permitted where appropriate.*

Comment – this proposal does not include works to protect, restore or rehabilitate beaches as the site does not contain these features. In addition, the property itself is sited well clear of these features. As such this principle has no further implications for this project.

- *Undeveloped headlands will be preserved.*

Comment - the site does not contain a headland.

- *Any developments on headlands already developed should be strictly limited to height and scale no greater than existing buildings and will require an environmental assessment, including an assessment of visual impact from adjoining beaches.*

Comment – the subject property is located in excess of 500 metres west of a headland, and separated by existing residential development within the Manyana village. The site is however, not prominent from the beach due to its separation, local topography, the extent of existing vegetation behind the beach along with the well developed nature of Manyana. Visual impact from the coastline is addressed in Section 6.5 of this Environmental Assessment.

It is considered that the development of the site will not lead to an unsatisfactory impact for the following reasons:

- The site is well setback from the actual headland,
- The site is not prominent from the coastline,
- The site is not visible from beaches near the site,
- The property is sited behind existing residential development when viewed from the coastline, and
- Shoalhaven City Council has adequate policies in place to control future residential development.

- *Beaches and waterfront open space will be protected from overshadowing. The standard to be applied will vary according to local circumstances, however generally the standard to be applied is:*
  - *in cities or large towns, no overshadowing before 3pm midwinter and 6:30pm Summer Daylight Saving Time;*
  - *elsewhere, no overshadowing before 4pm midwinter and 7pm Summer Daylight Saving Time.*

Comment – this proposal is for the subdivision of land only and will not result in the overshadowing of beaches or waterfront open space. Furthermore, the site is well clear of beaches and water front reserves such that overshadowing of these features will not occur when the site is ultimately developed.

- *Public setback lines will be set for every new development that immediately adjoins coastal lakes, estuaries, beaches, foreshores and cliffs. The amount of setback will be determined by consent authorities taking into consideration specific details of public access requirements, local topography, scenic factors (including the impact of the development as viewed from the waterway and foreshore area), coastal hazards (including sea level rise considerations), building design criteria and pollution and siltation management measures. No new development will be permitted to impede public access to foreshore areas.*

  *Apart from facilities essential to surf life saving, community facilities, works to protect property and environmental restoration measures, no development will be permitted seaward of this setback line and developers will be required to dedicate this land for public use or enter into a satisfactory agreement for ensuring public access, use and maintenance of the area to a suitable standard, as a condition of the development.*

Comment – the subject site does not include a coastal lake, estuary, beach, foreshore or cliff and as such, this requirement does not have implications for the proposal. The proposal does make provision for open space to preserve ecologically sensitive locations within the site, along with the establishment of appropriate buffers and drainage works to maintain current hydrology.

- *As a continuation of existing practice, any tourist or recreational development which is adjacent to, or proposes to utilise the natural assets of, a National Park, Nature Reserve or State Recreation Area must not compromise the natural values of the area. Any tourist developments adjacent to areas reserved or dedicated for conservation purposes must be consistent with the "Guidelines for Tourist Developments in Proximity to Major Natural Areas in the North Coast Region" prepared by the Department of Urban Affairs and Planning or other conservation oriented design controls adopted in an LEP or DCP.*

Comment – the proposal does not include any tourist or recreational use and as such, this has no further implications for the development.

It is considered that the proposal is consistent with the requirements of the Coastal Policy 1997.

***Coastal Design Guidelines 2003***

The Coastal Design Guidelines for NSW where prepared by the NSW State Government with reference to the NSW Government's Coastal Policy 1997 and complement the

Government's Coastal Protection Package (which included SEPP No. 71). The Coastal Design Guidelines are based upon the principles of ecologically sustainable development. The Guidelines provide additional direction to supplement the limited design matters contained in the Coastal Policy and are broad brush guidelines that support the place-based planning approaches espoused in PlanFirst, the NSW Government's plan making reform package released in 2002.

The Guidelines operate by applying the hierarchy of coastal settlements, which provides seven different settlement types ranging in size from Coastal Cities down to isolated coastal dwellings on large rural allotments.

Part 1 of the Guidelines outlines the relevant issues, opportunities, and desired future character which apply to each of the seven settlement types.

Part 2 of the Guidelines outlines the 5 Design Principles that should apply to each of the Settlements, providing a series of 'desirable' and 'undesirable' practices that are to be applied to coastal settlements. The 5 Design Principles relate to:

- defining the footprint and boundary of settlements;
- connecting open spaces;
- protecting the natural edges;
- reinforcing the street pattern;
- appropriate buildings in a coastal context.

Part 3 concludes the document and outlines how the Guidelines are to be implemented.

The following addresses the 5 Design Principles contained with the NSW Coastal Design Guidelines that are considered to have relevance to this proposal:-

Principle 1 - Defining the Footprint and Boundary of Settlements

The subject property is sited adjoining existing residential development to the east and south, undeveloped land zoned for rural purposes to the north, and undeveloped lands zoned for Village purposes (deferred from Shoalhaven LEP) to the west. The subject site has been identified by Shoalhaven Council for urban development since 1972.

It is considered that development of the subject site would form an appropriate northern extension to the village, on a site that has been zoned for such purposes, which is presently bordered by the existing sealed road network, and which has been catered for in the provision of relevant infrastructure.

The proposal allows for the following:

- Retention of vegetation within the site along riparian corridors;
- Provision of a permeable subdivision pattern allowing for pedestrian and cycle movements both within and beyond the site to places of importance, such as the community facilities and future neighbourhood shopping site;
- Utilisation of existing public infrastructure;
- Connection of all relevant services.

Principle 2 - Connecting Open Space Networks

The subdivision provides for the provision of open space in the following locations:

- Within a forested portion of the site, having a minimum area of 2.5 ha and remaining forested with native vegetation. This will provide passive recreation opportunities as well as maintaining visual amenity through the provision of a large expanse of green space;
- Near the centre of the site in a more formal park setting, having an area of 3,320 $m^2$. This area is to be embellished with playground equipment, and is also to contain a water quality control facility for visual interest, and it is anticipated that this will provide play space in a formal park like setting for local children to complement the more natural reserve provided above;
- A series of formal and informal pathways providing connectivity for pedestrians and cyclists.

Principle 3 - Protecting the Natural Edges

The subject site does not have direct frontage to the actual coastline or foreshore areas. The edge of the subject site is provided by established sealed public roads and adjoining residential development, which form an appropriate edge treatment themselves.

The site contains an Endangered Ecological Community (refer to Section 6.6) which is contained with a proposed open space reserve within the site which is proposed to be edged by a suitable buffer, bollard fencing and then sealed public roads. It is considered that this is an appropriate way in which to treat this natural area to ensure that impacts are minimised.

Principle 4 - Reinforcing the Street Pattern

The proposal seeks to reinforce the prevailing street pattern utilised within Manyana by:

- Building on the established street pattern which is loosely based on a grid arrangement.

- Having a road system that encourages lower speeds, culminating in a more pedestrian friendly environment.
- Linkages to all potential road frontages.
- Appropriate widths of roads; and
- Permeability for motorists, cyclists and pedestrians.

Principle 5 - Appropriate Buildings for a Coastal Context

Although no buildings are proposed as part of this application, it is important that the allotments that are created allow for the development of appropriate buildings in accordance with that espoused in the Coastal Design Guidelines. In this regard, it is considered that the proposal allows for suitable residential development due to:-

- the larger size of the allotments;
- the proposed orientation of lots;
- suitable road pattern;
- due regard to natural hazards;
- preservation of reasonable native vegetation within the site.

In addition to this, it is also intended to require compliance with the Design Guidelines that have been prepared and accompany this application, shown as **Annexure 2**, subject to further consultation with Shoalhaven City Council. This is further discussed in Section 6.5.

Finally, it is noted that Shoalhaven City Council has controls relating to future residential development on the resultant allotments (Policy to Control Building Height and Amenity in Residential Areas) and this is expanded upon in Section 6.5 of this report.

It is considered that the proposal is generally consistent with and will result in development that will comply with the requirements of the NSW Coastal Design Guidelines 2003.

***South Coast Draft Regional Strategy***

The Draft South Coast Regional Strategy applies to the Local Government Areas of Shoalhaven, Eurobodalla and Bega. The Draft Strategy was recently released and the period for public comments concluded on 31st May 2006. At the time of completing this Environmental Assessment, the Strategy has not been finalised.

According to the Introduction of the document, the *"primary purpose of the Regional Strategy is to ensure that significant natural and scenic assets that define the region's character and underpin its economy are not compromised by growth"*. The Strategy is to *"be implemented primarily through LEPs, development control plans and the State Infrastructure Strategy and funds collected through developer contributions"*.

In relation to residential growth, the Draft Strategy provides background information and a series of goals for each of the relevant Local Government Areas that culminate in a number of 'Outcomes' and 'Actions' relating to various themes including the natural environment, natural hazards, housing and settlement, economic development and employment growth.

Natural Environment

Having regard to the natural environment, the Strategy makes a number of recommended actions, the majority of which relate to future local environmental plans. The site contains an Endangered Ecological Community and the subdivision layout has proposed the preservation of this area, including an appropriate buffer and drainage works, to ensure its long term preservation within the subdivision. The proposal is considered to be consistent with the natural environment objectives of the Draft South Coast Regional Strategy. Consideration of the Endangered Ecological Community is undertaken in Section 6.6.

Natural Hazards

The relevant actions proposed for the consideration of natural hazards relate to the preparation of flood investigations, considerate of climate change, the consideration of coastal erosion in LEPs, and consideration of proper risk assessment when rezoning land. This has no consequences for this Major Project given that it is sited on land that is already zoned for urban development. Despite this, the proposal adequately considers natural hazards as:

- the site is not flood liable;
- a bushfire risk assessment has been undertaken and recommendations incorporated into the subdivision layout;
- the site is relatively high and above many residential lots in Manyana, located 20 - 30 m above sea level providing scope for sea level rise.

Housing and Settlement

In relation to Housing and Settlement, the Strategy estimates 45 600 new dwellings will be required throughout the Region by 2031. Within the Shoalhaven local government area, the Strategy makes the following specific approximations:

> *An additional 26 300 dwellings will be required in the Shoalhaven over the next 25 years, of which 23 900 can potentially be accommodated by existing vacant urban land and existing investigation areas. A majority of this land is located around the major centre of Nowra–Bomaderry and the major towns of Ulladulla and Vincentia (includes the Jervis Bay–St Georges Basin area). The 2400 dwelling 'supply gap' will be accommodated by medium-density development within the town centres.*

Having regard to actions to achieve these goals, the Strategy outlines the following:-

> *Other residential development in more isolated and sensitive locations as specified in Appendix 2 will be subject to a priority review by an expert panel to determine suitability and scale of any release, to be undertaken in consultation with the local council, land owner, Department of Environment and Conservation, Department of Lands, Roads and Traffic Authority and other relevant agencies.*

In relation to the subject site, it is noted that it is NOT identified in Appendix 2 as being Sensitive Urban Lands. Whilst there is certain land within and near Manyana that is so identified, these do not affect the subject site.

> *A land release staging program shall be developed to ensure the orderly release of new housing. The program should use the delivery of key infrastructure such as electricity, water and sewer as a tool to implement the staging program.*

The site is provided with key infrastructure including water and electricity, whilst sewer will be available for connection in mid 2007. Consultation has been had with the relevant supply authorities and no objection is raised to the proposal (refer to Section 6.7). Staging will be considerate of servicing constraints.

> *Urban investigation areas which are/will be identified in the following final NSW Government-endorsed documents are supported:*
>
> > *Nowra–Bomaderry Structure Plan*
> >
> > *Sussex Inlet Settlement Strategy*
> >
> > *Jervis Bay Settlement Strategy*
> >
> > *Milton–Ulladulla Structure Plan*
> >
> > *Eurobodalla Settlement Strategy.*
>
> *Additional development sites will only be considered if demand for additional subregional housing supply can be demonstrated. Any such additional investigation areas shall adjoin a major regional centre or major town and shall be consistent with the Sustainability Criteria in Appendix 1.*

The subject site has already been identified for future urban development due to its current Residential 2(a1) zone and as such, does not require further investigations. Consequently, this action has no implications for this application.

*No new towns or villages will be supported.*

This Major Project does NOT propose a new town or village, being part of the planned extension to the existing village of Manyana which has been provided for since 1972.

*Appropriate housing mix targets shall be developed between councils and the Department of Planning to ensure that new housing meets the needs of future households, in particular the needs of smaller households and an aging population.*

*Planning provisions shall ensure that the appropriate housing mix targets can be achieved, in particular the need to provide medium-density housing in and around major regional centres and major towns.*

Shoalhaven City Council has zoned the subject land Residential 2(a1) under the provisions of SLEP, 1985. Under this planning instrument, residential development is limited to single detached dwellings and dual occupancies. It is considered that implementation of this action is more appropriate during any further local environmental plans Shoalhaven City Council may choose to pursue and as such, has no ramifications for this Major Project.

*Councils shall undertake a strategic review of lands for seniors living developments in accordance with the principles provided in State Environmental Planning Policy (Seniors Living) 2004 and ensure that sufficient sites are identified.*

Shoalhaven Council commissioned Dr Judy Stubbs to prepare a study to examine the provision of aged accommodation within the entire City. This culminated in document *"A Place for Aging? An Assessment of the Social Impacts of an Aging Population in the Shoalhaven: Implications for Housing, Services and the Community"*, which was released in April 2004. Whilst this study recognised the need for additional aged care developments in the north (Nowra/Bomaderry) and south (Milton/Ulladulla/Mollymook) of the Shoalhaven, service provision is preferable in larger towns rather than small villages, where more effective utilisation of resources can be achieved. Regardless, it is considered that this is a matter for further consideration by Shoalhaven City Council when examining future local environmental plans.

*LEPs shall include appropriate urban design and land use objectives such as:*

> *sustainability principles, e.g. walkable neighbourhoods, compact centres, water and energy efficiency, and transit oriented development*

> *promoting community development and wellbeing, e.g. through the provision of adaptable housing, accessibility, safety and crime prevention, quality public domain and facilities that provide opportunities for social interaction*

> *quality architecture and character, e.g. coastal design, streetscape and heritage*

> *promoting community health and wellbeing through a clean and healthy environment and a built form that affords people a variety of recreation options, (e.g. through the provision of green spaces) and transport alternatives (e.g. walking and cycling).*

The above urban design and land use objectives are considered to be very worthwhile in creating suitable residential localities. It is noted that the objectives are for implementation when preparing LEPs, however despite this, a variety of these objectives have been introduced in the design of the subdivision and the accompanying design guidelines. Features include more walkable neighbourhoods, improved recreational opportunities through the provision of green space, water efficient development (reuse of treated effluent and stormwater), and Draft Design Guidelines that encourage appropriate architecture.

*A range of affordable housing strategies shall be considered and agreed between councils and the Department of Planning such as low-cost forms of housing, suitable zonings and development controls to improve housing choice and specific schemes (e.g. inclusionary zonings, joint projects, planning agreements and incentives). Strategies will be consistent with the NSW Affordable Housing Strategy.*

The NSW Affordable Housing Strategy is currently being prepared and is due for completion this year. Although not specifically designed as low-cost housing, the allotments proposed in this application will assist in maintaining housing affordability by continuing the reasonable supply of residential land.

Economic Development and Employment Growth

This section of the Strategy seeks to preserve economic growth and employment opportunities by:

- protecting lands that are currently zoned for employment;
- adding to the supply of employment lands in existing economic centres;
- monitoring the supply of employment lands;
- ensure provision of tourism infrastructure in new LEPs.

These actions relate to additional considerations required in the preparation of LEPs and as such, have no major bearing on this proposal.

Water, Energy and Waste Resources

This Section relates to the provision of essential services in an efficient and secure fashion and culminates in the following actions:

- Council shall identify suitably located and appropriately zoned land for new water supply, waste water treatment and recycling, energy, waste avoidance and resource recovery infrastructure, to support growth in major regional centres and major towns.
- Councils will be encouraged to reduce town water demand through water conservation such as replacement of potable water use with harvested stormwater and/or highly treated waste water for non-potable uses.
- Suitable locally generated and/or renewable energy projects such as wind, solar, bio-waste and wave power, shall be supported.
- Councils will be encouraged to promote waste avoidance and resource recovery in demolition and building work as well as in the design and occupancy of residential, commercial and industrial development.

The site is within the catchment of the Conjola Regional Sewerage Scheme which is currently under construction and will be available to accept effluent waste from this subdivision. This scheme is a $53 million project aimed at servicing 2200 dwellings within nine villages in the vicinity of Lake Conjola including Manyana, Bendalong, Cunjurong Point, Fishermans Paradise and Lake Conjola. The scheme provides for the tertiary treatment of effluent and allows for the reuse of reclaimed water within new subdivisions for toilet flushing and garden watering. It is the intention to install the requisite infrastructure to cater for this and allow the reuse of reclaimed water within the subdivision, thereby reducing reliance upon the potable water supply. Such water will be available for toilet flushing and garden watering, thereby reducing demand for potable water. This is further discussed in Section 6.7.

Having regard to the waste generation, Shoalhaven Council has adopted DCP 93 – Waste Minimisation and Management which aims to reduce the extent of waste generated by all phases of development, and requires the submission of a Waste Minimisation and Management Plan for all development applications, including single dwellings and development that is defined as Complying Development. This will assist in controlling the amount of waste, along with its storage and disposal, that is generated by this development.

The provision of alternative power energy sources are outside the scope of this development however Integral Energy, who supply electricity in the Shoalhaven Local Government Area, allows its customers to select renewable energy as an option under its 'INgreen' programme, and this will be available to future residents of the site.

Concluding Comment on Draft South Coast Regional Strategy

The Draft South Coast Regional Strategy is a strategic document to guide future decisions, principally in relation to LEPs and DCPs, however it is considered that the proposal is consistent with its aims and objectives given that:

- the development is on land zoned for the planned expansion of the existing village and has been so identified for in excess of 30 years.
- the layout is of good design that properly considers ecological constraints and opportunity;
- the development provides for the re-use of treated effluent;
- the subdivision proposes significant quantities of open space;

***Rural Fires Act***

The subject site is identified by mapping prepared by Shoalhaven Council in conjunction with the Rural Fire Service as being bush fire prone, with the entire site containing Category 1 vegetation. A Bushfire Safety Authority is not required however given that this proposal is to be considered under Part 3A of the EP&A. Despite this, a separate Bushfire Protection Assessment has been prepared by Bushfire and Environmental Services to address the threat of bushfire and to address the requirements of Planning for Bushfire Protection and this report accompanies the Environmental Assessment. This concludes that the following measures are required to address the bushfire hazard:

- A 30 m APZ to the west and north of the development to be maintained at an IPA standard.
- A 20 m APZ to the EEC to be maintained at an IPA standard.
- APZ can include existing and proposed roadways.
- Appropriate level of vehicular access be provided.
- Various levels of construction in accordance with AS 3959 dependent upon setback to unmanaged bushland.
- The staging of the development to provide an interim APZ of 80 m in width in order to protect development during the construction period of the development.

- The development will provide suitable mitigation measures to protect against bushfire.

The subdivision layout has been designed to accommodate the recommendations.

This will be discussed further in Section 6.4 of this report.

***Threatened Species Conservation Act***

This legislation was introduced with the objectives of conserving threatened species, populations and ecological communities of animals and plants. The Act amends the Environmental Planning & Assessment Act and the National Parks & Wildlife Act. Strict compliance with this legislation is not required given the Part 3A nature of the application however notwithstanding this consideration has been given to threatened flora and fauna. Accompanying this application is a report that addresses flora and fauna issues affecting the site.

This is further addressed in Section 6.6 of this report.

***Native Vegetation Act***

The Native Vegetation Conservation Act 2003 (NVC) came into force on 11th December 2003 to control the removal of native vegetation. The associated Regulations came into force on 1st December 2005. This legislation operates separately to the Environmental Planning and Assessment Act, 1979 (EP&A), and requires that approval be obtained for the clearing of remnant native vegetation or protected regrowth unless the clearing is a permitted activity. Schedule 1 of the NVC outlines those areas where the Act does not apply, and clause 14 of this schedule outlines the following:-

> *"Land within a zone designated **"residential"** (but not "rural-residential"), "village", "township", "industrial" or "business" under an environmental planning instrument or, having regard to the purpose of the zone, having the substantial character of a zone so designated, not being land to which a property vegetation plan applies."*

In relation to the subject site, it is zoned Residential 2(a1) under the provisions of Shoalhaven LEP 1985, and as such, the NVC will have no further implications for this development proposal.

### 5.1.1 State Policies

***State Environmental Planning Policy (SEPP) No. 11 – Traffic Generating Developments***

The proposal entails the subdivision of the site into 179 allotments. Under the provisions of Schedule 2 of SEPP 11, development involving:

*"(g) subdivision of land into 50 or more allotments"*

requires consideration by the Local Traffic Committee.

Accompanying this Assessment is a Transport Report prepared by Colston Budd Hunt and Kafes which has concluded that the proposed subdivision will not adversely impact on the efficiency of the local road network, whilst current access arrangements are satisfactory. Traffic is further addressed in Section 6.3 of this Environmental Assessment.

***State Environmental Planning Policy No 55 – Remediation of Land***

SEPP No. 55 aims essentially to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health and other aspects of the environment. In particular clause 7 of the SEPP requires that a consent authority must not consent to any development unless:

- it has considered whether the land is contaminated;
- if the land is contaminated whether the land is suitable in its contaminated state (or will be suitable after remediation) for the purpose for which the development is proposed; and
- if the land requires radiation to be made suitable, it is satisfied that the land will be remediated before the land is used for that purpose.

Furthermore, if a change of use of land for residential purpose is proposed, where,

- there is no knowledge (or incomplete knowledge) of past uses;
- on which it would have been lawful to carry out such past uses during any period in respect of which there is no knowledge (or incomplete knowledge).

The consent authority is required to consider a report specifying the findings of a preliminary investigation of the land.

Past development and uses have been investigated and are further discussed in Section 6.10 of this Environmental Assessment.

***State Environmental Planning Policy No. 71 - Coastal Protection***

The site is located entirely within the coastal zone, and as such, the provisions of SEPP 71 require consideration. The Policy was made to ensure that:

- development in the NSW coastal zone is appropriate and suitably located;

- there is a consistent and strategic approach to coastal planning and management;
- there is a clear development assessment framework for the Coastal Zone.

The aims of the SEPP are as follows:

*(a) to protect and manage the natural, cultural, recreational and economic attributes of the New South Wales coast, and*

*(b) to protect and improve existing public access to and along coastal foreshores to the extent that this is compatible with the natural attributes of the coastal foreshore, and*

*(c) to ensure that new opportunities for public access to and along coastal foreshores are identified and realised to the extent that this is compatible with the natural attributes of the coastal foreshore, and*

*(d) to protect and preserve Aboriginal cultural heritage, and Aboriginal places, values, customs, beliefs and traditional knowledge, and*

*(e) to ensure that the visual amenity of the coast is protected, and*

*(f) to protect and preserve beach environments and beach amenity, and*

*(g) to protect and preserve native coastal vegetation, and*

*(h) to protect and preserve the marine environment of New South Wales, and*

*(i) to protect and preserve rock platforms, and*

*(j) to manage the coastal zone in accordance with the principles of ecologically sustainable development (within the meaning of section 6 (2) of the Protection of the Environment Administration Act 1991), and*

*(k) to ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and*

*(l) to encourage a strategic approach to coastal management.*

The provisions of Clause 8 of the SEPP require consideration of additional matters by the consent authority when assessing development applications. These additional matters are as follows:-

*(a) the aims of this Policy set out in clause 2,*

*(b) existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved,*

*(c) opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability,*

*(d) the suitability of development given its type, location and design and its relationship with the surrounding area,*

*(e) any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore,*

*(f) the scenic qualities of the New South Wales coast, and means to protect and improve these qualities,*

*(g) measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats,*

*(h) measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats*

*(i) existing wildlife corridors and the impact of development on these corridors,*

*(j) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards,*

*(k) measures to reduce the potential for conflict between land-based and water-based coastal activities,*

*(l) measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals,*

*(m) likely impacts of development on the water quality of coastal waterbodies,*

*(n) the conservation and preservation of items of heritage, archaeological or historic significance,*

*(o) only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy applies, the means to encourage compact towns and cities,*

*(p) only in cases in which a development application in relation to proposed development is determined:-*

*(i) the cumulative impacts of the proposed development on the environment, and*

*(ii) measures to ensure that water and energy usage by the proposed development is efficient.*

The proposal is considered to be consistent with the requirements of Clause 8 for the following reasons:

- The proposal will not adversely affect public accessibility to and along coastal foreshores given the location of the site away from the actual coastline and the site

does not have frontage to a beach, estuary, coastal lake, headland, cliff or rock platform. The proposal includes the provision of publicly accessible lands throughout the subdivision within road reserves, drainage reserves and open space areas, thereby improving legal public accessibility over the site.

- The development is considered suitable given it adjoins the existing residential village and forms a reasonable extension to the north-west.
- The assessment has considered the impacts on Aboriginal cultural heritage and further information is provided in Section 6.9.
- The site is located behind existing development when viewed from the coast.
- The proposal includes measures to maintain water quality by the provision of water quality control ponds and other drainage infrastructure. Refer to Section 6.8 for further details.
- The site does not contain any rock platforms.
- The proposal is for the subdivision of land only and does not result in the construction of buildings, whilst Shoalhaven City Council has appropriate policies to control the scale of further development. In addition, separate Draft Design Guidelines will be finalised and are intended to be implemented in order to encourage design that is compatible with the village character.
- The site is well away from the coastal foreshore and the height limits that would be imposed on residential development would ensure that there is no overshadowing of the coastal foreshore.
- View loss from public places would not be significant.
- The site is surrounded by urban development on its eastern and southern boundaries and is NOT identified as a wildlife corridor under mapping prepared in support of the Illawarra Regional Environmental Plan.
- The site does not contain any areas of heritage, archaeological or historic significance.
- Give the nature of the development and the sites location, it is unlikely to cause conflict between land based and water based activities.
- It is proposed to utilise reclaimed water from the Conjola Sewerage Scheme for reuse in toilet flushing, garden watering and the like to reduce reliance upon the potable water supply.

- BASIX will ensure that all new development on the resultant allotments will meet the relevant energy and water saving targets that are stipulated.

Clauses 14 - 16 of the SEPP require consideration of the following additional matters when determining development applications:

> *14 Public access*
>
> *A consent authority must not consent to an application to carry out development on land to which this Policy applies if, in the opinion of the consent authority, the development will, or is likely to, result in the impeding or diminishing, to any extent, of the physical, land-based right of access of the public to or along the coastal foreshore*.

The property does not have frontage to a coastal foreshore area. As such, this clause is not considered to have implications for the proposal.

> *15 Effluent disposal*
>
> *The consent authority must not consent to a development application to carry out development on land to which this Policy applies in which effluent is proposed to be disposed of by means of a non-reticulated system if the consent authority is satisfied the proposal will, or is likely to, have a negative effect on the water quality of the sea or any nearby beach, or an estuary, a coastal lake, a coastal creek or other similar body of water, or a rock platform.*

It is intended that the site will be connected to the reticulated sewerage system which is currently under construction and will be available for connection mid 2007.

> *16 Stormwater*
>
> *The consent authority must not grant consent to a development application to carry out development on land to which this Policy applies if the consent authority is of the opinion that the development will, or is likely to, discharge untreated stormwater into the sea, a beach, or an estuary, a coastal lake, a coastal creek or other similar body of water, or onto a rock platform.*

The site drains into the ocean at Manyana Beach via an un-named creek. As part of this development, it is intended to provide water quality control devices, plus on-site detention, in order to mitigate impacts and improve water quality. This is addressed in the report prepared by Storm Consulting and is further discussed in Section 6.8 of this Environmental Assessment. The development is considered to be consistent with the requirements of Clause 16.

***SEPP Major Projects***

The project is affected by the provisions of the Major Projects SEPP due to the location of the site within the Coastal Zone, and the nature of the application, being the subdivision of land into more than 25 allotments. In this regard, the Director-General of the

Department of Planning formed the opinion on 22 November 2005 that the provision of Part 3A of the Environmental Planning and Assessment Act would apply.

In relation to this project, the SEPP aims to identify development to which the development assessment and approval process under Part 3A of the Act applies, and to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State.

***SEPP Building Sustainability Index (BASIX)***

This SEPP was introduced in order to ensure consistency throughout the state in applying the BASIX scheme which aims to encourage sustainable residential development.

At this time, the SEPP currently has no direct implications for the subdivision of land, however residential development on the resultant allotments will need to comply with the required targets applicable at the time of development.

## 5.2 REGIONAL PLANNING PROVISIONS

The subject site is affected by the provisions of the Illawarra Regional Environmental Plan No 1, 1986 (IREP).

The objectives of the Regional Plan that apply to living areas are:

- *to ensure that urban expansion is orderly and efficient having regard to the constraints of the natural environment and that sufficient land is available to prevent price rises resulting from scarcity of land,*
- *to ensure that new residential land or land for higher density development is only developed where there are adequate utility and community services available or there is a commitment from the relevant authorities or developer to provide those services,*
- *to provide for a range of lot sizes, dwelling types and tenure forms to cater for varying household needs in all local government areas,*
- *to ensure that residential development does not take place on hazard-prone lands, and*
- *to minimise bush fire risks to urban development.*

It is considered that the application is consistent with these objectives as follows:

- the land has been identified for at least 30 years to provide for additional residential accommodation;

- the project appropriately considers the natural hazards applying to the site, principally restricted to bushfire risks from the north and west;
- the site is well located in close proximity to the established community facilities;
- the site is well located in close proximity to those lands zoned for commercial purposes;
- all relevant services are or will be available and can be connected to the proposed lots.

A series of maps are attached to the Plan, which identify localities where specific policy issues apply. In relation to these maps, the subject land is:

- NOT identified as containing rainforest vegetation.
- NOT identified as a wildlife corridor.
- NOT Identified as land with prime crop and pasture potential.
- NOT identified as containing extractive resources.
- NOT Identified as land with landscape or environmental attributes.

In addition, it is noted that the site is NOT identified in Schedule 1 of IREP as containing an item of environmental heritage. Furthermore, as no property in the Manyana Village is listed in Schedule 1, the site is not within the vicinity of an item of environmental heritage.

## 5.3 LOCAL PLANNING PROVISIONS

### 5.3.1 Shoalhaven Local Environmental Plan (SLEP) 1985

***Zoning***

The subject site has been zoned for urban purposes since 1972 when Amendment No 3 of the Shire of Shoalhaven IDO No 1 zoned the land Village. An extract of IDO No. 1 Amendment No 3 is shown as **Figure 3** over page which shows the entire zoning map and the subject site is clearly visible as being zoned Village.

The site is currently zoned Residential 2(a1) under the provisions of Shoalhaven LEP 1985. **Figure 4** following is an extract from Council's GIS which shows the location of the relevant zones.

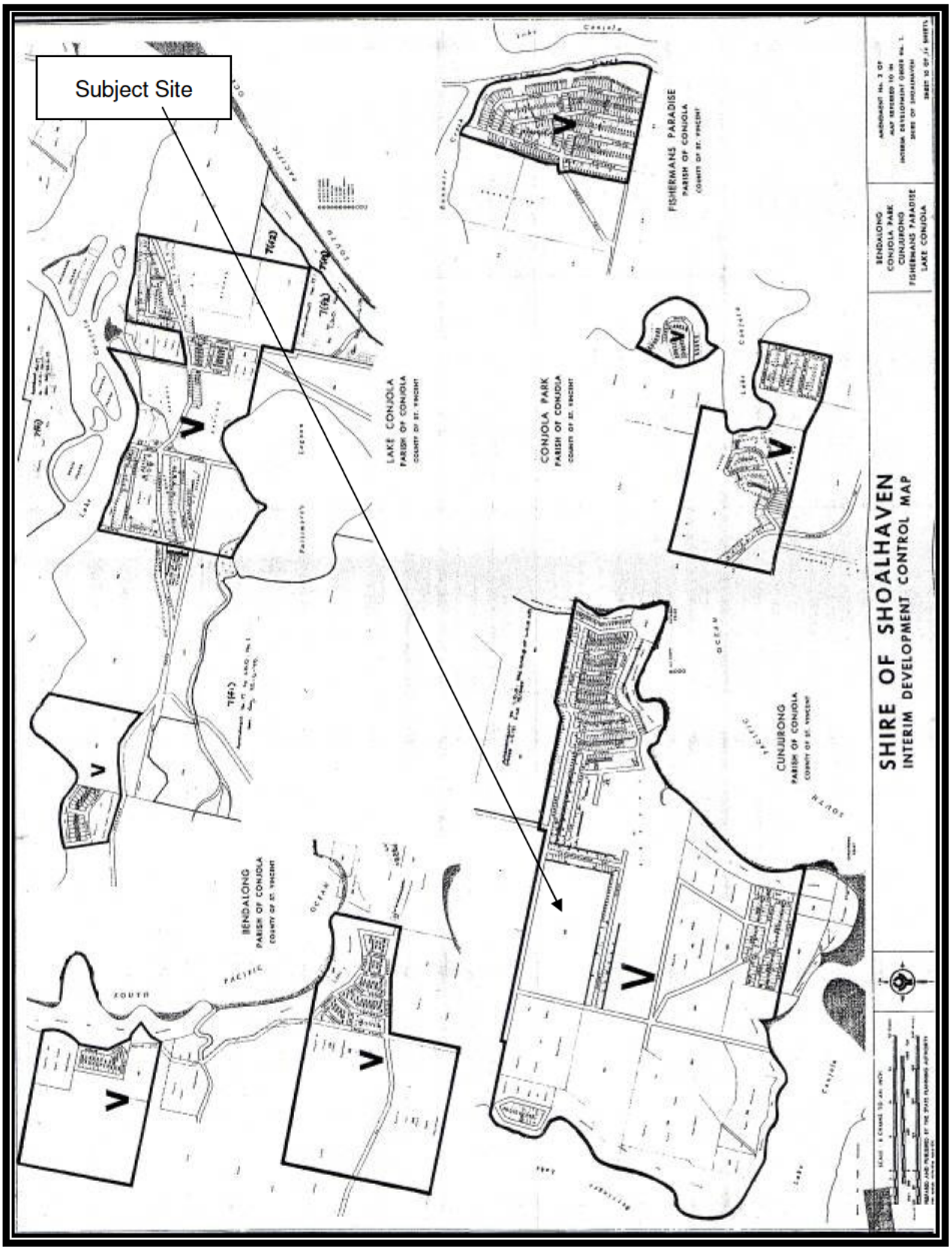


**Figure 3: Copy of Sheet 10 from Shoalhaven IDO No 1 Amendment No 3**

The objectives of the Residential 2(a1) are:-

> *"to provide an environment primarily for detached housing and to ensure that the range of development permitted in a residential area is compatible with the residential environment."*

The development of the proposed subdivision will provide allotments for future development with single detached housing and as such, is entirely consistent with these objectives.

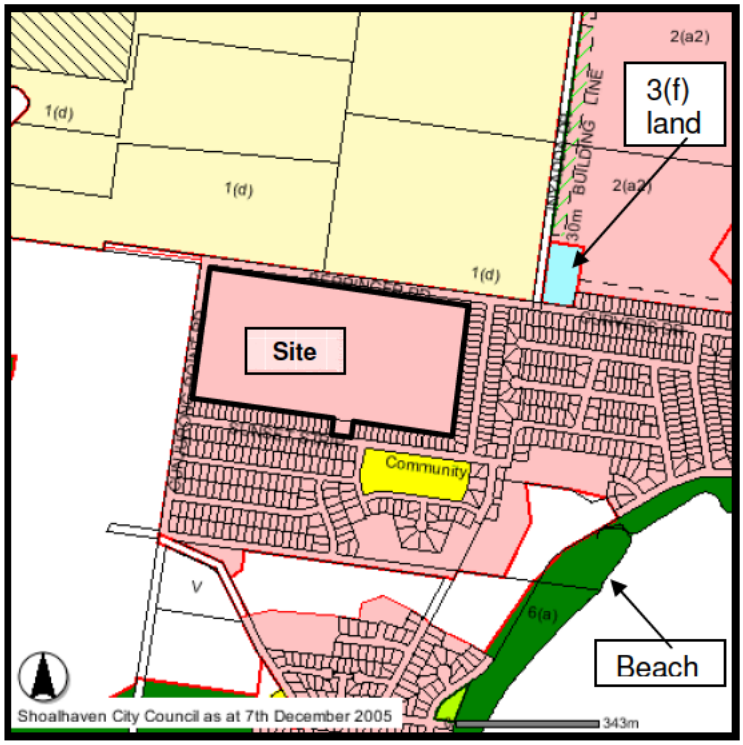


**Figure 4: Extract from Council's GIS showing location of relevant zones**

Shoalhaven LEP does not include any development standards applying to the subdivision of residential land, with the controls for subdivision being contained in Development Control Plan 100 – Subdivision Code.

***Environmental Management – Division 5***

Shoalhaven LEP at Division 5 relates to the environmental management of certain lands, contingent on certain locational criteria. The majority of these apply only to land zoned for rural or environmental protection purposes and as such will not be relevant to this proposal. The following addresses those matters that may apply or have relevance to this proposal.

Clause 21 – Land of Ecological Sensitivity

This clause applies to those lands that are identified on the accompanying LEP map with distinctive hatching. The relevant mapping does NOT identify the subject site with distinctive hatching.

Clause 21A – Vegetation Linkage

This clause applies to land identified on mapping with a broken black line and lettering noting "vegetation Linkage", but does not apply to land zoned for residential purposes, and as such, has no further implications for this proposal.

Clause 24 – Water Catchment Areas

The site is not within a water catchment area and as such, Clause 24 has no further implications for the proposal.

Clause 26 – Soil, Water and Effluent Management

This clause requires the following:

> *"1) A person must not carry out development that relates to the habitation of land by humans unless and until arrangements satisfactory to the Council have been made by the applicant (and if the applicant is not the owner, the owner also) for the provision of a water supply, facilities for the removal of sewage, and for the drainage of stormwater and other surface water from the land.*
>
> *(2) In deciding whether arrangements for drainage of stormwater and other surface water and the treatment and disposal of effluent are satisfactory, the Council must take into account whether the proposed systems can be accomplished in a manner which meets the following objectives:*
>
> *(a) economical feasibility and practicality in terms of design, installation and maintenance,*
>
> *(b) protection of public heath,*
>
> *(c) protection of surface water,*
>
> *(d) protection of ground water,*
>
> *(e) encouragement of the utilisation of wastewaters as a resource rather than a waste for disposal, and*
>
> *(f) protection of community amenity.*
>
> *(3) Despite any other provision of this plan, except clauses 2, 9 (3) and 21 and the objectives of the zone in which development the subject of this clause is proposed, the Council may consent to the construction of*

*devices which, in the opinion of the Council, are to be used principally for the purpose of soil and water management or water pollution control.*

It is intended that the development connect to the reticulated water and sewerage supply. This is further discussed in Section 6.7 of this Environmental Assessment.

Issues pertaining to stormwater and water quality are addressed in Section 6.8 of this Environmental Assessment.

Clause 27 – Acid Sulfate Soils

Clause 27 of SLEP specifies:

*"(1) This clause applies to land identified as having high probability to be affected by acid sulfate soils on the map prepared by the Department of Land and Water Conservation entitled Acid Sulfate Soil Risk Map dated December 1997 and available for public inspection at the office of the Council.*

*(2) Despite any other provision of this plan, the consent of the Council is required for any development which involves or is likely to involve, through drainage, earthworks, or any other means, the exposure to the atmosphere of any part of soil which contains iron pyrites within land to which this clause applies.*

*(3) The Council must not consent to development described in subclause (2) unless it is satisfied that measures can and will be taken to avoid or mitigate the actual or potential contamination of waterways in the vicinity of the land concerned by acid from acid sulfate soils."*

Plans show that the site does NOT have a high probability of acid sulphate soils and as such, this clause has no further implications for the proposal.

Clause 28 – Bushfire Prone Land

The site is identified as being bushfire prone by mapping prepared by Shoalhaven Council and signed by the RFS. Clause 28 requires:

*(1) The Council must not grant consent to the carrying out of development on bush fire prone land if it is of the opinion that:*

*(a) the development may have a significant adverse effect on the implementation of:*

*(i) any strategies for bush fire hazard reduction or risk management adopted by the Council, or*

*(ii) any relevant provisions of the Act or the Rural Fires Act 1997 , and*

*(b) the development, including the arrangements for access to and from the development, may constitute a significant threat to the lives of residents, visitors or emergency services personnel, and*

*(c) the development may give rise to an increased demand for emergency services during bush fire events that will result in a significant decrease in the ability of the emergency services to effectively control major bush fires.*

***Note:*** *Section 146 of the Act provides that bush fire prone land is land recorded by the Council as such on a map certified by the Commissioner of the NSW Rural Fire Service as a bush fire prone land map for the area of the Council.*

*(2) The Council must not grant consent to the carrying out of development on bush fire prone land unless it is satisfied that adequate measures are proposed to avoid or mitigate the threat from bush fire, having regard to:*

*(a) the siting of the development, and*

*(b) the design of, and the materials used in, any structures involved in the development, and*

*(c) the clearing of vegetation, and*

*(d) the provision of asset protection zones, landscaping and fire control aids (such as roads and water supplies).*

*(3) Before deciding to grant consent to any development on bush fire prone land, the Council:*

*(a) must have regard to the requirements set out in Planning for Bushfire Protection (ISBN 0 9585987 8 9) , prepared by Planning & Environment Services, NSW Rural Fire Service in co-operation with the Department of Planning (as it then was), and published in December 2001, and*

*(b) must be satisfied that those requirements will be met as far as is practicable in the circumstances.*

Accompanying this application is a Bushfire Protection Assessment prepared by Bushfire and Environmental Services. This addresses the requirements of *Planning for Bushfire Protection* and has recommended the provision of APZ, appropriate levels of construction and the like. The proposed layout considers the recommendations. This is addressed further in Section 6.4 of this Environmental Assessment.

Clause 29 – Development of Flood Liable Land

The site is located on higher lands that are not identified as being flood liable. As such, Clause 29 has no further implications for this proposal.

Clause 31 – Items of Environmental Heritage

The subject site is not identified as having an item of environmental heritage. Furthermore, no property in the vicinity of the site is identified as having heritage significance.

### *Draft Local Environmental Plans*

*Draft LEP 264 – Heritage LEP*

Shoalhaven LEP currently has a limited number of properties that are actually identified as items of environmental heritage. Council has commissioned a study of the whole Local Government Area to identify additional properties that may have heritage significance. This resulted in the release of Heritage Study 1995 – 1998 (dated February 2003) by Peter Freeman Pty Ltd Conservation Architects and Planners in association with JCR Planning Services and the preparation of a Draft LEP (DLEP 264) to formally list the relevant items. This study, along with the DLEP 264, has not identified the subject property, or any property in Manyana village for that matter, as containing an item of environmental heritage.

### *Development Control Plans*

*DCP 93 – Waste Minimisation and Management*

The DCP is implemented by a requirement to provide a Waste Minimisation and Management Plan (WMMP). Each WMMP is required to outline the amount of waste expected to be generated, its storage, and future re-use or disposal method. It is ordinarily the case that such information is provided before actual construction works commence and a condition of consent can be imposed requiring such plan for further consideration. The provisions of this DCP can be addressed.

*DCP 100 – Subdivision Code*

The proposal, being for the subdivision of the site into residential allotments, is subject of DCP 100 – Subdivision Code which applies when the subdivision of land is proposed. The aims of the DCP are:

- *To encourage high quality urban design and residential amenity;*
- *To set appropriate environmental criteria for subdivision development;*
- *To provide a comprehensive design approach for residential, rural, industrial and commercial subdivision;*
- *To provide a user friendly document with flexible performance-based criteria to guide*
- *development; and*
- *To provide for the ecologically sustainable subdivision of land.*

The DCP outlines a number of Performance Criteria with objectives that need to be met in the subdivision of land, along with Acceptable Solutions that may be examples of what is considered acceptable in complying with the Performance Criteria. The Acceptable Solutions are generally numerically based, and in this include issues relating to minimum allotment size, along with width and depths.

In relation to this subdivision, the following compliance table addresses the Acceptable Solutions that are considered to have relevance to this proposal.

**Table 1**

**DCP No. 100 - Subdivision Code**

| *Issue* | *Compliance* | *Comments* |
|---|---|---|
| **Lot Size**<br>*Minimum lot size of 500 $m^2$* | Yes (except for 2 lots below 500$m^2$) | The application proposes 179 allotments, 177 of which exceed the 500$m^2$ minimum with the smallest lot being 580$m^2$ and increasing up to 1520$m^2$.<br>Average size of the 179 lots is approximately 720$m^2$, which is 44% above the minimum allotment size.<br>Two of the lots however sited near Sunset Strip have areas of 485 $m^2$, and 490 $m^2$ which are marginally below the 500 $m^2$ requirement.<br>This is further discussed below. |
| **Dimensions**<br>• Rectangular non-corner lots<br>*Minimum width of 16 m and depth of 30 m.* | Yes (except for 1 lot non-compliant) | The proposed regular shaped allotments are all of a reasonable shape with width and depth that exceeds the minimum requirements.<br>The exception to this is one lot near the Sunset Strip which is smaller and has a depth of 26.5 metres.<br>This is discussed below. |
| • Rectangular corner lots<br>*Square width of 20 m depth of 30 m* | Yes (except for 1 lot non-compliant) | The proposed corner allotments are all of a reasonable shape with width and depth that exceeds the minimum requirements.<br>The exception is one lot on the corner of Proposed Road No 1 and the Sunset Strip, which is smaller and has a depth of 26.5 metres and a square width of 18.5 m at the building line.<br>This is discussed below. |
| • Irregular shaped lots<br>*Square width of 12 m*<br>*Width at building line of 16 m*<br>*Mean width 18 m*<br>*Depth of 30 metres* | Yes | All irregular shaped allotments are of a size and shape that exceed the minimum requirements. |

| *Issue* | *Compliance* | *Comments* |
|---|---|---|
| • Corner Splays<br>*4 metres* | Yes | Splays are provided to all corner allotments. |
| **Energy efficiency**<br>Allotments Design to achieve 5 star rating in accordance with Council's Energy Efficiency Policy | Yes | The allotments are all located on either an east-west or north-south axis which maximise opportunities of achieving good levels of solar access to future dwelling houses.<br>The exception to the above are allotments located to the north-east of the EEC. These allotments are more generous in their proportions with a minimum width of 19.5 m which will be sufficient to provide acceptable direct solar access. |

The subdivision layout departs from the requirements of Council's Subdivision Code in respect of two of the allotments sited towards Sunset Strip. The design of the subdivision in this location has been constrained by the shape of the subject site and the overall desire to have an access road onto Sunset Strip in order to improve accessibility and to properly distribute both vehicular and pedestrian access around the site. As a result, two lots in this location are constrained by the need to provide a road reserve to link with the Sunset Strip, which has the effect of restricting the depth of the allotments. These two allotments represent approximately 1% of the overall subdivision yield.

The allotments have areas of 485 $m^2$ and 490 $m^2$, which is 15 $m^2$ or 3% and 10 $m^2$ or 2% respectively, below the DCP requirements. These allotments have a width of 18.5 m and depth of 26.5 metres, are of a regular shape, are developed along an east-west axis, and are otherwise unconstrained such that a suitable dwelling would be able to be constructed. Indeed if anything, it is considered that the lots add some greater variety to the subdivision by providing a limited alternative to the very generous proportions of the remaining 177 lots.

Furthermore, this location will provide an important entry feature to the subdivision. It is considered preferable from an urban design perspective to have two east-west orientated lots facing onto the proposed road over one large corner lot which will have no proper relationship with the subject site.

The objectives of Council's Subdivision Code as it relates to Allotment Layout are contained within Element RE 14 as follows:-

***Objectives***

***01*** *To provide a range and mix of lot sizes to suit a variety of dwellings and household types, with areas and dimensions to meet user requirements.*

***02*** *To provide lots that are oriented where practicable to enable the application of energy conservation principles.*

***03*** *To provide lots of sufficient size to protect environmental features and take into account site constraints.*

***04*** *To provide for smaller lots in locations adjacent to neighbourhood centres, public transport stops and adjacent to higher amenity areas.*

The Performance Criteria applying to the Allotment Layout (and minimum lot size) is as follows:-

***P1*** *Lots have the appropriate area and dimensions for the siting and construction of a dwelling and ancillary outbuildings, the provision of private outdoor space, convenient vehicle access and parking.*

***P2*** *Lot areas and dimensions take into account the slope of the land and the desirability of minimising earthworks / retaining walls associated with dwelling construction.*

***P3*** *Lot areas and dimensions enable dwellings to be sited to:*

- *Protect natural or cultural features*
- *Acknowledge site constraints including soil erosion and bushfire risk*
- *Retain special features such as trees and views*

***P4*** *Lot frontages are oriented to streets and open spaces so that personal and property security, deterrence of crime and vandalism and surveillance of footpaths and open spaces are facilitated.*

***P5*** *Lot design precludes the need to reverse onto a major or minor distributor road.*

***P6*** *Lots to provide appropriate dimensions for the siting and construction of residential development and ancillary outbuildings or facilities*

***P7*** *Adequate provision to be made for access to the property.*

***P8*** *Suitable building envelope, of relatively flat land that can be developed.*

***P9*** *Minimise overshadowing and privacy impacts on adjoining residents.*

***P10*** *Provide opportunity for future dwellings to have good solar access.*

***P11*** *Retain character of location by preserving existing mature trees or provide opportunities for future planting.*

It is considered that the proposed allotments are reasonable despite the minor variation to Council's minimum lot size, for the following reasons:

- The overall subdivision layout provides a wide variety of allotment sizes, most of which are well in excess of Council's minimum requirements,
- The proposed allotments are of a suitable size and are provided with adequate width to allow for the construction of a dwelling with a reasonable footprint that would be able to comply with Council's setback requirements,
- The proposed allotments are of a reasonable shape which will not constrain the construction of a dwelling,
- The proposed lots run along an east-west axis which will provide good level of direct solar access to any future dwelling allowing application of energy conservation principles,
- Future dwellings are most likely to be sited towards Proposed Road No. 1 which will ensure maximum setback from an existing allotment to the west, thereby minimising impacts from overshadowing on that property. In other directions in the vicinity of these allotments are the road reserve of Sunset Strip to the south, Proposed Road No 1 to the east and Proposed Public Reserve to the north and overshadowing of these areas is not problematic,
- The portion of the site where these lots are sited is not constrained by excessive slope, natural features or the need to preserve view lines or the like and the development of these proposed lots with a dwelling will not lead to unsatisfactory impacts.

In addition to the specifics relating to the allotments themselves, it is worth noting that the average allotment size for the entire subdivision is approximately 720m$^2$, which far exceeds the minimum allotment size outlined in DCP 100. On balance, it is considered that the variation of up to 15m$^2$ or 3% is minor and the layout is suitable for approval notwithstanding this minor departure to the Subdivision Code.

***Area Specific Development Control Plans***

The site is not subject to any specific area based DCP adopted by Council.

### *Contributions Plan*

*Section 94 Contributions Plan*

The site is subject to Shoalhaven Council's Section 94 Contributions Plan. For the most part, this will result in a requirement to pay a monetary contribution to the provision of services and amenities off-site that will be used by future residents.

In addition however, Project 05OREC0004 requires the provision of 8,304m$^2$ of passive open space within the subject site for the use by residents of the subdivision. The subdivision layout proposes the provision of a total of 2.8 ha of open space comprising a combination of formal play space, forested lands containing an endangered ecological community, and drainage infrastructure. The total amount of open space provided is approximately 3.5 times the minimum area required by Shoalhaven City Council in its Section 94 Contributions Plan. It is noted that the subject site is located in close proximity to Yulunga Reserve which provides a large expanse of level playing field and residents of this site will have good accessibility to this space, and as such, it is not necessary to replicate such an area in this development.

Retention of the EEC has been proposed to satisfy the requirements of the Department of Environment and Conservation (DEC) and to have proper regard to the ecological constraints of the site. This will be further discussed in Section 6.6 of this Report.

The provision of modern drainage infrastructure incorporating wetlands and the like is necessary to maintain the integrity of the EEC and downstream watercourses as required by both DEC and the Department of Natural Resources and also the Performance Criteria established in Council's Subdivision Code DCP 100.

This leaves approximately 1.1 ha of area for public reserve purposes in a combination of structured play space in a centrally located park, with the balance comprising more natural forested areas.

The proposal is considered to be consistent with the requirements of Council's Section 94 Plan.

### *General Council Policies*

*Shoalhaven Cycleway Strategy*

Shoalhaven Council adopted a Cycleway Strategy on 16th December 1997 in order to recognise the needs of cyclists, to ensure that the Shoalhaven is a 'cycle friendly' city and to identify a realistic network of cycleways for implementation. A series of maps

accompanies the strategy in order to identify appropriate routes for cycleways, and the nature of the facility to be provided.

In relation to the settlements of Manyana, Cunjurong Point or Bendalong, the policy has no effect as no facilities have been identified as being required.

Notwithstanding this, the subdivision does include a series of formal and informal opportunities for cyclists within the property and the goal of a 'cycle friendly' city is enhanced by the proposal.

*Reflective Building Materials - Use in Coastal and Rural Areas*

Shoalhaven Council has adopted a policy to control the use of reflective materials in locations where the natural landscape is of such quality it should be pre-eminent, structures should not strongly contrast with the background and highly reflective materials are not permitted in such locations. The Draft Design Guidelines discourage the use of highly reflective materials such as galvanised iron and as such, compliance with this policy will be achieved in future residential development.

*Policy to Control Building Height and Amenity in Residential Areas*

Shoalhaven Council on 3 April 1990 adopted this policy which controls the height and floor space of residential dwellings in order to preserve residential amenity. This policy includes, amongst other things, requirements relating to overall height (8.5 metres) and a maximum of two storeys, building height plane (projected at $45^{o}$ from a height of 5 metres) and a floor space ratio (0.6:1).

It is expected that future development will comply with this policy.

## 5.4 CONCLUSION OF STATUTORY CONTROLS

To conclude this section on statutory controls, it is considered that this subdivision proposal is generally consistent with the relevant State, Regional and Local environmental planning instruments, Development Control Plans and local policies adopted by Shoalhaven Council.

Whilst the subdivision layout includes a variation to the minimum lot size outlined in DCP 100, this relates to only 2 of the proposed 179 lots, and the extent of departure is limited to a maximum of 3% or 15 $m^2$. The overall result of this minor non-compliance is an improved streetscape design at the main entrance to the subdivision. Despite this minor variation, the proposal is considered to comply with the applicable Performance Criteria and as such, is considered a reasonable departure.

# 6.0 ASSESSMENT

As outlined in Section 4, the Department of Planning identified key issues in the consideration of the Preliminary Assessment as follows:

a) Statutory and Other Requirements;
b) Cumulative Impacts;
c) Traffic Impacts (Construction and Operational);
d) Bushfire;
e) Urban Design, Visual Impact and Sustainability;
f) Threatened Species and Matters of National Environmental Significance;
g) Impact on Sewerage and Water Infrastructure;
h) Impacts on Water Quality and Drainage;
i) Aboriginal and Cultural Heritage;
j) Contamination.

## 6.1 STATUTORY AND OTHER REQUIREMENTS

Section 5 of this report provides a thorough assessment of the relevant statutory framework applying to the subdivision of the subject site. This assessment concluded that the proposal is consistent with all relevant State Environmental Planning Policies, Regional Environmental Plans and Local Environmental Plans. The application does propose a minor departure to the minimum allotment requirement outlined in Council's Subdivision Code DCP 100 however the proposal is considered to be consistent with the relevant performance criteria contained within that document.

## 6.2 CUMULATIVE IMPACTS

Within the villages of Manyana, Bendalong and Cunjurong Point, undeveloped land zoned for residential purposes under Shoalhaven LEP 1985 is limited to the following locations outline in **Table 1** over page:

**Table 1**

**Manyana and Surrounds: Existing and Future Residential Land Supply**

| Site | Location | Approximate Area | Current Zoning | Possible Future Zoning | Lot Yield |
|---|---|---|---|---|---|
| [1]Subject Site | Berringer Road & Cunjurong Point Roads, Manyana | 20.40 ha | Residential 2 (a1) | N/A | Proposed 179 |
| [2]Vacenta Pty Ltd | Sunset Strip and The Barbican, Manyana | 9.54 ha | Residential 2 (a1) | N/A | Proposed 71 |
| [3]Kylor Pty Ltd | | 77.98 ha | Residential 2 (a2)<br>Residential 2 (c)<br>Commercial 3 (f) | Residential 2 (a1)<br>Residential 2 (c)<br>Commercial 3 (f) | Potentially 156 |
| [4]Crown Land | West Manyana | 104.31 ha | Residential (Deferred) | N/A | Nil |
| [5]Crown Land | Bendalong | 24 ha | Residential (Deferred) | N/A | Nil |
| [6]Crown Land | North Bendalong | 46 ha | Residential (Deferred) | N/A | Nil |
| [7]Berringer Road Pty Ltd | Inyadda Drive & Berringer Road, Manyana | 40 ha | Rural 1(d) | N/A | Nil |
| **Total** | | | | | **406** |

**Figure 5** below shows the general location of these sites.

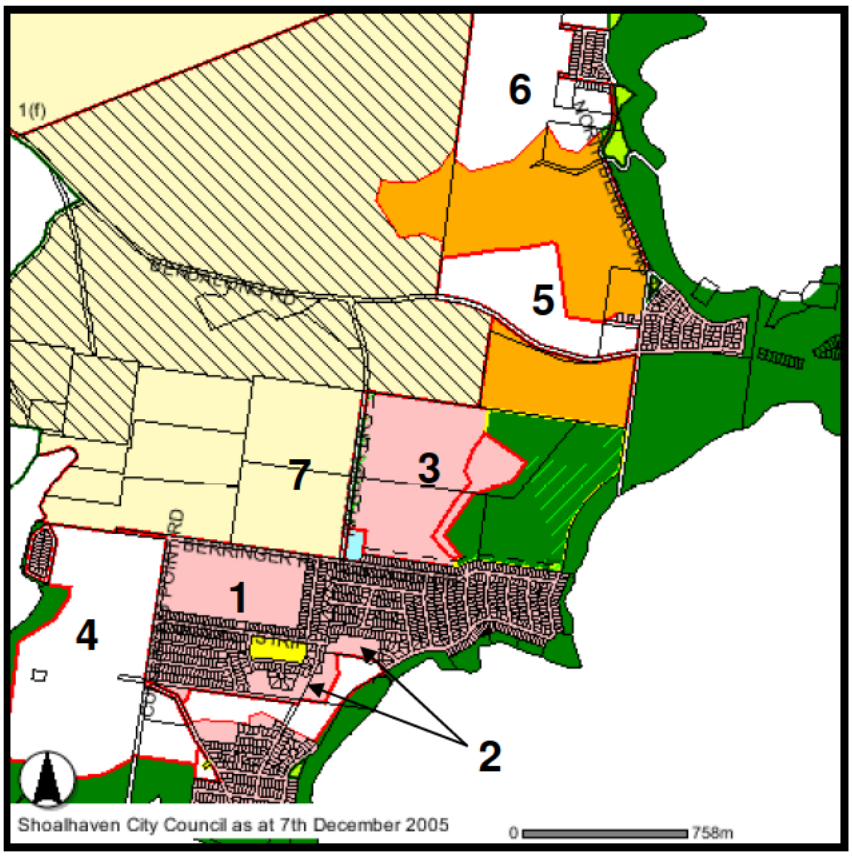


**Figure 5 – Villages of Manyana, Cunjurong Point and Bendalong showing location of potential development sites**

- Site 1 - subdivision of this land is the subject of this current application which proposes the creation of 179 residential allotments.
- Site 2 - this site is the subject of a Major Project application for the development of 71 allotments. At this time, the application is currently with the Department seeking the Director-General's Environmental Assessment Requirements.
- Site 3 - the owners of this property have sought to have the land rezoned for a combination of zones however a substantial portion of the site is proposed to be zoned Residential 2(a1) and 2(c) under SLEP in order to allow subdivision of the site at standard residential densities (minimum 500m$^2$ lots). At this time, Shoalhaven City Council has not resolved a final position on this proposal and a Planning Consultancy, Parsons Brickenhoff, has been engaged by Council to investigate the matter and prepare a report for Council's consideration. At the time of writing, this report has not been made publicly available and Council's position on these lands has not been finalised.

Based on current zonings, Shoalhaven City Council have made provision for 156 allotments in its Developer Service Plan adopted in December 2005.

- Site 4 - this land is the subject of an aboriginal land claim and it has also been identified in Appendix 2 of the Draft South Coast Regional Strategy as a 'sensitive site' which is subject to review by an expert panel established by the Department of Planning. The development of these lands may be constrained due to the sensitive nature of the site, its location and relevant ecological restrictions. This may ultimately see this land, or a portion thereof, 'down-zoned' to one that places greater emphasis on ecological conservation, over the current village zone. As such, potential yield from this site is unknown at this stage.

- Sites 5 - this site is identified in Appendix 2 of the Draft South Coast Regional Strategy as a 'sensitive site' that is subject to a review of the current zoning provisions. It should be noted that Shoalhaven City Council has not made any provision for servicing this land in the design and construction of the Conjola Regional Sewerage Scheme. Consequently, development potential of these sites would appear limited at this time.

- Site 6 – this site is also identified in Appendix 2 of the Draft South Coast Regional Strategy as a 'sensitive site' that is subject to a review of the current zoning provisions. As for site 6, Shoalhaven City Council has not made any provision for servicing this land in the design and construction of the Conjola Regional Sewerage Scheme. Consequently, development potential of these sites would appear limited at this time.

- Site 7 - this land is owned by Malbec Properties Pty Ltd and is currently zoned Rural 1(d) under the provisions of Shoalhaven LEP. As such, this land has no potential for residential development at this time. Notwithstanding this, a request has been made to Shoalhaven City Council for this site to be considered suitable for a rezoning to Residential 2(a1). Council has deferred consideration of this until after completion of its City Wide Settlement Strategy, however development of these lands could yield up to 330 allotments.

Based on the above, there appears little certainty regarding the development of most of the lands which are currently zoned for residential purposes given the sensitive nature of these lands, ecological constraints and the ability to properly service the properties. Table 1 above illustrates the reasonable potential lot yield from each of the sites. Those lands where some development for residential purposes is likely are limited to the subject site (179 lots), the Vacenta site (71 lots) and the Kylor site (possibly up to 156 lots), totalling

406 lots. However, given the uncertainty surrounding the future of the Kylor lands, it has not been possible to predict potential yield resulting from the development of this site. Consequently, our assessment has been limited to the Vacenta land where probable lot yield is known.

We are not aware of any other existing approvals or current applications for substantial development that are likely to impact on the infrastructure and services including water supply, electricity, waste disposal, gas, and social infrastructure such health care and public schools. Despite this, investigations have been made with the relevant service and infrastructure providers and the following sections address the cumulative impacts of development.

### 6.2.1 Water and Sewerage Services

Shoalhaven Water is the supply authority for water and sewerage services for the Shoalhaven Local Government Area. Shoalhaven Water has been approached to obtain their advice regarding their capabilities of servicing the site. Although there are some constraints with respect to water pressure, the site can be adequately serviced. Consideration will be required to properly stage the development in order that water pressure is maintained. Having regard to sewerage services, the Lake Conjola Sewerage Scheme is currently under construction and will be available for connection mid 2007. According to Shoalhaven Water, "*this site has been allowed for in the current design of the Conjola Sewerage Scheme"*.

This matter is discussed in further detail in Section 6.7.

### 6.2.2 Electricity

The supply authority for electrical power in the Shoalhaven Local Government Area is Integral Energy. Integral Energy were originally consulted by the Department of Planning when the initial Project Application was made in 2005 and a written response was provided at that time. Integral Energy indicated:

*"1. The proposed load has been assessed to be 1.3 MVA.*

*2. Subject to the following conditions, there is spare capacity in the network to supply the increase in load –*

- *The Yatte Yattah Zone Substation would require augmenting*
- *In order to maintain the existing end of feeder voltage levels at Bendalong a voltage regulator would be required after the Fishermans Paradise township.*

3. *The subdivision would need to be reticulated via underground high voltage and low voltage cables in accordance with Integral Energy's General Terms and conditions."*

Based on the above it is clear that the proposed development is capable of being serviced with a reticulated power supply.

### 6.2.3 Waste Disposal

The existing village is already serviced by Shoalhaven City Council, who undertake a kerb side collection for all residential properties through its contractor, SITA. At the time of writing, this service consists of a weekly household garbage collection service, a fortnightly household recyclables collection service, an annual chemical collection day for household chemicals and the provision of a community recycling centre on the western side of Inyadda Drive at the northern approach to Manyana. Consequently, Council already has considerable infrastructure in place to serve Manyana, Cunjurong Point and Bendalong.

Council encourages waste reduction by offering a variety of bin sizes for weekly collection, and imposing fees based on bin size, with smaller bins incurring a smaller service charge.

In preparing this Environmental Assessment, discussion was had with the Waste Services Manager of Shoalhaven Council who advised that:

- All waste from the local government area was taken to Council's waste facility at West Nowra.
- The West Nowra Depot has a life span of 15 years, however Council is already planning for the possibility of Stage 4 extensions to this facility.
- Council is exploring opportunities for waste reduction at source and through improved technologies.
- In designing the proposal, consideration should be had for road widths that are sufficient to allow for the manoeuvring requirements of garbage trucks.

In light of the above, it is considered that the impacts of the subdivision on waste disposal will be satisfactory given that:

- The design of the subdivision will facilitate easy movement of garbage trucks and adequate manoeuvrability has been provided with no cul-de-sacs proposed.
- Council is currently exploring ways to reduce waste, and any programmes that are implemented would require appropriate participation by all residents of the Shoalhaven, including future residents of this subdivision.

- Council already services the local area with its garbage collection service.
- Council is planning for the future by examining its waste requirements and exploring opportunities for expansion of the existing Waste Depot.

The subdivision is unlikely to have any significant cumulative impacts on the provision of waste services.

### 6.2.4 Gas

The Eastern Gas Pipeline (EGP) was completed by Duke Energy in 2000 and runs from Longford in Victoria, generally up the east coast of NSW, to Sydney. The nature of the EGP is that the pipeline infrastructure has been provided, with separate companies being able to tender for the operational aspects, supplying reticulated gas to consumers within various towns and villages along its path. Telephone contact has been made with Charles Devine, the Network Development Manager of Agility (previously AGL) who have undertaken feasibility studies along the EGP which have determined that unless significant populations exist, or large gas users such as industries are active, there is no financial incentive to build the infrastructure necessary to draw gas from the pipeline. Given the population of Manyana and surrounding villages, and the lack of any industry, this is likely to be the case for Manyana.

Manyana, like many small coastal villages, is however provided with bottled LPG, and this is readily available for residents who desire this fuel source for cooking, heating and the like. There are a number of companies that offer rental of storage containers and home delivery of gas.

This proposal is unlikely to have any adverse impacts on the supply of bottled gas in the locality.

### 6.2.5 Social Infrastructure

In order to consider the likely impacts on social infrastructure, it is necessary to establish the likely population increase resulting from the additional development proposed. The following section analyses the likely population increase as a result of this subdivision and other current known applications and the impacts such will incur on social infrastructure.

#### *6.2.5.1 Population Increase*

This subdivision proposes the creation of 179 allotments, which is an increase of 177 lots over that currently existing. Shoalhaven City Council has produced a “Population Profile 2001”, based on information contained in the Australian Bureau of Statistics 2001 census. This document places Manyana in Area 5 Planning District, which covers the southern

part of the Shoalhaven. In some circumstances, the profile provides specific information for Manyana/Cunjurong, whilst other information relates solely to Planning District 5. The following statistics are relevant to consider potential population expansion resulting from this subdivision:

- Manyana and Cunjurong have an unoccupied dwelling rate of 70.7%, therefore permanent occupation is limited to 29.3%.
- Occupancy rates for Planning Area 5 are an average of 2.36 persons per dwelling, with an average of 2.44 persons per detached house.

In addition, it is worth noting that the current (2001) population of Manyana/Cunjurong is 488 and that the Shoalhaven currently experiences a growth rate of 1.72% p.a., although it has experienced higher growth of 4% p.a. over the 1986-1991 period. It is also worth noting the population breakdown of the area and **Table 2** shows this information or Planning Area 5.

**Table 2**

**Population Breakdown for Area 5 Planning District**

| Age | Percentage of Overall Population |
|---|---|
| 0-4 | 5.7% |
| 5-12 | 11.7% |
| 13-17 | 6.9% |
| 18-24 | 4.4% |
| 25-39 | 15.0% |
| 40-54 | 20.5% |
| 55-64 | 13.4% |
| 65-74 | 13.3% |
| 75+ | 9.1% |

It is likely that Manyana and Cunjurong Point experience high levels of unoccupied dwellings given their location close to the coast, which makes properties attractive for weekenders and holiday accommodation. It should be noted that higher levels of unoccupied dwellings is relatively common in coastal villages of the Shoalhaven, and the rates for Bendalong (70.9%), Currarong (53%), Hyams Beach (73%) and Bawley Point (53%) for example, illustrate this.

It is possible to make population projections based on the above profile. As outlined above, this proposal provides for a total of 179 allotments and, assuming an occupied dwelling rate of 30% as is currently the case for this locality, it is expected that approximately 54 dwellings (179 x 30%) will be occupied. Given that this development

will provide for detached dwellings only, it is appropriate to use the occupancy rate of 2.44 persons per dwelling rather than the lower average figure of 2.36 and as such, the 54 occupied dwellings are likely to generate an additional population of 132 persons (54 x 2.44) when completed. As the subdivision is proposed to be developed in stages, it is anticipated that this increase will occur over a 7 to 10 year period. The consequences of this would result in approximately 19 additional persons per year, which equates to a growth rate of approximately 3.8% p.a. to the existing village population. This is not considered significant however given the limited population to begin with, whilst it is noted that this rate of growth is lower than that experienced for the whole Shoalhaven during the 1986-91 period.

In addition to an anticipated overall population growth of 132 persons **Table 3** below shows the projected additional population, divided into the various age categories assuming current age distribution rates for Area 5 as contained in Table 2 above.

**Table 3**

**Projected Additional Population**

| Age | No. of Additional Persons |
|---|---|
| 0-4 | 7.5 |
| 5-12 | 15.4 |
| 13-17 | 9.1 |
| 18-24 | 5.8 |
| 25-39 | 19.8 |
| 40-54 | 27 |
| 55-64 | 17.8 |
| 65-74 | 17.5 |
| 75+ | 12 |
| **TOTAL** | **132** |

In addition to the population projected by this application, consideration has been given to the cumulative impacts associated with the other proposal which is the subject of a Preliminary Assessment currently before the Department of Planning. That application proposes 71 allotments, which is an additional 68 over that currently existing, however for the purposes of this Environmental Assessment, the *total* number of proposed lots has been used in calculations. Assuming the occupancy rates outlined above, the 71 allotments are likely to result in 21.3 permanently occupied dwellings (71 x 30%), and at 2.44 persons per dwelling, a total additional permanent population of 51.9, say 52 persons.

The impacts of other potential sites has not been undertaken as the likely yield from these lands is unknown at this time.

To conclude this section, the total additional permanent population for this application, and the other known site, is 184 persons.

#### *6.2.5.2 Current Social Infrastructure*

Social infrastructure within the village is limited given its current size, and also the significant extent of unoccupied dwellings which limits the viability of providing services directly into the village. In this regard, there are no schools, dedicated doctor's surgeries or medical facilities. These facilities are however provided at larger nearby centres such as Milton/Ulladulla, which is approximately 35 kilometres away by road to the south, and also within Nowra to the north. This is a similar situation to many coastal villages in the Shoalhaven such as Hyams Beach, Currarong and Myola.

Social infrastructure which is provided directly to the village is principally centred within the Community Hall in Yulunga Reserve, and **Plate 5** in Section 3 show this area. Yulunga Reserve is well sited in relation to the subject property being approximately 50 m from its frontage to The Sunset Strip.

The Community Hall is used for a variety of regular activities including:

- play group;
- consultation facilities for a doctor who visits the village once a week;
- the base for a Mobile Preschool; and
- meeting place for Senior Citizens.

In addition, the hall is available for booking on an "as needs" basis for community events and functions by clubs and locals alike.

It is unrealistic to expect that significant social infrastructure is available given the limited population of the village, along with a high proportion of short term (tourist) occupancies, and the combined population of the villages. It is noted that this is not necessarily seen as a bad thing by some residents as this is what often appeals and indeed appeared to initially attract many residents to the area.

During discussions with the community group responsible for considering development proposals, it appears as though the community itself has mixed opinions on what additional infrastructure it considers necessary for the locality, with some residents considering that the locality should provide a more full range of facilities, similar to that

provided to residents in larger centres, including greater medical and aged care facilities, for example. As a counter to this however, other residents expressed a preference for the existing more limited conditions at the village to remain.

It is envisaged however that development of the subject site would increase the demand for commercial facilities within the locality.

#### *6.2.5.3 Other Community Infrastructure*

In addition to the facilities provided by the Community Hall in Yulunga Reserve, the following facilities are provided within the community:

- Yulunga Reserve which contains playground equipment, tennis courts, basketball court, and soccer oval and soccer club amenities. (See **Plate 6** and **7** in **Section 3**) This area is managed on behalf of Shoalhaven City Council by the Yulunga Reserve Management Committee who maintains and care for the facilities and arrange for the hire of the hall;
- Volunteer Fire Shed in Cunjurong Point Road (see **Plate 9**);
- general store sited within the village of Cunjurong Point to the south of Manyana;
- general store sited at Bendalong to the north of the Manyana village.

**Plate 9: Existing Volunteer Fire Shed – Cunjurong Point/Manyana Brigade**

Commercial development within Manyana is limited to a Real Estate office sited in Curvers Drive near the entrance to the village. **Plate 10** shows this premises.

**Plate 10: Existing Commercial Premises - Manyana**

In addition to the above infrastructure, the locality is provided with abundant natural areas including a relatively accessible foreshore, the provision of high-quality access to the areas natural resources including the ocean, lakes, and Conjola National Park, and boat ramps to access waterways.

#### *6.2.5.3 Schools*

Public schools are currently available in Milton and Ulladulla, which are accessible by road via Bendalong Rd and the Princes Highway. Currently, Kellam's Bus Lines Pty Ltd operates bus services from the Manyana village to access these schools. In addition to public schools, non-government schools exist locally at Milton.

Further to schools available in the southern Shoalhaven, a number of government and non-government schools are available close to Nowra which provide additional choice in educational facilities.

Correspondence was sent to the Department of Education and Training (DET) in relation to this proposal and advice was received that the *"Department of Education and Training does not expect that the subdivision will adversely impact on the local schools within the vicinity of the development."*

Based on the population projections outlined in Section 6.2.5.1 of this Environmental Assessment and by reference to **Table 2** in particular, the full development is likely to

result in an additional 15.4 primary school aged children, and 9.1 high school aged children residing in Manyana.

Furthermore, development of the 71 lots in the other Major Project is expected to accommodate an additional 6 primary school aged (11.7% of total population), and 3.6 high school aged (6.9% of total population) .

As such the *entire* additional school aged population generated by the cumulative total of 245 additional lots based on current population distribution, amounts to 21.4 primary school aged children, and 12.7 high school aged children.

As outlined above, this application is proposed to be staged such that the full impacts will not be felt immediately, with total population growth being experienced over an expected 7-10 year period. Despite this, examining the total numbers, and the response of the DET, it is unlikely that the subdivision will have a significant impact on the ability to provide educational services.

#### *6.2.5.4 Health*

The villages of Manyana, Bendalong and Cunjurong Point do not have a medical practitioner practicing full-time within the local area. This is likely to be attributed to the small size of the village, along with the high number of properties that are used for weekender or holiday accommodation, and therefore its limited population.

A part-time facility (currently Tuesday afternoons) is offered by Dr Philip Hayden, a General Practitioner from the Milton Medical Centre who operates out of the Community Hall sited with Yulunga Reserve. A discussion with the practice has revealed that the books are not closed to new patients located within Manyana wishing to utilise this service.

This service is supplemented by a number of General Practitioners who operate from within the larger centres of Milton and Ulladulla/Mollymook.

Milton-Ulladulla Hospital, located on the Princes Highway at Milton, would provide the closest public hospital to the subject site, approximately 35 km by road and this hospital has been the subject of a recent multi-million dollar upgrade to improve the level of facilities offered. This hospital provides a range of medical services, including an Emergency and Maternity Departments. In addition to Milton-Ulladulla, public and private hospitals are located at Nowra, which is approximately a 50 minute drive from the site.

Consultation was had with the Department of Health (South Eastern Sydney Illawarra Area Health Service) who advised in writing that:

> *"SESIAHS CSSP (Clinical Services Strategic Plan) includes considerable enhancements to clinical services for Shoalhaven residents, including enhancements at both Milton-Ulladulla and Shoalhaven District Memorial Hospitals. Given the small expected impact on services due to the small scale of the Manyana development, these enhancements should more than ensure that our health infrastructure can adequately service the proposed development."*

At the time of consulting with the SESIAHS, details of the other 71 lot Major Project were not known, however it is noted that the SESIAHS has assumed a population growth of approximately 300 persons in providing their comments. As outlined in Section 6.2.5.1 above, using the most recent population distributions, the 179 lots proposed in this subdivision will result in an increase of 132 permanent persons. In consideration of the 71 lots subdivision which is also proposed, this will increase total proposed allotments to 250, which will have an expected permanent population increase of 183 persons (250 lots x 30% occupancy x 2.44 persons per dwelling). This is well below the 300 persons the SESIAHS has accounted for in its correspondence.

Whilst it is acknowledged that visitors and holiday makers may also require some form of emergency medical attention, it is unlikely that this would place a significant burden on medical resources as planned procedures are more likely to be performed nearer their place of permanent residence.

Consequently, the development is unlikely to significantly impact on the provision of health services.

#### *6.2.5.5 Other Community Infrastructure*

It is not desirable to provide significant community infrastructure on the subject site given the zoning of the land Residential 2(a1). Notwithstanding this, the proposal does include substantial Public Reserve for the entire community to enjoy. Such is a combination of both natural forested areas incorporating the EEC, and more structured play space which will be embellished with play equipment and the like.

It is expected that Council will impose a requirement to make a monetary contribution under Section 94 towards community facilities that it deems are appropriate for future residents.

Council's clear direction is that greater commercial facilities for the locality should be provided near the entry to Manyana at the corner of Inyadda Drive and Curvers Drive, and SLEP has zoned an area of land in this location Business 3(f) Village specifically for this purpose. The area of this zone measures approximately 130 m by 80 metres, and as

such, has a land area of approximately 1 hectare. The objectives of the Business 3(f) Village zone are:

> *"to provide for village retail and business development to serve the needs of the village community and which is compatible with the village environment."*

This zone permits a variety of commercial and retail activities provided they are compatible with a village environment. Clause 9 of SLEP outlines that the following forms of development are prohibited, and everything else is permissible with Council's consent:

> *"bed and breakfast accommodation; bulky goods retailing; caravan parks; cluster housing; dual occupancy development; dwelling-houses and dwellings (other than those attached to shops or commercial premises); industries referred to in Schedule 5; intensive animal husbandry; junk yards; liquid fuel depots; sexual services premises; turf farming."*

Although being zoned for this purpose since 1992, no commercial development has been undertaken to date. The provisions of SLEP are relatively flexible as they apply to the commercial site and development of these lands could result in whole range of additional retail and commercial facilities including a small-scale supermarket, specialty shops such as butcher, bakery, chemist, doctor's surgery/medical centre, bottle shop, take-away or café/restaurant and professional offices. This could result an area that would serve as a focal point for the community, as well as providing a greater range of goods and services that would support the needs of locals and visitors alike. Suitable development of this area could also assist in reducing the dependence on car travel and reliance upon larger towns for basic consumer items.

The additional population brought to the village by this proposed development, and other residential subdivisions that may eventuate, will assist in providing additional demand for such commercial facilities and may expedite their delivery to the community.

In light of the above, the development is unlikely to have any significant impact on the provision of other community infrastructure.

## 6.3 TRAFFIC

Vehicular access to the subject site is available via Bendalong Road which runs generally east-west and intersects with the Princes Highway some 12 km to the west of Manyana. **Plates 11** and **12** show the available sight distances at this intersection. Bendalong Road is two lanes in width, provided with a sealed surface and is maintained by Shoalhaven City Council. Inyadda Drive intersects with Bendalong Road to service Manyana and Cunjurong Point. **Plates 13** and **14** show the available sight distances at this intersection. Inyadda Drive is two lanes in width and is finished in a bitumen seal.

**Plate 11: View to the south along Princes Highway from intersection with Bendalong Road**

**Plate 12: View to the north along Princes Highway from intersection with Bendalong Road**

**Plate 13: view along Bendalong Road to the west from the intersection with Inyadda Drive**

**Plate 14: View along Bendalong Road to the east from the intersection with Inyadda Drive.**

The subdivision layout proposes the following:

- one access to the south onto The Sunset Strip;
- two intersections to the north with Berringer Road, one near the western end of the site, the other near the eastern edge of the property;
- three intersections to the west with Cunjurong Point Road equally distributed along this boundary.

The proposed number and location of new roads will encourage the even distribution of traffic, rather than a concentration of vehicular movements along a specific route given the layout and varied opportunities available for entering/leaving the subdivision. It is considered that in general, the proposed layout provides a suitable local road network in that:

- it is simple, clear and distinct, that builds on the already established basic grid pattern;
- it provides for motorists a number of alternative routes that are generally direct and allow reasonable access to all desired destinations;
- it is permeable for pedestrians, allowing a variety of alternative routes through the site allowing pedestrians to filter through along roads, open space and drainage corridors and the like and not concentrate along specific pre-determined routes.

This Environmental Assessment is also supported by a Transport Report carried out by Colston Budd Hunt & Kafes Pty Ltd (CBHK), a copy of which is provided as **Annexure 5** to this Environmental Assessment. In accordance with the Director-General's Environmental Assessment Requirements, this report has specifically addressed:

- Council and RTA traffic codes;
- intersection modelling including an assessment of AM and PM peaks, holiday peaks;
- 10 year projections; and
- ameliorative measures.

The following section of this report is based on the findings of the CBHK report.

### 6.3.1 Existing Traffic Conditions

#### *6.3.1.1 Existing Traffic Volumes*

Vehicular access to the area is provided via Bendalong Road which runs generally east-west and intersects with the Princes Highway some 12 km to the west of the subject site. Bendalong Road is two lanes in width, provided with a sealed surface and is maintained

by Shoalhaven Council. Inyadda Drive intersects with Bendalong Road to service Manyana and Cunjurong Point. Inyadda Drive is two lanes in width and is finished in a bitumen seal.

In order to obtain an indication of the existing level of service of the road network adjoining the subject site, CBHK undertook a survey of the Princes Highway, Bendalong Road, Inyadda Drive, Berringer Road, Curvers Drive, the Companionway, The Sunset Strip and Cunjurong Point Road. This found that the Princes Highway carries some 450 to 500 vehicles per hour, two way, during the morning and afternoon peaks. Flows along all other roads, including Bendalong Road and local roads within the village of Manyana, were much lower and generally less than 100 vehicles per hour two way.

#### *6.3.1.2 Current Intersection Operation*

In order to estimate the existing efficiency of the surrounding local road network, a SIDRA analysis was undertaken by CBHK of all intersections surveyed. SIDRA is an analytical tool to evaluate alternative intersection designs in terms of capacity, level of service, a wide range of performance measures including delay, queue length and the like. A useful measure is the average delay per vehicle which results in the allocation of a level of service (LOS), ranging from A to F with A representing a good LOS, and F indicating an unsatisfactory LOS that requires additional capacity.

Based upon the above modelling, CBHK indicates that:

- The operation of the intersection of the Bendalong Road and the Princes Highway is operating at Level A/B,
- The intersections of Inyadda Drive with Bendalong Road and Berringer Road/Curvers Drive, The Companionway with Berringer Road and The Sunset Strip and Cunjurong Point Road with Berringer Road and Sunset Strip have a LOS of A/B, which represents a good level of service.
- For the intersection of the Princes Highway and Bendalong Road, accounting for peak holiday periods, the level of service reduces to B, which represents a reasonable level of service.

#### *6.3.1.3 Amenity*

In addition to the physical capacity of the local road network capacity, the Roads and Traffic Authority “Guide to Traffic Generating Developments” has outlined the acceptable environmental performance of local streets and suggests a maximum flow of 200 vehicles

per hour is an acceptable environmental goal. The existing traffic flows are well below that as outlined in Table 2.1 of the CBHK report.

### 6.3.2 Projected Traffic Conditions

#### *6.3.2.1 Traffic Generation*

The Roads & Traffic Authority's *Guide to Traffic Generating Developments* publication has illustrated trip generation rates for a variety of uses and activities based on surveys of existing developments. In relation to residential subdivisions, the RTA indicates that trip generation equates to 8.5 trips per allotment per day. Council's Subdivision Code DCP 100 indicates a higher rate at 10 trips per allotment. For the purposes of the study, CBHK utilised the higher Council rates.

Based upon the above guidelines, CBHK estimates that the proposal will generate 180 two way trips during morning and afternoon peaks. Of these total trips, 70% have been assigned to outbound traffic in the mornings, and 70% inbound in the afternoons, which are based on current traffic counts at the intersection of Bendalong Road and the Princes Highway. This additional traffic would be fairly concentrated along Inyadda Drive and Berringer Road however would evenly distribute once on the Highway.

In order to gauge the impact of the traffic projected to be generated by the proposed development on the local road network, it is necessary to determine the impact on surrounding intersection efficiency. The objective being to distribute the traffic generated by the proposed development along the major approach routes before it dissipates throughout the general road network. This has been determined by CBHK by based on counts of existing traffic and likely traffic routes once the subdivision is developed.

#### *6.3.2.2 Projected Intersection Performance*

Utilising the SIDRA analysis, the study of CBHK found that:

- The intersection of Bendalong Rd and the Princes Highway will operate at level of service B, which is good with minimal delays and spare capacity, even accounting for future growth and holiday traffic peaks.
- The intersections of Inyadda Drive with Bendalong Road and Berringer Road/Curvers Drive, The Companionway with Berringer Road and The Sunset Strip and Cunjurong Point Road with Berringer Road and Sunset Strip will have a level of service A/B.
- Additional traffic will not cause reasonable environmental capacity to be exceeded, and

- during the construction of residential development, construction traffic is expected to peak at 200 trips per day, which based on an eight hour day would equate to an average of 25 two way trips per hour.

### 6.3.3 Traffic Conclusion and Recommendations

According to the findings of CBHK, the only decrease in performance is the intersection of Bendalong Road and the Princes Highway which decreases from an A/B to a B level of service. During peak holiday periods however, the level of service at that intersection remains unchanged at B. All other intersections remain unchanged, even accounting for the additional traffic generated by this development and other growth in traffic volumes.

This study would indicate therefore that the intersections are currently performing satisfactorily, and that they will continue to do so even accounting for additional traffic generated by this development, general growth in traffic volumes, and increased traffic volumes expected during holiday periods. As a result, no work on existing intersections would be necessary. Furthermore, no adverse impacts result on the environmental performance of existing or proposed local roads and as such, no ameliorative measures are required.

The Transport Report undertaken by CBHK makes the following conclusions with respect to this proposal at Section 3.33:

- *the proposed residential subdivision comprises 179 lots;*
- *vehicular access to the proposed subdivision will be via new roads from Berringer Road, Cunjurong Point Road and Sunset Strip;*
- *the proposed access arrangements are considered appropriate;*
- *internal roads will be provided in accordance with the principles in Council's Subdivision Code and AMCORD;*
- *the proposed development would have a peak period traffic generation of some 180 vehicles per hour two-way during peak hours; and*
- *the road network will be able to cater for future traffic growth including traffic from the proposed development.*

The Transport Report addresses the matters raised in the Director-Generals Environmental Assessment Requirements and the recommendations of this Report are supported by this Environmental Assessment.

## 6.4 BUSHFIRE

The site is the subject of bushfire risk, particularly from the north and west where significant areas of bushland exist opposite Berringer Rd and Cunjurong Point Road respectively. Accompanying this Environmental Assessment as **Annexure 6** is a Bushfire Protection Assessment prepared by Bushfire and Environmental Services that considers the bushfire threat, applies the provisions of *Planning for Bushfire Protection* (PBP) and makes recommendations for the implementation of appropriate mitigation measures.

This report has advised that:

- the bushfire risk to the property is identified in PBP as Group 1 vegetation to the west and north, however mitigated by extensive residential development to the south and east;
- bushfire risk will be reduced by clearing undertaken in conjunction with the proposed development;
- the vegetation retained on site within the EEC can be classified as remnant vegetation Group 3 on the basis of its reduced size, shape and proximity to managed urban lands;
- the vegetation off site is all located upslope of the subject property;
- the site is serviced with a reticulated water supply; and
- a perimeter road surrounds the property on its northern and western edges where the bushfire threat is most pronounced.

### 6.4.1 Recommended Mitigation

The BES report concludes that development should be satisfactory subject to compliance with a number of issues, including, but not limited to the following:

- The provision of APZ to an Inner Protection Area standard at a distance of 30 m to the north and west of the subject site.
- The provision of APZ to an Inner Protection Area standard at a distance of 20 m to the EEC.
- The APZ is to be managed as an Inner Protection Area (IPA) in accordance with the following specifications:

- existing larger trees (at least 150 mm in diameter measured at chest height) will remain within the APZ provided that:
- no part of their crown occurs within 5 m of any building (significant habitat trees can remain 2 m out from the building line);
- canopies are discontinuous, ie. canopies are separated by at least 2 m;
- they are smooth barked species or, if rough barked, are maintained free of hanging bark and other ladder fuels; and
- low branches holding fine fuel (ie. leaves and twigs of <6mm in diameter) are pruned to 2 m from the ground;
- smaller trees (ie. less than 150 mm in diameter), shrubs, fallen trees and tree-limbs and stumps are to be removed and continually suppressed;
- any landscaping or plantings should preferably be local endemic mesic species or other low flammability species. The presence of a few shrubs, vegetable gardens or fruit trees is also acceptable provided that all plantings and residual vegetation are well spread out, do not form a contiguous pathway to the dwelling and do not constitute more than 5% of the total APZ area;
- a minimal ground fuel is to be maintained to include either mown grass, paving, concrete, bare ground, or less than 3 tonnes per hectare of fine fuel (ie. material of < 6 mm in diameter);
- any structures (e.g. fences, garden sheds, decks, pergolas etc) within the APZ are to be non-combustible (ie. non-combustible under Australian Standard 1530.1 and not deemed combustible pursuant to clause C1.12 of volume 1 of the Building Code of Australia);
- any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris; and
- gutters, roofs and roof gullies shall be kept free of leaves and other debris.

- A variety of Construction Standards contingent on the separation provided to unmanaged bushland ranging from no special requirements, up to Level 2 where lots are in the closest proximity. Although level 3 has been specified for certain lands, these are all within the front setback of proposed lost and as such, will not need to be applied.

Based on the assessment undertaken by Bushfire and Environmental Services, it is considered that the threat to the proposed subdivision by bushfire can be properly

mitigated though implementation of the recommendations in the Bushfire Assessment Report, which are also supported by this Environmental Assessment Report. The Report also addresses the matters pertaining to bushfire raised in the Director-Generals Environmental Assessment Requirements.

## 6.5 URBAN DESIGN, VISUAL IMPACT AND SUSTAINABILITY

Manyana is a small coastal village with development generally limited to single detached residences, both single and two storey in height. Existing development varies considerably from modest fibro/lightweight single storey cottages, to large two storey masonry dwellings, particularly close to the coast where water views are available.

Manyana has an informal coastal feel due to its close proximity to the coast and surrounding bushland. Evidence of this informality exists in the lack of formal landscaping for most properties and no consistency in street plantings, minimal kerb and gutter, no formal footpaths or cycleways, coupled with the mixed nature of the existing housing stock.

The subject property is sited further away from the actual coastline and foreshore areas than the established village and as such, its visual relationship with the coast is not as strong as existing development. The site itself is not prominent from the coastline due to its location and the siting of existing development, much of which is located on a headland. The site is not visible from Manyana Beach due to the topography and existing vegetation growing immediately adjacent to it.

The development is consistent with sustainability principles and the following points are made:

- the land is zoned Residential 2(a1) under Shoalhaven Local Environmental Plan;
- the site will be provided with adequate infrastructure to allow its residential development;
- the site is provided with adequate public road infrastructure and the development will not adversely impact on the performance of local roads, Bendalong Road or the Princes Highway;
- the development will positively impact on the provision of housing supply and choice given that vacant blocks will allow future owners to build suitable development to meet their needs;

- the township of Ulladulla is accessible to the locality, identified in the Draft South Coast Regional Strategy as providing regionally significant employment lands and infrastructure;
- the subdivision adequately plans for natural hazards that are expected in this locality;
- capacity has been made in Shoalhaven City Council's water and sewer infrastructure planning for the development of the site;
- the layout avoids the development of areas identified as containing resources, such as prime crop and pasture lands or mineral resources;
- spare capacity exists in the electricity infrastructure to service the development,

The final layout has been guided by Cox Richardson Architects who considered the existing character of Manyana and recommended an approach to build on the loose grid pattern established within the Village due to its desirability for creating walkable neighbourhoods and more permeable localities that reduce dependence on car transport and provide good pedestrian and cycle accessibility to desire locations.

Having regard to those matters specifically raised in the Director-General Environmental Assessment Requirements, the following comments are provided:

### 6.5.1 BASIX

At this time, BASIX does not apply to the initial subdivision of land, however the development of the resultant allotments will need to comply with the water and energy efficiency targets established in the BASIX SEPP. Given the reuse of water from the Conjola Regional Sewerage Scheme for non-potable purposes, BASIX may not mandate the collection and storage of rainwater. As such, it is proposed to require rainwater tanks for all dwellings regardless of BASIX requirements, in order to maximise sustainability of the development.

The subdivision has been designed with appropriate allotment orientation to ensure that future dwellings can be designed to comply with energy efficiency requirements.

### 6.5.2 Coastal Design Guidelines and NSW Coastal Policy

The project has been assessed against the requirements of the Coastal Design Guidelines and SEPP 71 – Coastal Protection in Section 5.0 above. The proposal is considered to be consistent with the requirements of the Coastal Design Guidelines and the NSW State Coastal Policy.

### 6.5.3 Safety

The proposal adequately considers Safer by Design principles in that:

- residential allotments face proposed public open space areas providing good opportunities for natural surveillance. In particular, the proposed formal play equipment is sited in a reserve totally open to public space and visible from many adjacent residential properties;
- well defined boundaries between public versus private space;
- pedestrian pathways are minimised and designed to limit length, avoid blind corners and entrapment spaces; and
- appropriate street lighting in compliance with Council's requirements will be provided.

### 6.5.4 Relationship to Surrounding Areas

The subject site immediately adjoins the existing village on its southern and eastern boundaries. This development will have a suitable relationship with the surrounding areas as:

- the established streetscape prevalent within the village will be continued;
- future development will be subject to the policy requirements of Shoalhaven City Council that has overseen the development of the existing village, whilst additional measures to provide suitably designed development will be encouraged;
- the proposed subdivision pattern builds upon that established in the existing village.

### 6.5.5 Visual Impacts and Analysis

Provided with this Environmental Assessment as **Annexure 3,** is a series of photographs that show the site and its relationship to the coast, the existing village and surrounding areas.

Having regard to the photos contained within Annexure 3, the subject site is not considered to be prominent from the actual coastline or foreshore reserves due to a variety of factors including local topography and the siting of the property to the west of the township, which places much of the existing village between the site and the coastline.

**Plates 1** to **5** in Annexure 3 have attempted to view the property from near the coastline in a range of settings including on the actual sandy beach and rock outcrop at Manyana Beach, on a foreshore reserve adjacent to the beach, and on higher land at Inyadda

Point. These photos demonstrate that the site is well screened by either vegetation close to the shore, other vegetation or existing residential development contained within Manyana. The only part of the site that may be visible from beyond the immediate area surrounding the site is tree canopy which projects above surrounding dwellings.

In the main, views of the site are therefore limited to the public road network immediately surrounding it, where the property is sited behind existing development along the Sunset Strip and the Companionway given that the canopies of trees project up beyond the roofscape of existing dwellings, and other incidental glimpses between dwellings or over vacant allotments. **Plates 6** to **15 in** Annexure 3 show the site when viewed from existing public roads surrounding the site. Visual impacts will result from the loss of vegetation, and the replacement of this with a more urban environment, most particularly along the western and northern edges.

Mitigating these impacts are the following features of this subdivision:

- 10 m building setbacks that are proposed on the western (Cunjurong Point Rd) and northern (Berringer Road) edges of the site which will not only provide a more open, spacious streetscape than ordinarily provided in urban locations, yet will also allow greater retention of vegetation;
- maintenance of a significant portion of the site as open space allowing for the retention of trees and maintenance of all natural habitat. The width of the public reserve abutting the southern edge of the site is approximately 230 metres in length, whilst this entire boundary is 630 m long, and as such, retained vegetation will comprise some 35% of the southern boundary;
- the provision of larger allotments throughout the entire subdivision that will allow the greater retention of existing vegetation;
- the clearing of the site in a staged fashion in order that trees can be established on the earlier stages prior to the clearing of vegetation associated with the later stages;
- the policies of Shoalhaven City Council which limit the height, bulk and scale of development;
- the additional Draft Design Guidelines proposed with this subdivision which will encourage development to maintain the village character that currently prevails in Manyana;
- the landscaping which is proposed to be undertaken within the public sphere in conjunction with this subdivision; and

- the adoption of an incentive scheme as outlined within the Draft Design Guidelines to encourage home owners to quickly establish landscaping and to landscape using selected species for consistency and ecological grounds.

The visual impacts anticipated by this development are not unexpected given the zoning of the land for residential purposes. Despite this, it is clear that these impacts will be local in their effects, and will in no way effect the visual amenity of the coastline. Furthermore, it is considered that the mitigation measures proposed having regard to both the design/layout of the subdivision, and the other ameliorative measures outlined above, will ensure that the local impacts are not unreasonable.

### 6.5.6 Pedestrian and bicycle movements

The subdivision layout is very permeable in that it allows pedestrians and cyclists to filter through the site along a variety of routes to reach their destination. This has been constrained to some extent by the limited road frontages available to the subject site, particularly along The Sunset Strip, whilst the site does not have any frontage to The Companionway. Notwithstanding this, it is considered that the layout provides allotments that are reasonably accessible along the road reserves to and from the desired destination points.

In addition to the permeable layout, it is proposed to provide a series of pedestrian/cycle pathways in the subdivision to improve accessibility to the desired local destinations to promote active transport options (cycling and walking), thereby reducing reliance on the motor car for short trips. Locally, the desired destinations are considered to be to:

- the east and south-east which contains Manyana Beach, Yulunga Reserve and community hall;
- the north east which is the siting of the future neighbourhood shopping facility and Inyadda Beach; and
- the on-site open space areas proposed within the subdivision.

The subdivision is to include the construction of pedestrian/cycle pathways within the property that:

- skirt around the edge of the EEC (note that the pathway is located outside of the identified buffer zone of this EEC);
- go to the south to link with Yulunga Reserve and community hall facilities;
- access the proposed playground area;

- go to the north-east to link with the zoned commercial area.

To the east, direct access is limited as the site does not have direct frontage to The Companionway. Despite this, the layout includes pedestrian cycle/pathways linking the majority of the site via The Sunset Strip to the south east which are relatively direct for the features outlined above. To the north-east, a pathway/cycleway is proposed which will link with a number of pathways from the remainder of the subdivision and The Sunset Strip.

Shoalhaven Council has adopted a Bicycle Strategy at its meeting of 16th December 1997 which examined the entire City and identified cycle routes for further implementation, however Manyana does not feature in this document. As such, no specific pathways are required in this Strategy.

### 6.5.7 Staging and Existing Infrastructure

Existing facilities and services (public reserve, sewer, water, drainage, public roads) are concentrated near the southern and eastern boundaries of the site where the site meets existing residential development.

The development will be staged in order to account for market conditions and take up rates. However despite this, a staging plan has been developed in order to account for the siting of existing infrastructure and to provide for the economic development of the site. Mindful of this, the development is expected to be completed over 7 to 10 years in six (6) stages and an Indicative Staging Plan is shown as **Annexure 1**. This Plan shows the subdivision commencing in the southern portion of the site at its frontage to The Sunset Strip where access to existing services are available. It is expected that development would then continue generally in an anti-clockwise manner around the site.

The staging also recognises the need to provide relevant infrastructure for residential development (particularly having regard to water supply pressure), along with appropriate maintenance of Asset Protection Zones in order to mitigate bush fire risk and allow reasonable residential development of lots that are released.

### 6.5.8 Indicative FSR, Site Coverage, Heights and Built Form

This application proposes the subdivision of land only and no buildings are proposed at this time. Future development on the resultant allotments will be subject to the requirements of Shoalhaven Council's Policy to Control Building Height and Amenity. This will see development restricted to an overall height of 8.5 metres and a maximum of two storeys, a floor space ratio of 0.6:1, along with reasonable setbacks established by

implementing the building height plane. The generous allotment sizes proposed in this application provide the opportunity for future dwellings to be designed in accordance with these requirements.

The controls ordinarily imposed by Shoalhaven Council when considering subsequent development applications from time to time have forged the established character and it is likely that they will continue to do so. As such, an argument exists that there is no particular need for specific controls applicable to this subdivision. Notwithstanding this fact, separate Design Guidelines have been prepared to encourage appropriate design in order to enhance the aesthetic appeal and more appropriately maintain the coastal village character. This document is only in Draft form at this time for reasons that will become clear below. A copy of this draft document is provided as **Annexure 2**.

The main components of the Draft Design Guidelines are:

- encourage the use of appropriate light weight materials and discourage brick and concrete structures, particularly those mocking past periods (eg Federation);
- compliance with BASIX principles regarding reduced water and energy consumption;
- garages that are setback an additional 1 metre behind the front façade to reduce their visual dominance on dwelling design;
- encourage the use of a mix of materials to reduce apparent height and bulk;
- use of gabled roofs to create consistency in roofscape, thereby unifying development;
- common letterbox design;
- all designs to include eaves;
- consistent fencing material and colour (Colorbond “Grey Ridge”); and
- adoption of a scheme with local nurseries to encourage the prompt landscaping of sites, use of consistent landscaping and planting of species that will grow to a suitable height in order to soften development.

Implementation of the above Draft Design Guidelines is intended to be achieved through a series of educational and promotional tools with purchasers, along with regulatory controls that are available. Consideration has been given to implementing the requirements through restrictions on the title however the additional burden such restriction could place on Council staff assessing future development applications is acknowledged. As such, it is considered that further consultation with Shoalhaven City

Council will be required before finalising the Guidelines and addressing how such is to be implemented.

It is considered that the controls espoused in the Draft Design Guidelines, working hand in hand with Council's Building Height and Amenity Code requirements, will ensure that future residential development will have a suitable aesthetic quality that will be consistent with the established and future desired character of the Manyana village.

## 6.6 THREATENED SPECIES AND MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The subject site is predominantly covered in native vegetation, and as such Bushfire and Environmental Services where originally engaged in May 2004 to investigate the site with a view to undertaking an 'eight part' test under the provisions of the Threatened Species Conservation Act. Prior to this work being completed, and a subdivision layout prepared, the legislative requirements altered with the introduction of Part 3A. Despite this, the fieldwork provided essential information to assist in determining the species of significance requiring greater analysis.

Since the introduction of Part 3A, it has been necessary to consider the impacts of the development on the threatened species and their habitats in accordance with the Threatened Species Assessment Guidelines and matters of national environmental significance under the Commonwealth's Environment Protection and Biodiversity Conservation Act, 1999. BES has undertaken an assessment to address these requirements and this is shown as **Annexure 7**. This section is based on the findings contained within this report.

The work undertaken by BES included search of relevant existing data, field work involving random and targeted surveys, spotlighting and call playback, stagwatching, trapping and habitat analysis. Fieldwork involved 27.5 person hours on flora surveys, and 61.75 hours and 231 trap nights on fauna surveys.

This work revealed that the site provides potential habitat for a variety of threatened fauna and flora species, and those species requiring further investigations included the Leafless Tongue-orchid *Cryptostylis hunteriana,* Greater Broad-nosed Bat, Gang-gang Cockatoo, Square-tailed Kite and Powerful Owl. Furthermore, migratory species including the Black-faced Monarch and Rufous Fantail were recorded at the site. In addition, some vegetation within the site is consistent with an Endangered Ecological Community (EEC) known as "Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions" (NSW Scientific Committee 2005).

***Flora Species***

In relation to the Leafless Tongue-orchid *Cryptostylis hunteriana,* BES undertook 9.5 hours of random survey and 16.5 hours of targeted survey work during the known flowering season which failed to detect this species on the site.

As outlined above, the site contains EEC being "Swamp sclerophyll forest on the coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions". This vegetation community is sited within a depression which drains the western portions of the site and has an area of approximately 0.92 ha. This proposal however is unlikely to have any impacts on this EEC given that the subdivision layout provides for the preservation of this area in its entirety, the provision of buffers, and the implementation of a hydrological regime to ensure that stormwater flows through the EEC mimic current conditions. Section 6.7 of this report addresses stormwater through the site in order to mitigate impacts on the EEC.

Based on this, it is considered that the proposal is unlikely to have an impact on the EEC.

***Fauna Species***

Having regard to the Greater Broad-nosed Bat, the study area provides potential foraging resources and roosting habitat. Despite targeted surveys involving 13 hours of stag watching, BES failed to detect this species using the site as roosting habitat. Although the proposal will result in the loss of some potential habitat, the highly mobile nature of this species is such that BES conclude that the development is unlikely to cause significant impacts.

In relation to the Gang-gang Cockatoo, the site provides potential foraging and nesting resources. Targeted surveys failed to detect the presence of any nests on the site or surrounds. As this species is highly mobile, BES conclude that it is unlikely that the development will cause significant impacts despite the small loss of some foraging habitat.

In relation to the Square-tailed Kite, this migratory species was detected flying over the site and foraging in nearby properties and no nests where detected on the subject site by BES.

Having regard to the Powerful Owl, a single example was detected on two occasions during the survey work. Although call playbacks were used during the survey work, no response was received, leading BES to conclude that the bird was not 'territory holding'. Furthermore, the small quantity and lower quality of habitat for prey species is such that better quality habitat is available for the Powerful Owl elsewhere in the locality.

Although the site provides potential habitat for a variety of species, work undertaken by BES indicates that the site is used only foraging by threatened fauna species. Furthermore, the site does not contain individual threatened flora species. Consequently, impacts are limited to the EEC.

In order to mitigate the impacts of the project, BES have made a number of recommendations in Section 1 of their report. These include preservation of the EEC, and in this regard the subdivision layout incorporates a large public reserve centred around the western drainage depression which will comprise the entirety all of the vegetation identified within the EEC. In conjunction with this is a buffer of retained vegetation, generally a minimum of 10 m in width to further mitigate the potential impacts. In addition, works to control the quality and quantity of stormwater draining though this area has been addressed by the report of Storm Consulting to ensure that current hydrology is maintained, and this has resulted in some improvement in water quality, and acceptable flows through the site. This public reserve is to be edged within the subject site by sealed public roads, which will minimise the edge impacts. As this proposal will result in unmanaged lands having a reasonable size, relevant APZ have been provided to this area for allotments in the vicinity.

***Habitat Corridor***

The Department of Environment and Conservation has expressed concern in relation to the wider ramifications associated with the removal of vegetation and its impacts on habitat connectivity. This issue is discussed by BES in their assessment and is given further consideration in Section 7.2.1.1 of this report which deals with consultation.

***Matters of National Environmental Significance***

BES has addressed the provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act and have concluded that the development is unlikely to have any significant impact in matters of national environmental significance.

***Concluding Comments***

The mitigation measures recommended by BES are supported in this Environmental Assessment Report.

The work undertaken by BES is considered to address the Director-General's Environmental Assessment Requirements.

## 6.7 IMPACT ON SEWERAGE AND WATER INFRASTRUCTURE

### 6.7.1 Water Infrastructure

The subject site is provided with reticulated water supply along the frontage of the site to Cunjurong Point Road and The Sunset Strip. In addition to this, reclaimed water from the Conjola Sewerage Scheme will be available for reuse at the site, with such water being treated to a level whereby it can be used for toilet flushing and garden irrigation. This will be delivered in a 'third' pipe which would require appropriate plumbing upon construction of future dwellings to enable its use.

Initially, Shoalhaven Water advised that a detailed water supply hydraulic analysis strategy would be required in order to determine whether adequate supply, and pressure, could be provided to the entire subdivision. The principle concern of Shoalhaven Water appeared to be the impact such a subdivision would have on the available water pressure and the ability of the existing system to meet the peak demands. These concerns can be overcome with the provision of additional infrastructure constructed to service the subdivision, such as storage tanks and pumps, and this will be subject to detailed design when necessary.

Subsequent to this, and after consideration of additional information in relation to the proposed staging of the development, Shoalhaven Water has indicated by letter dated 12 July 2006 that they withdraw the requirement to undertake an hydraulic analysis, which can be done by them as part of their investigations into the use of reclaimed water supply at the development.

In addition to this, it is expected that the use of reclaimed water within the subdivision for toilet flushing and garden watering, will have benefits in reducing the demand for potable water.

Based on this advice, it is considered that adequate water supply exists and the subdivision will not have an unanticipated impact.

### 6.7.2 Sewer Infrastructure

Sewer is currently unavailable and existing properties presently rely on either the on site disposal of waste water, or its storage within pump out tanks prior to collection.

However, the Lake Conjola Sewerage Scheme is currently under construction and will ultimately provide a reticulated sewerage scheme for a number of villages within the Lake Conjola area, including Manyana, Cunjurong Point and Bendalong. This is a $53 million dollar project and it is expected that individual properties will be able to connect to the

system from mid 2007. At this time, construction of the sewerage treatment plant is underway, and this is located south of Bendalong Road.

This system has been designed to accept additional effluent waste generated by the subdivision of the subject site.

Given this timing, this proposed subdivision will be in a position to connect directly into the Lake Conjola Sewerage Scheme.

This opinion has been supported by Shoalhaven Water who have advised by letter dated 30th May 2006 that *"with respect to sewerage services this site has been allowed for in the current design of the Conjola Sewerage Scheme".*

Given the above, it is expected that the subdivision will have no unintended impacts on the sewerage supply scheme.

## 6.8 IMPACTS ON WATER QUALITY AND DRAINAGE

In support of this application is a report prepared by STORM Consulting which has examined the impacts on water quality and drainage, a copy of which is included as an **Annexure 8**. This report was prepared in consultation with the Department of Natural Resources having regard to the management of drainage lines, and the Department of Environment and Conservation with respect to hydrologic regime through the EEC area in order to maintain the integrity of the vegetation. The assessment undertaken by STORM Consulting included modelling the impacts of the development on total suspended solids, total phosphorous and total nitrogen.

STORM Consulting have recommended a number of measures aimed at minimising the impacts of the subdivision, and mimicking the hydrologic regime through the EEC as closely as possible. Works proposed include the provision of:

- infrastructure to allow the use of reclaimed water from the Lake Conjola Sewerage Scheme for outdoor use and toilet flushing;
- 5000 litre rainwater tanks to collect roof water off every dwelling;
- onsite detention within every allotment, to ensure pre-development flows off the site are not exceeded;
- infiltration with a volume of $2m^3$ for each allotment;
- road side swales and biofiltration trenches adjacent to the EEC to maintain soil moisture;
- a gross pollutant trap to allow the collection of pollutants and coarse sediment; and

- 4 constructed wetlands to provide a high level of treatment of runoff.

According to the modelling undertaken by STORM Consulting, the measures proposed to mitigate impacts within the EEC will see a reduction in total suspended solids and total phosphorous leaving the site over that occurring on the current undeveloped lands, whilst total nitrogen will slightly increase from 34.3 kg/y to 36.6 kg/y. It is noted however that these results meet the Best Management Practice targets which have been established for the site.

For the entire site after discharge through the final wetland, water quality will meet the Best Management Practice guidelines for 80% reduction in total suspended solids, and 45% reduction in total phosphorous and total nitrogen loads.

The infrastructure proposed by STORM is entirely consistent with the Performance Criteria contained in DCP 100. As such, the location of these facilities on land to be dedicated to Council is reasonable.

Having regard to the capacity of the downstream stormwater system, it is noted that the detention measures required will limit peak flows off the site, ensuring no increase in run off, and consequently, no additional burden on the drainage system is anticipated.

Based on the findings of the STORM Consulting report, it is considered that the proposal provides adequate ameliorative measures to ensure that impacts within both the EEC and beyond the site are acceptable.

The STORM report also addresses the assessment requirements contained within the Director-General's Environmental Assessment Requirements. The ameliorative measures recommended in the STORM report are supported by this Environmental Assessment Report.

## 6.9 ABORIGINAL AND CULTURAL HERITAGE

In support of this application is a Heritage Impact Assessment (HIA) prepared by South East Archaeology Pty Ltd which has examined the proposal and its impacts on Aboriginal and cultural heritage. A copy of this report is included as **Annexure 9**. This section is based on the findings and recommendations of the HIA.

In relation to European Heritage issues, the subject site and surrounding lands have not been identified in either SLEP, draft LEP 199 or the Shoalhaven Heritage Study 1995-1998.

The HIA was prepared in accordance with the guidelines established by the Department of Environment and Conservation and involved the following:

- consultation with relevant government agencies;
- consultation with relevant Aboriginal stakeholders;
- review of relevant existing information including heritage registers, LEPs and the like;
- field inspection, accompanied by representatives of the registered Aboriginal stakeholders; and
- preparation of a final report incorporating input from the registered Aboriginal stakeholders.

The HIA found that visibility of the site was limited due to dense vegetation and substantial leaf litter, restricting visibility to a major portion of the site. Despite this, two sites were found as follows:

- one indigenous site, comprising an artefact scatter (identified as Site Manyana 1) was located in the south-eastern portion of the site;
- one non-indigenous site was found, comprising a timber weekender (identified as Site Manyana 2) located within an existing clearing.

The likelihood of finding additional non-indigenous items is low as these are likely to be visible despite vegetation and leaf litter.

There remains some potential for other indigenous items to be found should additional investigations, including sub-surface excavations be undertaken. Despite this however, the nature of the site with no reliable water supply, limited food source coupled with its relative remoteness from the coast, is such that other sites in the immediate vicinity located closer to the coast would have been considered more attractive.

Site Manyana 1

Site Manyana 1 comprises thirteen artefacts including several flakes, including those which may have been used a stools, and flake fragments. Preliminary assessment of the sites significance considers the site to have little significance in relation to aesthetic, educational or historic criteria due to the unobtrusive nature of the find. In relation to scientific significance, Site Manyana 1 is considered to have a low to moderate significance in a local context.

The level of significance has been difficult to establish given that visibility is limited over much of the site. As such, it has been recommended that additional investigations be undertaken in order to clarify the level of significance, as well as provide greater contextual information to allow further assessment.

Various options are available for the management of the site, however additional investigation is the preferred method recommended in the report to more fully understand the significance of the property.

Site Manyana 2

Site Manyana 2 is a small timber hut, constructed by the forefathers of the current owner of the site and used for weekender/holiday accommodation purposes. According to the report, the *"site is of moderate integrity, being mostly intact but having been partially modified over the past 50 years for upgrades, maintenance and repairs"* and the *"heritage significance of this site is assessed as little (low)"*.

The proposal will result in the removal of this hut, however due to the low significance of this building as assessed in the report, this is considered a reasonable approach.

Conclusion

Assessment of potential Aboriginal sites has been hampered by the low levels of visibility over much of the property and as such, it has not been possible to determine the full impacts of development with certainty. The HIA outlines a number of potential "Mitigation and Management Strategies" which could be adopted, however has recommended that additional investigations, including sub-surface excavations, be undertaken to better understand the significance of the site. In order to undertake this additional work, a Section 87 Preliminary Research Permit is required to be issued by the Department of Environment and Conservation (DEC) under the National Parks and Wildlife Act is required to authorise these works. At this time, application is being made to the DEC for issue of a Section 87 permit and additional survey work will be undertaken.

The HIA prepared by South East Archaeology addresses the Director-General's Environmental Assessment Requirements and its recommendations are supported in this Environmental Assessment Report.

## 6.10 CONTAMINATION

One of the current owners has been visiting the site for in excess of 50 years. Prior to his ownership, it was owned by his father, and before that his grandfather. Consequently, the family has a relatively long and continuous history with the subject site and local area.

The site is currently forested with native vegetation, and in the past has been logged, with that use limited to the felling of trees for their processing off site. The site did not contain a mill or any other plant to treat or process timber. Consequently, it is very unlikely that

the site has been used for any purpose that would potentially lead to its contamination and, as such no further action is required.

# 7.0 CONSULTATION

In preparing this Environmental Assessment, the Director-General specified that *"an appropriate and justified level of consultation with relevant local, State and Commonwealth government agencies, service providers, community groups, and affected landowners"* be undertaken. It should be noted that the Department did not consider that a Planning Focus Meeting was necessary in this instance before proceeding with the preparation of this Environmental Assessment Report.

Having regard to the "appropriate and justified" consultation requirements, different forms of consultation where necessary based on the particular issue for consideration and the agency concerned. As such, it was considered that no one form of consultation would meet all community and agency needs. Consequently, consultation was had in a variety of ways, including formal written correspondence, telephone conversations and meetings, or a combination thereof. The following details the consultation processes that were had with the relevant authorities and groups conferred with.

## 7.1 THE COMMUNITY

Shoalhaven City Council officially acknowledges Principal Consultative Bodies which are formally notified of applications and other relevant information relating to Council's affairs. In relation to Manyana, the Manyana District Citizens Association is the formal group that is identified. Meetings were arranged through the Secretary of this Association. In considering matters such as this development proposal, the Manyana District Citizens Association goes outside of its direct members in order to obtain input and feedback from a wider cross section of the community. This session involved members of various groups within the community including Manyana District Citizens Association, Playgroup, Local Environment Group, Bush care, Local Rural Fire Service Brigade, and sporting clubs including Fishing, Soccer and Board-riders.

The Project Team met with this expanded group on two occasions, firstly before any detailed planning had been undertaken on 26th April 2006, and secondly, on 13th September 2006 when site constraints were more fully understood and a detailed subdivision layout was presented.

In relation to the initial meeting, the community expressed concern with the subdivision of the site having regard to issues such as impacts on social infrastructure, densities, road widths, visual amenity, stormwater control, lack of existing facilities including recreational and social infrastructure, and limited public transport. The community encouraged the preservation of large areas for public reserve purposes and the retention of vegetation,

the use of grey-water in the subdivision and the provision of affordable housing. After this initial meeting, commitment was given to a further meeting once the constraints to development were more fully realised and a subdivision design was available for discussion.

The issues raised by the community that have relevance to the design of the subdivision have guided the final layout, particularly having regard to:-

- the more generous size of the allotments proposed,
- the extent of public reserve and areas of retained vegetation,
- drainage design and infrastructure,
- the reuse of treated wastewater, and
- road design for fire/garbage and removalist's trucks with no cul-de-sacs.

In addition, other mitigating measures include implementation of Draft Design Guidelines and landscaping incentive scheme, all of which will assist in maintaining the village character of the locality.

In relation to the second meeting, the proposed layout was discussed after the Project Team outlined the relevant constraints to the subdivision. In general, the community group approved of the extent of open space provided, the large lot sizes and the use of reclaimed waste water. Concern was expressed in relation to the impact of the proposal on social infrastructure, the isolated nature of the village and the possibility of additional residential development in the locality.

## 7.2 STATE AGENCIES

### 7.2.1 Department Of Environment and Conservation

#### *7.2.1.1 Flora and Fauna Matters*

With regard to consultation with DEC, the Project Team met with staff from DEC in Nowra on the 13 June 2006 whereby they were briefed on the results of the survey undertaken by BES, and the key ecological constraints. At that time, the layout had not been finalised and consideration was being given to the removal of the EEC. Written correspondence was sent by BES to DEC on 20th June 2006 to gauge their views on this approach. This correspondence was discussed with staff from DEC in a teleconference call with the Project Team on 13 July 2006 whereby DEC outlined concern with the removal of vegetation, and indeed considered that additional vegetation beyond that comprising the EEC should also be retained in order to provide

connectivity from Crown land adjoining Berringer Lake to the south east of the subject site to lands to the north, as well as providing added protection for the EEC. Formal written response was provided by letter dated 27th July 2006 and a copy of this is included in **Annexure 10**.

Based on their response, concerns of DEC can be summarised as follows:

- Impact of residential development on the Endangered Ecological Community "Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions" by way of drainage works, pollution from urban and agricultural run-off, weed invasion and rubbish dumping; and
- The site is in the vicinity of a large tract of Crown land which is currently linked, through lands which include the subject site, to the Conjola National Park. According to DEC, the impacts of this development would see the corridor reduced to little more than 100 metres, and it would be better to maintain a width of 225 metres to ensure greater ecological integrity and function of this link. DEC also advised that they are required under the Draft South Coast Regional Strategy to prepare a Regional Conservation Plan to guide implementation of conservation outcomes. This process has identified the retention and enhancement of vegetated corridors as regionally important conservation outcomes.

In relation to the first matter raised by DEC, the proposed subdivision layout has maintained all of the EEC, along with the following measures aimed at ensuring its integrity:

- an appropriate buffer, generally a minimum of 10 m in width;
- drainage works to mimic existing flows and improve existing water quality;
- bollard fencing to discourage inappropriate access;
- preparation of a vegetation management plan for ongoing implementation.

This has been addressed in detail in Section 5.3 of the Flora and Fauna Assessment prepared by Bushfire and Environmental Services.

Given that the subject site has been identified for urban development for in excess of 30 years, it is considered that the approach adopted, that is the preservation of this area, and implementation of appropriate buffers is a reasonable one that balances ecological issues with efficient use of this residential land resource.

With respect to the second matter raised by DEC, this too has been addressed in the Flora and Fauna Assessment prepared by BES in Section 5.5 of that report. Their

assessment concludes that the actual width of the corridor would decrease from 400 m to 250 m, in excess of the 225 m outlined by DEC. In relation to threatened fauna species, this is unlikely to cause any impact given the highly mobile nature of these. Furthermore, having regard to general habitat connectivity, BES consider that the provisions of a 250 m corridor will be suitable to connect and sustain flora and fauna. This is supported by a study referred to in the BES report which considers that corridors with a width of between 80-100 metres have been shown to provide suitable habitat connectivity.

Consequently, it is considered that the development will not impose unreasonable impact on habitat connectivity and the maintenance of a 250 m corridor that will result is acceptable.

#### *7.2.1.2 Aboriginal Cultural Matters*

In relation to DEC input into the Heritage Impact Assessment prepared by South-East Archaeology consultation was had with the Department of Environment and Conservation in formulating the relevant consultative groups and this is outlined in detail in their report.

### 7.2.2 Roads and Traffic Authority

In preparing the Transport Report, Colston Budd Hunt and Kafes considered the prior comments of the Department of Planning and the Roads and Traffic Authority (RTA). In this regard, their analysis addressed:

- traffic modelling utilising the SIDRA analytical tool;
- holiday peaks;
- 10 year projected volumes;
- adequacy of intersections and performance.

As a result of this, additional consultation with the RTA was not necessary.

### 7.2.3 Rural Fire Service

The Bushfire Protection Assessment prepared by Bushfire and Environmental Services was prepared strictly in accordance with the provisions of Planning for Bushfire Protection. As such, further detailed consultation beyond that undertaken in the preparation of the Director-General's requirements, with the RFS was not considered necessary in this instance.

### 7.2.4 Department of Health

In undertaking this Environmental Assessment, the views of the Department of Health was sought through the South Eastern Sydney and Illawarra Health Service (SESAIHS) on the potential impacts of the subdivision, and their ability to meet the health needs of residents. A copy of their response is provided in **Annexure 10**. In consideration of this matter, the SESAIHS have advised that they plan for population growth in their service delivery and consider that enhancements of clinical facilities will *"more than ensure that our health infrastructure can adequately service the proposed development"*.

### 7.2.5 Department of Education

The Department of Education and Training were consulted in the preparation of this Environmental Assessment with a formal letter. In their response, they advised that they do *"not expect that the subdivision will adversely impact on the local schools within the vicinity of the development"*. Their full letter is contained within **Annexure 10.**

### 7.2.6 Department of Planning

Two meetings were held with the Department of Planning in their offices in Sydney to discuss the project. Firstly with Mr David Mutton and Ms Sri Soreono on 19th August 2005 to discuss the process to be followed having regard to the recently enacted Part 3A legislation.

Secondly, a meeting was held with Mr David Mutton and Mr Eng-Joo Ong on 10th September 2006 to discuss the relevant constraints and the process for consideration of the application.

## 7.3 SHOALHAVEN CITY COUNCIL

Various staff Shoalhaven City Council have been informed of the project throughout its design as follows:

- meeting with Council's Subdivision Planner prior to seeking Clause 6 declaration of Major Project Status;
- consideration of Preliminary Assessment and inclusion of its requirements in the Director General's Environmental Assessment Requirements;
- meeting with various Council Officers on 25th July 2006 to discuss relevant environmental constraints and the proposed subdivision layout; and
- meeting with Council's Subdivision Manager on 19th September 2006 to discuss final lot layout and the provision and long-term management of public open space.

## 7.4 INFRASTRUCTURE SERVICE PROVIDERS

***Shoalhaven Water***

Shoalhaven Water where consulted on a number of occasions and copies of their correspondence is provided in **Annexure 10**.

Initially, Shoalhaven Water corresponded on 30 May 2006 and advised that in regard to sewerage services, it has been indicated that the "site has been allowed for in the current design of the Conjola Sewerage Scheme". However, in relation to water supply, queried whether spare capacity existed within the system and whether augmentation was necessary. Shoalhaven Water also urged consideration of the use of reclaimed water for non-potable purposes.

Following on from this, Shoalhaven Water advised on 12 July 2006 that conceptually at least, the site can be serviced, however further details will ultimately need to be provided. The additional information is in relation to the precise staging of the development. It is anticipated that Shoalhaven Water would impose conditions in relation to this matter in any notice they prepare in the determination of the proposal.

In consideration of Shoalhaven Waters comments, along with the desire to develop a sustainable subdivision, the use of reclaimed is a feature of the project. It is noted that this will reduce reliance upon potable water for outdoor uses, toilet flushing and the like.

***Integral Energy***

Integral Energy were formally approached and their response in included in **Annexure 10**. Integral Energy considers that there is spare capacity in the system to service the subdivision.

***Telstra***

Telstra have been notified of the application in accordance with usual practices. Telstra raised no issues that require further investigation at this time. A copy of their response is provided in **Annexure 10**.

## 7.5 OTHERS

In preparing supporting documentation, consultants working on the project have consulted with:-

- local public transport providers; and
- medical practice servicing Manyana.

## 7.6 CONCLUDING COMMENTS

In conclusion, it is considered that consultation undertaken with the community, Shoalhaven City Council, infrastructure providers and relevant State Government Agencies is justified and appropriate given that it:

- has been considerate of the relevant key issues requiring resolution;
- has provided opportunities for feedback and consideration in final design of the subdivision and other ameliorative and mitigating measures; and
- has resulted in the provision of information allowing consideration and analysis of the key issues.

# 8.0 STATEMENT OF COMMITMENT

The commitments listed below have been compiled based on the Environmental Assessment undertaken and the constraints and opportunities available at the site. They provide a commitment from the developer indicating their responsibilities in developing the site as proposed to ensure that the development is environmentally, socially, and economically sustainable.

In developing the subdivision, the developer gives the following commitments in order to minimise the impact on the environment:

| Item | Commitment | Timing |
|---|---|---|
| General | The developer will carry out the development in accordance with this Environmental Assessment Report (EAR), prepared by Cowman Stoddart dated September 2006, plans prepared by Allen Price & Associates and supporting reports. | For the duration of the subdivision. |
| Legislative Controls/Requirements | The developer will obtain and maintain the following licences, permits and approvals for the residential subdivision:<br>• Shoalhaven City Council - Construction Certificates for engineering works for each stage of the subdivision. The application for Construction Certificates will contain Design Drawings submitted containing, where relevant, detailed designs relating to earthworks, drainage, Soil erosion and Sediment Control and site rehabilitation, tree clearing and site stability, roadworks, footpaths/cycleways, water supply (both potable and use of reclaimed water) and sewerage works, and landscaping.<br>• Shoalhaven City Council - Road Opening Permit from Shoalhaven City Council as required;<br>• Shoalhaven City Council - Section 138 Consent for roadworks (Roads Act 1993);<br>• Integral Energy - Design Certification;<br>• Integral Energy - Notification of Arrangement;<br>• Telstra - Compliance Certificate;<br>• Shoalhaven Water - Compliance Certificate;<br>• Shoalhaven City Council – Subdivision Certificates for each stage;<br>• Department of Land and Property Information - registration of the subdivision. | For the duration of the subdivision. |

| Item | Commitment | Timing |
|---|---|---|
| Final Plan of Subdivision | The developer will prepare a final plan of subdivision and Section 88B instrument for each stage of the development in accordance with the recommendations of the Environmental Assessment and requirements of Shoalhaven City Council. | Prior to the release of Subdivision Certificates. |
| Ecological | **Endangered Ecological Community** | |
| | The developer will prepare a Vegetation Management Plan in relation to that part of the site containing the Endangered Ecological Community for approval by Shoalhaven City Council. | Prior to the release of the Construction Certificate for that stage of the development. |
| | The developer will implement the recommendations and prepare the site in accordance with the VMP prior to its dedication to Shoalhaven Council. | Prior to the release of the Subdivision Certificate which creates the lot(s) containing the EEC. |
| | **Other** | |
| | The developer will impose a restriction on the title of each allotment requiring that any dogs or cats are kept only within the curtilage of a dwelling house, however dogs may be kept outside of the curtilage if secured on a leash. | Prior to the release of the Construction Certificate for that stage of the development. |
| Public Open Space | The developer will prepare and embellish all public reserves in accordance with the Vegetation Management Plan (for EEC) and detailed landscape design plans to be approved by Shoalhaven Council as part of the Construction Certificate. | Prior to release of certificate for subdivision for each stage/s containing public reserve. |
| | The developer will dedicate all public reserves to Shoalhaven City Council. | Prior to release of Subdivision Certificate and dedicated upon registration. |
| Waste Minimisation and Management | The developer will prepare a Waste Minimisation and Management Plan for subdivision construction works in accordance with Development Control Plan No 93 for approval by Shoalhaven City Council for implementation. | Prior to the release of the Construction Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Construction | The developer will prepare a Construction Management Plan for approval by Shoalhaven Council including education of workers in the approvals and conditions requiring compliance (including soil erosion and sediment controls, flora and fauna and aboriginal archaeological issues), details of the environmental management procedures during the development and measures relating to waste minimisation and management. | Prior to the commencement of construction and for the duration of the development. |
| Urban Design | The developer will finalise the form and implementation strategies regarding the Draft Design Guidelines in consultation with Shoalhaven City Council. | Prior to the release of the Construction Certificate for each stage. |
| Bushfire Management | **Provision of Asset Protection Zones** | |
| | The developer will establish and maintain Asset Protection Zones (APZs) in accordance with the Bushfire Assessment, January 2006, prepared by Bushfire and Environmental Services Pty Ltd. | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will install relevant infrastructure as required, including fire hydrants. | Prior to the release of the Subdivision Certificate for each stage. |
| | **Restriction as to User** | |
| | The developer will impose a Section 88B Restriction as to User on the title of relevant allotments specifying a Level of Construction in accordance with Figure 3 in the Bush Fire Assessment prepared by Bushfire and Environmental Services. | Prior to the release of the Subdivision Certificate for each stage. |
| Water Quality Management and Soil Control | The developer will design, install and maintain water quality control measures in accordance with the Construction Certificate Plans approved by Shoalhaven City Council. | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will prepare a soil and water management plan to control run off during construction in accordance with the principles of the Landcom publication Managing Urban Stormwater (MUS): Soils and Construction Volume 1, 4$^{th}$ Edition and Construction Certificate Plans approved by Shoalhaven City Council and DCP 100. | Prior to release of the Construction Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Cultural Heritage | The developer will undertake further assessment as recommended in the report prepared by South East Archaeology Pty Ltd, and implement its findings. | For the duration of the development. |
| | The developer will inform the Jerrinja Local Aboriginal Land Council of progress of the development. | Ongoing through the construction of the subdivision. |
| Infrastructure | **Roads** | |
| | The developer will construct all roads and intersections with Berringer Rd, Cunjurong Point Rd and The Sunset Strip in accordance with DCP 100 and approved Construction Certificates. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will provide a minor street drainage system to accommodate the 5 year A.R.I. storm event in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will provide a major street drainage system to accommodate the 100 year A.R.I. storm event in accordance with plans approved by Shoalhaven City Council with the Construction Certificate. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will construct footpaths and cycleways as shown on the plans prepared by Allen Price and Assoc and approved Construction Certificates. | Prior to the release of the Subdivision Certificate for each relevant stage. |
| | The developer will provide street signs in accordance with the requirements of Shoalhaven City Council. | Prior to the release of the Subdivision Certificate for each stage. |
| | **Electricity and Telecommunications** | |
| | The developer will provide underground power to each residential lot in the subdivision accordance with the requirements of Integral Energy | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will provide underground telecommunications infrastructure to each lot in the subdivision in accordance with requirements of Telstra. | Prior to the release of the Subdivision Certificate for each stage. |

| Item | Commitment | Timing |
|---|---|---|
| Infrastructure (continued) | **Water and Sewer Services – Residential Allotments** | |
| | The developer will provide reticulated water and sewerage services to each lot in the subdivision in accordance with the requirements of Shoalhaven Water | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will provide infrastructure to allow each lot in the subdivision to allow the reclaimed water from the Conjola Regional Sewerage Scheme. | Prior to the release of the Subdivision Certificate for each stage. |
| | **Water and Sewer Services - Public Reserves** | |
| | Within the public reserves, the developer will provide access to both the potable water and reclaimed water supplies. | Prior to the release of the Subdivision Certificate for each stage/s containing public reserve |
| Landscaping Plans | The developer will use native species, endemic to the locality in the preparation of landscaping plans, and subsequent works undertaken in conjunction with this subdivision. | For the duration of the subdivision |
| Geotechnical | The developer will provide a lot classification geotechnical report to Shoalhaven City Council for each stage of development prior to the release of the final plan of subdivision for that stage. | Prior to the release of the Subdivision Certificate for each stage. |
| Staging | The developer will construct the subdivision in accordance with the Proposed Staging Plan prepared by Allen Price and Associates or as otherwise approved in Construction Certificate plans approved by Shoalhaven City Council. | For the duration of the subdivision. |
| Developer Contributions | The developer will pay Section 94 developer contributions in accordance with Shoalhaven City Council's Section 94 Contributions Plan on a "per ET" basis for each stage of the residential subdivision. | Prior to the release of the Subdivision Certificate for each stage. |
| | The developer will pay Section 64 water and sewer developer contributions in accordance with the development servicing plan applicable at the time of payment. | Prior to the release of the Subdivision Certificate for each stage. |
| Signage | The developer will provide estate marketing signs in accordance with the provisions of DCP 89 – Exempt and Complying Development or as otherwise approved by Shoalhaven City Council. | For the duration of the subdivision. |

# 9.0 CONCLUSION

This report provides an Environmental Assessment in relation to a Project Application for a residential subdivision at Manyana.

The plan provides for the development of 179 allotments, ultimately allowing for the residential expansion of the existing village in a manner that appropriately considers the relevant constraints that apply to the site, including ecological, statutory, social, and scenic impacts.

The development is to be undertaken in 6 stages and it is intended to develop the project to meet market demand and take up rates which is envisaged to be over a 7 to 10 year period.

The development is a reasonable one that appropriately balances the constraints that apply to a site of this nature, with the need to expand Manyana in a planned fashion. The subdivision layout is considered to be an excellent example, combining modern subdivision design and practice, with an already established village character which includes an abundance of public open space and the retention of large forested areas.

The accompanying reports are the result of over two years of studies, consultations, investigations and research. Current best practice has been applied to all facets of the development and it is considered that this will lead to a high quality urban subdivision that is ecologically sustainable in the long term.

This Environmental Assessment considers the issues raised by the Director-General of the Department of Planning in the Environmental Assessment Requirements, issued January 2006 and has thoroughly addressed the requirements.

In preparing this environmental assessment, separate reports addressing Traffic Impacts, Flora and Fauna Design Guidelines, Bushfire, Water Cycle Management and Heritage Impact have been prepared, and have been considered in this Environmental Assessment.

Key mitigating features of this development include an appropriate subdivision design, retention and treatment of all ecologically sensitive areas, use of best practice stormwater management Design Guidelines aimed at providing an appropriate built form and consideration of natural hazards.

Research undertaken to prepare this report has demonstrated that this development, along with the other application currently before the Department, are unlikely to incur significant cumulative impacts on the provision of infrastructure, including the availability of social facilities.

Support for the development is recommended subject to implementation of those matters outlined in the statement of commitments.