Woolgoolga to Ballina Pacific Highway upgrade

Phased Resource Reduction for Koala

Wardell Road – Phase 3

September 2017

NSW GOVERNMENT

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Woolgoolga to Ballina Pacific Highway Upgrade Phased Resource Reduction for Koala – Wardell Road phase 3 report.

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Final Report

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Cover Photo: Adult koala, Munro Wharf Road control site.

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1. Introduction

The Woolgoolga to Ballina (W2B) Pacific Highway Upgrade Koala Management Plan proposed a staged approach to clearing in two koala hotspots in Section 10 of the upgrade. Koala hot-spots are situated at Laws Point and Wardell Road. The staged approach is referred to as 'phased resource reduction' (PRR) and involves the gradual reduction of food resources by ring-barking and collaring trees to facilitate the voluntary movement of koalas into adjacent habitat. The PRR method aims to reduce stress-induced impacts associated with clearing activities for the new alignment. The project also involves population surveys to monitor koala numbers throughout the PRR process. Due to logistical issues, the PRR program has been staged with work commencing at Laws Point prior to Wardell Road. Sandpiper Ecological (Sandpiper) has been contracted by Pacific Complete to implement the PRR program.

The program includes five phases (Table 1):

- Phase 1 (Wks 1-3): Tag and map all trees to be collared/ring-barked and undertake six population surveys.
- Phase 2 (Wks 4-5): Collar 40%, ring-bark 20% of trees with continuous canopy to feed trees, ring-bark non-collared trees (DBH 100-300mm), and conduct two population surveys.
- Phase 3 (Wks 6-7): Collar a further 40% of trees, continue ring-barking non-collared trees (DBH 100-300mm), and conduct two population surveys.
- Phase 4 (Wks 8-10): Collar the remaining 20% of trees, finalise ring-barking, and conduct two population surveys.
- Phase 5 (Wks 11-17): Following clearing of the hotspot site undertake eight population surveys.

The following report details the results of Phase 2 of the PRR program at the Wardell Road hotspot site. Phase 2 was undertaken between 17 and 28 July 2017. Work at the Laws Point koala hotspot commenced in March 2017 and is presently in Phase 4 (Sandpiper Ecological 2017a, b & c). Information gained from Laws Point will be used to improve methods at Wardell Road.

Table 1: The Phased resource Reduction schedule applied at the Wardell Road koala hotspot.

Phase	Duration	Dates	Tasks completed
1	66 days	1 May 2017 to 5 July 2017	1. Survey & mark project boundary. 2. Tag and map all trees to be collared & ring-barked. 3. Conduct 3 diurnal and 3 nocturnal population surveys.
2	18 days	10 to 27 July 2017	1. Collar 40% of trees. 2. Ring-bark 100-300mm DBH trees. 3. Ring-bark continuous canopy trees. 4. Conduct 1 diurnal and 1 nocturnal population survey.
3	14 days	28 July – 11 August 2017	1. Collar a further 40% of trees. 2. Conduct 1 diurnal and 1 nocturnal population survey. 3. Discuss options for additional ring-barking with Pacific Complete.
4	In progress		
5	Not commenced		

2. Study area

The Wardell Road study site is located approximately three kilometres west north west of the town of Wardell on the New South Wales north coast. Access to the site is via Wardell Road through RMS acquired land, adjoining private properties and Hillside Lane. The study site stretches for 1.3 kilometres and encompasses chainages 152200 to 153500 of the Woolgoolga to Ballina (W2B) Pacific Highway Upgrade. The survey area includes the subject site – section of W2B alignment between the abovementioned chainages, and study area – vegetation adjoining the subject site that contains eight, 1.3 km long koala survey transects.

3. Methods

3.1 Tree collaring

Phase 2 requires that 40% of trees with a Diameter at Breast Height (DBH) of >300mm have 600mm wide collars installed between one and two meters above ground. Collars were made of 1.5mm thick High Density Polyethylene (HDPE). HDPE was used as it is lightweight, has a slippery surface, can withstand punctures, is UV stabilised, and is easy to cut and handle in a field situation. Collar size was determined for each tree by measuring the circumference at 1m (hollow-bearing trees) or 2m (non-hollow-bearing trees) above ground. A three-step ladder was used to install collars at 2m (Plate 1). An additional 100mm was added to each circumference to allow for imperfections in the trunk and to provide a loose fit (Plate 2). Collars were attached using three or four 50-60mm screws. Each tree was inspected for koalas prior to collar installation. Collars were installed loosely around trunks to provide an unstable surface for koalas and enable small scansorial fauna to move up and down trunks. Phase 2 collaring was undertaken between 17 and 22 July 2017.

Plate 1: Procedure used to install collars during the Phased Resource Reduction for koalas.

Plate 2: Example of a loosely fitted collar with a gap around the trunk to reduce a koalas grip on the collar.

3.2 Ring-barking

Based on the findings at Laws Point the focus of ring-barking continuous canopy trees at Wardell Road was switched to ring-barking feed trees. Tree with a DBH between 100 and 300mm were still ring-barked at Wardell Road (refer Sandpiper Ecological 2017d). At Laws Point ring-barking of *Eucalyptus* spp. and *Lophostemon* spp. was particularly effective and it was considered a worthwhile variation to the ring-barking of continuous canopy trees specified in the Koala Management Plan. No ring-barking was undertaken in Phase 3 of the PRR program at Wardell Road.

3.3 Koala population monitoring

3.3.1 Koala surveys

One paired (diurnal & nocturnal) koala population monitoring survey was conducted in Phase 3 and follows on from the three diurnal, and three nocturnal koala population monitoring surveys conducted in Phase 1 (Sandpiper Ecological 2017d) and the paired sample conducted in Phase 2 (Sandpiper Ecological 2017e). Nocturnal surveys preceded diurnal surveys, which were conducted on the following day. Surveys were completed by one team of three and included one person walking the transect centre line flanked by a person 20m away on each side. Nocturnal surveys were conducted with handheld spotlights (Led Lenser P14) and all personnel were equipped with binoculars for both nocturnal and diurnal surveys. Each 1.3km transect took approximately 30 minutes to complete. The Phase 3 population survey was conducted on 9 and 10 August 2017. Phase 1 population surveys, at Wardell Road, were conducted on 30 and 31 May, 5 and 6 June and 3 and 4 July 2017 and Phase 2 on 26 and 27 July 2017. Property access in Phase 3 was the same as that described in the Phase 2 report (Sandpiper Ecological 2017e).

Data recorded during each survey included; date, survey number, observer names, start and end time, temperature range, cloud cover, wind, rain and moon phase. Data collected on each koala observed included: date, time, transect number, coordinates (easting & northing GDA 94), tree species including DBH, temperature, weather, sex, breeding status, and health (i.e. signs of conjunctivitis or cystitis). Each tree with a koala was marked with red and white tape so it could be re-located the following day.

3.3.2 Scat collection

To support a study being undertaken by Roads and Maritime Services and Sydney University on cortisol levels in koalas fresh koala scats were collected at Wardell Road (impact site) and Tucki Tucki (control site) following each diurnal survey. At Wardell Road, each tree containing a koala, or where a koala was recorded the previous night, was revisited and a search conducted for fresh koala scats. Fresh scats were identified by their colour (paler green) and presence of a moist coating. Scats were subsequently collected from the same number, and if possible same sex ratio, of koalas at Tucki Tucki. The Tucki Tucki site was visited on the afternoon following the diurnal koala survey at Laws Point and trees containing suitable koalas were marked. These trees were revisited the following morning and fresh scats collected. Where possible between five and six scats were collected from each tree and scat collection was conducted during dry weather. As per Phase 1 control site scats for the Wardell Road sample were collected from Hazlemount Lane.

Data collected at each scat collection site included; location (easting & northing GDA 94), tree species, weather (temperature, cloud cover, rainfall), time since last sunny day, tree size, koala behaviour, koala health, date, and observer. Scats were collected with a toothpick and placed immediately into a Styrofoam block positioned in a plastic container (Plate 3). Scats were then stored in a cool dry location.

Plate 3: Scats being collected at the Tucki Tucki control site.

3.4 Camera monitoring

To obtain data on how koalas respond to collars six motioned-activated infra-red cameras were installed at six trees, four forest red gums and two swamp mahoganies, on 4 August 2017. Cameras were installed 3-4m above ground and angled downwards to video koalas interacting with collars. The proximity of feed trees and orientation of cameras enabled more than one tree to be monitored by each camera. Three trees are monitored on both sides and three on one side only. Cameras were set to record 10 seconds of video with a 20 second quiet-period (Plate 4). The 10/20 second schedule was adopted due to concerns about false-triggers. The results of camera monitoring will be included in the Phase 4 report. The base of each collar on a feed tree was painted to assist in identifying scratch marks.

Plate 4: Camera installed (left side of tree above collar) on a collared feed tree at Wardell Road. The camera is monitoring use of an adjacent feed tree which also contains a camera aimed at the tree shown. The bottom of collars on feed trees was painted to assist with identifying scratch marks.

4. Results

4.1 Collaring

A total of 117 trees containing 162 stems were collared in Phase 2 (Figures 1 & 2). This equates to 38% of trees to be collared, and 39% of total stems to be collared. Two habitat trees, 115 non-habitat trees and 12 koala feed trees were collared (Figures 1, 2 & 3). No koalas were recorded during tree collaring or ring-barking in Phase 3. Where possible collaring extended outwards from the centre of the alignment and extended for the entire length of the Wardell Road Hotspot area. Four additional, previously unmarked, trees were identified and collared during Phase 2, bringing the total number of

trees to be collared at Wardell Road to 310 (Table 3). Palms were typically not collared or ring-barked, with the exception of three cabbage palms (*Livistonia australis*).

Table 2: Number of trees and stems collared and feed trees ring-barked during Phase 2 and 3 of the PRR program at Wardell Road.

Phase	Total trees collared	Total Stems collared	Non HBT collared	Feed trees collared	Feed trees ring-barked	HBT collared
Two	114	150	113	6	18	1
Three	117	162	115	18	0	2

Table 3: Number of trees marked during Phase 1 of the PRR program at Laws Point.

Phase	Total trees to be collared	Total Stems to be collared	Non HBT	HBT
Phase 1	310	413	303	7

4.2 Ring-barking

No trees were ring-barked in Phase 3. Dieback of feed trees ring-barked in Phase 2 was monitored during Phase 3. Initial signs of wilt were noted two days after ring-barking mature feed trees and substantial browning of leaves was recorded after two-weeks (Plate 5). The rate of dieback differed between species, tree age and location. No evidence of dieback was recorded in swamp oaks ring-barked in Phase 2, and dieback in broad-leaved paperbark and weeping bottlebrush was variable, with some trees showing total dieback (Plate 6), and others showing minimal dieback.

Plate 5: Dieback of mature forest red gum 19 days after ring-barking. Tree ring-barked on 13 July 2017 and photographed on 1 August 2017.

Plate 6: Dieback of broad-leaved paperbark and weeping bottlebrush 19 days after ring-barking.

4.2.1 Feed trees

No feed trees were ring-barked in Phase 3.

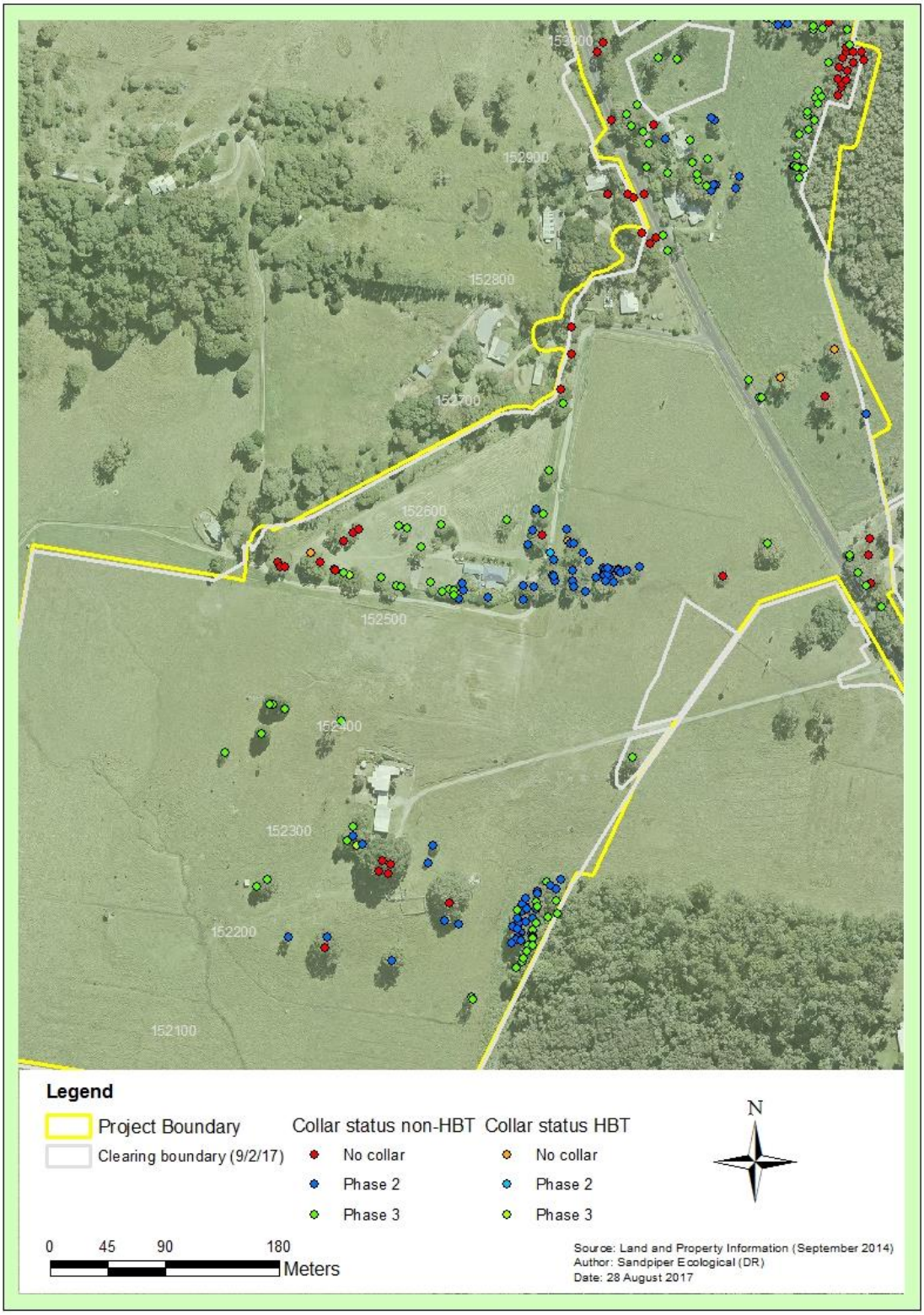

Figure 1: Distribution and status of all trees (DBH >300mm) within the Wardell Road site following Phase 3 of the PRR program.

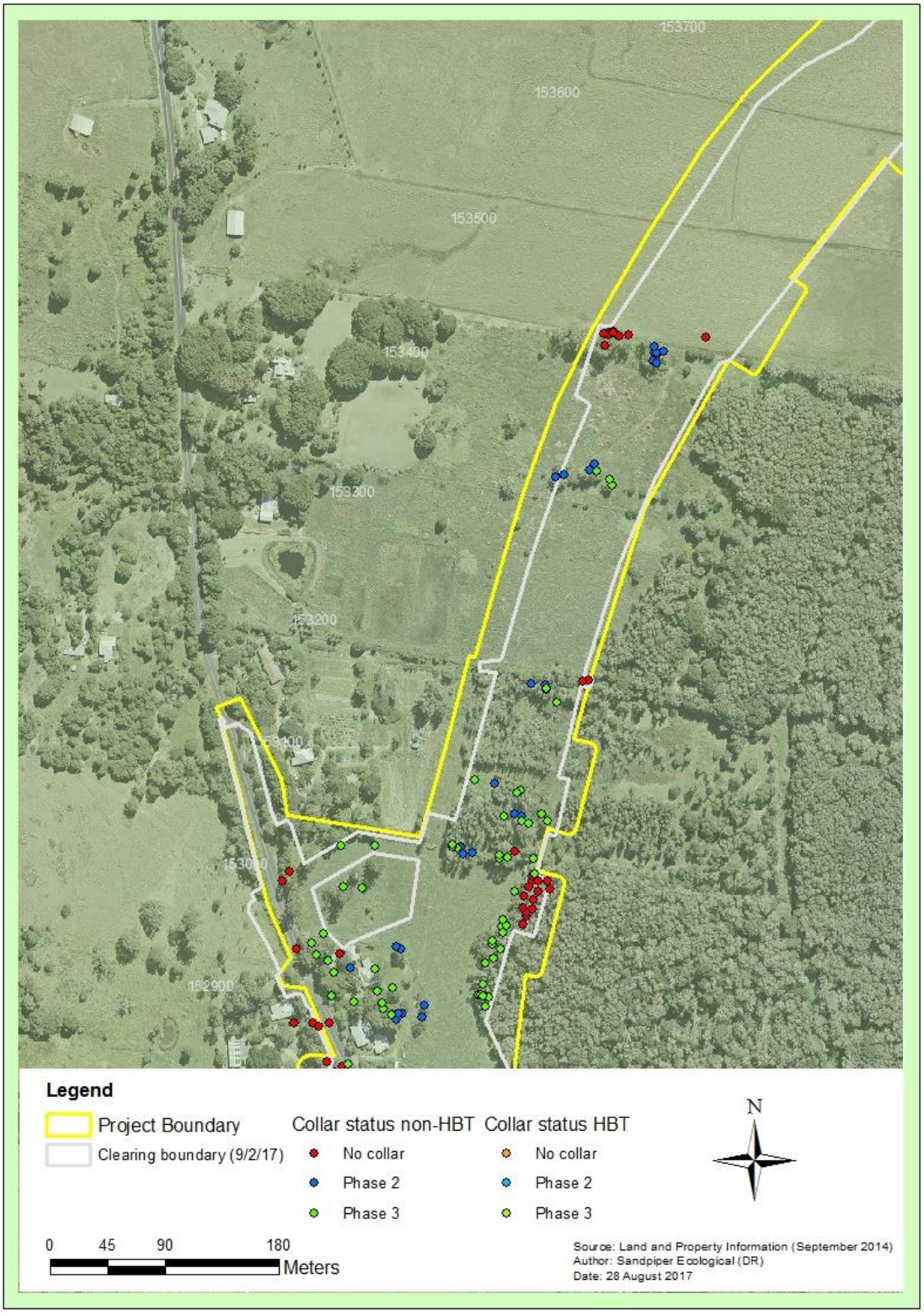

Figure 2: Distribution and status of all trees (DBH >300mm) within the Wardell Road site following Phase 3 of the PRR program.

Figure 3: Status of koala feed trees within the Wardell Road hotspot area following Phase 3 of the PRR program.

4.3 Koala population surveys

4.3.1 Koala surveys

Phase 3 koala population surveys were conducted on 9 and 10 August 2017. One koala, a probable adult female, was recorded during the night survey (Figures 4, 5 & 6). The koala was recorded in a forest red gum approximately 40m east of the LoC boundary. This record is in a similar location to the adult female recorded in Phase 2, and corresponds with sightings by the nearby resident who recorded two individuals in the area following completion of the Phase 1 surveys. Phase 2 and Phase 3 records are suspected to be the same individual.

A total of nine koala records have been made during the five paired (day & night) population surveys (Table 4). Five records have occurred at night, and four during the day. No ear-tagged individuals have been recorded. All individuals recorded at the Wardell Road hotspot have shown signs of disease (i.e. brown or wet bottom and/or conjunctivitis). Weather conditions during the Phase 3 population survey are summarised in Table A3, Appendix A.

4.3.2 Scat Collection

In Phase 3 scats were collected from two koalas, one at the impact site and one at the control site (Hazlemount Lane, Tucki Tucki) (Table A4, Appendix A). Between 3 and 6 scats have been collected for each sample and no rainfall was recorded 24hrs prior to scat collection.

4.4 Koala specialist site inspection

Dr Sean Fitzgibbon inspected the Wardell Road hotspot site on Wednesday 26 July, following completion of the Phase 2 collaring and ring-barking. The inspection involved a foot-based traverse of the site looking at tree collars and ring-barked trees and discussing issues encountered.

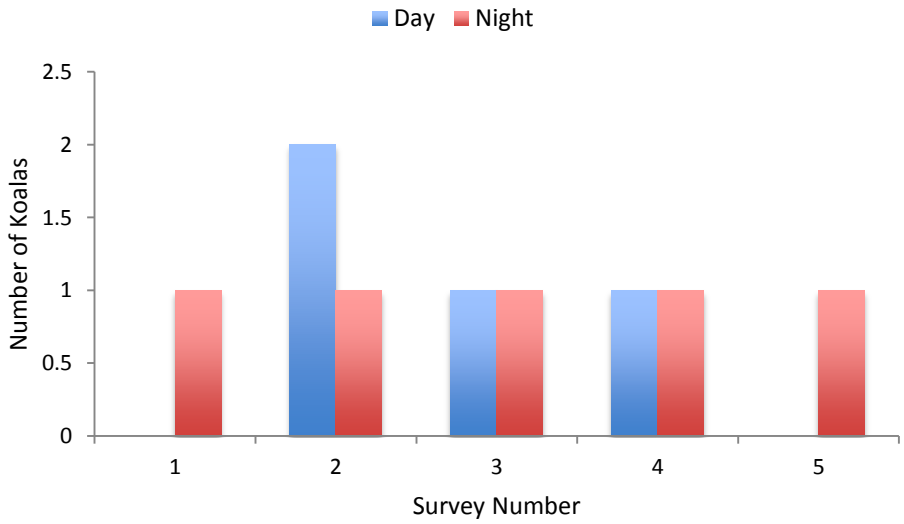

Figure 4: Number of koalas recorded during paired day and night surveys during Phase 1 (surveys 1-3) and 2 (survey 4) at Wardell Road.

Table 4: Koala records obtained during the Phase 1 (baseline) koala surveys at Wardell Road.

Date	Record No.	Same individual as	D/N	Time	Transect	Phase	Easting	Northing	Tree sp.
30/5/2017	WK1		N	1743	1	1	542533	6798776	Forest red gum
5/6/2017	WK2		N	1739	1	1	542533	6798776	Forest red gum
6/6/2017	WK2.1	WK2	D	0945	1	1	542533	6798770	Forest red gum
6/6/2017	WK3	WK1	D	0945	1	1	542569	6798777	Forest red gum
3/7/17	WK4		N	1751	1	1	542553	6798770	Narrow-leaved red gum
4/7/17	WK4.1	WK4	D	1010	1	1	542540	6798773	Forest red gum
26/7/17	WK5		N	1926	7	2	542763	6798531	Forest red gum
27/7/17	WK5.1	WK5	D	1051	8	2	542747	6798494	Flooded gum
9/8/17	WK6	WK5	N	1933	8	3	542803	6798541	Forest red gum

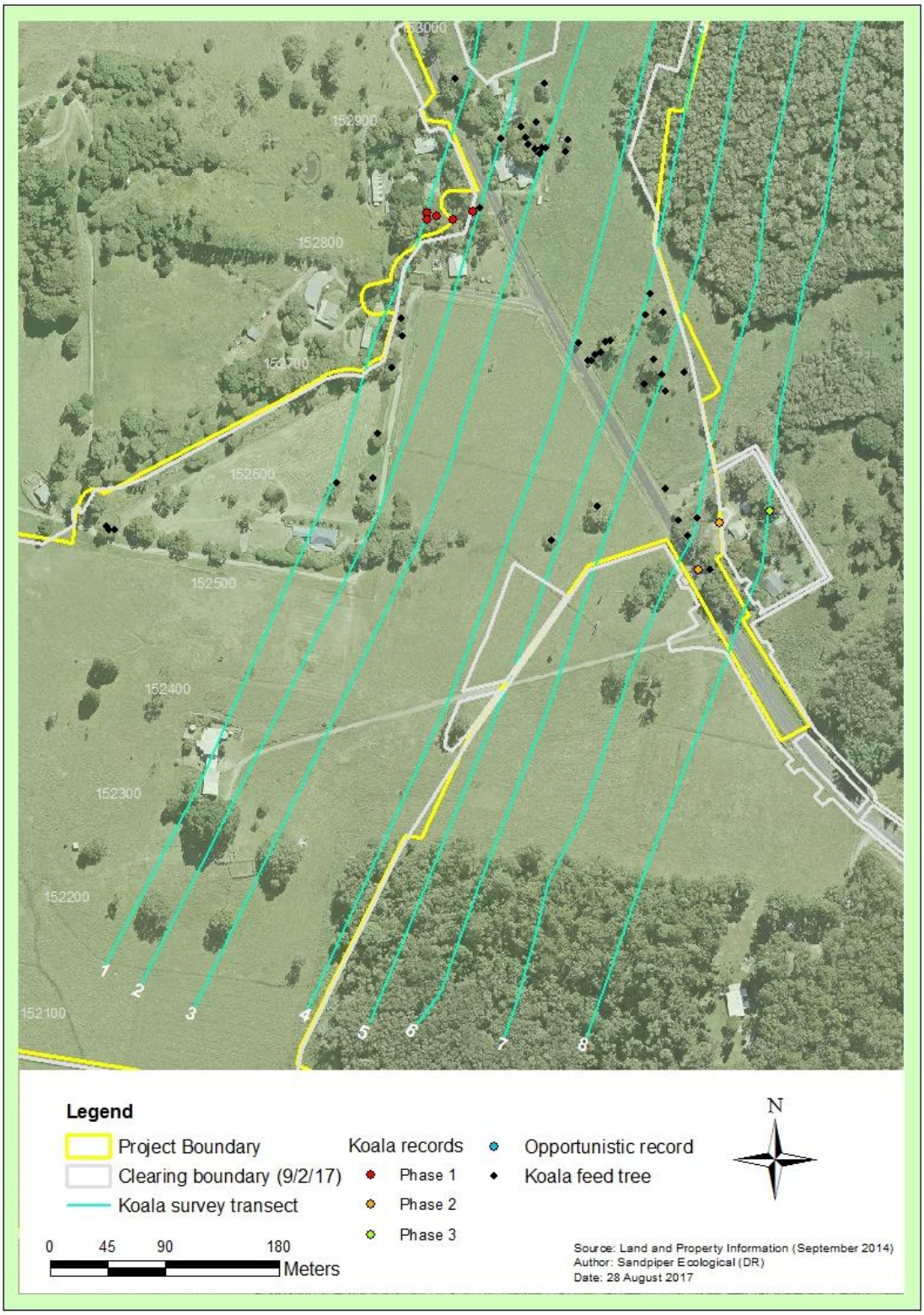

Figure 5: Distribution of koala records following Phase 3 of the PRR program at the Wardell Road hotspot site.

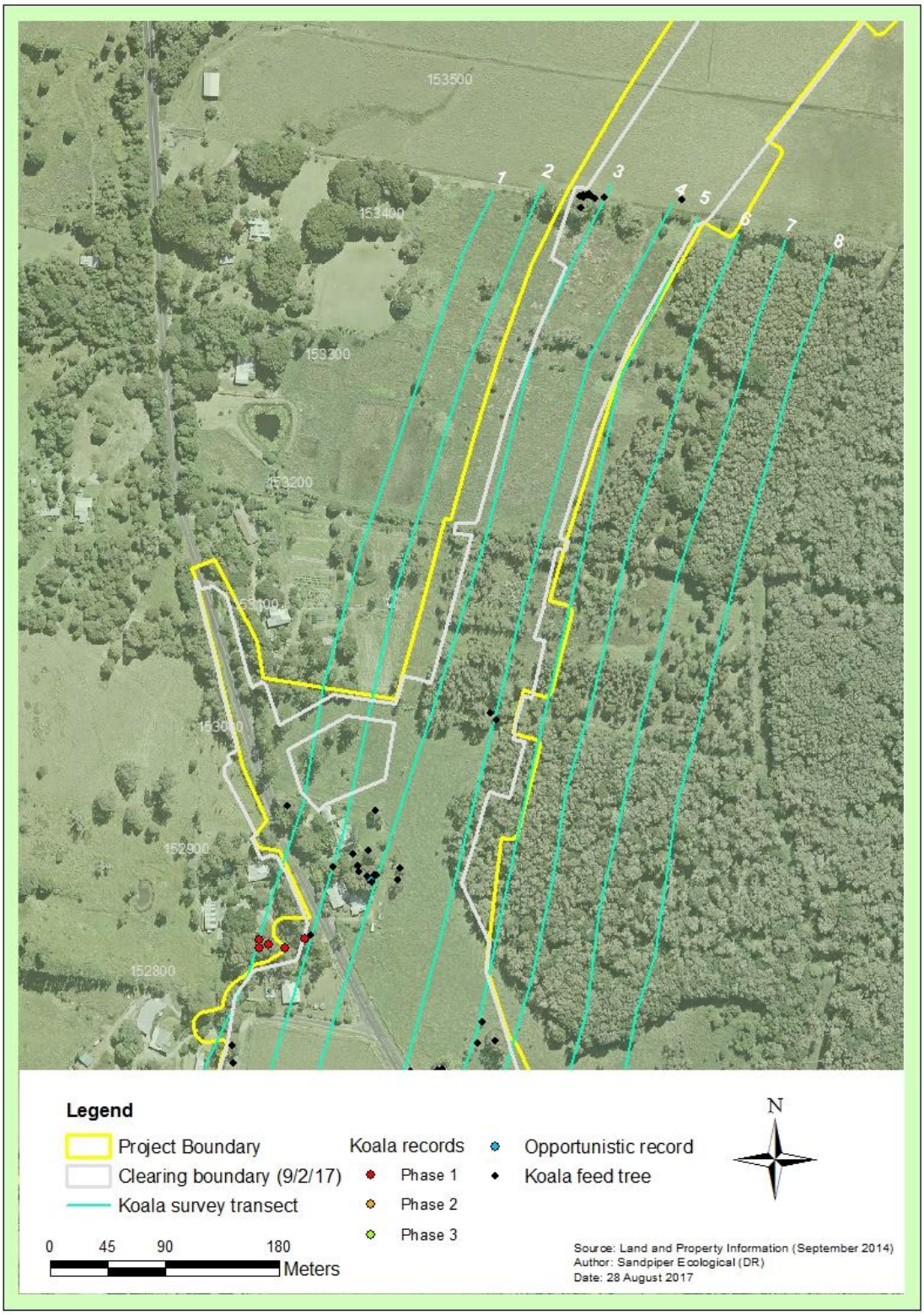

Figure 6: Distribution of koala records following Phase 3 of the PRR program at the Wardell Road hotspot site.

5. Discussion

5.1 Collaring and ring-barking

During Phase 3 all effort was made to extend collaring outwards from the centre towards each Limit of Clearing (LoC) boundary. As noted in the Phase 2 report (Sandpiper Ecological 2017e) the patchy distribution of trees and irregular shape of the Wardell Road site made this approach difficult. The strategy adopted in Phase 3 resulted in most trees being collared within the main central part of the study area, with small numbers of trees left in isolated patches or linear strips along roads for Phase 4. In general, collaring of trees has occurred without issue. The proportion of trees collared in Phase 3, was 38%, which leaves 25% remaining for Phase 4. The larger number of trees left for Phase 4 (25%) compared to that specified in the Koala Management Plan (20%) is due to the irregular nature of the Wardell site and a desire to progressively collar trees from the centre to the edge over the three phases.

The 18 feed trees collared in Phase 3 brings the total number of feed trees collared to 24, with an additional 18 ring-barked in Phase 2. At the end of Phase 3 68% of feed trees had either been collared or ring-barked. Feed tree collared in Phase 3 were situated next to Wardell Road, or dwellings, or within 10m of the LoC boundary and were therefore unsuitable for ring-barking. Increased ring-barking of koala feed trees, as recommended in the Phase 1 and 2 reports (Sandpiper 2017d & e), was not implemented in Phase 3, although the feasibility of ring-barking additional feed trees was discussed with Pacific Complete. The aim of discussions was to:

- Determine if feed trees within 10m of the LoC boundary could be ring-barked;
- Determine if trees around the quad-bike track could be ring-barked; and
- Resolve how best to exclude koalas from the fig trees at the southern end of the site.

Outcomes of the discussions were:

- The 10m buffer / ring-bark exclusion zone around the LoC boundary would be retained;
- Trees around the quad-bike track should be reassessed by an arborist to clarify the risk of tree falls following ring-barking;
- A 1.2m high chicken mesh fence with a 600mm wide strip of HDPE would be installed around fig trees that cannot be collared using the standard method.

5.2 Koala population survey

The Phase 3 population survey provided further confirmation that the Wardell study area is used occasionally by at least three koalas. The majority of koala records are situated near the outer edges of the alignment. The number of individuals recorded in the Wardell Road hotspot study area has ranged from 1-2 and the number recorded in phase 3 is consistent with Phase 1 (baseline) and Phase 2 results. During population surveys no koalas have been recorded in the cluster of feed trees east of Wardell Road near chainage 152750, and only one individual has been recorded at the cluster near chainage 152900, also east of Wardell Road.

Once again, the adult female recorded in phase 3 showed obvious signs of cystitis (i.e. wet dripping bottom) and Friends of the Koala were informed of its location for capture and treatment.

Data collected in Phases 1, 2 and 3 is insufficient to enable any assessment of koala home range, apart from suggesting that one adult male occupies a home range that encompasses habitat on both sides of Wardell Road, and that individual, plus an adult female utilise habitat on the eastern slope of Buckombil Mountain to the west of the alignment. Individuals recorded in the south-east of the study area most likely utilise habitat further east, in the Wardell Heath. That area is known to contain reasonable numbers of swamp mahogany.

One issue noted during the Phase 3 survey is that koalas accessing feed trees in the house yard at 1243 Wardell Road, near chainage 152 600 would be blocked by the koala exclusion fence. Koalas attempting to access trees inside the exclusion fence traverse the edge of the fence resulting in additional time on the ground. Once inside the fence individuals trying to leave the yard would most likely try and move directly east where the fence would block their movement. To exit the yard koalas would once again need to traverse the inside fence perimeter until they reach the fence ends, once again forcing individuals to spend additional time on the ground. A domestic dog resides at that dwelling which means koalas spending additional time on the ground will be subject to a high predation risk. Installation of temporary timber poles and bridges over the fence directly connected to feed trees would be one way to minimise the barrier effect.

5.3 Recommendations

1. The cluster of large figs near the southern end of the Wardell Road hotspot area (i.e. near chainage 152300) should be excluded by installing a basic exclusion fence consisting of star pickets and chicken wire. The fence should have a 100mm gap at the bottom to allow other fauna to enter and exit the trees. A bottom strand of tensioned plain wire should be installed to stop koalas pushing under the fence.
2. During Phase 4 all koala feed trees situated outside the 10m LoC buffer zone or that have infrastructure within their fall zone should be ring-barked.
3. Consider installing temporary timber poles and bridges over the incomplete koala exclusion fence at the rear of No. 1243 Wardell Road to allow koalas easy access to feed trees from outside the fence and an exit point for individuals inside the fence.

4. References

Sandpiper Ecological (2017a). *Woolgoolga to Ballina Pacific Highway Upgrade Phased Resource Reduction for Koala – phase 1 Laws Point*. Report prepared for Pacific Complete.

Sandpiper Ecological (2017b). *Woolgoolga to Ballina Pacific Highway Upgrade Phased Resource Reduction for Koala – phase 2 Laws Point*. Report prepared for Pacific Complete.

Sandpiper Ecological (2017c). *Woolgoolga to Ballina Pacific Highway Upgrade Phased Resource Reduction for Koala – phase 3 Laws Point*. Report prepared for Pacific Complete.

Sandpiper Ecological (2017d). *Woolgoolga to Ballina Pacific Highway Upgrade Phased Resource Reduction for Koala – phase 1 Wardell Road*. Report prepared for Pacific Complete.

Appendix A – Field data

Table A1: Collared trees identified in the Wardell Road study area. Decimal indicates co-dominant stems.

Date	Observer	Tree number	Species	Easting	Northing	DBH	Circumference	Collar Status
15.5.17	DR & SR	C1	Forest red gum	542712	6798660	1444	4.54	Ring-barked
15.5.17	DR & SR	C6	Forest red gum	542631	6798518	499	1.57	Ring-barked
15.5.17	DR & SR	C6.1				315	0.99	No collar
15.5.17	DR & SR	C6.2				372	1.17	No collar
15.5.17	DR & SR	C6.3				236	0.75	No collar
15.5.17	DR & SR	C9	Broad-leaved paperbark	542492	6798277	963	3.02	No collar
15.5.17	DR & SR	C49	Broad-leaved paperbark	542478	6798227	445	1.4	No collar
15.5.17	DR & SR	C49.1				256	0.8	No collar
15.5.17	DR & SR	C57	Strangler fig	542360	6798286	1022	3.21	No collar
15.5.17	DR & SR	C58	Strangler fig	542367	6798284	2500	7.85	No collar
15.5.17	DR & SR	C59	Strangler fig	542369	6798291	3700	11.62	No collar
15.5.17	DR & SR	C60	Strangler fig	542363	6798294	3400	10.68	No collar
15.5.17	DR & SR	C63	Strangler fig	542416	6798261	3100	9.74	No collar
15.5.17	DR & SR	C66	Strangler fig	542317	6798226	1646	5.17	No collar
25.5.17	DR & ZE	C82	Swamp mahogany	542280	6798529	600	1.88	No collar
25.5.17	DR & ZE	C83	Swamp mahogany	542280	6798529	310	0.86	No collar
25.5.17	DR & ZE	C84	Swamp mahogany	542282	6798526	250	0.77	No collar
25.5.17	DR & ZE	C85	Swamp mahogany	542286	6798526	433	1.34	No collar
25.5.17	DR & ZE	C86	White mahogany	542314	6798529	735	2.31	No collar
25.5.17	DR & ZE	C87	Tuckeroo	542325	6798524	485	1.52	No collar
25.5.17	DR & ZE	C88	Mango	542326	6798523	310	0.97	No collar
25.5.17	DR & ZE	C88.1				370	1.16	No collar
25.5.17	DR & ZE	C90	Pink bloodwood	542332	6798546	108	3.4	No collar
25.5.17	DR & ZE	C91	Hoop pine	542340	6798553	475	1.5	No collar
25.5.17	DR & ZE	C92	Mango	542344	6798555	430	1.35	No collar
25.5.17	DR & ZE	C118	Moreton bay fig	542504	6798666	1258	3.96	No collar
25.5.17	DR & ZE	C119	Tallowwood	542512	6798693	460	1.44	No collar
25.5.17	DR & ZE	C120	Cadagi	542512	6798715	445	1.4	No collar
25.5.17	DR & ZE	C122	Grey Ironbark	542489	6798551	1010	3.18	No collar
26.5.17	DR & SR	C129.1				280	0.88	No collar
26.5.17	DR & SR	C129.2				178	0.56	No collar
27.5.17	DR & ZE	C158	Liquid amber	542748	6798513	728	2.28	No collar
27.5.17	DR & ZE	C160	Forest red gum	542746	6798535	1043	4.5	No collar
27.5.17	DR & ZE	C163	Silky oak	542747	6798548	308	0.97	No collar
27.5.17	DR & ZE	C172	Lilly pilly	542619	6798826	485	1.53	No collar
27.5.17	DR & ZE	C197	Swamp oak	542722	6798897	317	1	No collar
27.5.17	DR & ZE	C198	Broad-leaves paperbark	542725	6798904	330	1.04	No collar
27.5.17	DR & ZE	C199	Swamp oak	524726	6798911	355	1.12	No collar
27.5.17	DR & ZE	C200	Swamp oak	542725	6798906	295	0.93	No collar
27.5.17	DR & ZE	C201	Broad- leaved paperbark	542722	6798910	380	1.2	No collar
27.5.17	DR & ZE	C202	Swamp oak	542723	6798919	372	1.16	No collar

Date	Observer	Tree number	Species	Easting	Northing	DBH	Circumference	Collar Status
27.5.17	DR & ZE	C204	Broad-leaved paperbark	542729	6798909	295	0.95	No collar
27.5.17	DR & ZE	C205	Swamp oak	542730	6798917	456	1.44	No collar
27.5.17	DR & ZE	C206	Broad-leaved paperbark	542734	6798923	345	1.08	No collar
27.5.17	DR & ZE	C207	Swamp oak	542726	6798927	340	1.07	No collar
27.5.17	DR & ZE	C208	Swamp oak	542729	6798931	343	1.08	No collar
27.5.17	DR & ZE	C208.1				390	1.22	No collar
27.5.17	DR & ZE	C208.2				399	1.25	No collar
27.5.17	DR & ZE	C209	Broad-leaved paperbark	542734	6798931	300	0.95	No collar
27.5.17	DR & ZE	C209.1				235	0.74	No collar
27.5.17	DR & ZE	C210	Broad-leaves paperbark	542741	6798931	280	0.87	No collar
27.5.17	DR & ZE	C211	Swamp oak	542743	6798925	323	1.02	No collar
27.5.17	DR & ZE	C212	Broad-leaved paperbark	542729	6798935	390	1.22	No collar
27.5.17	DR & ZE	C212.1				300	0.95	No collar
27.5.17	DR & ZE	C212.2				225	0.71	No collar
27.5.17	DR & ZE	C214	Broad-leaved paperbark	542730	6798949	250	0.78	No collar
27.5.17	DR & ZE	C214.1				148	0.48	No collar
27.5.17	DR & ZE	C214.2				180	0.57	No collar
27.5.17	DR & ZE	C214.3				340	1.08	No collar
27.5.17	DR & ZE	C214.4				144	0.45	No collar
27.5.17	DR & ZE	C224	Swamp oak	542707	6798982	321	0.98	No collar
27.5.17	DR & ZE	C229	Forest red gum	542715	6798955	388	1.25	Ring-barked
27.5.17	DR & ZE	C230	Forest red gum	542710	6798950	572	1.8	No collar
27.5.17	DR & ZE	C236	Swamp oak	542684	6799011	345	1.1	No collar
27.5.17	DR & ZE	C236.1				275	0.87	No collar
27.5.17	DR & ZE	C243	Sieber's paperbark	542774	6799090	437	1.37	No collar
27.5.17	DR & ZE	C244	White bottlebrush	542769	6799089	350	1.1	No collar
27.5.17	DR & ZE	C252	Forest red gum	542787	6799354	468	1.47	No collar
27.5.17	DR & ZE	C260	Forest red gum	542866	6799360	454	1.43	Ring-barked
27.5.17	DR & ZE	C261	Forest red gum	542793	6799365	571	1.79	No collar
27.5.17	DR & ZE	C262	Forest red gum	542805	6799362	549	1.73	Ring-barked
27.5.17	DR & ZE	C263	Forest red gum	542795	6799363	333	1.05	No collar
27.5.17	DR & ZE	C264	Forest red gum	542798	6799361	394	1.24	No collar
27.5.17	DR & ZE	C265	Forest red gum	542791	6799364	313	0.98	No collar
27.5.17	DR & ZE	C266	Forest red gum	542789	6799364	327	1.03	No collar
27.5.17	DR & ZE	C267	Forest red gum	542789	6799362	284	0.89	No collar
27.5.17	DR & ZE	C268	Forest red gum	542793	6799364	417	1.31	No collar
27.5.17	DR & ZE	C269	Forest red gum	542786	6799363	193	0.61	No collar
12.7.17	GM & SR	C270	Hoop pine	542537	6798939	725	2.28	No collar
12.7.17	GM & SR	C271	Hoop pine	542532	6798931	982	3.08	No collar
12.7.17	GM & SR	C277	Broad-leaved paperbark	542543	6798878	382	1.2	No collar
12.7.17	GM & SR	C277.1				460	1.4	No collar
12.7.17	GM & SR	C277.2				384	1.2	No collar
12.7.17	GM & SR	C283	Hoop pine	542577	6798874	896	2.81	No collar
12.7.17	GM & SR	C284.1				340	1.07	No collar
12.7.17	GM & SR	C284.2				300	0.94	No collar

Date	Observer	Tree number	Species	Easting	Northing	DBH	Circumference	Collar Status
12.7.17	GM & SR	C284.3				430	1.35	No collar
19.7.17	BT & ZE	C288	Forest red gum	542574	6798780	350.00	1.10	No collar
19.7.17	BT & ZE	C289	Flooded gum	542574	6798780	350.00	1.10	No collar
19.7.17	BT & ZE	C290	Spotted gum	542579	6798785	345.00	1.10	No collar
19.7.17	BT & ZE	C291	Swamp oak	542579	6798785	291.00	0.90	No collar
19.7.17	BT & ZE	C292	Swamp oak	542567	6798789	295.00	0.94	No collar
19.7.17	BT & ZE	C293	Swamp oak	542569	6798819	338.00	1.05	No collar
19.7.17	BT & ZE	C294	Swamp oak	542561	6798817	415.00	1.31	No collar
19.7.17	BT & ZE	C295	Swamp oak	542556	6798819	373.00	1.17	No collar
19.7.17	BT & ZE	C296	Flooded gum	542556	6798819	450.00	1.41	No collar
19.7.17	BT & ZE	C297	Tipuana tipu	542541	6798819	582.00	1.83	No collar
15.5.17	DR & SR	C4	Camphor Laurel	542744	6798646	545	1.7	Phase 2
15.5.17	DR & SR	C8	Broad-leaved paperbark	542504	6798279	555	1.74	Phase 2
15.5.17	DR & SR	C10	Broad-leaved paperbark	542485	6798270	561	1.76	Phase 2
15.5.17	DR & SR	C11	Tuckeroo	542485	6798268	350	0.95	Phase 2
15.5.17	DR & SR	C12	Broad-leaved paperbark	542500	6798272	314	0.99	Phase 2
15.5.17	DR & SR	C13	Broad-leaved paperbark	542495	6798275	356	1.12	Phase 2
15.5.17	DR & SR	C17	Strangler fig	542484	6798256	480	1.5	Phase 2
15.5.17	DR & SR	C22	Broad-leaved paperbark & strangler fig	524480	6798254	480	1.5	Phase 2
15.5.17	DR & SR	C22.1				450	1.41	Phase 2
15.5.17	DR & SR	C24	Broad-leaved paperbark	542476	6798258	346	1.09	Phase 2
15.5.17	DR & SR	C24.1				262	0.82	Phase 2
15.5.17	DR & SR	C25	Broad-leaved Paperbark	542473	6798260	310	0.97	Phase 2
15.5.17	DR & SR	C26	Broad-leaved paperbark	542476	6798264	403	1.26	Phase 2
15.5.17	DR & SR	C27	Broad-leaved paperbark	542473	6798254	368	1.16	Phase 2
15.5.17	DR & SR	C27.1				282	0.89	Phase 2
15.5.17	DR & SR	C28	Broad-leaves paperbark	542477	6798256	395	1.24	Phase 2
15.5.17	DR & SR	C29	Broad-leaved paperbark	542481	6798249	369	1.16	Phase 2
15.5.17	DR & SR	C30	Broad-leaved paperbark	542476	6798246	550	1.73	Phase 2
15.5.17	DR & SR	C34	Broad-leaved paperbark	542469	6798242	432	1.36	Phase 2
15.5.17	DR & SR	C35	Broad-leaved paperbark	542469	6798240	352	1.11	Phase 2
15.5.17	DR & SR	C36	Broad-leaved paperbark	542470	6798245	301	0.94	Phase 2
15.5.17	DR & SR	C37	Broad-leaved paperbark	542472	6798238	465	1.46	Phase 2
15.5.17	DR & SR	C38	Broad-leaved paperbark	542466	6798242	501	1.56	Phase 2
15.5.17	DR & SR	C39	Broad-leaved paperbark	542469	6798249	580	1.82	Phase 2
15.5.17	DR & SR	C40	Broad-leaved paperbark	542469	6798240	438	1.38	Phase 2
15.5.17	DR & SR	C41	Broad-leaved paperbark	542480	6798237	313	0.99	Phase 2
15.5.17	DR & SR	C43	Broad-leaved paperbark	542470	6798234	313	0.99	Phase 2
15.5.17	DR & SR	C44	Broad-leaved paperbark	542469	6798234	325	1.02	Phase 2
15.5.17	DR & SR	C45	Broad-leaved paperbark	542468	6798232	350	1.1	Phase 2
15.5.17	DR & SR	C46	Broad-leaved paperbark	542465	6798229	632	1.98	Phase 2
15.5.17	DR & SR	C46.1				395	1.24	Phase 2
15.5.17	DR & SR	C47	Broad-leaved paperbark	542472	6798231	462	1.45	Phase 2
15.5.17	DR & SR	C56	White mahogany	542370	6798215	1411	4.43	Phase 2
15.5.17	DR & SR	C61	Wavy pittosporum	542399	6798292	386	1.21	Phase 2

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15.5.17	DR & SR	C62	Stag	542403	6798306	474	1.49	Phase 2
15.5.17	DR & SR	C64	Camphor laurel	542423	6798244	540	1.7	Phase 2
15.5.17	DR & SR	C65	Cheese tree	542412	6798247	443	1.39	Phase 2
15.5.17	DR & SR	C67	Tuckeroo	542319	6798234	307	0.97	Phase 2
15.5.17	DR & SR	C68	Unidentified sp.	542289	6798234	501	1.57	Phase 2
16.5.17	DR & SR	C71	Cypress pine	542347	6798307	818	2.57	Phase 2
16.5.17	DR & SR	C72	Cypress pine	542340	6798314	435	1.37	Phase 2
25.5.17	DR & ZE	C105	Mango	542423	6798501	291	0.92	Phase 2
25.5.17	DR & ZE	C105.1				260	0.81	Phase 2
25.5.17	DR & ZE	C105.2				307	0.98	Phase 2
25.5.17	DR & ZE	C106	Mango	542427	6798507	224	0.69	Phase 2
25.5.17	DR & ZE	C106.1				205	0.68	Phase 2
25.5.17	DR & ZE	C106.2				200	0.63	Phase 2
25.5.17	DR & ZE	C107	Mango	542426	6798513	222	0.7	Phase 2
25.5.17	DR & ZE	C107.1				370	1.17	Phase 2
25.5.17	DR & ZE	C107.2				357	1.12	Phase 2
25.5.17	DR & ZE	C107.3				230	0.71	Phase 2
25.5.17	DR & ZE	C107.4				320	1.01	Phase 2
25.5.17	DR & ZE	C108	Mango	542446	6798502	255	0.8	Phase 2
25.5.17	DR & ZE	C108.1				420	1.32	Phase 2
25.5.17	DR & ZE	C108.2				460	1.45	Phase 2
25.5.17	DR & ZE	C108.3				207	0.65	Phase 2
25.5.17	DR & ZE	C109	Mango	542474	6798500	275	0.87	Phase 2
25.5.17	DR & ZE	C109.1				264	0.82	Phase 2
25.5.17	DR & ZE	C109.2				267	0.82	Phase 2
25.5.17	DR & ZE	C109.3				208	0.65	Phase 2
25.5.17	DR & ZE	C109.4				232	0.73	Phase 2
25.5.17	DR & ZE	C109.5				230	0.72	Phase 2
25.5.17	DR & ZE	C109.6				365	1.14	Phase 2
25.5.17	DR & ZE	C110	Mango	542474	6798511	387	1.22	Phase 2
25.5.17	DR & ZE	C110.1				315	0.99	Phase 2
25.5.17	DR & ZE	C111	Grey Ironbark	542482	6798510	1015	3.18	Phase 2
25.5.17	DR & ZE	C112	Mango	542478	6798543	440	1.38	Phase 2
25.5.17	DR & ZE	C113	Mango	542481	6798554	380	1.2	Phase 2
25.5.17	DR & ZE	C115	Mango	542484	6798571	288	0.9	Phase 2
25.5.17	DR & ZE	C115.1				217	0.68	Phase 2
25.5.17	DR & ZE	C115.2				195	0.62	Phase 2
25.5.17	DR & ZE	C115.3				246	0.78	Phase 2
26.5.17	DR & SR	C123	Grey Ironbark	542497	6798519	788	2.47	Phase 2
26.5.17	DR & SR	C124	Forest oak	542499	6798515	420	1.32	Phase 2
26.5.17	DR & SR	C125	White mahogany	542498	6798518	425	1.34	Phase 2
26.5.17	DR & SR	C125.1				428	1.34	Phase 2
26.5.17	DR & SR	C126	White mahogany	542498	6798531	679	2.13	Phase 2
26.5.17	DR & SR	C127	Camphor Laurel	542508	6798555	305	0.96	Phase 2
26.5.17	DR & SR	C127.1				230	0.72	Phase 2
26.5.17	DR & SR	C127.2				190	0.6	Phase 2

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26.5.17	DR & SR	C128	Cupaniopsis spp.	542511	6798544	399	1.25	Phase 2
26.5.17	DR & SR	C129	Camphor Laurel	542514	6798544	335	1.06	Phase 2
26.5.17	DR & SR	C130	White mahogany	542521	6798537	381	1.2	Phase 2
26.5.17	DR & SR	C131	Pink bloodwood	542513	6798523	620	1.94	Phase 2
26.5.17	DR & SR	C131.1				354	1.11	Phase 2
26.5.17	DR & SR	C131.2				283	0.89	Phase 2
26.5.17	DR & SR	C132	White mahogany	542513	6798515	685	2.15	Phase 2
26.5.17	DR & SR	C133	White mahogany	542514	6798510	634	2	Phase 2
26.5.17	DR & SR	C134	White bottlebrush	542523	6798506	576	1.81	Phase 2
26.5.17	DR & SR	C135	Broad-leaved paperbark	542531	6798517	700	2.16	Phase 2
26.5.17	DR & SR	C136	Broad-leaved paperbark	542537	6798519	420	1.32	Phase 2
26.5.17	DR & SR	C137	Pink bloodwood	542526	6798530	489	1.54	Phase 2
26.5.17	DR & SR	C138	Broad-leaved paperbark	542537	6798525	392	1.23	Phase 2
26.5.17	DR & SR	C139	Broad-leaved paperbark	542539	6798524	490	1.54	Phase 2
		C139.1				328	1.03	Phase 2
26.5.17	DR & SR	C140	Broad-leaved paperbark	542542	6798524	387	1.22	Phase 2
26.5.17	DR & SR	C141	Broad-leaved paperbark	542542	6798517	353	1.11	Phase 2
26.5.17	DR & SR	C142	Broad-leaved paperbark	542538	6798519	233	0.74	Phase 2
26.5.17	DR & SR	C143	Broad-leaved paperbark	542538	6798519	243	0.77	Phase 2
26.5.17	DR & SR	C144	Broad-leaved paperbark	542545	6798514	330	1.04	Phase 2
26.5.17	DR & SR	C145	Broad-leaved paperbark	542539	6798515	430	1.35	Phase 2
26.5.17	DR & SR	C146	Broad-leaved paperbark	542541	6798520	310	0.98	Phase 2
26.5.17	DR & SR	C147	Broad-leaved paperbark	542542	6798524	290	0.92	Phase 2
26.5.17	DR & SR	C148	Broad-leaved paperbark	542542	679853	238	0.75	Phase 2
26.5.17	DR & SR	C149	Broad-leaved paperbark	542541	6798525	302	0.95	Phase 2
26.5.17	DR & SR	C150	Broad-leaved paperbark	542549	6798524	320	1.01	Phase 2
26.5.17	DR & SR	C151	Broad-leaved paperbark	542549	6798522	435	1.37	Phase 2
26.5.17	DR & SR	C152	Broad-leaved paperbark	542549	6798523	330	1.04	Phase 2
26.5.17	DR & SR	C153	Broad-leaved paperbark	542551	6798521	257	0.81	Phase 2
26.5.17	DR & SR	C154	Broad-leaved paperbark	542555	6798523	484	1.52	Phase 2
26.5.17	DR & SR	C155	Pink bloodwood	542566	6798526	423	1.33	Phase 2
27.5.17	DR & ZE	C167	Forest red gum	542642	6798824	430	1.36	Phase 2
27.5.17	DR & ZE	C168	Forest red gum	542644	6798833	367	1.16	Phase 2
27.5.17	DR & ZE	C169	Swamp mahogany	542622	6798822	287	0.91	Phase 2
27.5.17	DR & ZE	C170	Swamp mahogany	542626	6798827	340	1.07	Phase 2
27.5.17	DR & ZE	C174	Forest red gum	542624	6798827	723	2.27	Phase 2
27.5.17	DR & ZE	C179	Forest red gum	542625	6798878	465	1.46	Phase 2
27.5.17	DR & ZE	C180	Cabbage palm	542622	6798880	315	0.99	Phase 2
27.5.17	DR & ZE	C217	Swamp oak	542682	6798954	299	0.95	Phase 2
27.5.17	DR & ZE	C218	Swamp oak	542675	6798953	344	1.09	Phase 2
27.5.17	DR & ZE	C219	Swamp oak	542673	6798958	274	0.86	Phase 2
27.5.17	DR & ZE	C220	Swamp oak	542673	6798958	375	1.18	Phase 2
27.5.17	DR & ZE	C225	Swamp oak	542715	6798984	350	1.1	Phase 2
27.5.17	DR & ZE	C226	Swamp oak	542721	6798982	300	0.95	Phase 2
27.5.17	DR & ZE	C235	Swamp oak	542700	6799008	290	0.91	Phase 2
27.5.17	DR & ZE	C239	Swamp oak	542740	6799082	355	1.11	Phase 2

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27.5.17	DR & ZE	C240	Swamp oak	542740	6799084	345	1.09	Phase 2
27.5.17	DR & ZE	C241	Swamp oak	542739	6799086	284	0.89	Phase 2
27.5.17	DR & ZE	C242	Black wattle	542728	6799087	294	0.92	Phase 2
27.5.17	DR & ZE	C247	Broad-leaved paperbark	542748	6799250	295	0.92	Phase 2
27.5.17	DR & ZE	C247.1				200	0.63	Phase 2
27.5.17	DR & ZE	C249	Broad-leaved paperbark	542778	6799260	978	3.06	Phase 2
27.5.17	DR & ZE	C250	Broad-leaved paperbark	542775	6799256	770	2.42	Phase 2
27.5.17	DR & ZE	C251	Broad-leaved paperbark	542754	6799252	1097	3.45	Phase 2
27.5.17	DR & ZE	C253	Broad-leaved paperbark	542827	6799346	430	1.35	Phase 2
27.5.17	DR & ZE	C253.1				345	1.09	Phase 2
27.5.17	DR & ZE	C253.2				362	1.14	Phase 2
27.5.17	DR & ZE	C254	Broad-leaved paperbark	542826	6799348	400	1.25	Phase 2
27.5.17	DR & ZE	C254.1				300	0.93	Phase 2
27.5.17	DR & ZE	C255	Broad-leaved paperbark	542825	6799342	310	0.98	Phase 2
27.5.17	DR & ZE	C255.1				450	1.4	Phase 2
27.5.17	DR & ZE	C255.2				435	1.36	Phase 2
27.5.17	DR & ZE	C256	Broad-leaved paperbark	542827	6799348	302	0.95	Phase 2
27.5.17	DR & ZE	C257	Black wattle	542827	6799340	270	0.85	Phase 2
27.5.17	DR & ZE	C258	Broad-leaved paperbark	542826	6799353	680	2.14	Phase 2
27.5.17	DR & ZE	C259	Broad-leaved paperbark	542833	6799349	780	2.46	Phase 2
12.7.17	GM & SR	C284	Ficus sp.	542586	6798863	327	1.03	Phase 2
18.7.17	BT & ZE	Add	Stag	NR	NR	NR	NR	Phase 2
18.7.17	BT & ZE	Add	Stag	NR	NR	NR	NR	Phase 2
15.5.17	DR & SR	C5	Forest red gum	542667	6798544	795	2.49	Phase 3
15.5.17	DR & SR	C5.1				477	1.5	Phase 3
15.5.17	DR & SR	C5.2				448	1.4	Phase 3
15.5.17	DR & SR	C5.3				385	1.21	Phase 3
15.5.17	DR & SR	C7	Grey Ironbark	542560	6798376	1100	3.45	Phase 3
15.5.17	DR & SR	C14	Pink bloodwood	542500	6798263	428	1.35	Phase 3
15.5.17	DR & SR	C15	Broad-leaved paperbark & strangler fig	542501	6798252	495	1.55	Phase 3
15.5.17	DR & SR	C16	Broad-leaved paperbark	542484	6798262	300	0.94	Phase 3
15.5.17	DR & SR	C16.1				305	0.97	Phase 3
15.5.17	DR & SR	C16.2				398	1.25	Phase 3
15.5.17	DR & SR	C16.3				248	0.78	Phase 3
15.5.17	DR & SR	C16.4				219	0.69	Phase 3
15.5.17	DR & SR	C16.5				178	0.56	Phase 3
15.5.17	DR & SR	C18	Strangler fig	542485	6798258	290	0.9	Phase 3
15.5.17	DR & SR	C19	Strangler fig	542485	6798258	449	1.41	Phase 3
15.5.17	DR & SR	C20	Swamp box	542493	6798250	360	1.12	Phase 3
15.5.17	DR & SR	C21	Broad-leaved paperbark	542484	6798245	575	1.8	Phase 3
15.5.17	DR & SR	C23	Broad-leaved paperbark	542469	6798255	560	1.76	Phase 3
15.5.17	DR & SR	C31	Broad-leaved paperbark	542481	6798239	373	1.17	Phase 3
15.5.17	DR & SR	C32	Broad-leaved paperbark	542481	6798235	374	1.18	Phase 3
15.5.17	DR & SR	C33	Broad-leaved paperbark	542481	6798234	301	0.95	Phase 3
15.5.17	DR & SR	C42	Broad-leaved paperbark	542481	6798233	339	1.07	Phase 3

Date	Observer	Tree number	Species	Easting	Northing	DBH	Circumference	Collar Status
15.5.17	DR & SR	C48	Broad-leaved paperbark	542481	6798227	466	1.46	Phase 3
15.5.17	DR & SR	C50	Ficus spp	542477	6798223	575	1.8	Phase 3
15.5.17	DR & SR	C51	Swamp box	542473	6798214	385	1.21	Phase 3
15.5.17	DR & SR	C52	Swamp box	542474	6798217	322	1.01	Phase 3
15.5.17	DR & SR	C53	Swamp box	542468	6798210	427	1.35	Phase 3
15.5.17	DR & SR	C54	Broad-leaved paperbark	542433	6798187	797	2.5	Phase 3
15.5.17	DR & SR	C55	Broad-leaved paperbark	542434	6798185	627	1.97	Phase 3
15.5.17	DR & SR	C69	Camphor Laurel	542264	6798274	384	1.2	Phase 3
15.5.17	DR & SR	C70	Camphor Laurel	542272	6798279	1012	3.18	Phase 3
16.5.17	DR & SR	C73	Cypress pine	542335	6798310	550	1.73	Phase 3
16.5.17	DR & SR	C73.1				365	1.15	Phase 3
16.5.17	DR & SR	C74	Mango	542340	6798321	370	1.17	Phase 3
16.5.17	DR & SR	C75	Grey Ironbark	542330	6798404	714	2.24	Phase 3
16.5.17	DR & SR	C76	Camphor Laurel	542286	6798414	550	1.73	Phase 3
16.5.17	DR & SR	C77	Camphor Laurel	542275	6798417	389	1.22	Phase 3
16.5.17	DR & SR	C77.1				381	1.2	Phase 3
16.5.17	DR & SR	C78	Camphor Laurel	542277	6798417	500	1.57	Phase 3
16.5.17	DR & SR	C78.1				562	1.76	Phase 3
16.5.17	DR & SR	C79	Camphor Laurel	542274	6798417	499	1.57	Phase 3
16.5.17	DR & SR	C80	Camphor Laurel	542267	6798394	515	1.62	Phase 3
16.5.17	DR & SR	C80.1				460	1.44	Phase 3
16.5.17	DR & SR	C80.2				675	2.12	Phase 3
16.5.17	DR & SR	C80.3				673	2.11	Phase 3
16.5.17	DR & SR	C81	Tuckeroo	542239	6798379	418	1.31	Phase 3
25.5.17	DR & ZE	C89	Mango	542332	6798521	335	1.06	Phase 3
25.5.17	DR & ZE	C93	Eucalyptus spp	542362	6798517	355	1.12	Phase 3
25.5.17	DR & ZE	C94	White Mahogany	542374	6798511	945	2.97	Phase 3
25.5.17	DR & ZE	C95	White mahogany	542378	6798510	443	1.39	Phase 3
25.5.17	DR & ZE	C96	Broad-leaved paperbark	542376	6798558	320	1.02	Phase 3
25.5.17	DR & ZE	C97	Broad-leaved paperbark	542382	6798556	380	1.2	Phase 3
25.5.17	DR & ZE	C98	African tulip	542409	6798559	380	1.19	Phase 3
25.5.17	DR & ZE	C99	Blackbutt	542393	6798541	517	1.65	Phase 3
25.5.17	DR & ZE	C100	Mango	542401	6798514	728	2.29	Phase 3
25.5.17	DR & ZE	C101	Mango	542410	6798506	400	1.26	Phase 3
25.5.17	DR & ZE	C101.1				271	0.85	Phase 3
25.5.17	DR & ZE	C102	Mango	542416	6798508	516	1.62	Phase 3
25.5.17	DR & ZE	C103	Mango	542419	6798507	477	1.5	Phase 3
25.5.17	DR & ZE	C104	Mango	542419	6798503	510	1.6	Phase 3
25.5.17	DR & ZE	C114	Swamp mahogany	542461	6798563	525	1.64	Phase 3
25.5.17	DR & ZE	C116	Tallowwood	542494	6798602	550	1.73	Phase 3
25.5.17	DR & ZE	C117	Tallowwood	542505	6798654	560	1.76	Phase 3
25.5.17	DR & ZE	C121	Forest red gum	542490	6798567	754	2.36	Phase 3
27.5.17	DR & ZE	C156	Forest red gum	542756	6798494	285	0.9	Phase 3
27.5.17	DR & ZE	C156.1				280	0.87	Phase 3
27.5.17	DR & ZE	C156.2				225	0.72	Phase 3
27.5.17	DR & ZE	C157	Liquid amber	542744	6798511	166	0.54	Phase 3

Date	Observer	Tree number	Species	Easting	Northing	DBH	Circumference	Collar Status
27.5.17	DR & ZE	C157.1				185	0.59	Phase 3
27.5.17	DR & ZE	C159	Forest red gum	542738	6798521	242	0.76	Phase 3
27.5.17	DR & ZE	C159.1				180	0.57	Phase 3
27.5.17	DR & ZE	C161	Forest red gum	542731	6798533	245	0.76	Phase 3
27.5.17	DR & ZE	C162	Blueberry ash	542731	6798535	231	0.73	Phase 3
27.5.17	DR & ZE	C164	Forest red gum	542652	6798673	208	0.66	Phase 3
27.5.17	DR & ZE	C164.1				203	0.63	Phase 3
27.5.17	DR & ZE	C165	Forest red gum	542660	6798659	160	0.51	Phase 3
27.5.17	DR & ZE	C166	Forest red gum	542662	6798659	136	0.43	Phase 3
27.5.17	DR & ZE	C171	Forest red gum	542612	6798830	795	2.5	Phase 3
27.5.17	DR & ZE	C173	Forest red gum	542618	6798826	720	2.26	Phase 3
27.5.17	DR & ZE	C175	Forest red gum	542611	6798835	408	1.28	Phase 3
27.5.17	DR & ZE	C176	Forest red gum	542607	6798844	530	1.67	Phase 3
27.5.17	DR & ZE	C177	Hoop pine	542605	6798862	900	2.82	Phase 3
27.5.17	DR & ZE	C178	Forest red gum	542619	6798847	560	1.76	Phase 3
27.5.17	DR & ZE	C181	Broad-leaved paperbark	542692	6798832	290	0.91	Phase 3
27.5.17	DR & ZE	C181.1				345	1.09	Phase 3
27.5.17	DR & ZE	C182	Broad-leaved paperbark	542687	6798842	497	1.55	Phase 3
27.5.17	DR & ZE	C183	Broad-leaved paperbark	542688	6798842	185	0.59	Phase 3
27.5.17	DR & ZE	C183.1				220	0.7	Phase 3
27.5.17	DR & ZE	C183.2				204	0.64	Phase 3
27.5.17	DR & ZE	C184	Broad-leaved paperbark	542692	6798841	233	0.7	Phase 3
27.5.17	DR & ZE	C184.1				297	0.93	Phase 3
27.5.17	DR & ZE	C184.2				277	0.87	Phase 3
27.5.17	DR & ZE	C185	Swamp oak	542695	6798840	230	0.72	Phase 3
27.5.17	DR & ZE	C185.1				274	0.87	Phase 3
27.5.17	DR & ZE	C185.2				370	1.16	Phase 3
27.5.17	DR & ZE	C186	Swamp oak	542690	6798841	394	1.24	Phase 3
27.5.17	DR & ZE	C187	Swamp oak	542690	6798850	335	1.04	Phase 3
27.5.17	DR & ZE	C188	Swamp oak	542692	6798867	352	1.1	Phase 3
27.5.17	DR & ZE	C189	Swamp oak	542699	6798870	565	1.78	Phase 3
27.5.17	DR & ZE	C190	Swamp oak	542698	6798881	413	1.3	Phase 3
27.5.17	DR & ZE	C191	Swamp oak	542704	6798878	510	1.6	Phase 3
27.5.17	DR & ZE	C192	Broad-leaved paperbark	542698	6798884	390	1.23	Phase 3
27.5.17	DR & ZE	C193	Broad-leaved paperbark	542705	6798895	340	1.23	Phase 3
27.5.17	DR & ZE	C193.1				170	0.55	Phase 3
27.5.17	DR & ZE	C193.2				189	0.59	Phase 3
27.5.17	DR & ZE	C194	Broad-leaved paperbark	542706	6798891	330	1.04	Phase 3
27.5.17	DR & ZE	C195	Broad-leaved paperbark	542709	6798896	518	1.63	Phase 3
27.5.17	DR & ZE	C195.1				408	1.28	Phase 3
27.5.17	DR & ZE	C196	Broad-leaved paperbark	542706	6798901	510	1.6	Phase 3
27.5.17	DR & ZE	C203	Swamp oak	542715	6798923	397	1.25	Phase 3
27.5.17	DR & ZE	C213	Broad-leaved paperbark	542731	6798937	380	1.2	Phase 3
27.5.17	DR & ZE	C213.1				330	1.04	Phase 3
27.5.17	DR & ZE	C215	Swamp oak	542703	6798949	170	0.54	Phase 3
27.5.17	DR & ZE	C215.1				340	1.06	Phase 3

Date	Observer	Tree number	Species	Easting	Northing	DBH	Circumference	Collar Status
27.5.17	DR & ZE	C215.2				263	0.83	Phase 3
27.5.17	DR & ZE	C215.3				210	0.67	Phase 3
27.5.17	DR & ZE	C216	Hoop pine	542703	6798952	320	1	Phase 3
27.5.17	DR & ZE	C221	Swamp oak	542670	6798957	338	1.07	Phase 3
27.5.17	DR & ZE	C222	Swamp oak	542666	6798958	334	1.05	Phase 3
27.5.17	DR & ZE	C223	Swamp oak	542666	6798960	300	0.94	Phase 3
27.5.17	DR & ZE	C227	Swamp oak	542721	6798979	350	1.1	Phase 3
27.5.17	DR & ZE	C227.1				228	0.72	Phase 3
27.5.17	DR & ZE	C227.2				250	0.79	Phase 3
27.5.17	DR & ZE	C228	Swamp oak	542726	6798977	350	1.09	Phase 3
27.5.17	DR & ZE	C231	Swamp oak	542741	6798979	414	1.3	Phase 3
27.5.17	DR & ZE	C232	Swamp oak	542737	6798984	317	1	Phase 3
27.5.17	DR & ZE	C233	Swamp oak	542720	6799003	297	0.93	Phase 3
27.5.17	DR & ZE	C233.1				260	0.81	Phase 3
27.5.17	DR & ZE	C234	Swamp oak	542717	6799001	307	0.96	Phase 3
27.5.17	DR & ZE	C234.1				224	0.7	Phase 3
27.5.17	DR & ZE	C237	Black wattle	542749	6799072	542	1.7	Phase 3
27.5.17	DR & ZE	C238	Swamp oak	542740	6799083	354	1.11	Phase 3
27.5.17	DR & ZE	C245	Camphor Laurel	542792	6799244	480	1.51	Phase 3
27.5.17	DR & ZE	C246	Broad-leaved paperbark	542790	6799248	312	0.98	Phase 3
27.5.17	DR & ZE	C248	Broad-leaved paperbark	542780	6799255	645	2.03	Phase 3
27.5.17	DR & ZE	C248.1				485	1.51	Phase 3
12.7.17	GM & SR	C272	Hoop pine	542578	6798959	922	2.9	Phase 3
12.7.17	GM & SR	C273	Hoop pine	542580	6798927	1045	3.28	Phase 3
12.7.17	GM & SR	C274	Hoop pine	542595	6798926	530	1.66	Phase 3
12.7.17	GM & SR	C274.1				295	0.94	Phase 3
12.7.17	GM & SR	C275	Hoop pine	542605	6798959	907	2.85	Phase 3
12.7.17	GM & SR	C276	Blackbutt	542564	6798890	694	2.18	Phase 3
12.7.17	GM & SR	C278	Tallowwood	542555	6798882	595	1.87	Phase 3
12.7.17	GM & SR	C279	Hoop pine	542559	6798873	703	2.21	Phase 3
12.7.17	GM & SR	C280	Hoop pine	542568	6798868	490	1.94	Phase 3
12.7.17	GM & SR	C280.1				410	1.28	Phase 3
12.7.17	GM & SR	C280.2				552	1.74	Phase 3
12.7.17	GM & SR	C281	Lemon-scented gum	542573	6798859	630	1.98	Phase 3
12.7.17	GM & SR	C282	Broad-leaved paperbark	542571	6798841	485	1.52	Phase 3
12.7.17	GM & SR	C282.1				188	0.6	Phase 3
19.7.17	BT & ZE	C285	Hoop pine	542588	6798775	530.00	1.65	Phase 3
19.7.17	BT & ZE	C285.1	Hoop pine			615.00	1.94	Phase 3
19.7.17	BT & ZE	C286	Hoop pine	542584	6798787	700.00	2.20	Phase 3
19.7.17	BT & ZE	C287	Hoop Pine	542584	6798787	465.00	1.46	Phase 3
2.8.17	DR & ZE	C288	Forest red gum	542588	6798836	260	NR	Phase 3
2.8.17	DR & ZE	C288.1				315	NR	Phase 3
1.8.17	DR & ZE	Add	Palm			80	NR	Phase 3
1.8.17	DR & ZE	Add	Palm			100	NR	Phase 3
1.8.17	DR & ZE	Add	Palm			85	NR	Phase 3
2.8.17	DR & ZE	Add				100	NR	Phase 3

Table A2: Habitat trees identified in the Wardell Road study area. s = small (10-50mm); m = medium (51-150mm); l = large (151-300mm); vl = very large (>300mm).

Tree no.	Tree Species	Easting	Northing	DBH (m)	Circumf (m)	Branch	Trunk	Spout	Collar status
H1	Cypress pine	542342	6798306	0.66	2.09		1m		Phase 3
H2	White mahogany	542306	6798537	1.26	3.95	1m, 1s	1l		No collar
H3	White mahogany	542337	6798519	0.79	2.48		1m		Phase 3
H4	White mahogany	542495	6798537	1.07	3.37	1s, 4m	2s, 2m		Phase 2
H5	White mahogany	542509	6798546	0.42	1.31	1s	2s		No collar
H6	Forest red gum	542677	6798675	1.00	3.14	1s	1term		No collar
H7	Forest Red Gum	542714	6798662	1.30	4.08	2s, 2m			No collar

Table A3: Weather conditions during Phase 2 koala population surveys at the Wardell Road hotspot. N = night; D = day; Mlb = moves large branch; Msb = moves small branch.

Date	Survey No.	Observers	Start	End	Temp Range	Cloud %	Wind	Rain	Moon	Comments
30/5/2017	1N	BT,NP, SR	1730	2056	14-17	10	Stil	Fine	1/4	
31/5/2017	1D	NP, SR, MJ	1202	1530	16-19	nil	Mlb	Fine	1/4	
5/6/2017	2N	BT, GM, SR	1722	2059	12-16	15	Msb	Fine	2/4	
6/6/2017	2D	BT, GM, DR	0927	1308	17-20	10	Msb	Fine	2/4	
3/07/2017	3N	NP, GM, SR	1725	2115	17-19	10-80	MLB	Fine	2/4	Fine, then light shower.
4/07/2017	3D	GM, SR, ZE	945	1330	21-22	0	Nil	Fine	N/A	
26/7/17	4N	BT MJ SJ	1730	2055	14-17	0	Msb	Fine	2/4	
27/7/17	4D	BT MJ SJ	941	1248	28-20	0	Msb	Fine	2/4	
9/8/17	5N	NP, GM, ZE	1800	2139	7-14	0	Msb	Fine	4/4	
10/8/17	5D	NP, GM, ZE	900	1245	1-12	0	Nil	Fine	0	

Table A4: Koala scat collection location data. HZMT = Hazlemount Lane.

Collection Date	Record No.	Impact/ Control	Time	T'sect/ Location	Easting	Northing	Tree sp.	Collection Type
31/5/2017	WK1	I		1	542533	6798776	Forest red gum	Off ground
2/6/2017	WC1	C	915	HZMT	531901	6798489	Tallowwood	Off ground
6/6/2017	WK2	I	1325	1	542533	6798776	Forest red gum	Off ground
6/6/2017	WK3	I	1325	1	542569	6798777	Forest red gum	Off ground
6/6/2017	WC2	C	830	HZMT	532008	6799069	Flooded gum	Off ground
6/6/2017	WC3	C	900	HZMT	531891	6798479	Flooded gum	Off ground
4/07/2017	WK4	I	1345	1	542549	6798784	Narrow-leaved red gum	Off ground
5/07/2017	WC4	C	735	HZMT	531904	6798512	Forest red gum	Off ground
27/07/17	WK5	I	1320	7	542763	6798531	Forest red gum	Off ground
28/07/17	WC5	C	900	HZMT	531915	6798549	Swamp mahogany	Off ground
27/07/17	WK5	I	1320	7	542763	6798531	Forest red gum	Off ground
28/07/17	WC5	C	900	HZMT	531915	6798549	Swamp mahogany	Off ground

Table A5: Koala scat collection weather and health data. HZMT = Hazlemount Lane; M = male; F = female; po = possible.

T'sect/ Location	DBH	Temp at collection	Weather at collection	Rainfall (collection period)	Sex	Breeding	Health	Comments (activity; ear tag?)
1	600		Fine	Nil	Mpo	No	Healthy	
HZMT	450	12	Fine	Nil	M	No	Healthy	Large male, healthy
1	600	20.5	Fine	Nil	Fpo	No	Wet, stained	
1	300	20.5	Fine	Nil	Mpo	No	Wet, stained	
HZMT	300	12	Fine	Nil	Mpo	?	Dry	
HZMT	380	14	Fine	Nil	Mpo	?	Dry	
1	600	24	Fine	Nil	Mpo	?	Stained	
HZMT	650	9	Fine	Nil	Fpo	?	Healthy	
7	1400	19	fine	nil	Fpo	?	Dirty bum	
HZMT	500	9	fine	nil	Fpo	?	Dirty bum	
7	1400	19	fine	nil	Fpo	?	Dirty bum	
HZMT	500	9	fine	nil	Fpo	?	Dirty bum	