APPENDIX E

BORR Northern and Central Section Targeted Fauna Assessment (Biota 2019a) – Part 2e (part 6 of 7)

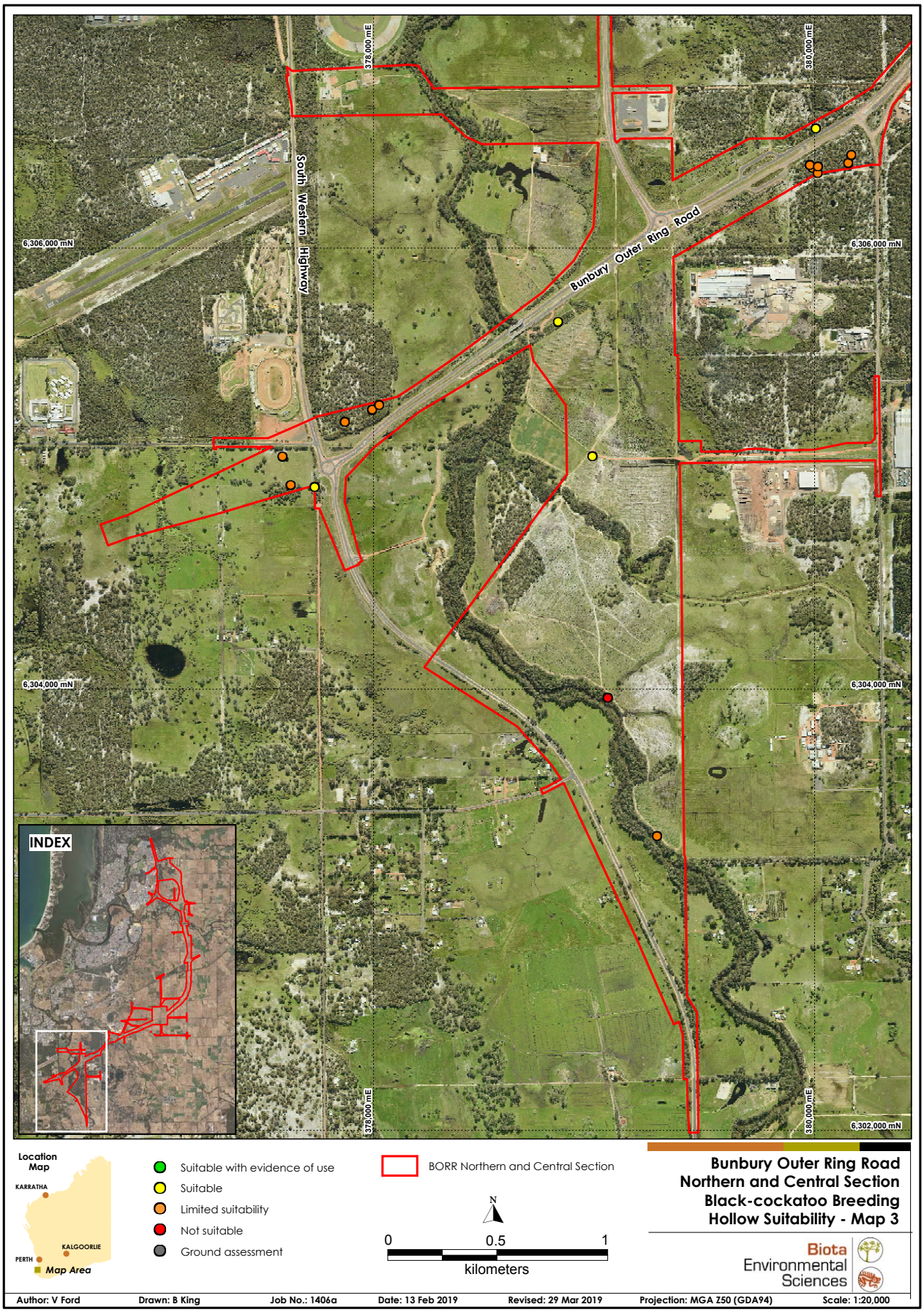

Figure 5.14: Tree hollow assessment results (southern section, map 3/3).

5.4.3 Foraging Habitat

Evidence of foraging by all three species of black-cockatoo was found within the study area. Foraging evidence consistent with Forest Red-tailed Black-Cockatoos and Carnaby's Black-Cockatoo was most common, but Marri nuts with chew marks indicative of Baudin's Black-Cockatoo were also located. Examples of Marri nuts with chew marks of each black-tailed cockatoo species are shown in Plate 5.5 to Plate 5.7

Plate 5.5: Carnaby's Black-Cockatoo nut chew.

Plate 5.6: Baudin's Black-Cockatoo nut chew.

Plate 5.7: Forest Red-tailed Black-Cockatoo nut chews.

Much of the study area was devoid of black-cockatoo foraging habitat being cleared, highly disturbed, consisting of non-native vegetation (e.g. blue gum plantation) or native vegetation that did not contain foraging plants (uniform stands of peppermint, *Melaleuca* shrubland or woodland, *Astartea* shrubland), together this represented 967.1 ha or 85.7% of the study area.

The Foraging Habitat Scoring Tool of the draft Commonwealth referral guidelines for black-cockatoos (DoEE 2017) was applied to the remainder of the native vegetation with potential to represent foraging habitat. Appendix 6 presents the foraging habitat scoring tool, in summary the final scores are categorised as:

- Low Quality, score of 1 – 4;
- Quality, score of 5-6;
- High Quality, score of 7-9; and,
- Very High Quality, score of 10+.

The results for each vegetation unit within the study area (GHD 2019) are summarised for each black-cockatoo species in Table 5.7 while Appendix 7 details the full scoring of each vegetation unit for each species. The results are also illustrated in Figure 5.15 - Figure 5.17 where the highest score of the three black-cockatoo species is the score that has been mapped.

Foraging habitat within the study area was largely represented by areas of Marri and Jarrah woodland, which all three species of black-cockatoo were found to utilising during the survey. The primary factor driving differences in the foraging habitat score of vegetation units was their starting score. Areas of Marri/Eucalyptus woodland generally satisfied the criteria for a starting score of "7" (High Quality) while areas of scattered trees were generally assigned a starting score of "1" (Low quality), which is applied to indicate that "Individual foraging plants of small stands of foraging plants are present". However, while these vegetation units had a low starting score, they generally contained trees with DBH greater than 50 cm and in some cases trees with hollows potentially suitable for black-cockatoo nesting and the addition of these context adjustors typically increased their score from Low Quality to Quality. Those vegetation units with a starting score of High Quality tended to have the same breeding habitat context additions applied so their final score was invariably Very High Quality.

Many of the plants representing favourable foraging habitat for black-cockatoos in Western Australia are susceptible to the soil-borne fungal pathogen Phytophthora dieback (typically *Phytophthora cinnamomi*) including all Banksia, some *Hakea*, some Grevillea and Jarrah although Marri appears to be resistant (Centre for Phytophthora Science and Management 2019). As a result, Phytophthora dieback represents a threat to foraging habitat occurrence in the Southwest. A separate Phytophthora dieback survey was undertaken over the study area (GS Bio Logic 2018) and results in relation to the foraging habitat are shown in Figure 5.15 - Figure 5.17. Some areas of Very High Quality, High Quality and Quality foraging habitat were affected by *Phytophthora* (as shown on Figure 5.15 - Figure 5.17), however, no vegetation unit was entirely affected and so it was not considered appropriate to apply the one point subtraction.

A total 967.1 ha was classified as non-foraging habitat, 58.2 ha of habitat was classified as Very High Quality, 19.2 ha as High Quality, 14.2 ha as Quality and 69.8 ha as Low Quality.

Table 5.7: Foraging Habitat Scores for Three Species of Black-Cockatoo (DoEE 2017).

Veg. Code	Veg. description	Area (ha)	Carnaby's	Baudin's	Forest Red-tailed
1	Highly modified / Cleared	786.2	-	-	-
2	Non native vegetation	123.3	-	-	-
3	Revegetation / Planted	16.8	9	9	3
3a	Recent Revegetation / Planted	17.4	9	9	6
4	Low woodland of *Eucalyptus rudis* and *Melaleuca rhaphiophylla*	21.9	-	-	3
5	*Corymbia calophylla* and *Melaleuca preissiana* / *Kunzea glabrescens* Swamp	2.1	14	14	12
6	Very open woodland of *Melaleuca rhaphiophylla* over introduced grasses and herbs in paddocks and road reserves	25.2	-	-	-
7	*Melaleuca preissiana* and *Kunzea glabrescens* Swamp	4.6	-	-	5
8	Mosaic of *Melaleuca rhaphiophylla*, *Corymbia calophylla* and *Eucalyptus rudis* woodland	3.7	6	6	6
9	Woodland of *Eucalyptus rudis* and *Corymbia calophylla* over *Melaleuca rhaphiophylla* on creeklines	5.9	14	14	14
10	Woodland of *Melaleuca rhaphiophylla*, *Eucalyptus rudis* and *Casuarina obesa*; fringing vegetation along Collie River	2.3	-	-	3
11	Open Forest of *Corymbia calophylla* and *Eucalyptus rudis* over *Agonis flexuosa* along the Preston River	21.6	14	14	14
11a	Open Forest of *Eucalyptus rudis* on upper banks of Brunswick River	0.3	-	-	3
12	*Melaleuca rhaphiophylla* and *Melaleuca lateritia* Shrubland (MrMl)	1.0	-	-	-
12a	(blank)	0.4	-	-	-
13	*Astartea scoparia* shrubland	0.2	-	-	-
14	Woodland of *Corymbia calophylla* and *Agonis flexuosa* over weedy grass and herbland	6.8	17	17	17
15	Open woodland of *Corymbia calophylla* over introduced grasses in road reserves and paddocks	25.0	17	17	17
16	*Agonis flexuosa* Closed Woodland over pasture grasses	25.8	-	-	3
17	Scattered *Eucalyptus rudis*	1.4	-	-	3
18	Isolated Trees of *Eucalyptus* species / *Agonis flexuosa* and *Melaleuca* species in paddocks	10.7	6	6	3
19	Woodland of *Eucalyptus marginata* over *Agonis flexuosa*, *Banksia attenuata* and *B. ilicifolia*	23.1	15	15	17
20	*Eucalyptus marginata*, *Banksia* spp, *Kunzea glabrescens*	3.0	12	12	14
	Grand Total	**1128.5**			

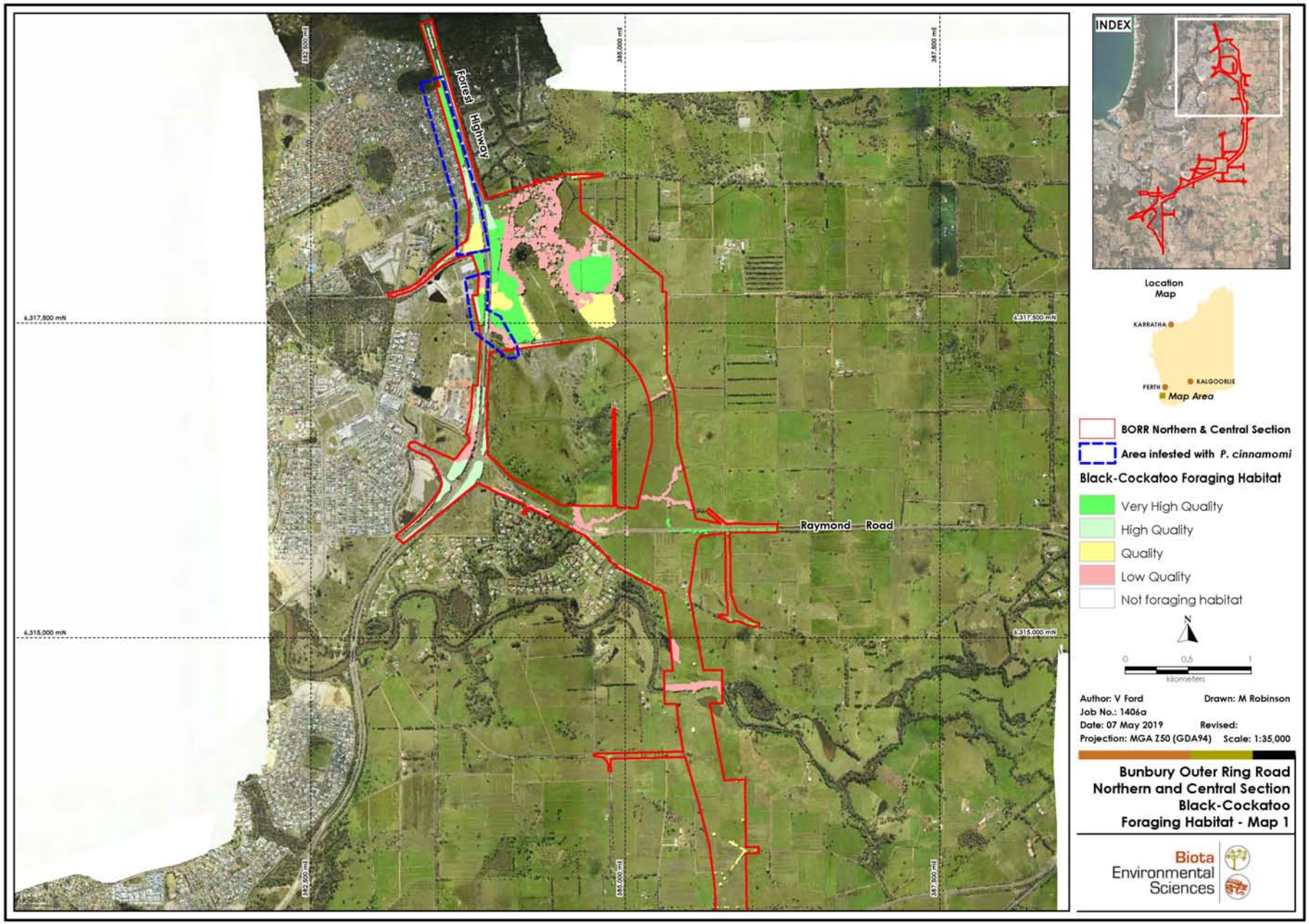

Figure 5.15: Foraging habitat quality and occurrence within the study area (northern section, map 1/3).

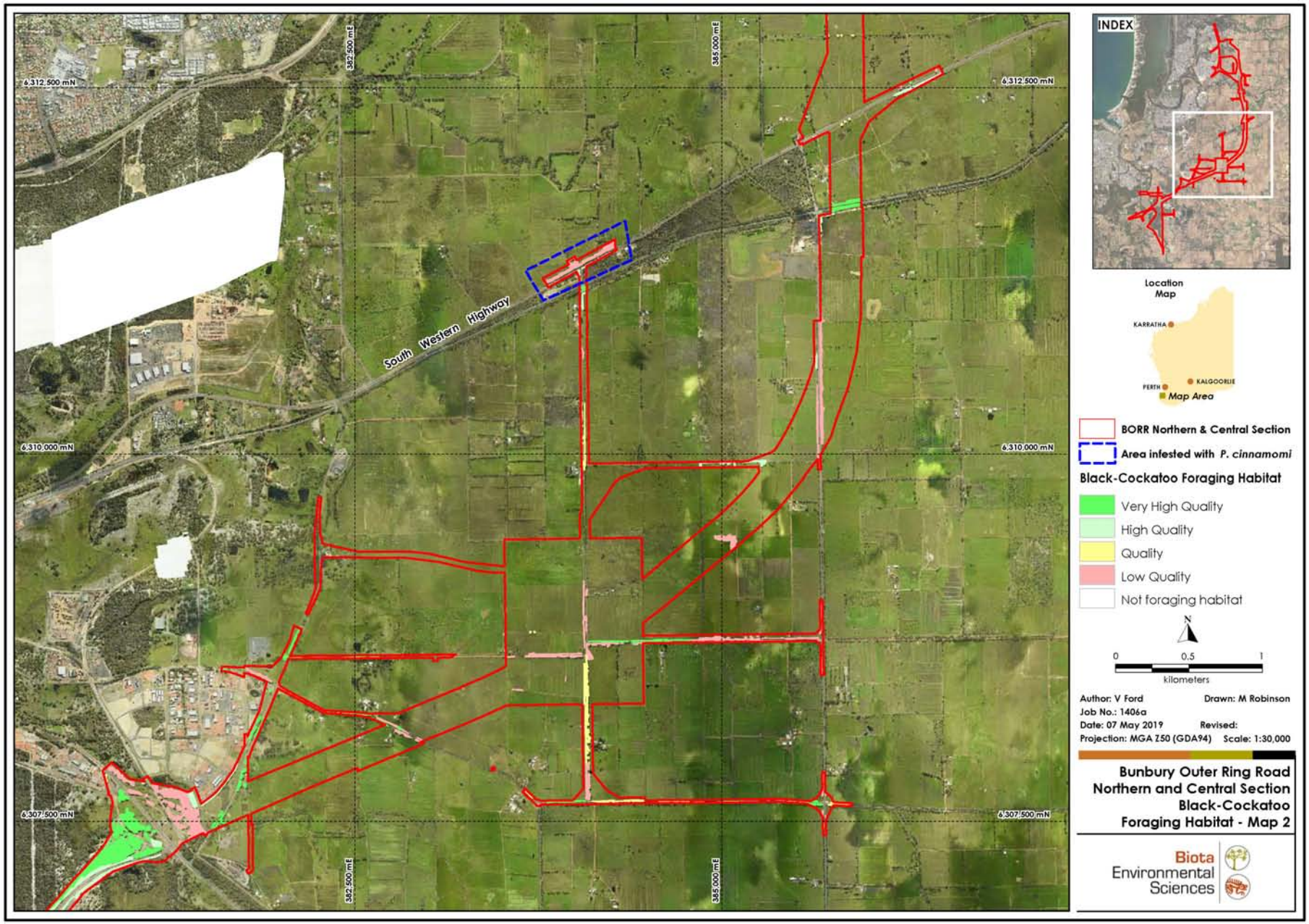

Figure 5.16: Foraging habitat quality and occurrence within the study area (middle section, map 2/3).

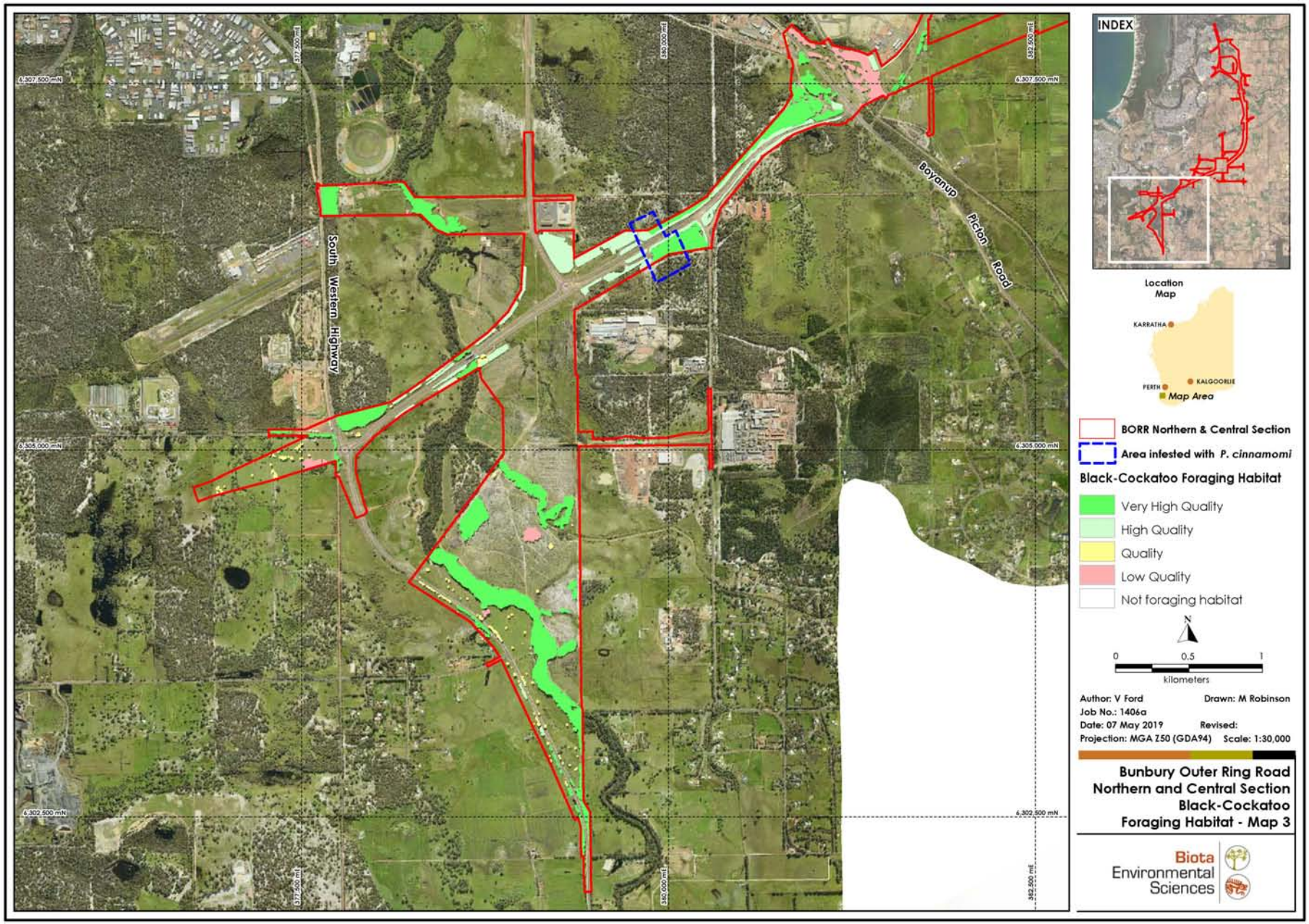

Figure 5.17: Foraging habitat quality and occurrence within the study area (southern section, map 3/3).

The black-cockatoo foraging habitat within the study area has been considered in the context of wider availability in Figure 5.18 by mapping the occurrence of each Swan Coastal Plain (DPaW 2017) vegetation complexes both within the study area and their occurrence in remnant vegetation out to a 12 km radius around the study area. The figure illustrates the small amount of remnant vegetation remaining in the immediate vicinity of the study area corridor.

Four vegetation complexes occur within the study area (SCP Veg. 32, 33, 42 and 44), each is defined in Table 5.7 and their occurrence (in hectares) both within the study area and out to a 12 km radius presented. The Bassendean Complex Central and South (SCP Veg. 44) occurrence within the study area is continuous with much larger extents within the wider area. The same was generally true for the Southern River Complex (SCP Veg. 42) with the exception of the area of this vegetation complex that occurred within the Northern Lots, which is generally isolated from its wider occurrence. The Swan Complex (SCP Veg. 33) within the study area represented the riparian vegetation of the Preston River. This complex is more limited in occurrence with the study area containing 3.5% of its occurrence within 12 km. This complex represents lower quality foraging habitat for black-cockatoos being generally devoid of preferred foraging plants (e.g. Marri, Jarrah and *Banksia* absent).

Table 5.8: Occurrence of the Swan Coastal Plain (DPaW 2017) vegetation complexes within the study area and

SCP ID	Complex Name	Complex Definition	Study Area (ha)	Remnant within 12 km (ha)
32	Guildford Complex	A mixture of open forest to tall open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) and woodland of *Eucalyptus wandoo* (Wandoo) (with rare occurrences of *Eucalyptus lane-poolei* (Salmon White Gum)). Minor components include *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark).	19.4	1021.8
33	Swan Complex	Fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) with localised occurrence of low open forest of *Casuarina obesa* (Swamp Sheoak) and *Melaleuca cuticularis* (Saltwater Paperbark).	24.8	716.3
42	Southern River Complex	Open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) along creek beds.	40.5	2045.7
44	Bassendean Complex-Central and South	Vegetation ranges from woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - *Banksia* species to low woodland of *Melaleuca* species, and sedgelands on the moister sites. This area includes the transition of *Eucalyptus m*arginata (Jarrah) to *Eucalyptus todtiana* (Pricklybark) in the vicinity of Perth.	34.4	3834.2

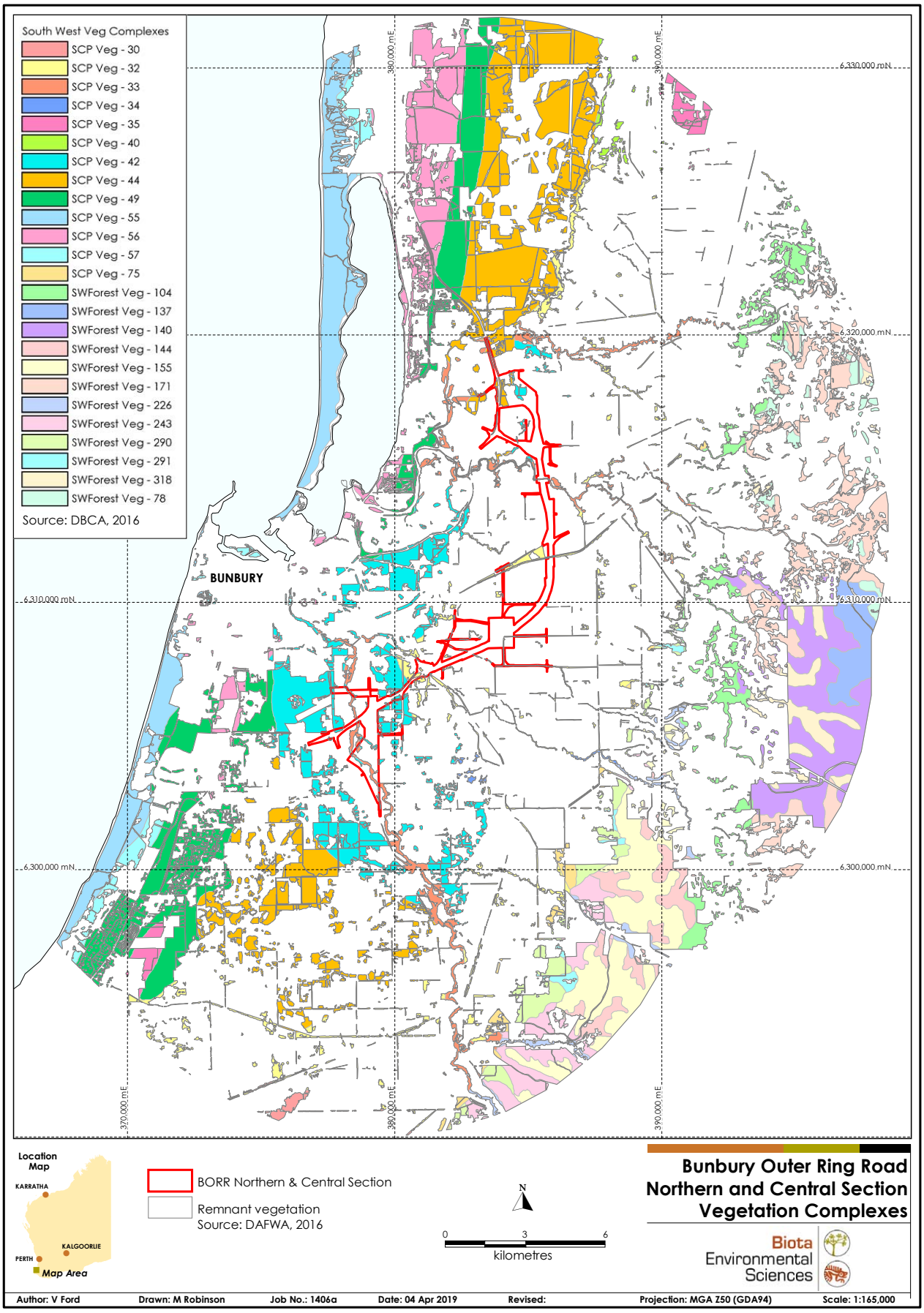

Figure 5.18: Remnant vegetation and Swan Coastal Plain Vegetation Mapping (DPaW 2017) within a 12 km radius of the study area.

5.5 Brush-tailed Phascogale

Two Brush-tailed Phascogales were observed within the study area, while an additional eight records of the species were made in close proximity (Figure 5.19). All individuals were observed while conducting nocturnal searches. Both records from the study area were from riparian vegetation, however the species has been recorded from woodland habitats away from water in the local area.

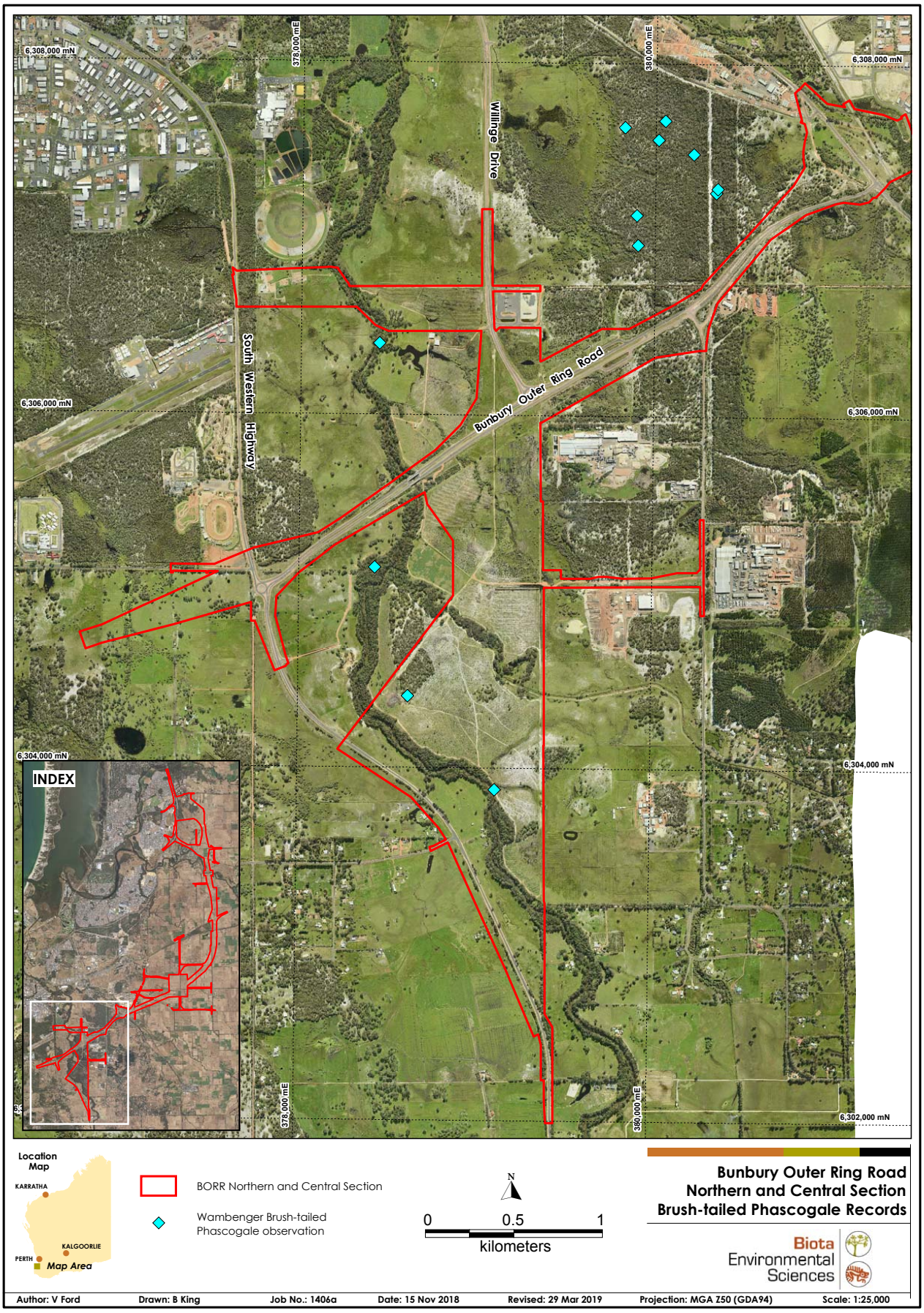

Figure 5.19: Records of the Brush-tailed Phascogale from within the study area and contextual sites nearby.

5.6 Carter's Freshwater Mussel

Carter's Freshwater Mussel was recorded within the study area (see Plate 5.8 and Plate 5.9), and immediately adjacent at two other locations on the same segment of the Preston River (Figure 5.20). It is likely to occur at other locations along the Preston River with the study area.

Plate 5.8: Carter's Freshwater Mussel shells on the bank of the Preston River within the study area.

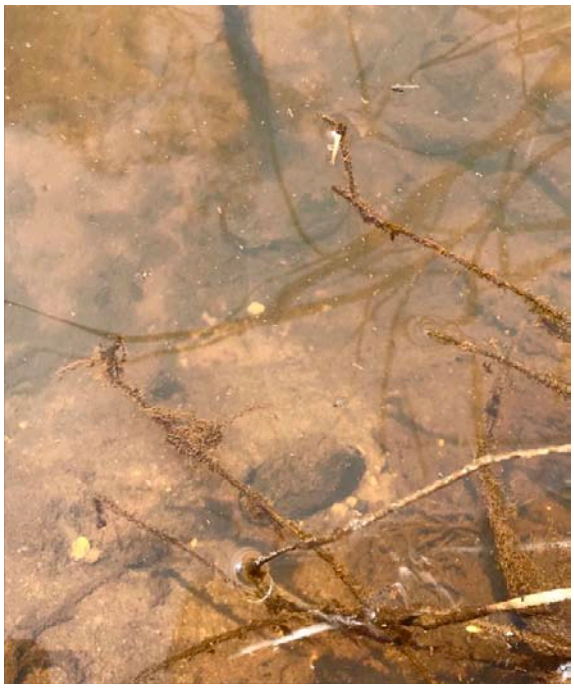

Plate 5.9: Live Carter's Freshwater Mussel *in situ* in the shallow banks of the Preston River within the study area.

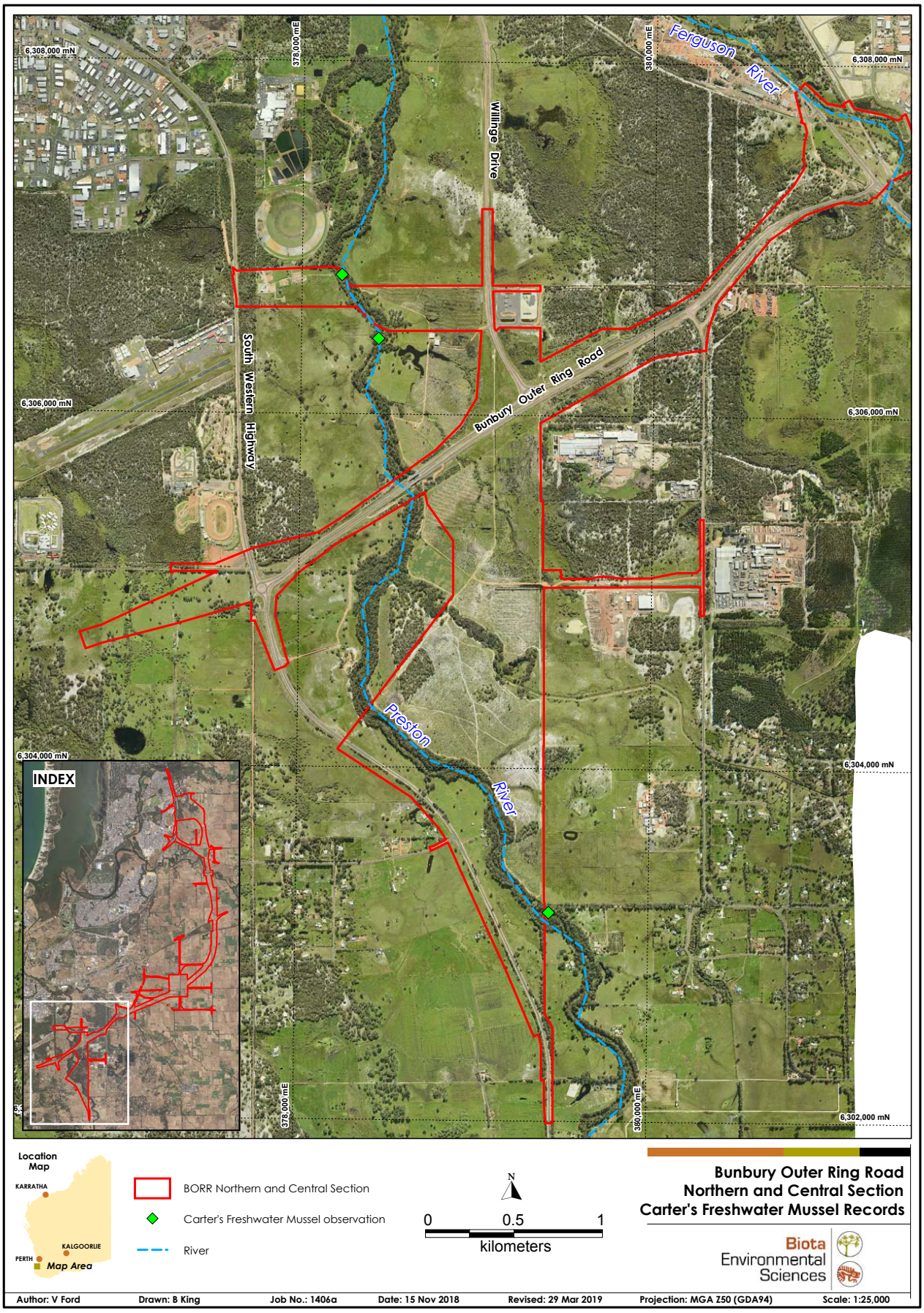

Figure 5.20: Records of Carter's Freshwater Mussel within the study area and from contextual work nearby.