KOALA BEACH ESTATE

COMMON PLANIGALE PLAN OF MANAGEMENT

Prepared for the Ray Group

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EXECUTIVE SUMMARY

The Common Planigale Plan of Management (CPPoM) has the overall objective of maintaining and monitoring the status of the *Planigale maculata* population within the Koala Beach Estate over the next 10 years and beyond.

The actions and initiatives proposed in this CPPoM are summarised in the following table together with performance criteria.

MANAGEMENT ACTIONS (SUMMARY)	PERFORMANCE CRITERIA	RESPONSIBLE AGENCY
Future Development		
1. Any soil disturbance, slashing or clearing should commence at one location and proceed on one front.	All disturbance undertaken systematically on one front.	Ray Group Council
2. Ensure construction activities and associated impacts are fully constrained to a clearly marked construction site.	No impacts from construction activities beyond the designated construction site.	Ray Group Council
3. Avoid risks of bushfire during construction.	No bushfires resulting from construction activity.	Ray Group Council
Habitat Restoration Work		
4. Ensure a gradual or staged replacement of exotic grasses with native ground covers in conjunction with habitat restoration activities.	Gradual or staged replacement of exotic grasses with structurally similar ground-layer vegetation.	Ray Group KBWHMC Consultant

MANAGEMENT ACTIONS (SUMMARY)	PERFORMANCE CRITERIA	RESPONSIBLE AGENCY
5. Incorporate outcomes from the ongoing monitoring into annual planning for habitat restoration.	Planigales recorded within areas subject to habitat restoration work.	Ray Group KBWHMC Consultant
Threat Abatement		
6. Undertake appropriate management actions to control foxes, feral cats and roaming dogs.	Foxes, feral cats and roaming dogs successfully controlled on site.	Ray Group KBWHMC Consultant
Monitoring Program		
7. Install and clearly mark (with a central brightly-painted star picket) a total of 20 fixed monitoring shelters.	20 monitoring shelters successfully installed and clearly marked.	Ray Group KBWHMC Consultant
8. Inspect all 20 monitoring shelters annually over 5 consecutive days between September and November.	20 monitoring shelters successfully inspected and recorded.	Ray Group KBWHMC Consultant
9. Annually install 6 monitoring stations (each consisting of 4 pitfall traps with drift-net fencing) in fixed areas of higher quality habitat adjoining developed sections of the Estate. Two stations should be in areas subject to habitat restoration.	6 monitoring stations successfully installed annually.	Ray Group KBWHMC Consultant

MANAGEMENT ACTIONS (SUMMARY)	PERFORMANCE CRITERIA	RESPONSIBLE AGENCY
10. Survey all 6 monitoring stations annually over 4 consecutive trap nights between September and November.	6 monitoring stations successfully surveyed and recorded.	Ray Group KBWHMC Consultant
11. Provide an annual report describing the results from the monitoring program to Koala Beach Wildlife and Habitat Management Committee (KBWHMC).	Annual report (electronic and hard copy) provided to the KBWHMC by March.	Ray Group KBWHMC Consultant

1.0 Introduction

The Common Planigale *Planigale maculata* is listed as 'Vulnerable' on Schedule 2 of the *Threatened Species Conservation Act 1995*.

Planigale maculata have been recorded in a wide variety of vegetation communities ranging from open grasslands to eucalypt forests, marshlands, swamp forests, heathlands and rainforests, primarily in association with dense groundcover such as grasses, or rocky areas (Van Dyck 1979; Andrew & Settle 1982; Redhead 1995). They are known to construct cup-shaped nests of leaves and grass at the base of grass clumps, in or under logs, under concave shells of bark, and also under discarded sheets of iron or wood (Van Dyck 1979). In a radio-tracking study near Byron Bay, Planigales sheltered below the ground surface by day, possibly in burrows made by other fauna (Peter Parker, pers. comm.) Andrew and Settle (1982) state that habitat selection for *P. maculata* appears to be particularly dependent upon the availability of groundcover, presumed necessary for protection from predators and from desiccation. Denny (1982) reported that *P. maculata* occurs

mainly in or near wet swampy areas that have a vegetation cover of trees, scrub, sedge and/or grass. Denny (1982) also noted that habitats occupied by Planigales are often associated with either permanent water or areas subject to periodic flooding. Taylor *et al.* (1982) indicate that *P. maculata sinualis* occupy coastal floodplain sedgelands in the Northern Territory, and move to adjacent fringing savannah woodland during the wet season. Van Dyck (1979) reported also catching *Planigale maculata* from rubbish dumps amongst *Imperata* (blady grass) grassland.

Planigale maculata are generally most active from slightly before dusk to before sunrise, interspersed with rest periods (Van Dyck 1979). During periods of high activity they are capable of eating the equivalent of their own body weight in food daily and have the ability to enter torpor in response to cold weather or food deprivation (Van Dyck 1979). Van Dyck (1979) described *P. maculata* as unspecialised predators upon insects (mainly), other invertebrates, and small vertebrates (in some cases). Van Dyck (1979) reports of their willingness to tackle prey larger than themselves and states that their arboreal capabilities also allow access to prey such as small nesting birds. Van Dyck (1979) recorded *P. maculata* successfully killing and consuming House Mice *Mus musculus* pups in captivity and suggested that a significant number of nestling and juvenile rodents may be taken in the wild. Andrew & Settle (1982) observed a *P. maculata* attacking the base of a flower and proposed that Planigales may also seasonally feed on nectar or other plant products.

Introduced predators of *P. maculata* include cats (Redhead 1995) and dogs (Fleay 1981). Foxes are also considered likely predators.

2.0 Planigale Habitat at Koala Beach

Survey results indicated that the local *Planigale maculata* population is focused in fringing forest areas with dense grass cover or with tall, dense grass stands nearby (mostly dominated by introduced *Setaria sphacelata* which has not been grazed by cattle since 1994). It appears likely that both forest and grassland areas are important to the local Planigale population with possible seasonal use varying in

response to food availability and avoidance of low-lying areas during periods of inundation. Food resources in the area are likely to include invertebrates (such as beetles, cockroaches, crickets, grasshoppers, centipedes and millipedes) and small vertebrates including the young of introduced House Mice *M. musculus*, which were abundant in parts of the Koala Beach site during the April-May 2002 and August 2003 surveys. Small skinks (eg. Garden Skink *Lampropholis delicata*) are probably also eaten.

Habitat features that appear most important to the local Planigale population include:

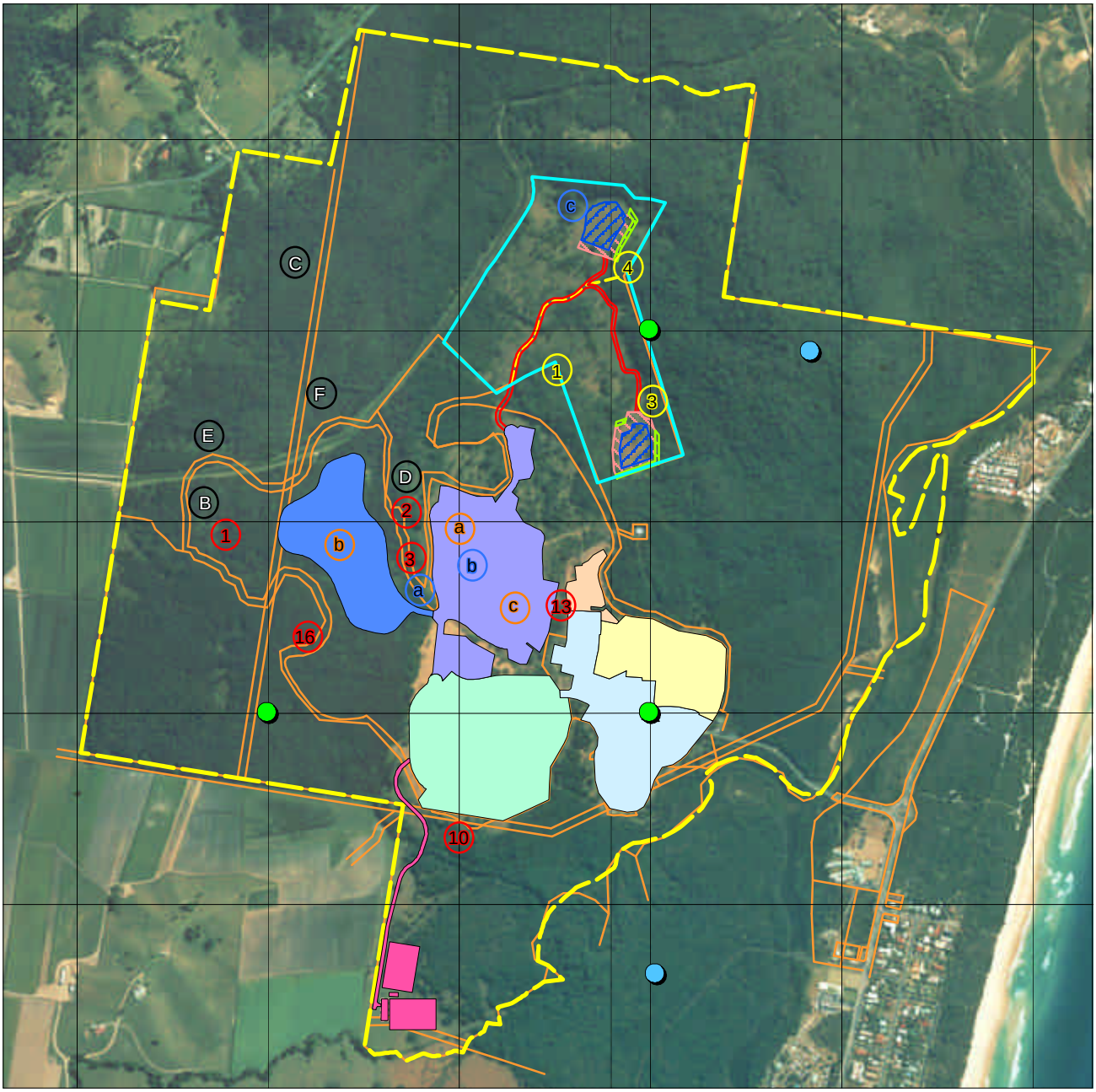
i) Dense or scattered tree canopy-cover;
ii) Dense ground-cover vegetation; and
iii) Areas within or adjacent to low-lying sites subject to seasonally wet conditions, with occasional inundation for short periods.

3.0 Planigale Records for Koala Beach

Early Records

Six earlier records of *P. maculata* at Koala Beach were sourced from the NPWS *Atlas of NSW Wildlife* database (see Figure 1). These include four records from 1994 (one in dry Blackbutt Forest to the east of Stage 7; one in the Stage 1 area; one from the swamp forest to the west of Stage 3; and one from the Tweed Bicentennial

Figure 1 goes here



Planigale Records

- Targeted Threatened Fauna Survey for Stage 5 and 6 April 2002*
- Targeted Planigale Survey Report Stages 5 and 6, May 2002
- Targeted Pitfall Survey for Planigales in Conjunction with proposed Stage 7 of the Koala Beach Estate, May 2003
- Additional Targeted Pitfall and Elliot Trap Survey for Planigales in conjunction with proposed Stage 6 of the Koala Beach Estate, August 2003
- Koala Beach Trial Planigale Monitoring - Planigale Monitoring, June 2004
- NSW NPWS Atlas Record
- NSW NPWS Grid-based Atlas Record

Development Stages

- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Stage 5 (under construction)
- Stage 6 (under construction)
- Proposed Stage 7
- Proposed Sports Fields
- Cadastral Boundary
- Site Boundary
- 500m Grid

*Letters and numbers identify traps and trap lines

Figure 1
Koala Beach Estate
Common Planigale Records

1 : 15 000

Note: Absent survey sites not shown

Environmental Park, south of Koala Beach), and two records from 1981 (one to the east of Stage 7; and one in the Stage 1 area).

Other *P. maculata* records are known from the Tweed Coast area including Round Mountain (AKF 1995) and Cudgen (Mark Fitzgerald, pers. obs.), and from the broader regional area including Nullum State Forest (now Mt Jerusalem NP) in Tweed Shire (CSIRO 1995) and a number of locations in Byron Shire (BSC 1999).

Targeted Planigale Surveys

Threatened fauna surveys for Stages 5, 6 and 7 were undertaken in April 2002 and resulted in the capture of three *P. maculata* (Figure 1 and Table 1): one in a fringing Brush Box community in the northern section of Stage 7 (captured in a pitfall trap); one in a swamp forest community between Stage 5 and Stage 6 (captured in a pitfall trap); and one in regrowth Eucalypt forest in the middle section of the western-facing ridge in Stage 5 (captured in an Elliot trap).

A follow-up targeted Planigale survey was undertaken in May 2002 involving pitfall traps, hair tubes, and Elliott traps. This resulted in two additional Planigale captures including one in swamp forest in the Stage 6 area (captured in a pitfall trap) and one from the far northern section of the western-facing ridge in regrowth Eucalypt forest in Stage 5 (captured in a pitfall trap). An additional probable Planigale record resulted from a hair tube in the southeastern section of the western-facing ridge in Stage 5 (Figure 1 and Table 1). A further survey using pitfall traps was undertaken in May 2003 in conjunction with the Stage 7 proposal. This resulted in the capture of seven Planigales at three sites within fringing forest communities near the edge of open *Setaria*-dominated grassland (Figure 1 and Table 1).

Additional targeted Planigale surveys (pitfall and Elliott traps) were required in conjunction with the Development Application for Stage 6. These surveys were undertaken in August 2003 and aimed to establish whether the local Planigale population extended to the north, south and west of Stage 6 into areas proposed for

Environmental Protection Zoning. This survey resulted in a further 12 Planigale captures (11 different animals) from five additional sites within adjacent Environmental Protection Zone lands (Figure 1 and Table 1).

4.0 Trial Artificial Shelters

The Eight Part Test for Planigales that was undertaken for Stages 5 and 6 of the Koala Beach Estate recommended trialing the use of artificial shelters as a potential additional resource and as a potential monitoring technique.

A total of 16 artificial shelters were installed across the Koala Beach Estate (Figure 1 and Table 1) and inspected at varying intervals between June and September 2004. Shelters consisted of sheets of corrugated iron pegged at one corner, but allowing for easy lifting for visual inspection. Two small hair tubes were also installed under each shelter.

During the course of the trial, a total of 42 sightings were made of Planigales using the shelters (14 sightings @ Site 1; 1 @ Site 2; 23 @ Site 3; 1 @ Site 10; 2 @ Site 13; and 1 @ Site 16). In a number of instances, Planigales appeared to have constructed nests under the shelters using dried grass. The Planigales were often sighted resting close to the surface of the corrugated iron, suggesting that they may have been using it for warmth. The hair-tube analysis only yielded two positive results for Planigales, making it much less effective than the results from visual inspection beneath shelters.

Table 1: Summary of Planigale (*Planigale maculata*) captures at Koala Beach Estate (**DPT** – Dry Pitfall Trap; **ET** – Elliot Trap; **HT** - Hair Tube; **AS** – Artificial Shelter (corrugated iron); ***** - probable sample).

Survey	Date	Capture Location	Number caught	Trap Type
Targeted Threatened Fauna Survey for Stages 5, 6 and 7, April 2002.	23/04/02	a	1	DPT
	24/04/02	b	1	ET
	25/04/02	c	1	DPT
Targeted Planigale Survey Report, Stages 5 and 6, May 2002	9/05/02	a	1	DPT
	20/05/02	b	1	DPT
	2 - 10/05/02	c	1	HT**
Targeted Pitfall Survey for Planigales in Conjunction with proposed Stage 7 of the Koala Beach Estate, May 2003	3/05/03	Line 3 and 4	2	DPT
	4/05/03	Line 4	1	DPT
	5/05/03	Line 3	1	DPT
	6/05/03	Line 4	2	DPT
	7/05/03	Line 1 and 4	2 (1 recapture)	DPT
Additional Targeted Pitfall and ET Survey for Planigales in conjunction with proposed Stage 6 of the Koala Beach Estate, August 2003.	7/08/03	Site B	1	DPT
	9/08/03	Site B	1	DPT
	13/08/03	Site C	1	DPT
	14/08/03	Site B	2	DPT
		Site D	3	DPT
		Site E	1	DPT
	16/08/03	Site B	1	DPT
		Site E	1 (recapture)	DPT
		Site F	1	DPT

Koala Beach Trial Monitoring - Planigale Shelters, June to September 2004.	11/06/04	Site 1	2	AS
		Site 3	4	AS
	15/06/04	Site 3	2	AS
	30/06/04	Site 1	1	AS
		Site 2	1	AS
		Site 10	1	AS
	01/07/04	Site 1	1	AS
		Site 3	1	AS
	02/07/04	Site 3	3	AS
	07/07/04	Site 1	2	AS
		Site 3	2	AS
	17/07/04	Site 1	1	AS
		Site 3	3	AS
	20/07/04	Site 1	2	AS
		Site 3	2	AS
	27/07/04	Site 1	2	AS
		Site 3	2	AS
	30/07/04	Site 3	3	AS
	06/09/04	Site 1	2	AS
		Site 13	1	AS
		Site 16	1	AS
	22/09/04	Site 13	1	AS

5.0 Management Actions

Specific actions to mitigate impacts on Planigales associated with construction activities for Stage 5 and Stage 6 and to undertake compensatory habitat restoration were incorporated into Eight Part Tests and conditions of development consent. Stage 7 and Sporting Fields remain to be developed subject to relevant approvals.

Future Development of Stage 7 and Sporting Fields

1. In order to maximise chances for escape of Planigales and other fauna from the construction area, any soil disturbance or clearing should commence at one location and proceed systematically on one front.

2. All possible care should be taken to ensure construction activities and associated impacts are fully constrained within to the designated construction site, which should be clearly marked out prior to commencement. This includes an induction process for all personnel working on the site.

3. All possible care should be taken to avoid risks of bushfire during construction.

Habitat Restoration Work

4. Ensure a gradual or staged replacement of exotic grasses with native ground covers in conjunction with habitat restoration activities undertaken in accordance with the Overall Habitat Restoration Plan (James 2005) for the Estate. Plantings should replicate the tall, dense, physically complex microhabitat provided by un-grazed Setaria stands.

5. Incorporate outcomes from the ongoing monitoring program into annual planning for habitat restoration works in accordance with the Overall Habitat Restoration Plan.

Threat Abatement

6. Undertake appropriate management actions to control foxes, feral cats and roaming dogs on site.

Monitoring Program

The monitoring program should aim to detect changes (trends) in the distribution and status of the local Planigale population. The design of the monitoring program has been assisted by power analysis to investigate the probabilities of identifying a real trend in the Planigale population over time.

The monitoring program will build upon the data collected in conjunction with assessments for stages of the Koala Beach development.

7. Install and clearly mark (with a central brightly-painted star picket) a total of 20 fixed monitoring shelters, stratified according to distance from developed areas and habitat quality. This approach should aim to achieve a spread of sites ranging from close to developed areas to near the limits of the Estate with a focus on medium and high quality habitat areas.

8. Inspect all 20 monitoring shelters annually for the presence of Planigales over 5 consecutive days between September and November. Monitoring shelters will require preparation and maintenance at least one week prior to each monitoring period. This would include placing dry grass under each shelter for bedding.

9. Annually install 6 monitoring stations (each consisting of 4 pitfall traps with drift-net fencing) in fixed areas of higher quality habitat adjoining developed sections of the Estate. Two of these stations should be positioned in areas subject to habitat restoration involving the staged removal and replacement of *Setaria sphacelata*.

10. Survey all 6 monitoring stations annually over 4 consecutive trap nights between September and November.

11. Provide an annual report (electronic and hard copy) by March describing the results from the monitoring program to the Koala Beach Wildlife and Habitat Management Committee (KBWHMC).

References

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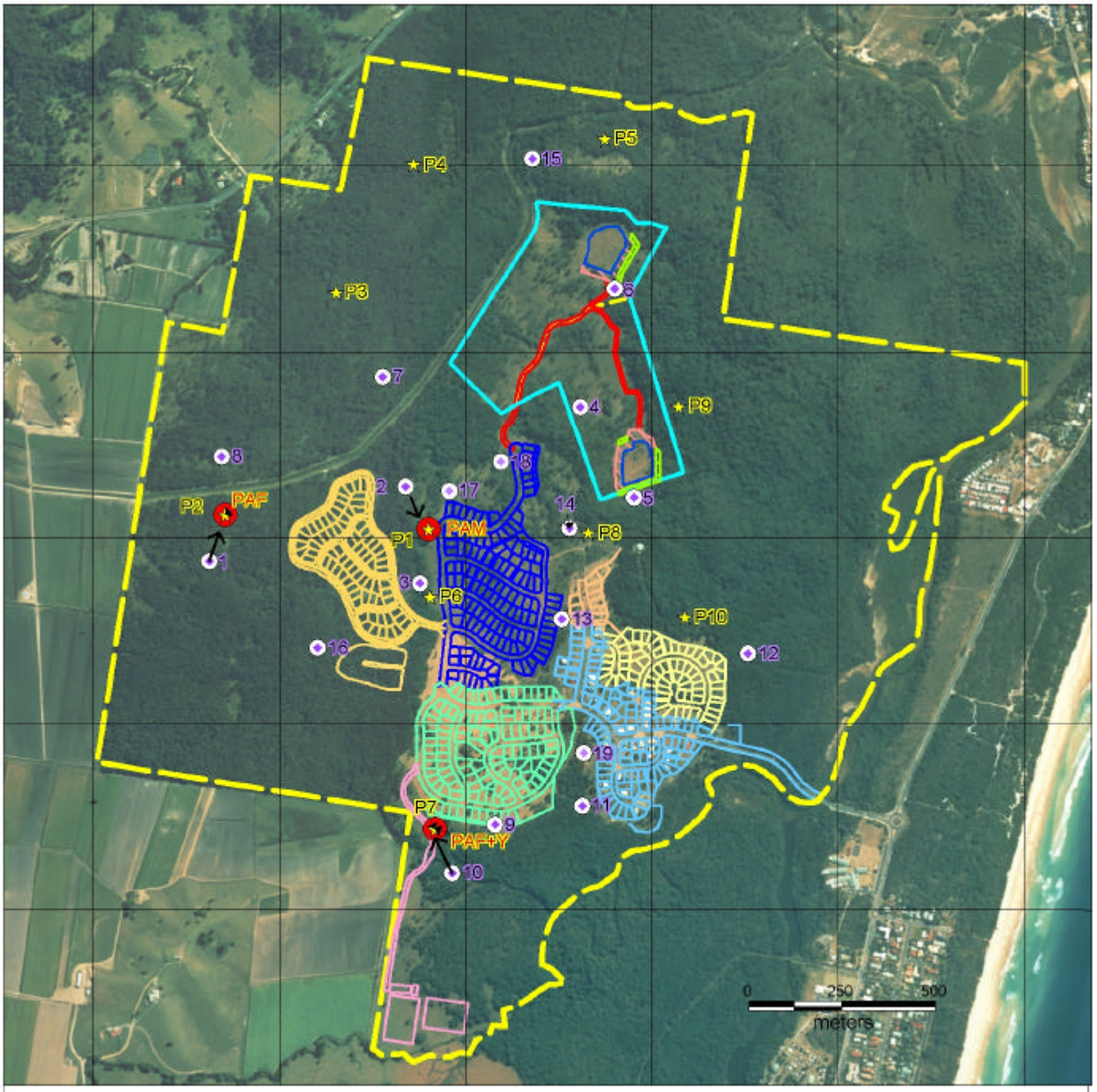

Figure 2:
Planigale Pitfall and Artificial Shelter Surveys

December 2005

- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Stage 5
- Stage 6
- Proposed Stage 7
- Proposed sports fields, ammenities block, access road and carpark
- Koala Beach Estate Site Boundary
- 500m Grid

- Planigale Shelter Sites
- 2005 Planigale Pitfall Locations
- Planigale Capture Locations

AUSTRALIAN KOALA FOUNDATION