ANNEX G

Supplementary Flora and Fauna Assessment

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Our ref: SB/N02066/LW3 2008. Reply to Ballina office

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RE: RESPONSE TO REQUEST FOR FURTHER INFORMATION

1. Introduction

James Warren and Associates (JWA) have been engaged by The Rothwell Boys to address a NSW Department of Planning (DOP) request for further information. Coffs Harbour City Council (CHCC) and the Department of Environment and Climate Change (DECC) have made submissions outlined in a DOP letter dated 21/1/2008. The letter requested further information with regard to the impact of the proposed development on the following:

- Grass owl. Seven point test is required.
- Potential impacts on the Wallum froglet habitat from fill, extent of development footprint, storm water infrastructure and asset protection zones.
- Swamp Sclerophyll Forest. This forest type is considered to represent Endangered Ecological Communities (EEC).

2. Seven Point Test for the Grass Owl (Tyto capensis)

2.1 Introduction

CHCC have requested that a seven (7) point test be provided for the Grass owl. JWA have completed call play back on the Site in 2006 and did not record any evidence of Grass owls on the site. This section contains an assessment of significance (7 point test) for the Grass owl.

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2.2 Seven Point Test Grass Owl

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

Habitat description/Lifecycle components

Grass owls have been recorded occasionally in all mainland states of Australia but appear to be more commonly recorded in north and north-eastern Australia. In New South Wales they are more likely to be found in the north-east. Grass owl numbers often increase when rodent numbers increase (NPWS 2002).

Grass owls are found in areas of tall grass, including grass tussocks in swampy areas, grassy plains, swampy heath, and cane grass, or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy growth. If disturbed they burst out of cover, flying rather slowly, before dropping straight down again into cover (NPWS 2002).

The Grass owl is a nomadic wanderer and preys on small nocturnal ground mammals. The coastal population seems moderately stable and permanent, preying mainly on the Canefield rat (*Rattus sordidus*) and other rodents. At dusk they rise to spend much of the night flying on steadily beating wings at about 5-25 metres above the ground (Readers Digest 1997).

The Grass owl breeds at any time, but mainly March – June after heavy rain. They sometimes nest in loose communities. The nest is a scrape or platform of plant stems under a tussock, which is entered by up to a 10 metre long tunnel under vegetation (Readers Digest 1997).

In the Northern Rivers Grass owls are known to be associated with several vegetation types including:

- Coastal wet Heathland & Shrubland;
- Wallum Sedgeland , and Rushlands;
- Coastal heathlands (Cypress Pine, headland heaths, coastal mallee and *Themeda australis* grasslands) (DEC 2005).

Extent of the local population

The NPWS database contained one (1) record of this species within 10 kilometres of the Subject site.

The NPWS Atlas of NSW Wildlife database contained five (5) sightings of this species in the Coffs Harbour Local Government Area.

A targeted Grass owl call playback program was undertaken at seven (7) selected sites for three consecutive nights on the 23rd, 24th, & 25th of September 2004. Grass

owl calls were broadcast and a ten minute listening period followed. Spotlighting was undertaken for 10 minutes at each of the sites following call broadcast to determine whether owls had flown in to the broadcast site. No Grass owls were recorded with this survey effort.

Stages of the life-cycle affected by the proposed development
The NPWS Threatened Species Unit discusses the following threats for the Grass owl:

- Loss of suitable habitat from grazing, agriculture and development;
- Disturbance and habitat degradation by stock;
- Use of pesticides in agriculture to control rodent populations, resulting in reduced food sources for owls, and potential for poisoning; and
- Frequent burning, which reduces ground cover.

The Proposed development will result in the loss of a minor amount of potential habitat for the Grass owl. The area of potential Grass owl habitat on the Subject Site is limited to Community 3a – Tall closed heath. 0.0084 hectares of this community will be removed. The loss of this small area of potential habitat is not considered to effect any stage of the life cycle of the Grass owls in the locality.

Likelihood of local extinction
It is unlikely that the proposed development will cause the extinction of any local population of this species.

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

Not Applicable

(c) In the case of an endangered ecological community or critically endangered ecological community whether the action proposed:

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

(ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not Applicable

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

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

Within the Subject site (Lots 1 & 2 DP 725785) approximately 1.25 hectares of optimal habitat occurs. Only 0.0084 hectares of the vegetation which represents viable habitat will be removed or modified. This loss is considered to be relatively minor.

Approximately 7.3 hectares of land will be allowed to naturally regenerate. This natural regeneration area will provide a suitable habitat type for the Grass owl.

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

The development is occurring over a majority of cleared grassland, the small area of potential habitat for the Grass owl is to be retained and embellished with natural regeneration and revegetation techniques. No area of potential habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action.

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

The area of potential habitat for the Grass owl is to be retained and allowed to regenerate. It is considered that the loss of the 52 hectares of mainly low closed grassland is not important for the Grass owls nesting or breeding purposes in the locality.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not Applicable

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No recovery plan or Draft recovery plan has been gazetted for this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A “threatening process” means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or

ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (1995)*.

Key Threatening Processes (Schedule 3):

- Invasion and establishment of exotic vines and scramblers;
- Invasion and establishment of the Cane toad, *Bufo marinus*;
- Invasion of the yellow crazy ant;
- Feral pigs;
- Competition and habitat destruction by feral goats;
- Entanglement in, or digestion of anthropogenic debris in marine and estuarine environments;
- Introduction of the large earth Bumble bee, *Bombus terrestris*;
- Removal of dead wood and dead trees;
- Death or injury to marine species following capture in shark control programs on ocean beaches;
- Invasion of native plant communities by exotic perennial grasses;
- Infection of frogs by amphibian chytrid, causing the disease chytrodiomycosis
- Competition from feral honeybees;
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- Clearing of native vegetation;
- Anthropogenic climate change;
- Removal of Bush rock;
- High frequency fire;
- Invasion by Bitou Bush (*Chrysanthemoides monilifera*);
- Loss and/or degradation of sites used for hilltopping by butterflies;
- Predation by the European red fox (*Vulpes vulpes*);
- Predation by the Feral cat (*Felis catus*);
- Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island;
- Predation by the Plague Minnow (*Gambusia holbrooki*);
- Infection of native plants by *Phytophthora cinnamomi;*
- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Importation of red imported fire ants into NSW; and
- Competition and grazing by the feral European rabbit.

The proposed development will contribute towards the clearing of native vegetation, a key threatening process listed on Schedule 3 of the *TSC Act (1995)*. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive species; loss of leaf litter layer; loss or disruption of ecological function (*e.g.* loss of populations of pollinators or seed dispersers) and changes to soil biota.

The proposed development will result in the removal of a total of approximately 1.5 hectares of mixed grassland and slashed heath in low lying areas of the site. In addition, scattered trees will be lost within grazing land.

The proposed development includes adequate buffering to the potential Grass owl habitat on the site and a Vegetation Management Plan that will result in significant restoration of the heathland environment on the site, which comprises potential habitat for this species. The Proposed development is unlikely to increase the impact of any other key threatening processes.

On the basis of this assessment it is considered that a Species Impact Statement is not required.

3. Assessment of Impacts on Potential Wallum Froglet Habitat

3.1 Introduction

Coffs Harbour City Council (CHCC) have requested that the indirect effects of the proposed development layout are further investigated with regard to the habitat of the Wallum froglet. This section outlines the potential impacts associated with the proposed development and also includes a revised assessment of significance (7 points test) for the Wallum froglet.

3.2 Impacts

The Wallum Froglet Assessment (JWA 2007) outlined the impacts of the development layout on the probable Wallum froglet foraging and dispersal habitat mapped by White (2006). The proposed development layout will result in the loss of 0.29 hectares of the Wallum froglet foraging and dispersal habitat (White 2006).

In response to CHCC and the DOP request for further information, Environmental Resources Management (ERM) have produced a plan that shows the indirect encroachments from the proposed development. The plan shows Stormwater drainage outlets, Bio-retention zones, Vegetation Filter Zones and Asset Protection Zones (APZ). The proposed encroachments will impact on approximately 0.8711 hectares of the Wallum froglet foraging and dispersal habitat (White 2006) as shown in **FIGURE 1.**

TABLE 1 shows the Wallum froglet foraging and dispersal habitat which is to be lost directly by the development and the potential impacts associated with the indirect encroachments.

TABLE 1 IMPACT ON WALLUM FROGLET FORAGING AND DISPERSAL HABITAT

TYPES OF IMPACT	AREA IN HECTARES
Impact from Development, such as roads and lots.	0.29
Impact from encroachments, such as Stormwater outlets, Filter zones, APZ, etc.	0.8711
Total Impacts (area to be lost/modified)	1.1611

3.3 Revised Seven (7) point test

(a) In the case of a Threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

Extent of the local population
The NPWS database contains one (1) record of the Wallum froglet within 10 kilometres of the Study area. This record is from Hearns Lake, approximately 7km north of the site. The NPWS database contains five (5) records of the species within the Coffs Harbour LGA, while two (2) additional records are also known. Following recent survey work by Dr. Arthur White, the species is now known to reside within Moonee Nature Reserve, which occurs adjacent to the site, separated by Moonee Creek.

Following recent site investigations by White (2006) it is apparent that Wallum froglets are not permanent residents of the site and no core population exists on the site itself. Rather, Wallum froglets disperse onto the site when conditions are favourable, or when a flood event occurs. The Subject site provides for foraging and dispersal habitat for the Wallum froglet.

Stages of the life-cycle affected by the proposed development
Wallum froglets are found only in acid paperbark swamps and sedge swamps of the coastal 'wallum' country (NPWS 2002). Wallum is a banksia-dominated lowland heath ecosystem characterised by acidic waterbodies. This species does not utilise open or free water in swamps but prefers the vegetated, muddy edges of pools, both temporary and permanent (White 1995). Refuge habitat consists of a dense cover of ground vegetation, with interspersed tree canopy cover.

Breeding occurs in late winter in ephemeral sites such as larger puddles in heath or puddles in watercourses and creek-lines (NPWS 2002; White 2006).

As part of the RFA process, Environment Australia (1999) conducted an analysis of the responses of forest fauna to various forms of land cover disturbance in the North-east region. The analysis was based on local expert knowledge and ranked the significance of various forms of disturbance for the Wallum froglet, with the following results:

1st order disturbances	Habitat clearing Wetland swamp drainage for mosquito control Altered hydrology from earthworks
2nd order disturbances	Mining/quarrying
3rd order disturbances	Fish Pollution
4th order disturbances	Tea-tree harvesting

Development of the Subject site in accordance with the proposed development layout will result in the loss of 1.16 hectares of Wallum froglet foraging and dispersal habitat (as mapped by White 2006), which represents a loss of 18 % of the potential

Wallum froglet foraging and dispersal habitat on the site. It is relevant to note that the species will only utilise the site when conditions are appropriate and is unlikely to persist on the site as a resident population due to fluctuating water quality. The retention of approximately 82% of foraging habitat for the species in the south of the site and adoption of amelioration measures is considered to adequately provide for the potential use of the site by the Wallum froglet.

Likelihood of local extinction
With the adoption of amelioration measures discussed in Section 5.4 of the Flora and Fauna Report (JWA 2007), the proposed development is considered unlikely to result in the local extinction of this species.

(b) In the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Thirty-three (33) endangered populations have been identified under the *TSC Act*. The following endangered populations occur in north-eastern NSW:

- Emu population in the NSW North Coast Bioregion and Port Stephens LGA;
- Long-nosed potoroo population, Cobaki Lakes and Tweed Heads West;
- Low growing form of *Zieria smithii*, Diggers Head; and
- *Glycine clandestina* (Broad-leaf form) in the Nambucca LGA.

The proposed development will not affect any of these endangered populations.

(c) In the case of an endangered ecological community or critically endangered ecological community whether the action proposed:

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

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Amelioration measures propose that some periodic thinning of Paperbarks along the southern drainline is necessary to continue to make habitat in this area suitable for the Wallum froglet. Vegetation flanking the southern drainline, while degraded by modification (removal of most structural components, slashing and grazing) is representative of the Endangered Ecological Community – 'Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions'.

It is Management of this community is considered unlikely to adversely effect the composition of this EEC to any significant degree.

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

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed

The proposed development will result in the minor loss of habitat for the Wallum froglet around the drainage line area to the south of the site. Approximately 1.16 hectares is to be modified for the proposed development.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action

The Proposed development will not further isolate or fragment areas of Wallum froglet habitat on the site. Wallum froglet habitat on the site already exists in relative isolation from any adjacent suitable habitat areas. The southern drainage line will be retained, buffered and allowed to regenerate to provide superior habitat for this species over time.

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

The Wallum froglet habitat on the site comprises foraging and dispersal habitat only. No breeding habitat occurs on the site. Habitat on the site does not support a permanent population of the Wallum froglet, with the species only likely to utilise the habitat periodically when conditions are suitable. The habitat area is not considered likely to undergo any significant modification or fragmentation which will be to the detriment to the Wallum froglet from the Proposed development.

The Proposed development will not have any impacts on other known Wallum froglet populations or Wallum froglet habitat in the locality.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Critical habitat areas listed under the *Threatened Species Conservation Act (2002)* currently consist of habitat for Mitchell's rainforest snail in Stott's Island Nature Reserve, and habitat for the Little penguin population in Sydney's North Harbour.

Neither of these critical habitats will be adversely affected.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

A Recovery plan has not been prepared for the Wallum froglet.

A Threat abatement plan has been prepared to address predation by the Plague minnow (*Gambusia holbrooki*). This species has been observed to prey upon the eggs and tadpoles of some other frog species, including other *Crinia* species (NPWS 2003). The Plague Minnow is also considered likely to predate upon the tadpoles of the Wallum froglet and three (3) other Threatened frog species (NPWS 2003).

No *Gambusia* were observed in the drainlines at the site, although it is likely that in times of inundation they dwell within the southern drainline, and it is likely that the species is established within the central dam on the site (where Wallum froglets are unlikely to occur due to deeper water and the general absence of Wallum vegetation). Given the diversity of other frog species within the drainline environment, it appears that the impacts of the Plague minnow are relatively minor.

A Threat abatement plan has also been prepared for the Red fox. This species is unlikely to have any impacts on the Wallum froglet on the site, and the proposed action is unlikely to increase the impacts of the Red fox on the site.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (1995)*.

Key Threatening Processes (Schedule 3):

- Invasion and establishment of exotic vines and scramblers;
- Invasion and establishment of the Cane toad, *Bufo marinus*;
- Invasion of the yellow crazy ant;
- Feral pigs;
- Competition and habitat destruction by feral goats;
- Entanglement in, or digestion of anthropogenic debris in marine and estuarine environments;
- Introduction of the large earth Bumble bee, *Bombus terrestris*;
- Removal of dead wood and dead trees;
- Death or injury to marine species following capture in shark control programs on ocean beaches;
- Invasion of native plant communities by exotic perennial grasses;
- Infection of frogs by amphibian chytrid, causing the disease chytrodiomycosis
- Competition from feral honeybees;
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- Clearing of native vegetation;
- Anthropogenic climate change;
- Removal of Bush rock;
- High frequency fire;
- Invasion by Bitou Bush (*Chrysanthemoides monilifera*);
- Loss and/or degradation of sites used for hilltopping by butterflies;
- Predation by the European red fox (*Vulpes vulpes*);

- Predation by the Feral cat (*Felis catus*);
- Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island;
- Predation by the Plague Minnow (*Gambusia holbrooki*);
- Infection of native plants by *Phytophthora cinnamomi;*
- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Importation of red imported fire ants into NSW; and
- Competition and grazing by the feral European rabbit.

The proposed development will contribute towards the clearing of native vegetation, a key threatening process listed on Schedule 3 of the *TSC Act (1995)*. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive species; loss of leaf litter layer; loss or disruption of ecological function (*e.g.* loss of populations of pollinators or seed dispersers) and changes to soil biota.

A total of approximately 1.5 hectares of mixed grassland and slashed heath will be removed within low lying areas of the site as a result of the proposed development (in addition to the loss of scattered trees within grazing land).

The proposed development will result in the loss of 1.16 hectares of dispersal and foraging habitat for the Wallum froglet (as mapped by White 2006), which represents a loss of 18 % of the potential Wallum froglet habitat on the site. The areas to be lost occurs at the peripheries of suitable habitat for the species, and this loss is considered likely to place negligible limits on available foraging and dispersal habitat for the species.

The proposed development includes adequate buffering to Wallum froglet habitat. A Vegetation Management Plan will result in significant restoration of the heathland environment on the site, which comprises suitable foraging habitat for this species.

The Proposed development is unlikely to increase the impact of any other key threatening processes.

On the basis of this assessment, it is considered that a Species Impact Statement (SIS) is not required.

4. Potential Impacts and Proposed Amelioration measures for the Swamp Sclerophyll EEC.

4.1 Introduction

This section discusses the revision of the seven (7) point test for the Endangered Ecological Community Swamp Sclerophyll Forest. DECC have requested further information on the potential impacts and the methods to be used in the amelioration effort.

4.2 Condition of Swamp Sclerophyll Forest

Two (2) small patches of Vegetation Community 2c - Mid-high Swamp Sclerophyll Forest occur within the north-western portion of the site (JWA 2007). The two (2) patches of vegetation are quite small and the structural formation of these communities has been reduced due to previous farming practices including clearing and cattle grazing. The two (2) small patches of Swamp Sclerophyll Forest are considered to be regrowth of poor structural quality.

4.3 Impacts on Swamp Sclerophyll Forest

The proposed development will have an impact on Vegetation Community 2c Mid-high Swamp sclerophyll forest (*Melaleuca sieberi*). Approximately 0.2351 hectares of this community will be lost for the construction of the Development, Storm water drainage outlets, Bio-retention Basin and a Vegetation Filter Zone.

4.4 Amelioration for Swamp Sclerophyll Communities

The removal of a small portion of the EEC Swamp Sclerophyll Forest from the north-western portion of the site, will require compensatory revegetation to offset the loss of the Endangered Ecological Community. A Vegetation Management Plan outlining rehabilitation should be implemented before approval of the construction certificate is granted.

Other amelioration measures include:

- Weeds should be controlled during construction.
- It is also recommended that mature *Melaleuca sieberi* on the site be similarly retained.
- It is recommended that any mature *Melaleuca sieberi* that are removed be replaced at a ratio of three (3) trees for each of the mature *Melaleuca sieberi* lost.
- Vegetation removed during construction should be mulched for use on the site. This will prevent the introduction of weeds from seeds in mulch brought in from elsewhere.
- Weeds should be controlled in landscaped areas and areas of retained vegetation.
- Landscape plantings should include a majority of native species that are listed in the final determination for the Swamp Sclerophyll Forest.

- Landscaping trees should be situated where possible to reduce the amount of disturbance to retained areas of habitat.

4.5 Background

A seven (7) point test has been completed with regard to the Swamp Sclerophyll forest and the potential impact associated from the development. Section 5.2.3.4 of the Flora and Fauna Assessment (JWA 2007) details the seven point test for Swamp sclerophyll forest. The assessment (7 point test) concluded that only a minor area of Swamp Sclerophyll Forest will be potentially modified for the construction of a bio-retention basin and associated vegetation filter zones.

4.6 Revised Seven (7) point Test for Swamp Sclerophyll forest on Coastal floodplain

(a) In the case of a Threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable.

(b) In the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Not applicable.

(c) In the case of an endangered ecological community or critically endangered ecological community whether the action proposed:

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

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Paperbark forest on the site occurs in several areas, mostly in small pockets adjoining other vegetation communities. One (1) small patch of Community 2(c) and Community 2 (d) – Paperbark communities will be modified for the construction of a bio-retention basin. No other patches of Swamp Sclerophyll Forest will be affected by the proposed development. The majority of the Paperbark areas on the site will be retained. The proposed development will not cause the Swamp Sclerophyll Forest on the Subject site to be placed at risk of extinction.

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

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

The proposed development will result in the loss of 0.2351 hectares of Swamp Sclerophyll Forest for the Proposed Development and Storm water infrastructure, including bio-retention basins and vegetated buffer zones.

Swamp sclerophyll forest on coastal floodplains is associated with humic clay-loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines, associated with coastal floodplains (NSW Scientific Committee 2004).

Approximately 56% of the total site area (approximately 54 hectares) will be subject to urban development. Nearly all urban development of the site occurs within grasslands with scattered trees on the site. Whilst development will occur in some low-lying areas of the site, historical and current land management practices (i.e. slashing and grazing) would preclude the establishment of this EEC in these areas. It is considered that only 0.4 hectares of suitable habitat for this EEC will be removed or modified as a result of the proposed development.

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

The EEC Swamp Sclerophyll Forest on coastal floodplain on the site is already fragmented, and does not retain any connectivity with other nearby similar communities. The proposed development will not further isolate this community on the site.

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

The small area of habitat is not considered to be of importance to the life cycle or reproductive success of the Swamp Sclerophyll forest in the locality. Larger areas of retained vegetation will continue to allow for a viable Swamp Sclerophyll community to continue in the locality.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Critical habitat areas listed under the *Threatened Species Conservation Act (2002)* currently consist of habitat for Mitchell's rainforest snail in Stott's Island Nature Reserve, and habitat for the Little penguin population in Sydney's North Harbour.

Neither of these critical habitats will be adversely affected.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No Recovery plan has been prepared for the EEC Swamp sclerophyll forest on Coastal floodplain.

A Draft Threat Abatement Plan has been prepared to address the invasion of native plant communities by Bitou bush – a Key Threatening Process (KTP).

Bitou bush does not occur within this EEC on the Subject site.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the *TSC Act (1995)*.

Key Threatening Processes (Schedule 3):

- Invasion and establishment of exotic vines and scramblers;
- Invasion and establishment of the Cane toad, *Bufo marinus*;
- Invasion of the yellow crazy ant;
- Feral pigs;
- Competition and habitat destruction by feral goats;
- Entanglement in, or digestion of anthropogenic debris in marine and estuarine environments;
- Introduction of the large earth Bumble bee, *Bombus terrestris*;
- Removal of dead wood and dead trees;
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- Invasion of native plant communities by exotic perennial grasses;
- Infection of frogs by amphibian chytrid, causing the disease chytrodiomycosis
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- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- Clearing of native vegetation;
- Anthropogenic climate change;
- Removal of Bush rock;
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- Invasion by Bitou Bush (*Chrysanthemoides monilifera*);
- Loss and/or degradation of sites used for hilltopping by butterflies;
- Predation by the European red fox (*Vulpes vulpes*);
- Predation by the Feral cat (*Felis catus*);
- Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island;
- Predation by the Plague Minnow (*Gambusia holbrooki*);
- Infection of native plants by *Phytophthora cinnamomi;*

- Infection by Psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations;
- Importation of red imported fire ants into NSW; and
- Competition and grazing by the feral European rabbit.

The proposed development will result in the minor removal and modification of Swamp sclerophyll forest (Paperbark) on the site. The Proposed development will not increase the impact on any threatening processes. Vegetation to be lost to the proposed development consists of sclerophyll communities, sedgeland, and grassland with scattered trees.

On the basis of this assessment, it is considered that a Species Impact Statement (SIS) is not required.

5. Summary

James Warren and Associates (JWA) have been engaged by The Rothwell boys to address a NSW Department of Planning (DOP) request for further information.

JWA have re-calculated the potential impacts of the development having regard to the indirect encroachments such as Storm water infrastructure, APZ and Vegetation buffer zones.

A seven (7) point test has been completed for the Grass owl and two (2) revised seven (7) point test have been provided for the Endangered Ecological Community Swamp Sclerophyll Forest and for the threatened fauna species the Wallum froglet.

On the basis of this assessment, it is considered that the proposed development including the indirect encroachments will only cause a minor impact on the habitat of the Grass owl, Wallum froglet and the Endangered Ecological Community Swamp Sclerophyll Forest. These minor impacts are not considered to cause a significant effect and it would be unlikely for the proposed development to cause the local extinction of these threatened species or Endangered Ecological Community, hence a Species Impact Statements (SIS) will not be required.

Regards

James Warren
Environmental Scientist

Per: ……

Yours faithfully

JAMES WARREN & ASSOCIATES

References

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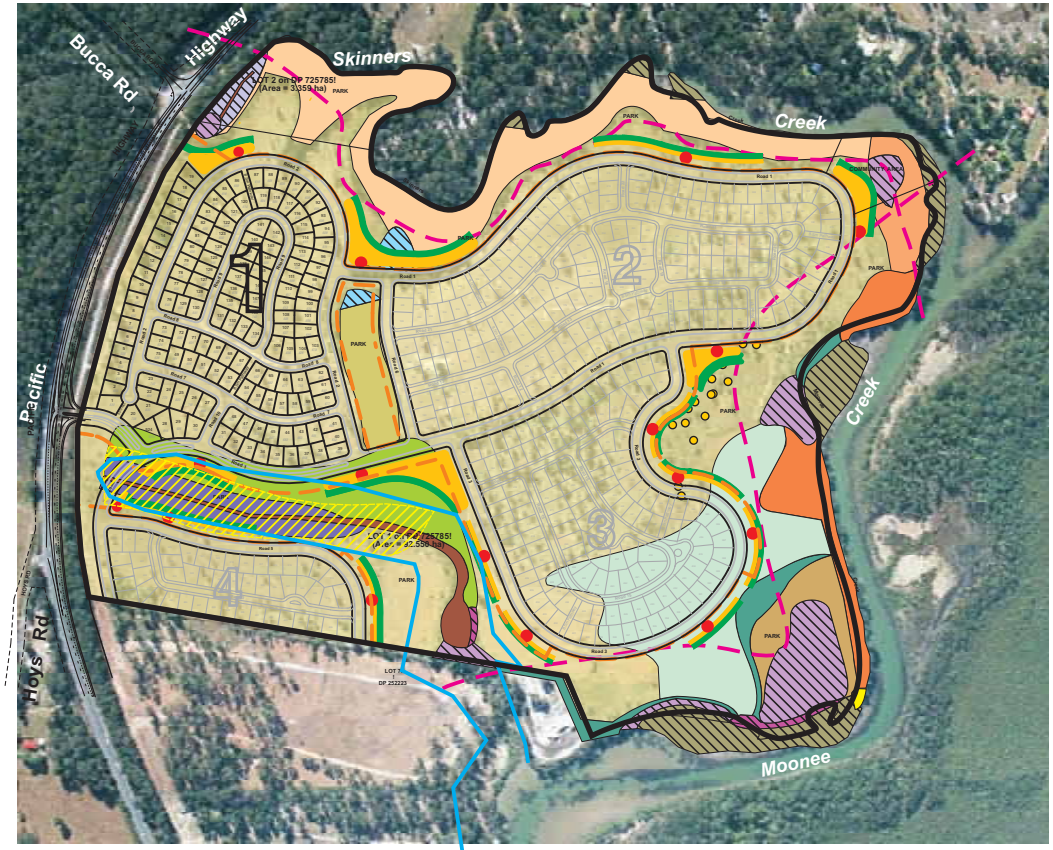


Legend
- Core Wallum frogle habitat (JWA)
- Probable extent of Wallum frogle foraging & dispersal habitat (White)
- Bioretention Zones
- Stormwater Drainage Outlets
- Vegetation Filter Zone
- Creek Buffers
- APZ
- Subject Site

VEGETATION LEGEND

Dry sclerophyll forest/woodland communities
- Community 1a - Tall closed forest *(Eucalyptus pilularis +/-* mixed species)
- Community 1b - Tall mid-dense forest *(Eucalyptus planchoniana, Syncarpia glomulifera, Corymbia intermedia)*
- Community 1c - Tall mid-dense forest *(Syncarpia glomulifera, Eucalyptus robusta)*
- Community 1d - Tall mid-dense forest *(Eucalyptus planchoniana, Eucalyptus tindaliae, Eucalyptus pilularis, Syncarpia glommulifera)*
- Community 1e - Tall open forest *(Eucalyptus siderophloia)*
- Community 1f - Tall closed forest *(Eucalyptus planchoniana, Syncarpia glomulifera, Eucalyptus pilularis)*

Swamp sclerophyll communities
- Community 2a - Tall mid-dense forest *(Eucalyptus robusta, Lophostemon suaveolens, Melaleuca quinquenervia, Syncarpia glomulifera)*
- Community 2b - Mid-high swamp sclerophyll forest *(Melaleuca quinquenervia)*
- Community 2c - Mid-high swamp sclerophyll forest *(Melaleuca sieberi)*
- Community 2d - Mid-high swamp sclerophyll woodland *(Melaleuca quinquenervia, M. linariifolia)*
- Community 2e - Mid-high swamp she-oak woodland *(Casuarina glauca)*

Heathland/sedgeland/fernland communities
- Community 3a - Tall closed heath *(Ochrosperma leneare, Leptospermum polygalifolium, Leucopogon parviflorus)*
- Community 3b - Slashed heath (Mixed species)

Grassland communities
- Community 4a - Low closed grassland *(Andropogon virginicus, Themeda triandra)* with scattered trees.
- Community 4b - Low closed grassland *(Themeda triandra, Juncus* sp.*)*

Intertidal communities
- Community 5a - Low open mangrove forest/Saltmarsh *(Aegicerus corniculatum, Juncus kraussii, Sporobolus virginicus)*

Wetland communities
- Community 6a - Wetland *(Nymphaea* sp., *Eleocharis* sp., *Philydrum lanuginosum)*
- Individual *Melaleuca sieberi*
- Endangered Ecological Community

0 100 200m
1 : 8000

SOURCE: JWA Site Investigations; Auspacific Engineers (Ref: 04-1600-P5C.pdf); Resource Design & Management (Ref: 05025 BUSHFIRE8 Bushfire.pdf)
SCALE: 1 : 8000 @ A3
JAMES WARREN & ASSOCIATES PTY LIMITED Environmental Consultants

CLIENT
Resource Design Management Pty Ltd
PROJECT
Lots 1 & 2 DP725785
Pacific Highway, Moonee, NSW
Coffs Harbour City LGA

FIGURE 1
PREPARED: VJA/BW
DATE: 06 June 2008
FILE: 02066_encroachment.cdr

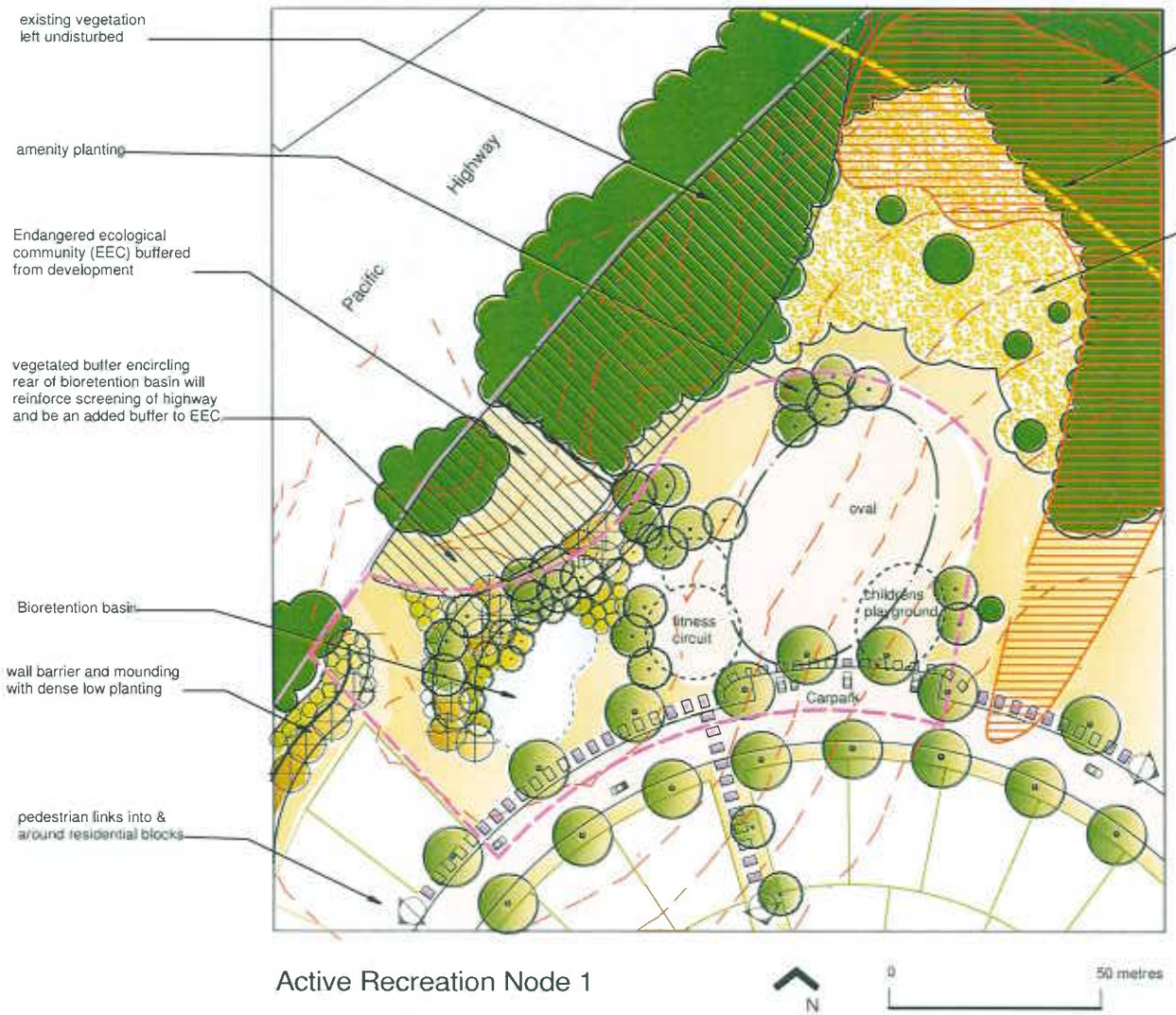
TITLE
IMPACT OF PROPOSED DEVELOPMENT ON VEGETATION & WALLUM FROGLET HABITAT

ANNEX H

Revised Landscape Concept Plan and Open Space Management Plan Figures

ANNEX H1

Active Recreation Node 1



Active Recreation Node 1

Active Recreation Node 1

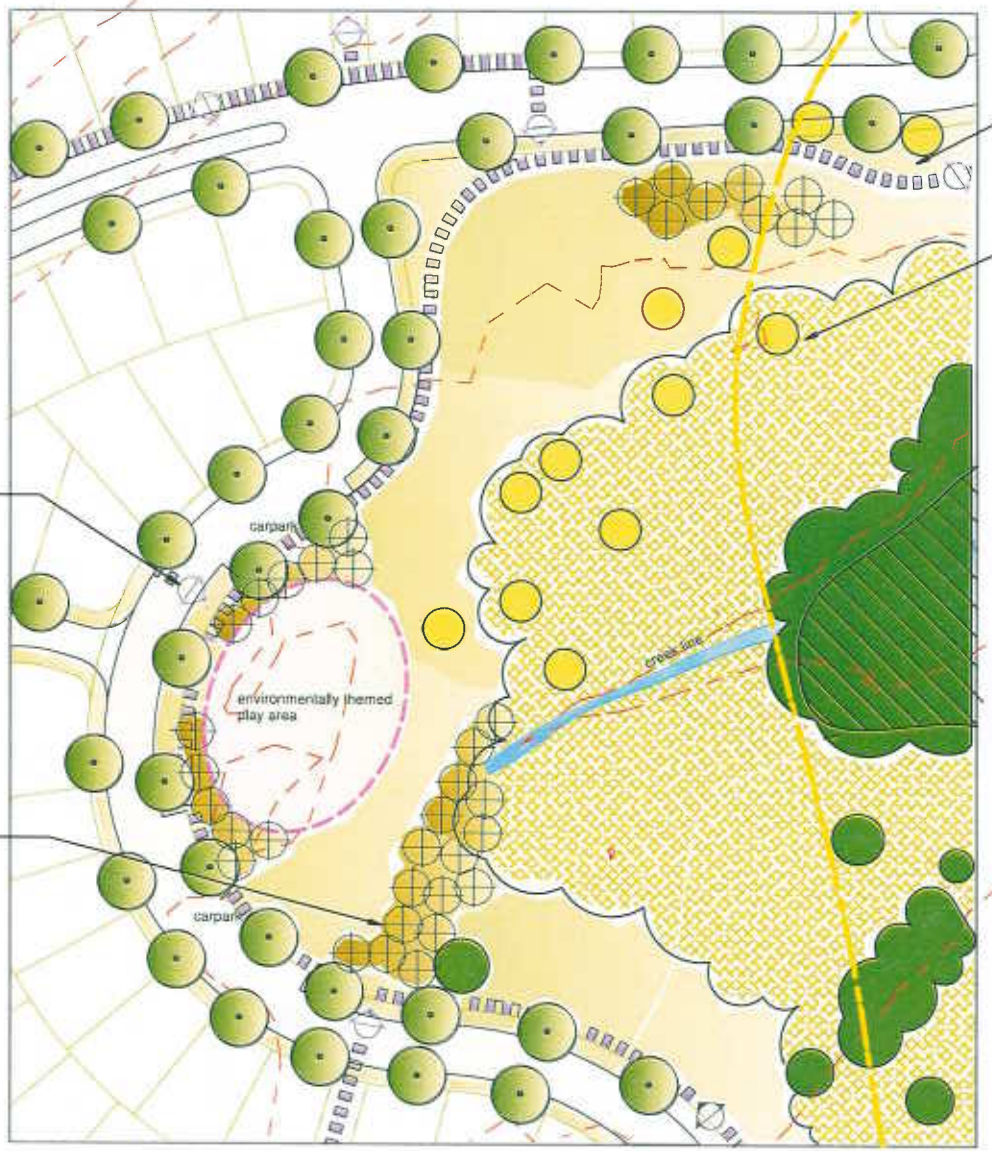
Recreation emphasis is on facilitating active use of open space. The node will cater to adults and older children. The recreation node is kept away from environmentally sensitive elements. It has direct pedestrian and vehicular links to the proposed residential development. Its construction and maintenance will not impinge into creek buffers or areas of cultural interest.

The recreation node may contain:

mown oval (approx 75m x 50m) to allow for kick around games
fitness track circuit
play equipment for older children
BBQS
Seating and picnic tables
toilet
carparking

ANNEX H2

Passive Recreation Node 2



Passive Recreation Node 2

Recreation emphasis is on explaining and incorporating environmental and cultural elements into recreation use Recreation will be more passive in nature and cater more to younger children. The node will be managed to facilitate informal family gatherings

The recreation node is kept away from ecologically and culturally sensitive regions of the site. It is readily accessible from multiple points within the proposed residential blocks.

Its theme will help promote positive custodial ownership of the surrounding Moonee Creek environs.

The recreation node may contain:

play equipment for young children
Seating and picnic tables
Interpretive material
planting for shade and amenity
BBQs
carparking

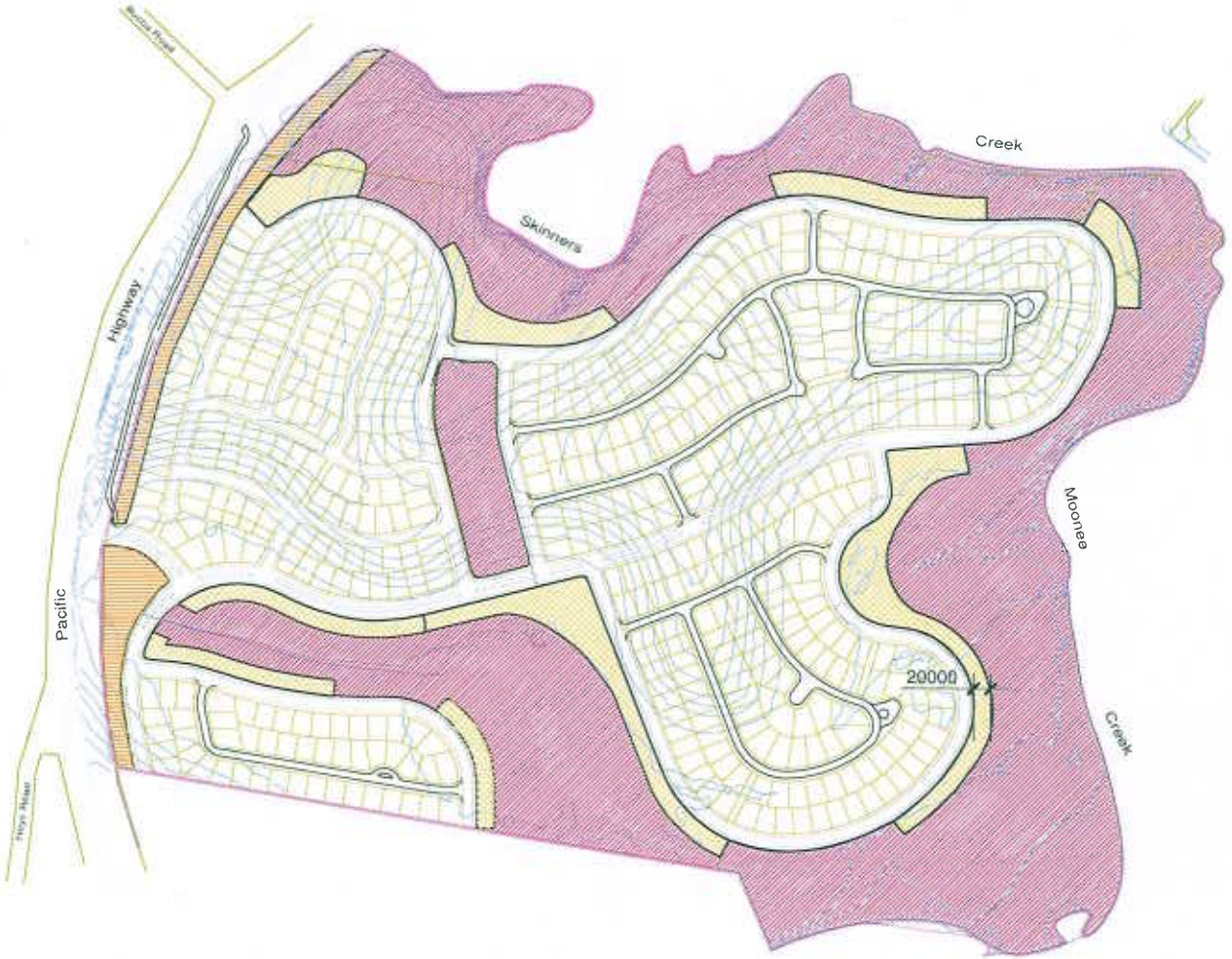
Passive Recreation Node 2

N

0 50 metres

ANNEX H3

Broadscale Open Space



Open Space - Category 1 Natural Areas

Development and management of open space is directed at environmental protection, vegetation rehabilitation and improving habitat ecology

Open Space - Category 2 Residential and Recreation Areas

Development and management of open space is focussed on providing appropriate recreation facilities, asset protection and enhancing existing vegetation

Open Space - Category 3 Environmental Scenic Highway Buffer

Emphasis of development and management of open space is on screening, noise abatement and providing a connecting pedestrain / cycle route to access areas north and south of the site

Note: Open Space makes up over 40% of the total site area

The Glades

Winten Property Group

Rothwell Boys Pty Ltd

Plan 3 Broad Scale Open Space Type

N

Anne Harrison
Landscape Architect
Ph: 02 6656 2711

ANNEX H4

Vegetation Management

Landscape Features

Open space comprises over 40% of the total development parcel. The natural landscape and its enhancement will play a key role in defining the over all natural coastal character of this subdivision.

Built areas are logically placed to cause minimal disturbance to vegetation and be well away from sensitive low lying areas.

Native species are to be used in all areas to be maintained for natural vegetation. Biodiversity of the site should increase as remnant vegetation is strengthened.

All green open space areas are multi purpose; filtering stormwater, recreation, visual amenity and sustaining the environmental integrity of the site

All work outlined on this plan will commence following consent of the plan. The strengthening of vegetation within buffer zones will be a priority so that plants are established prior to occupancy

Legend

Existing forest, swamp and mangrove communities protected and enhanced. Grazing removed and recreation contained to structured path ways These areas will be fenced to allow rehabilitation to occur

Rehabilitation of indigenous forest communities. Natural buffer enhanced. Revegetation utilises existing seed source and fencing to aid re-establishment

Rehabilitation of existing wetland, sedgeland, swamp sclerophyll and heath communities. Revegetation utilises existing seed source and fencing to aid re-establishment

Revegetation of indigenous heath community. Slashing is to cease to allow natural recovery of plant species. The majority of this area will also be fenced to aid re-establishment

Intensive landscape management within this zone. Recreation facilities are contained within areas of grassed open space with feature planting and interconnected via pathways. Area will be regularily mown and monitored to ensure quality of all landscape and recreation features

Proposed grouped indigenous tree planting (no understorey)

connecting laneway or median strip, will be intensively managed and contain pathway, trees and grass

* Any area shown white internal to the site will be mown and operate with dual primary purposes of storm water filtration and secondly as open space suitable for a variety of recreation uses

Asset Protection Zone (APZ)

This zone has been identified for bushfire protection and complies with requirements recommended by the NSW Rural Fire Service. This zone also acts as an effective buffer between urban dwellings and natural vegetation. The APZ is part of the open space network and is characterised or may contain:

recreation nodes
perimeter roads
block setbacks
walking / cycle tracks
playground / picnic facilities
trees with no understorey
will be slashed or mown regularily
will operate as storm water filtering areas

The Glades

Winten Property Group

Rothwell Boys Pty Ltd

Plan 4 Vegetation Management

N

Anne Harrison
Landscape Architect
Ph: 02 6656 2711

ANNEX H5

Streetscape

Legend

Existing Vegetation- comprising

dry sclerophyll forest/woodland communities
swamp sclerophyll communities and
intertidal communities

Boulevard Trees - Indicative species
(refer appendix 2 for full species list)

Lophostemon confertus (Brush Box)
Backhousia citriodora (Lemon Scented Myrtle)
Flindersia australis (Native Teak)

Avenue Trees - Indicative species

Melaleuca quinquenervia (Broad Leaved Paper Bark)
Buckinghamiana celsissima (Ivory Curl)
Eucalyptus robusta (Swamp Mahogany)
Eucalyptus microcorys (Tallow Wood)
Acmena smithii (Lilly-pilly)
Lophostemon confertus (Brush Box)

Street and Connecting Pathway Trees

Melaleuca sieberi (Sieber's Paper Bark)
Melaleuca leucadendra (Weeping Paper Bark)
Lophostemon suaveolens (Swamp Turpentine)
Cupaniopsis anarcardiodes (Tuckeroo)
Syzgium australe (Brush Cherry)
Tristaniopsis laurina (Kanuka)
Syzygium luehmannii (Riberry)
Callistemon salignus (White Bottlebrush)
Callistemon "Dawson River Weeper"

Plan Theme

Streetscape planting utilisies species found on site or found within the local area. All species are native.

Accent trees are used to visually highlight thoroughfares.

Colour and size of species will vary according to the scale of the street to be landscaped.

The aim of streetscape planting is to provide shade and colour to the development and soften the built form.

In line with Coffs Harbour City Council's Development Control Plan for the Moonee Release Area all proposed buildings are low density, semi detached and restricted to a maximum of 2 storeys. These building controls combined with streetscape planting will create a low impact, natural coastal living environment.

Planting is in keeping with Coffs Harbour City Council's Street Tree Masterplan

Roads adjoining public open space will utilise planting and bollards to control access

Open space that immediately adjoins roadways will be utilised for stormwater run off and consist of mowable grassed swales

The Glades

Winten Property Group

Rothwell Boys Pty Ltd

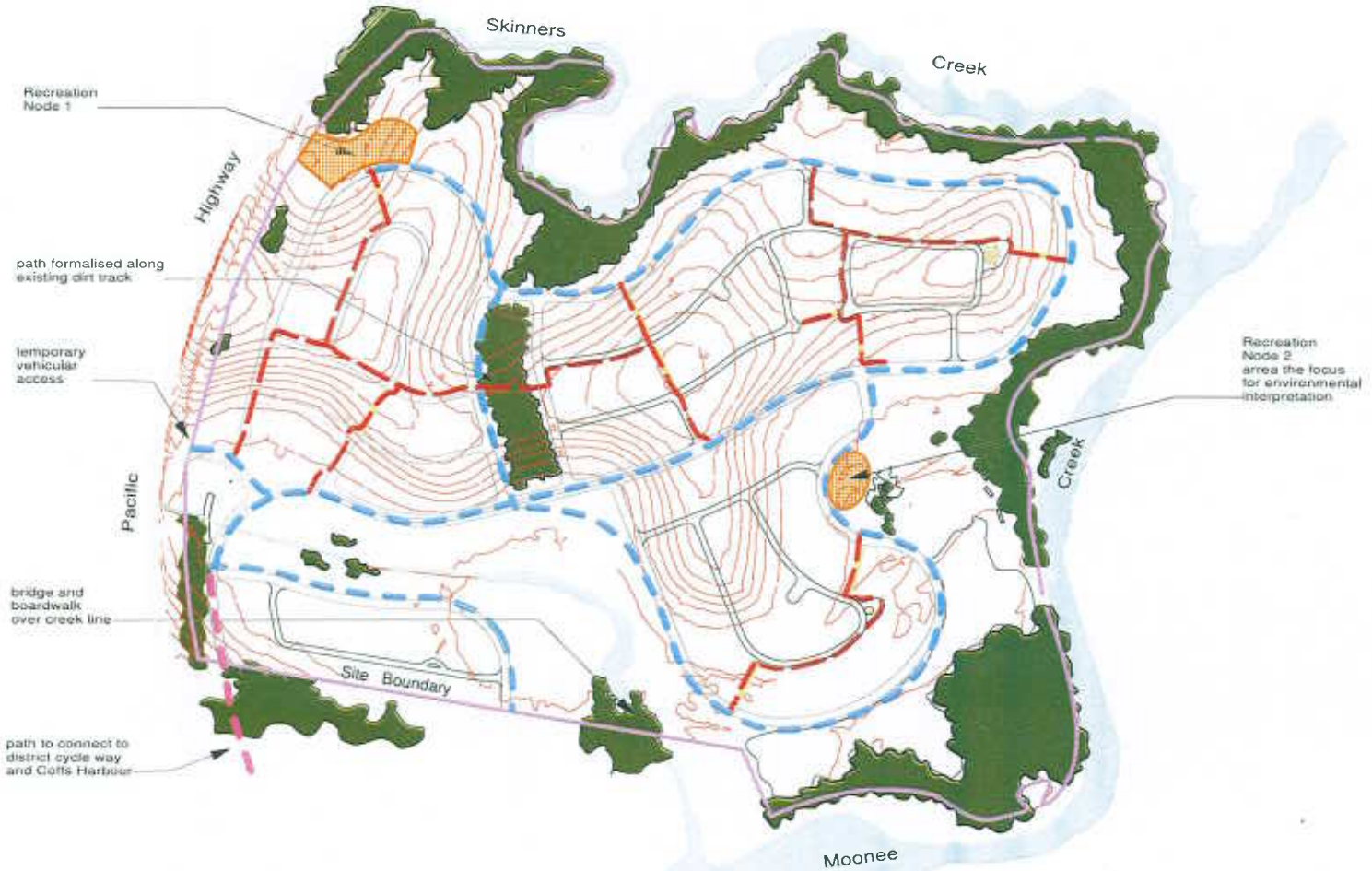
Plan 5 Streetscape

0 100m 200m N

Anne Harrison
Landscape Architect
Ph: 02 6656 2711

ANNEX H6

Path Networks



Legend

Major pedestrian / cycle (shareway) routes may entail being; part of a grassed road easement or concrete footpath

Main pedestrian / cycle boulevarde (shareway) This path will be part of a network which ultimately aims to link the northern beaches to Coffs Harbour

Local connecting pathways will be concrete paved or elevated decks

Focus of recreation activities and facilities. May comprise;
picnic shelters
BBQS
open space for ball games
playground

Plan Theme

The circulation plan for the site compliments the Coffs Harbour City Council's Development Control Plan "open space and circulation network"

The path network wraps around the entire site Internally pathways connect to give logical links through suburban areas allowing easy pedestrain access from one side of the site to the other.

Pathway construction will vary in character depending on use and location. Pathways will be comprised of a combination of:

concrete
oxide coloured concrete
charcoal coloured conc pavers
timber (suitable for exposure to coastal climate)
"Safegrate"or "Safetread" - "X - treme" conditions
material used in and over marine / wetland locations

The Glades

Winten Property Group
Rothwell Boys Pty Ltd

Plan 6 Path Network & Development Facilities

N

Anne Harrison
Landscape Architect
Ph: 02 6656 2711

ANNEX H7

Landscape Concept Plan

Plan Theme

The Glades will be a high quality built environment, surrounded by open space, reflecting in character its beautiful natural coastal setting. The development where possible will enhance the sites many natural assets and create opportunities for people to enjoy them.

The Glades

Winten Property Group

Rothwell Boys Pty Ltd

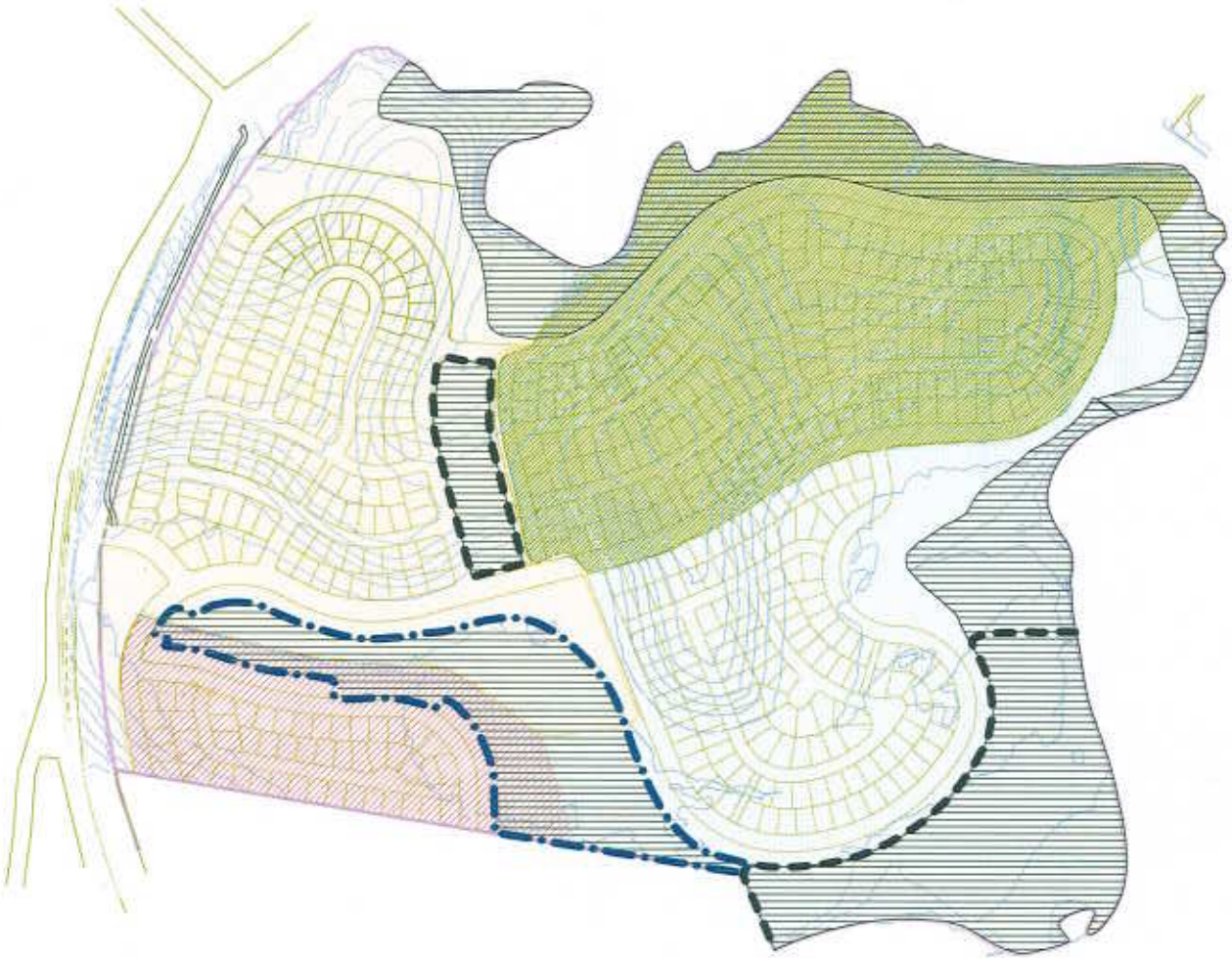
Plan 7 Landscape Concept Plan

0 100m 200m N

Anne Harrison
Landscape Architect
Ph: 02 6656 2711

ANNEX H8

Landscape Staging



Permanent farm style timber post and wire fence pedestrian access through fence gaps and bollards will be installed to control pedestrian movement where desired

Temporary timber and star picket combination fence with 3- 4 strand wire. Gates to be installed to correspond where access is required for maintenance. Fencing will be progressively removed as each civil construction stage ceases

Rehabilitation and strengthening of existing native vegetation areas

Stage 1

Stage 2

Stage 3

Stage 4

Stage 5

The Glades

Winten Property Group

Rothwell Boys Pty Ltd

Plan 8 Landscape Staging

0 100m 200m N

Anne Harrison
Landscape Architect
Ph: 02 6656 2711

ANNEX I

Revised Bushfire Risk Assessment Map

RESOURCE DESIGN & MANAGEMENT PTY LTD
ACN 060 179 866
ABN 53 243 724 089

Our Ref: 05025LM05
Contact: Matthew Cooper
Date: 07 July 2008

Winten Property Group
PO Box 2578
SOUTHPORT BC 4215

Attention: Mr Dale Holt

Dear Sir,

RE: THE GLADES – PROPOSED RESIDENTIAL SUBDIVISION LOTS 1 & 2 IN DP725785, PACIFIC HWY, MOONEE

We write with regard to the NSW Department of Planning's further information request dated the 29th of January 2008 and with particular regard to the Bushfire Risk Assessment prepared by this office dated September 2007. (Reference No. 03100BFA)

We understand that minor changes have occurred in relation to the proposed subdivision layout necessary to address issues raised by the Department and others.

Having completed a review of the Bushfire Risk Assessment and having regard to the amended subdivision layout, RDM advises that the recommendations and conclusions provided therein remain applicable to the updated plans listed below and attached herein.

- Preliminary Lot Layout prepared by Auspacific Engineers Pty Ltd;
- Vegetation Classification Map prepared by RDM Pty Ltd;
- Bushfire Risk Assessment Map prepared by RDM Pty Ltd;

We trust this information is sufficient for your purposes; however should you require further details or clarification, please do not hesitate to contact the writer by telephone on 6651 2688.

Yours Faithfully,
RESOURCE DESIGN & MANAGEMENT PTY LTD

Matthew Cooper
Registered Surveyor / Environmental Planner

Stage	No of Lots
1	62
2	40
3	47
4	47
5	51
6	61
7	48
8	48
9	50
10	42
11	28
TOTAL	**524**

D	MAY 08	TOTAL SITE APPLICATION
C	APRIL 08	ENTRY AMENDED
B	OCT 07	DRAWING TITLE AMENDMENT
A	SEPT 07	CONCEPT PLAN & PRECINCT NOTED

DISCLAIMER: This is a preliminary concept plan prepared by Auspacific Engineers Pty Ltd ("the consultant"). The concept plan has been prepared by the Consultant for the benefit of the entity to which it is address ("the Client") and is in response to certain instructions and ...

PRELIMINARY LOT LAYOUT

AUSPACIFIC ENGINEERS

AUSPACIFIC ENGINEERS PTY LTD
development consultants, civil, structural and hydraulic engineers
3 / 20 Nerang Street
NERANG QLD 4211

Scale: AS SHOWN
Date: NOV 2006

THE ROTHWELL BOYS PTY LTD

PROPOSED RESIDENTIAL SUBDIVISION
MOONEE BEACH COFFS HARBOUR

04-1600

P1 | D

PROJECT- Development Application

CLIENT- Winten Property Group

VEGETATION CLASSIFICATION MAP

SOURCE- R.D.M.

DWG. No. 05025/5

SCALE- Approx. 1:5000 at A3

0 100 200

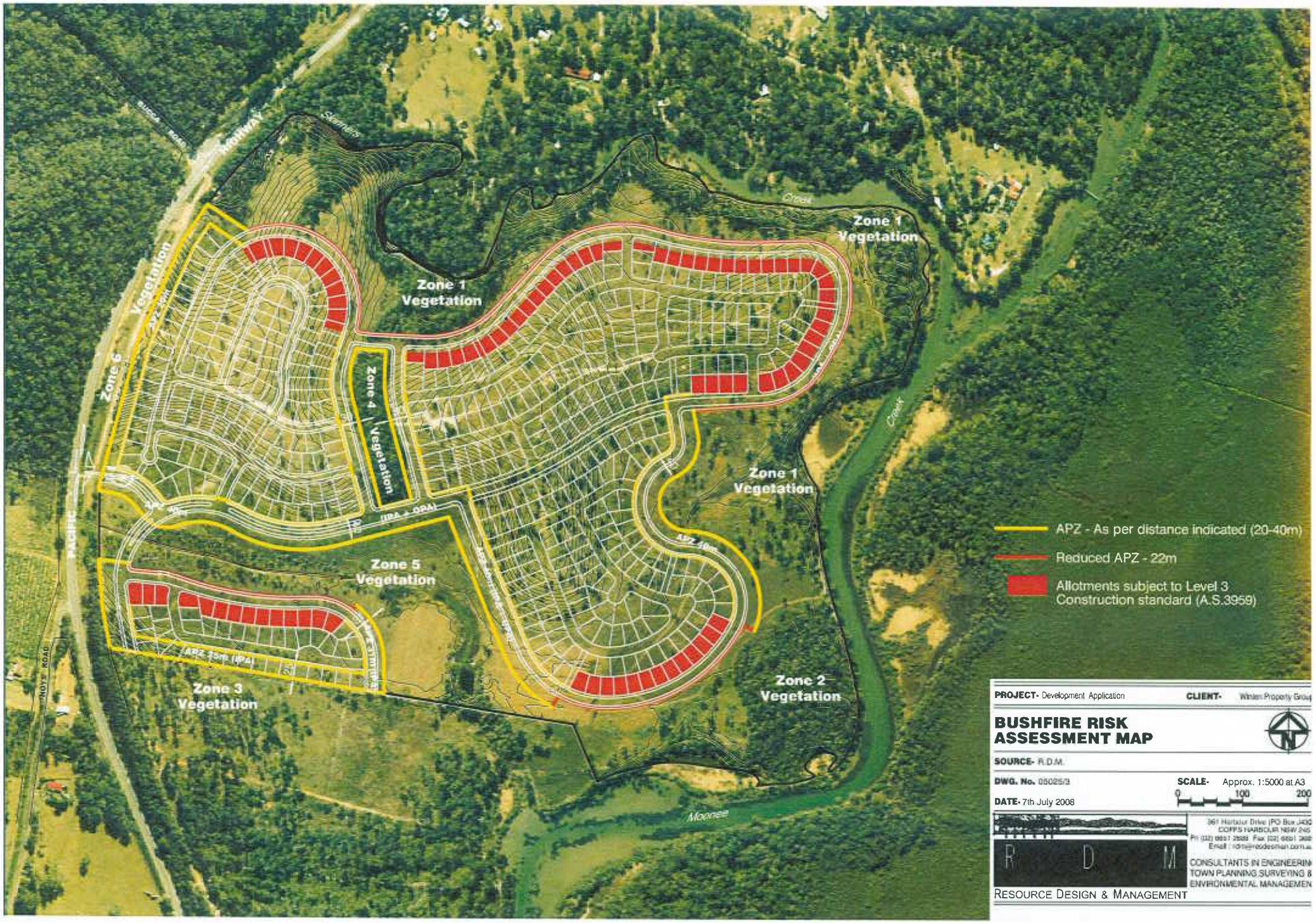
DATE- 7th July 2008

361 Harbour Drive (PO Box 2403)
COFFS HARBOUR NSW 2450
Ph (02) 6651 2688 Fax (02) 6651 2698
Email : rdm@resdesman.com.au

R D M

CONSULTANTS IN ENGINEERING
TOWN PLANNING, SURVEYING &
ENVIRONMENTAL MANAGEMENT

RESOURCE DESIGN & MANAGEMENT



PROJECT- Development Application **CLIENT**- Winten Property Group

BUSHFIRE RISK ASSESSMENT MAP

SOURCE- R.D.M.

DWG. No. 05025/3 **SCALE**- Approx. 1:5000 at A3

0 100 200

DATE- 7th July 2008

361 Harbour Drive (PO Box 1430)
COFFS HARBOUR NSW 2450
Ph (02) 6651 2588 Fax (02) 6651 3688
Email : rdm@rodesman.com.au

R D M

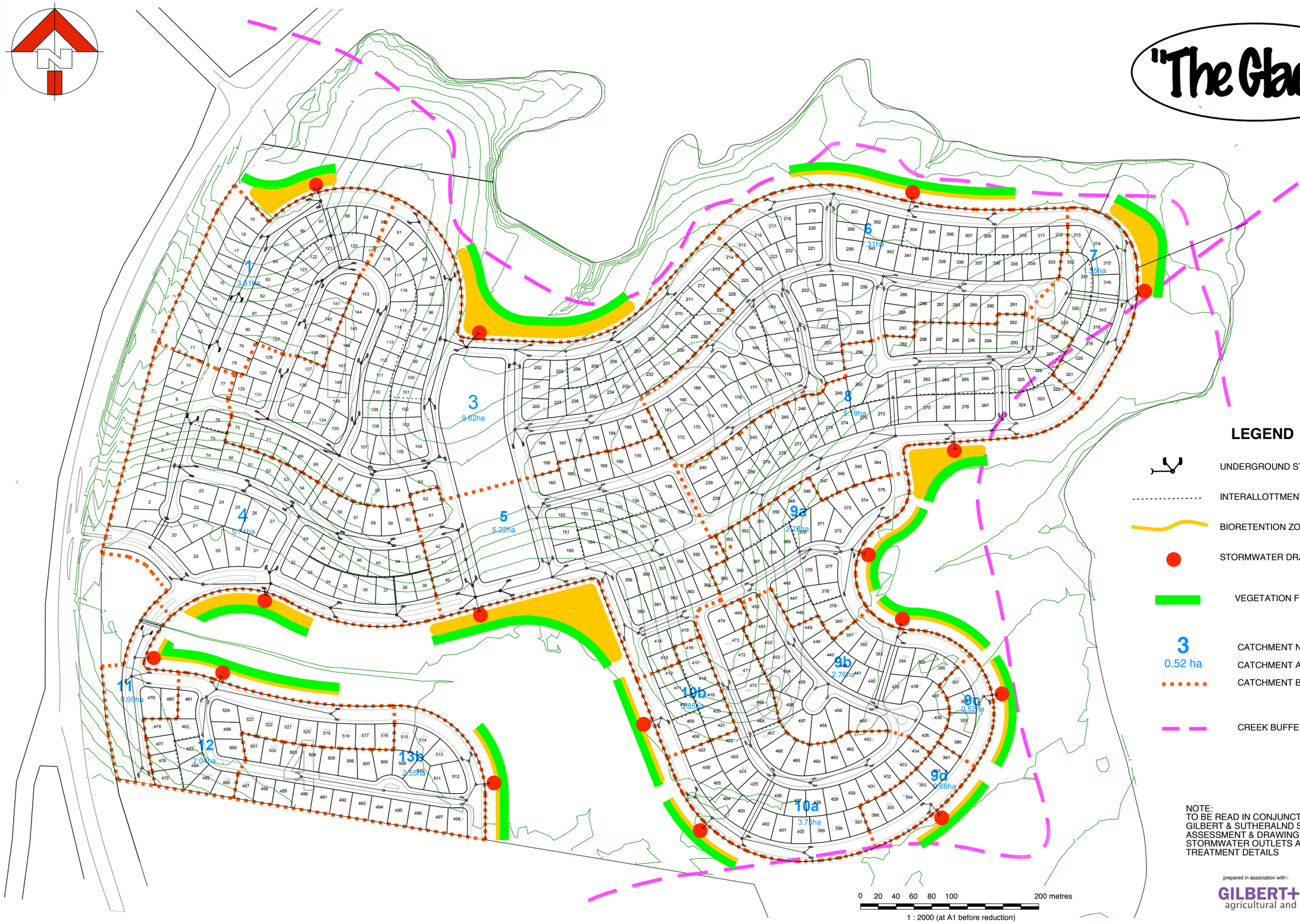
CONSULTANTS IN ENGINEERING
TOWN PLANNING, SURVEYING &
ENVIRONMENTAL MANAGEMENT

RESOURCE DESIGN & MANAGEMENT

ANNEX J

Revised Stormwater Drainage Plan

"The Glades"



LEGEND

- UNDERGROUND STORMWATER DREAINAGE
- INTERALLOTTMENT DRAINAGE
- BIORETENTION ZONES
- STORMWATER DRAINAGE OUTLETS
- VEGETATION FILTER ZONE
- 3 / 0.52 ha — CATCHMENT NO / CATCHMENT AREA
- CATCHMENT BOUNDARY
- CREEK BUFFERS

NOTE:
TO BE READ IN CONJUNCTION WITH GILBERT & SUTHERALND STORMWATER ASSESSMENT & DRAWING No's 1600-P6 FOR STORMWATER OUTLETS AND STORMWATER TREATMENT DETAILS

0 20 40 60 80 100 200 metres

1 : 2000 (at A1 before reduction)

prepared in association with:-

GILBERT+SUTHERLAND
agricultural and environmental scientists

amdt no.	date	amendment
C	APRIL 08	ENTRY LAYOUT AMENEDED
B	SEPT 07	ASSETT LINE REMOVED
A	JULY 07	BUFFERS SHOWN / SWALES AMENDED

STORMWATER DRAINAGE AND CATCHMENT PLAN

AUSPACIFIC ENGINEERS

AUSPACIFIC ENGINEERS PTY LTD
development consultants, civil, structural and hydraulic engineers

3 / 20 Nerang Street
NERANG QLD 4211

T 07 5596 5377
F 07 5596 3443

E auspacifik@austarnet.com.au

scales		
AS SHOWN		
design	drawn	
RKH	JM	
date	signed	
NOV 2006		

client: THE ROTHWELL BOYS PTY LTD

project: PROPOSED RESIDENTIAL SUBDIVISION MOONEE BEACH COFFS HARBOUR

dwg no.: P5

amendment: C

04-1600