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FIELD SURVEY OF ENVIRONMENTAL VALUES FOR AN OFFSET PROPOSAL Prepared for Carbone Bros Pty Ltd Lot 5 Wellesley Road, Wellesley Shire of Harvey

1. INTRODUCTION

This letter report has been prepared to provide the results of a field survey undertaken to determine the environmental values of proposed offset areas; associated with native vegetation clearing for an extension to a current sand mining operation. A location map is provided as Figure 1. The objective of the study is to identify an appropriate offset proposal to counterbalance the residual impacts of the proposed clearing.

The requirement for this field survey arises from correspondence received from the Department of Water and Environmental Regulation (DWER) dated 1 September 2020, in response to an application for a Purpose Permit under section 1E(1) of the *Environmental Protection Act 1986* to:

- clear 5.18ha of native vegetation within Lot 5 on Plan 5888, Wellesley for the purpose of sand extraction (Reference CPS 8561/1).

A copy of this correspondence is provided as Appendix 1 to this letter report.

DWER's preliminary assessment identified that a number of flora taxa and/or fauna species protected under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are likely to be found in, or in proximity to, the application area. This includes:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*), the Forest Red-Tailed Black Cockatoo (*Calyptorhynchus banksii subsp. naso*); and
- the Commonwealth listed Threatened Ecological Community (TEC) '*Banksia woodlands of the Swan Coastal Plain IBRA Bioregion*'.

The offset proposal set out in the application was deemed by DWER to be insufficient to counterbalance the residual impacts of the proposed clearing, even after the implementation of avoidance and minimization techniques. DWER carried out some preliminary calculations; using a calculation broadly consistent with the Commonwealth Department of Environment and Energy offset calculator; as a guide to identify a satisfactory size of environmental offset for this application. Results of these calculations are provided in Schedule 1, Appendix 1.

Lundstrom Environmental Consultants assessed several options (using desktop techniques and mapping tools) for achieving the environmental offsets identified in Schedule 1. These were presented to DWER via email in late September 2020 and correspondence undertaken with [REDACTED] (Environmental Officer) DWER Native Vegetation Regulation / Regulatory Services.

DWER provided the following response in an email dated 29 September, 2020.

“In order to clear the trees on the proposed 5.18ha area, an area of more than 20ha needs to be put aside as an offset. However, before these areas can be finalized as an offset area DWER need the information stated below to confirm these areas will be habitat for Western Ringtail Possums and that the vegetation is similar to that of the proposed clearing area.

Much of the area is mapped as the ‘Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region’ PEC and commonwealth TEC and therefore is likely to be suitable to offset the impacts to the TEC and to foraging habitat for black cockatoos. However, DWER has no information as to how the offset would provide habitat for Western Ringtail Possum in the area.

Given the flora and vegetation survey associated with the application did not cover any of the areas to be offset, DWER cannot be certain of the environmental values or vegetation types contained within the areas proposed to be offset. As such, could you please provide DWER with an offset proposal which outlines the environmental values to be retained within the areas to be offset? This may include the vegetation types and vegetation condition etc.”

2. SCOPE OF THE SURVEY

Based on DWER’s letter advice and subsequent correspondence, a field survey is required to be undertaken to assess the environmental values of proposed offset areas.

Specifically, the scope is to determine:

- i) vegetation types and the vegetation condition within proposed offset areas;
- ii) the associated environmental values within proposed offset areas, in particular as to how the offset would provide habitat for the Western Ringtail Possum; and
- iii) suitably sized offset areas, based on the preliminary calculations in Schedule 1, Appendix 1. A breakdown of these areas in relation to their values are summarized in Table 1.

Table 1. Summary of DWER Calculated Offset Areas Based on Values

Approximate Size	Values of Native Vegetation
27.99ha by conserving remnant native vegetation (in a ‘Very Good’ condition). It is noted that that these values can all be present within one larger remnant.	
17.75ha	that provides suitable habitat for Western Ringtail Possums
10.24 ha	that provides suitable habitat for black cockatoo foraging
7.32ha	that provides vegetation representative of the Commonwealth listed TEC ‘Banksia Dominated Woodlands of the Swan Coastal Plain’
OR 13.46ha revegetation (from a ‘Good’ to ‘Very Good’ condition) may be sufficient	
7.95ha	that provides suitable habitat for Western Ringtail Possums
5.51ha	that provides suitable habitat for black cockatoo foraging
3.94ha	provides vegetation representative of the Commonwealth listed TEC ‘Banksia Dominated Woodlands of the Swan Coastal Plain’

It is noted by DWER that:

- a) these calculations have assumed particular variables that directly impact on the adequacy of an offset, and as such are to be used as a guide only. The final offset areas may have differing variables and would alter the calculations accordingly; and
- b) for both sets of calculations in Table 1 that the acquisition or rehabilitation of vegetation representative of the Commonwealth listed TEC '*Banksia Dominated Woodlands of the Swan Coastal Plain*' could be included as part of the larger acquisition or rehabilitation of suitable foraging habitat for black cockatoos. This is given that the TEC vegetation is generally considered as high quality foraging habitat for black cockatoo species.

3. VEGETATION TYPES, CONDITION AND BOTANICAL VALUES OF THE PROPOSED CLEARING AREA

3.1 Vegetation Types

Plantecology Consulting conducted a detailed flora and vegetation field survey of the proposed clearing area, including an assessment of botanical values in September 2019. A copy of the report 'Lot 5 Wellesley Rd, Wellesley Flora and Vegetation Survey, January 2020' was attached to Clearing Permit Application CPS 8561/1. Information relevant to this offset proposal has been summarized below, while relevant figures and plates have been extracted and attached as Appendix 2.

The survey area identified two plant communities within the site:

Eucalyptus marginata - *Banksia attenuata* woodland (Plates 1-4, Appendix 2)

Open Woodland of *Eucalyptus marginata* and *Banksia attenuata* with *Agonis flexuosa* over *Banksia grandis* and a shrubland of *Xanthorrhoea gracilis* and *Hibbertia hypericoides* over a hermland of *Dasyogon bromeliifolius*, *Anarthria prolifera* and *Desmocladius fasciculatus* on grey sands.

Agonis flexuosa Woodland (Plate 5, Appendix 2)

Woodland of *Agonis flexuosa* with *Eucalyptus marginata* over open shrubland of *Xanthorrhoea gracilis*, *Macrozamia riedlei* and *Hibbertia hypericoides* over a hermland of *Dasyogon bromeliifolius* in grey sands.

Figure 2, Appendix 2 shows the distribution of these plant communities in the proposed clearing area. Note: the numbering of proposed offset areas on this figure do not correspond with the offset proposal detailed in this letter report.

3.2 Vegetation Condition

The *Eucalyptus marginata* - *Banksia attenuata* woodland is rated mostly as 'Good' or better with much of the original vertical structure intact as well as the original shrub and tree density. The native herbaceous understorey has been somewhat modified in some areas.

Most of the site is in an 'Degraded' condition or worse and retains only some of its original botanical value. This is mainly in the *Agonis flexuosa* woodland where the vegetation structure has been highly modified from past grazing activity, especially in the understorey, where native herbaceous species have largely been replaced by exotic species. The shrub mid-storey has also been largely lost.

Figure 3, Appendix 2 shows the vegetation condition as mapped in the proposed clearing area.

3.3 Botanical Values

3.3.1 Overview

The site retains some significant botanical values including the: presence of Priority Flora; a Commonwealth-listed TEC; vegetation complexes that have been significantly cleared; and is situated within a regionally significant ecological linkage.

3.3.2 Flora

No species of Threatened Flora were recorded during the survey.

One species of Priority Flora was recorded within the site. *Lasiopetalum ?membranaceum* was recorded at seven locations within the *Eucalyptus marginata* - *Banksia attenuata* woodland. This species is ranked as Priority 3 and occurs in sand over limestone mainly from the Perth region to the Busselton area.

3.3.3 Plant Communities

Eucalyptus marginata - *Banksia attenuata* woodland has an open overstorey with *Banksia attenuata* as a co-dominant, which is a key diagnostic characteristic for the Commonwealth-listed TEC '*Banksia dominated woodlands of the Swan Coastal Plain IBRA Region*'. For this TEC to be present, the condition of the vegetation needs to be 'Good' or better, which is the case for this woodland. As the extent of the community within the site exceeds 2 ha, it is likely that this community meets the criteria for inclusion in the '*Banksia-dominated woodlands of the Swan Coastal Plain IBRA Region*' TEC.

The *Agonis flexuosa* woodland is in a 'Degraded' condition, most likely from past grazing of the site. Due to the community's condition, it is not possible to assign a floristic community type, and therefore conservation category, with any degree of confidence. As *Agonis flexuosa* is a prominent part of the overstorey within the adjacent *Eucalyptus marginata* - *Banksia attenuata* woodland, it is possible this area also formed part of that same community.

The remnant vegetation within the site is within 100m of a regional ecological linkage axis line and forms part of a core asset of this linkage connecting vegetation to the southeast and northwest of the site (Molloy et al. 2009). This linkage is identified as the McLarty/ Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage in the Greater Bunbury Region Scheme (EPA 2003). Naturally vegetated areas (in particular the larger relatively intact remnants) in the area of the linkages are priorities for retention and protection. Also, as the site is outside the constrained area as identified in the Greater Bunbury Region Scheme (EPA 2003). The two vegetation complexes mapped as occurring within the site (the Bassendean Complex – Central and South, and the Karrakatta Complex – Central and South) both have less than 30% of their original extent remaining, which may present an impediment to development.

3.4 Weeds

Fourteen of the taxa recorded during the survey are exotics (weeds). The most significant weed in the site is **Zantedeschia aethiopicum* (Arum Lily), which is a Declared Pest under the Biosecurity and Agriculture Management Act 2007.

4. FAUNA HABITAT ASSESSMENT OF THE PROPOSED CLEARING AREA

4.1 Level 1 Fauna Survey

Greg Harewood (B.Sc - Zoology) conducted a Level 1 fauna survey of the proposed clearing area in April 2018, as defined by the EPA 2016 guidelines. The assessment included a literature review and a field reconnaissance survey, including a nocturnal survey. Because some listed threatened species (e.g. several species of black cockatoo and the Western Ringtail Possum) are known to occur in the general area, the scope of the survey work was expanded to include a targeted assessment of the site's significance to these species.

A copy of the fauna report 'Fauna Assessment Lot 5 Wellesley Rd, Wellesley, April 2018 was attached to Clearing Permit Application CPS 8007/1. Information relevant to this offset proposal has been summarized below, while relevant figures and plates have been extracted and attached as Appendix 3.

4.2 Site Fauna Habitat Values

Because of the level of historical disturbance which has occurred in the proposed clearing area, fauna habitat values have been compromised significantly. This is mainly due to an absence of significant shrub and groundcover.

Because of its generally degraded state the area cannot be regarded as being of any specific local or regional conservation value when compared to other areas in the vicinity, much of which appears to be of a similar composition but generally in better condition (e.g. areas within the Kemerton Industrial Buffer Zone to the south and east).

The subject site is surrounded on three sides by areas of continuous native remnant vegetation and therefore it does not specifically represent a key "linkage" or "corridor" for wildlife movement. The relatively small amount of clearing is not likely to create any significant barriers to fauna movement on a local or regional scale.

4.3 Black Cockatoo Habitat Values

The proposed clearing site was found to contain 57 potential "black cockatoo breeding habitat trees" (DBH >50cm). Seven trees appeared to contain hollows with larger entrances (greater than ~10cm) that appeared big enough to possibly allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk, though none showed any sign of current or previous use by cockatoos for this purpose.

Sections of the subject site represent black cockatoo foraging habitat mainly given the presence of jarrah and to a much lesser extent banksia and marri, though the exact extent is difficult to quantify given the tree species in question vary in density from area to area.

No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

There are significant areas of similar habitat in vegetation bordering the subject site and it can be reasonably expected that these also contain numerous "habitat trees" many of which are likely to provide both breeding, roosting and foraging opportunities for black cockatoos.

4.4 Western Ringtail Possum Habitat Values

The subject site does contain what superficially looks like suitable habitat for the species (i.e. peppermint trees) however no evidence of western ringtail possums utilising the subject site was found during the day or night surveys (i.e. dreys, scats or individuals). This would suggest that they were either absent from the area surveyed or present in very low densities. Western Ringtail Possums have therefore been listed as a potential species as a precautionary measure but they may in fact not use the site except on rare occasions.

Previous surveys carried out by the Author in this general area (i.e. east of Forrest Highway) have also failed to find individuals of the species, though it is very likely to occur at some locations, in particular along the Wellesley/Brunswick Rivers further to the south and eastwards of the subject site.

5. APPROACH TO FIELD SURVEY FOR THE OFFSET PROPOSAL

5.1 Selection of Offset Areas for Assessment

Lundstrom Environmental Consultants selected the areas for assessment by a field survey by undertaking:

- i) a review of the results of the Lot 5 Wellesley Rd, Wellesley Flora and Vegetation Survey, January 2020; in particular vegetation type, vegetation condition and botanical values such as Priority Flora;
- ii) a review of the results of the Fauna Assessment Lot 5 Wellesley Rd, Wellesley, April 2018; in particular the habitat values for the Black Cockatoo and Western Ringtail Possums; and
- iii) discussions with the landowner on the broader site values, with a focus on locating the presence of Peppermint trees within a native remnant vegetation context, i.e. not primarily as re-growth in a parkland cleared setting as a result of historic grazing or clearing practices. The purpose of this was to locate habitat for the Western Ringtail Possum.

The approach taken was to focus on identifying at least 28ha of remnant native vegetation to be conserved as an offset, rather than a proposal that focused on revegetation of approximately 13.5ha (see Table 1). Remnant bushland on both Lot 5 and Lot 6 were considered as a result of discussions with the landowner.

Areas to be assessed using field survey techniques were then selected based on the density of vegetation from an aerial photograph and where there appeared to be the least disturbance from previous or current land practices. Four areas ranging from 5.5ha to 15ha were identified, as shown on Figure 2, Field Survey Areas for An Offset Proposal.

5.2 Approach

A summary of the approach to the field survey is provided below:

Field surveys were conducted over two separate days, on 28th October and 11 November 2020. A minimum of two environmental scientists were present, including one qualified zoologist.

Survey area boundaries were loaded into a hand held GPS for location in the field. Reference sites were also pre-loaded as waypoints into the GPS prior to the survey to allow the inspection of the vegetation types and condition ratings assigned by Plantecology (Figure 2 and Figure 3, Appendix 2). Vegetation condition categories and ratings used by Plantecology were based on the scale developed by Keighery, 1994 (Appendix 2).

A walkover within survey areas was carried out to record the following:

- vegetation type, vegetation condition rating (Keighery, 1994) and the presence of Priority 3 Flora, *Lasiopetalum membranaceum* ; as well as
- habitat values including number of hollows, size of hollows, nests, the presence of scats, dreys, any other signs of foraging or direct observation of fauna activity.

Photographs and GPS waypoints were taken at key observation points and of representative sites within a survey area. This included where there was a change in vegetation type, condition rating, or where habitat values were noted. *Eucalyptus marginata* trees with at least one hollow were mapped as habitat trees.

Survey Area 1 (5.5ha) and Survey Area 3 (10.3ha) were completed on the first day. This involved walking transects (from boundary to boundary) and recording all data within an approximate 10m to 15m width zone.

A broader survey approach was carried out for the second field day to focus on finding Peppermint (*Agonis flexuosa*) trees within remnant native vegetation to locate suitable Western Ringtail Possum habitat. This involved an additional task of mapping the percentage of Peppermint trees within the plant communities in Survey Area 2 and Survey Area 4. This approach was adopted based on the following description of Western Ringtail Possum habitat by Jones *et al.* 1994:

“Along the Swan Coastal Plain near Busselton the highest densities occur in habitats with dense, relatively lush vegetation. In these areas the main determinants of suitable habitat for Western Ringtail Possums appears to be the presence of Agonis flexuosa either as the dominant tree or as an understorey component of Eucalypt forest or woodland”.

A summary of the approach adopted is provided in Table 2.

Table 2. Details of the Approach to the Field Survey

Survey Area	Survey Approach
1	Two x north-south axis transects approximately 50m apart through the central western and central eastern portions of the area.
2	Four x north-south axis transects 150m to 250m apart, and other point locations where changes in the percentage of Peppermint trees in the remnant mix was recorded.
3	Two x north-south axis transects, approximately 200m apart along the central western and central eastern portions of the area. One additional transect on an east-west axis, slightly north of the midway line.
4	A series of short approximate 50m walk in/out lines (ie not full length transects) from five points accessed from the perimeter track. The percentage of Peppermint trees in the remnant mix was recorded.
Note: a walk through of the Conservation Covenant Area (13.49ha) to the north west of the site was also carried out to determine if any Peppermint trees were present as potential Western Ringtail Possum habitat.	

6. RESULTS OF THE FIELD SURVEY AND DETAILS OF THE OFFSET PROPOSAL

6.1 Identification of Suitably Sized Offset Areas

Lundstrom Environmental Consulting have identified a suitably sized offset proposal with the appropriate environmental values, as per the preliminary calculations in Schedule 1, Appendix 1 (and summarized in Table 1 of this letter report). Proposed offset areas are shown in Figure 3. Vegetation types have also been included on this Figure.

Proposed offset areas comprise a total of 28.10ha through the conservation of remnant native vegetation, in a mix of Good, Very Good and Excellent Condition. Table 3 provides a breakdown of the size of offset areas in relation to the native vegetation values mapped in the field survey.

Table 3. Size of Environmental Value Areas Within the Offset Proposal

Approximate Size	Values of Native Vegetation
DWER Calculations: 27.99ha by conserving remnant native vegetation (in a 'Very Good' condition). It is noted that that these values can all be present within one larger remnant.	
17.75ha	that provides suitable habitat for Western Ringtail Possums
10.24 ha	that provides suitable habitat for black cockatoo foraging
7.32ha	that provides vegetation representative of the Commonwealth listed TEC ' <i>Banksia Dominated Woodlands of the Swan Coastal Plain</i> '
Offset Proposal: 28.10ha by conserving remnant native vegetation (in a 'Good', 'Very Good' and 'Excellent' condition).	
19.50ha	that provides suitable habitat for Western Ringtail Possums.
28.10ha	that provides suitable habitat for black cockatoo foraging
28.10ha	provides vegetation representative of the Commonwealth listed TEC ' <i>Banksia Dominated Woodlands of the Swan Coastal Plain</i> '

6.2 Vegetation Type

As can be seen from Table 3, the entire proposed offset area (28.1ha) has been mapped as vegetation representative of the Commonwealth listed TEC '*Banksia Dominated Woodlands of the Swan Coastal Plain*'. Mature *Banksia attenuata* is co-dominant with *Eucalyptus marginata* over the offset area. Refer to Photographic Plates 1 to 12.

Variations were noted within this woodland community, particularly in relation to the percentage of Peppermint trees (*Agonis flexuosa*) present as part of the overstorey and understorey mix. Results have been mapped on Figure 3. Survey Area 1 and Survey Area 2 had the highest percentage of Peppermint trees. Combined, these areas will provide 19.50ha of suitable habitat for the Western Ringtail Possum. Refer to Photographic Plates 1 to 8.

6.3 Vegetation Condition

Offset areas have been selected based upon the best condition ratings recorded in the field survey. Vegetation condition for the offset proposal is shown in Figure 4.

Offset Area 1 and Offset Area 2 range from 'Good' to 'Very Good'. The vertical structure is largely intact in these areas, apart from signs of historic logging of some of the larger Eucalyptus. Alterations to the basic vegetation structure in these offset areas primarily related to the absence of a shrub mid storey and herbaceous understorey layer. The patchy nature of the missing vegetation layers may be due to the associated disturbance with logging activities, intermittent fire, grazing and/or the edge effects of maintaining fire breaks.

In excess of 75% of the vegetation structure in Offset Area 3 is intact and as such has been assigned a condition rating of 'Very Good' or 'Excellent'. Occasional stumps of Eucalyptus trees, indicative of logging, was the main disturbance noted.

No *Phytophthora sp.* affected areas were recorded during the field survey. Similarly, the presence of aggressive weeds were not observed in the transect areas. Exotic grasses formed the main weed population in disturbed areas.

6.4 Environmental Values

Environmental values for the proposed offset area are mapped in Figure 5.

6.4.1 Black Cockatoo Foraging Habitat

The entire offset area is considered high quality foraging habitat for black cockatoo species, given the occurrence of *Eucalyptus marginata* with *Banksia attenuata* (and to a lesser extent *Banksia grandis*) mapped in all of the field survey areas (Figure 3).

There was little direct foraging evidence (i.e. chewed nuts around the base of trees) although given the large areas to be traversed, the nature of the survey focused on mapping the extent of potential foraging habitat in offset areas. Survey Area 3, in particular, provides ideal foraging habitat given that the vegetation structure is intact (i.e. assigned a 'Very Good' to 'Excellent' condition rating) and due to the density of mature *Banksia* trees (>30cm diameter at breast height). Refer to Photographic Plates 9 to 12.

A walk through of the Conservation Covenant Area (13.49ha) to the north west of the site (Figure 2) identified abundant evidence of recent black cockatoo foraging, mainly on chewed *Banksia* cones. Refer to Photographic Plates 13 and 14. A small flock of Forest Red-Tailed Black Cockatoo (8 individuals) were also observed in Eucalypt trees near the house and sheds on the second day of the field survey. Refer to Photographic Plates 15 and 16. The landowner reported them as regular visitors to the property, often to source water from the trough near the shed. These observations indicate that black cockatoos are current users of habitat on Lot 5 Wellesley Rd.

A total of 53 *Eucalyptus marginata* habitat trees with large hollows (>10cm diameter) were recorded in the proposed offset areas. Habitat trees typically had a >50cm diameter at breast height. These have the potential to be used by black cockatoos for nesting/breeding. Four of these habitat trees were noted to contain feral bee hives (*Apis mellifera*). This species competes with black cockatoos for use of the hollows, making them unsuitable for nesting sites where bees are present.

6.4.2 Western Ringtail Possum

A 19.50ha area of suitable habitat type for the Western Ringtail Possum has been identified in this offset proposal (see Section 6.2).

No dreys or direct sightings were observed in the two days of field survey.

Habitat trees with hollows may be used as refuge sites for the Western Ringtail Possum and are a key component of the core habitat for this species (Department of the Environment, Water, Heritage and the Arts, 2009). A total of 82 habitat trees with a variety of hollow sizes were recorded in the field survey; those with large hollows located within proposed offset areas are mapped on Figure 5. Refer to Photographic Plates 1, 2 and 12.

Possum scats were recorded across all of the proposed offset areas, including woodland without the presence of *Agonis flexuosa*. Individual scats were generally found in clusters of 3 to 5 and were primarily observed deposited along the top surface of fallen tree trunks. The possums use these areas as runways or paths to move around the site. Some scats were also found on tree stumps and in leaf litter at the base of trees. Variations in scat morphology are shown on Photographic Plates 17 to 22. The majority of scat forms are attributed to the Common Brushtail Possum with 6 of the 22 scat recordings potentially representing the Western Ringtail Possum.

6.4.3 Priority 3 Flora

Priority 3 Flora *Lasiopetalum membranaceum* was recorded in all transects in Offset Area 1 and Offset Area 2, Figure 5. This P3 ranked species was most abundant in Offset Area 2 where it often occurred as clusters of groundcover plants in close proximity. One GPS waypoint can therefore represent groups of individual plants that occur within an approximate 3m radius.

This species was also recorded at one location along the western edge of Survey Area 3 and at several locations within Survey Area 4, Figure 2.

7. SUMMARY AND DISCUSSION

The objective of this study was to identify an appropriate offset proposal to counterbalance the residual impacts of the proposed clearing of 5.18ha of native vegetation on Lot 5/Plan 5888, Wellesley. DWER provided guidance on the level of detail required to allow an assessment of an offset proposal for this site. Results of the field survey are discussed below in relation to the items specified by DWER, that form the scope of the study.

Item 1. An area of more than 20ha needs to be put aside as an offset.

The offset proposal is to conserve 28.1ha of remnant native vegetation. Native vegetation with the appropriate environmental values specified by DWER were identified in three offset areas that share a common boundary with (to varying degrees) the proposed clearing area, as shown on Figure 3.

Item 2. Confirm the vegetation is similar to that of the proposed clearing area.

Plantecology Consulting (September 2019) identified two vegetation types in the proposed clearing area, being: i) *Eucalyptus marginata* - *Banksia attenuata* woodland; and ii) *Agonis flexuosa* woodland. The following observations were then made in the detailed flora and vegetation field survey of the proposed clearing area:

“*Agonis flexuosa* woodland is in a ‘Degraded’ condition, most likely from past grazing of the site. Due to the community’s condition, it is not possible to assign a floristic community type, and therefore conservation category, with any degree of confidence. As *Agonis flexuosa* is a prominent part of the overstorey within the adjacent *Eucalyptus marginata* - *Banksia attenuata* woodland, it is possible this area also formed part of that same community.”

Results of the field survey for this offset proposal support these observations, in that the entire offset proposal area and the broader areas surveyed were mapped as *Eucalyptus marginata* - *Banksia attenuata* woodland. Variations were noted within this woodland community, in relation to the percentage of Peppermint trees (*Agonis flexuosa*) present as part of the overstorey and understorey mix. This was evident in Offset Area 1 and Offset Area 2 situated along the northern boundary of Lot 5, while Offset Area 3 had a minimal occurrence of this species in the woodland (Figure 3).

Item 3. Confirm that the offset would provide habitat for Western Ringtail Possums

Jones *et al.* 1994 provide the following description of Western Ringtail Possum habitat:

“Along the Swan Coastal Plain near Busselton the highest densities occur in habitats with dense, relatively lush vegetation. In these areas the main determinants of suitable habitat for Western Ringtail Possums appears to be the presence of Agonis flexuosa either as the dominant tree or as an understorey component of Eucalypt forest or woodland”.

This offset proposal has identified a suitably sized area (19.50ha) of appropriate vegetation type (see Item 2) with key components of core habitat values required to support the Western Ringtail Possum. Habitat values included the presence of 82 habitat trees with hollows of various sizes. These may be used as refuge sites for the Western Ringtail Possum.

The DWER calculations in Table 1 indicated that areas of remnant vegetation to be retained should be in Very Good condition. Offset Area 2 was below this condition rating over a portion of the site, being mapped as both Good and Very Good, Figure 4. The total size of the offset area for Western Ringtail Possum habitat (19.50ha) is however larger than the 17.75ha identified in Table 1.

Although there were no dreys or direct sightings of the Western Ringtail Possum in the field survey, possum scats were recorded across all of the proposed offset areas (including woodland without the presence of *Agonis flexuosa*). The majority of scats are largely attributed to the Common Brushtail Possum. Six of the 22 scats deposits were identified as potential Western Ringtail Possum. These species are known to co-occur in areas (Department of the Environment, Water, Heritage and the Arts, 2009). The Common Brushtail Possum may compete with the Western Ringtail Possum for refuge sites, although in some study sites this may result in natural habitat partitioning to allow the two species to co-exist (Department of the Environment, Water, Heritage and the Arts, 2009).

In terms of the likelihood of the Western Ringtail Possum being present on Lot 5 Wellesley Rd, the Level 1 Fauna Assessment report concluded that this species may use Lot 5 Wellesley Rd on rare occasions, and if so, is likely present in very low densities. The Western Ringtail Possum is considered most likely to occur in the general area (east of the Forest Highway) in denser riparian vegetation along the Wellesley/Brunswick Rivers, further to the south and east of the subject site (Harewood, 2018).

Item 4. Provide details of the vegetation type, condition and environmental values of areas to be offset

Details of the vegetation type are provided in Item 2. Areas to be offset (28.1ha) have been assigned a vegetation condition rating of Good, Very Good or Excellent (Figure 4). The condition rating and size (>2ha) meets the criteria for this vegetation type to be considered representative of the Commonwealth listed TEC '*Banksia Dominated Woodlands of the Swan Coastal Plain*'.

This TEC vegetation type is generally considered as high-quality foraging habitat for black cockatoo species. The presence of 53 recorded habitat trees with large hollows (>10cm diameter) provides additional environmental value for this species in relation to the potential for nesting/breeding. Four of the habitat trees were occupied by feral bee hives (*Apis mellifera*).

Habitat values of the proposed offset areas in relation to the Western Ringtail Possum have been demonstrated in Item 3.

Priority 3 Flora *Lasiopetalum ?membranaceum* was recorded in all transects in Offset Area 1 and Offset Area 2 to the north of the proposed clearing area.

No *Phytophthora sp.* affected areas were recorded during the field survey. Aggressive weeds were not observed in the transect areas. Exotic grasses formed the main weed population in disturbed areas.

This offset proposal contributes important environmental value to the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage in the Greater Bunbury Region Scheme (EPA 2003). The remnant vegetation within Lot 5 Wellesley Rd is within 100m of this regional ecological linkage axis line and forms part of a core asset of this linkage connecting vegetation to the southeast and northwest of the site (Molloy et al. 2009). Naturally vegetated areas, in particular the larger relatively intact remnants, in the area of the linkages are priorities for retention and protection (Plantecology, 2019).

4. REFERENCES

Department of the Environment, Water, Heritage and the Arts (2009). Background Paper to EPBC Act Policy Statement 3.10 - Nationally Threatened Species and Ecological Communities Significant impact guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia

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Figures

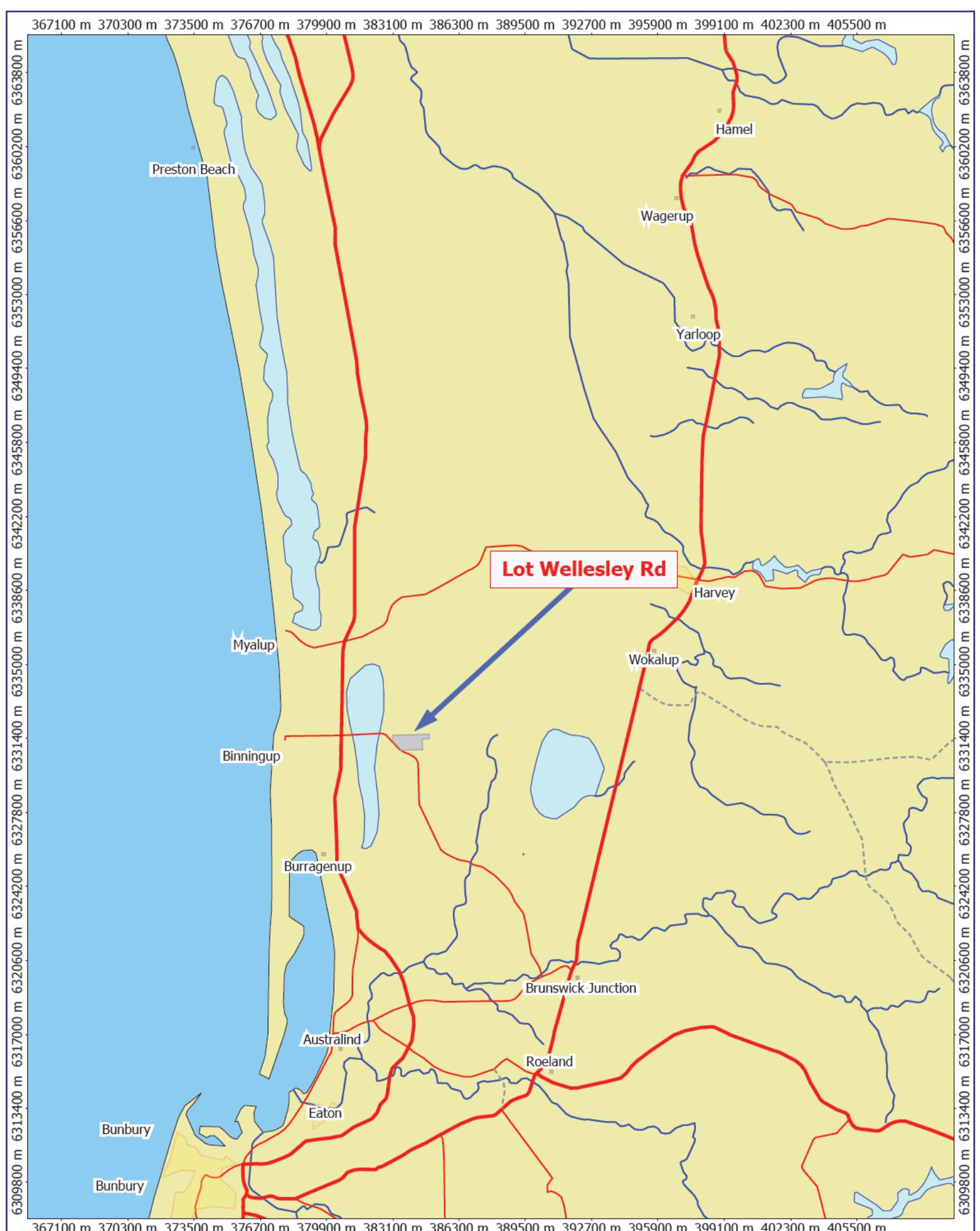
Figure 1 - Location Map.

Figure 2 - Field Survey Areas for an Offset Proposal.

Figure 3 - Vegetation Type of Proposed Offset Areas.

Figure 4 - Vegetation Condition of Proposed Offset Areas.

Figure 5 - Environmental Values of Proposed Offset Areas.

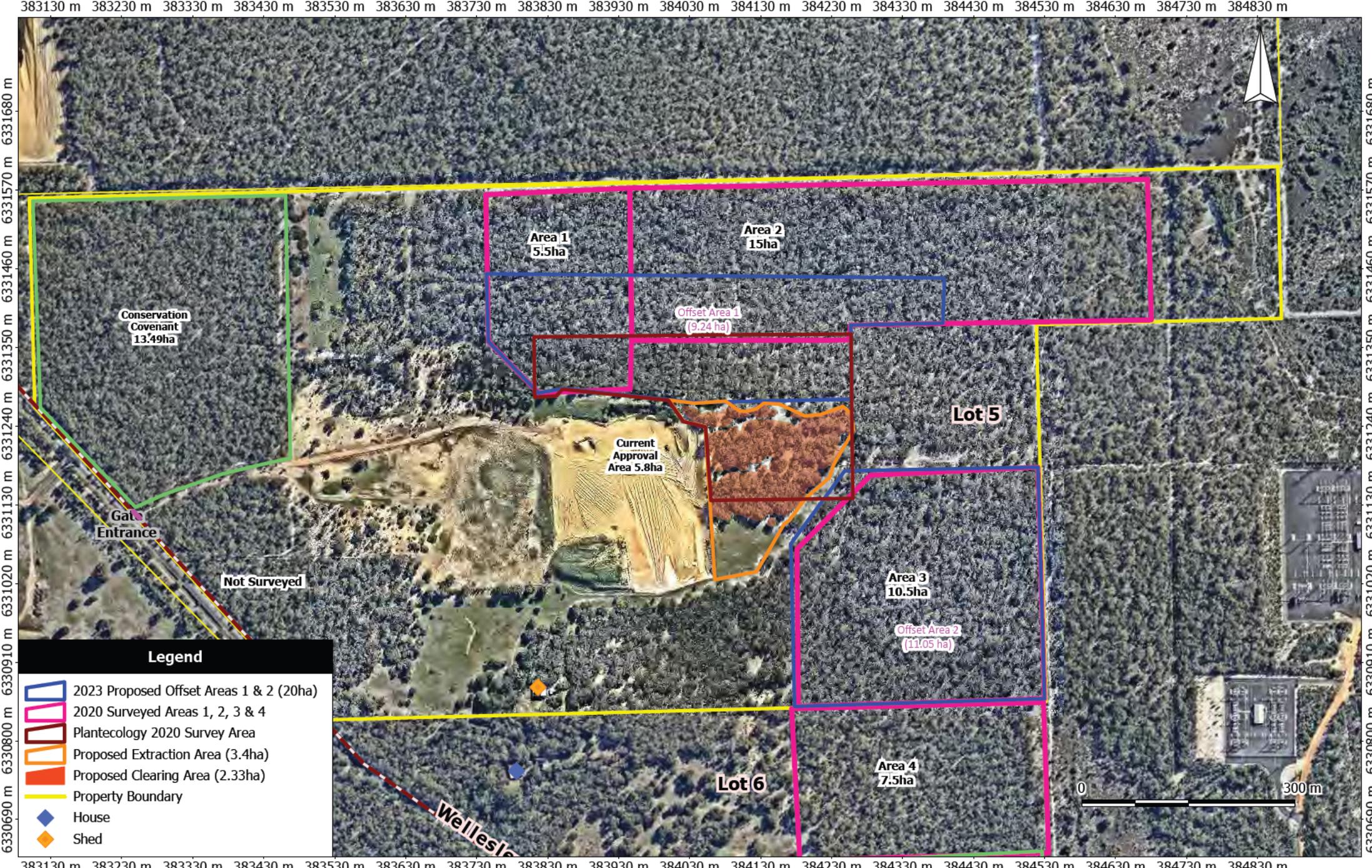


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Client: Carbone Bros
Project: Sand Extraction
Location: Lot 5 Wellesley Rd
Wellesley

**Figure 1:
Locality Plan**



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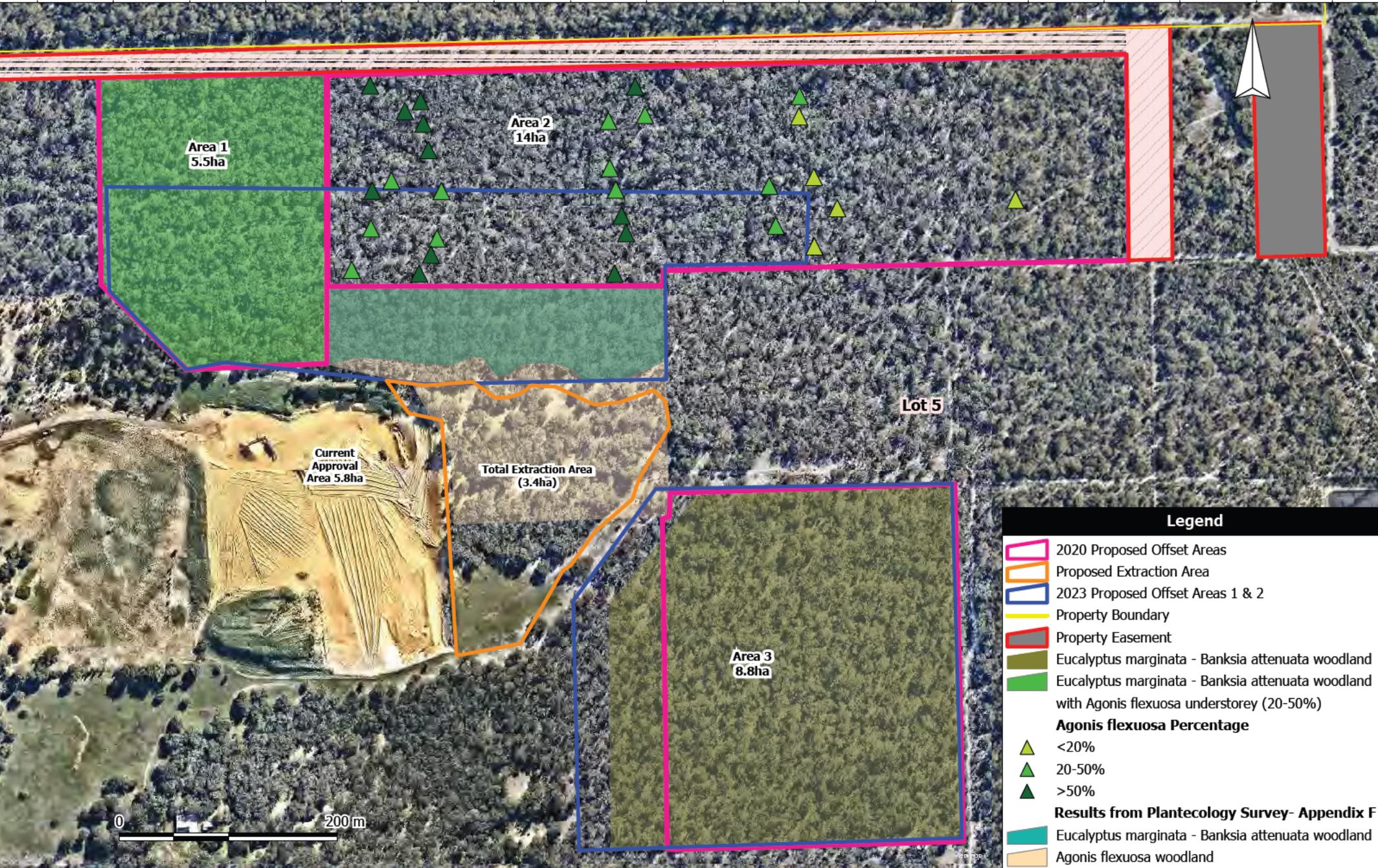
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 Datum: GDA94
 Projection: Australia MGA94 (50)

Client: Carbone Bros Pty Ltd
 Project: Offset Proposal
 Location: Lot 5 Wellesley Rd, Wellesley

Figure 2
 Field Survey Areas for an Offset Proposal

383680 m 383750 m 383820 m 383890 m 383960 m 384030 m 384100 m 384170 m 384240 m 384310 m 384380 m 384450 m 384520 m 384590 m 384660 m 384730 m 384800 m 384870 m

6331510 m
6331430 m
6331350 m
6331270 m
6331190 m
6331110 m
6331030 m
6330950 m
6330870 m



383680 m 383750 m 383820 m 383890 m 383960 m 384030 m 384100 m 384170 m 384240 m 384310 m 384380 m 384450 m 384520 m 384590 m 384660 m 384730 m 384800 m 384870 m

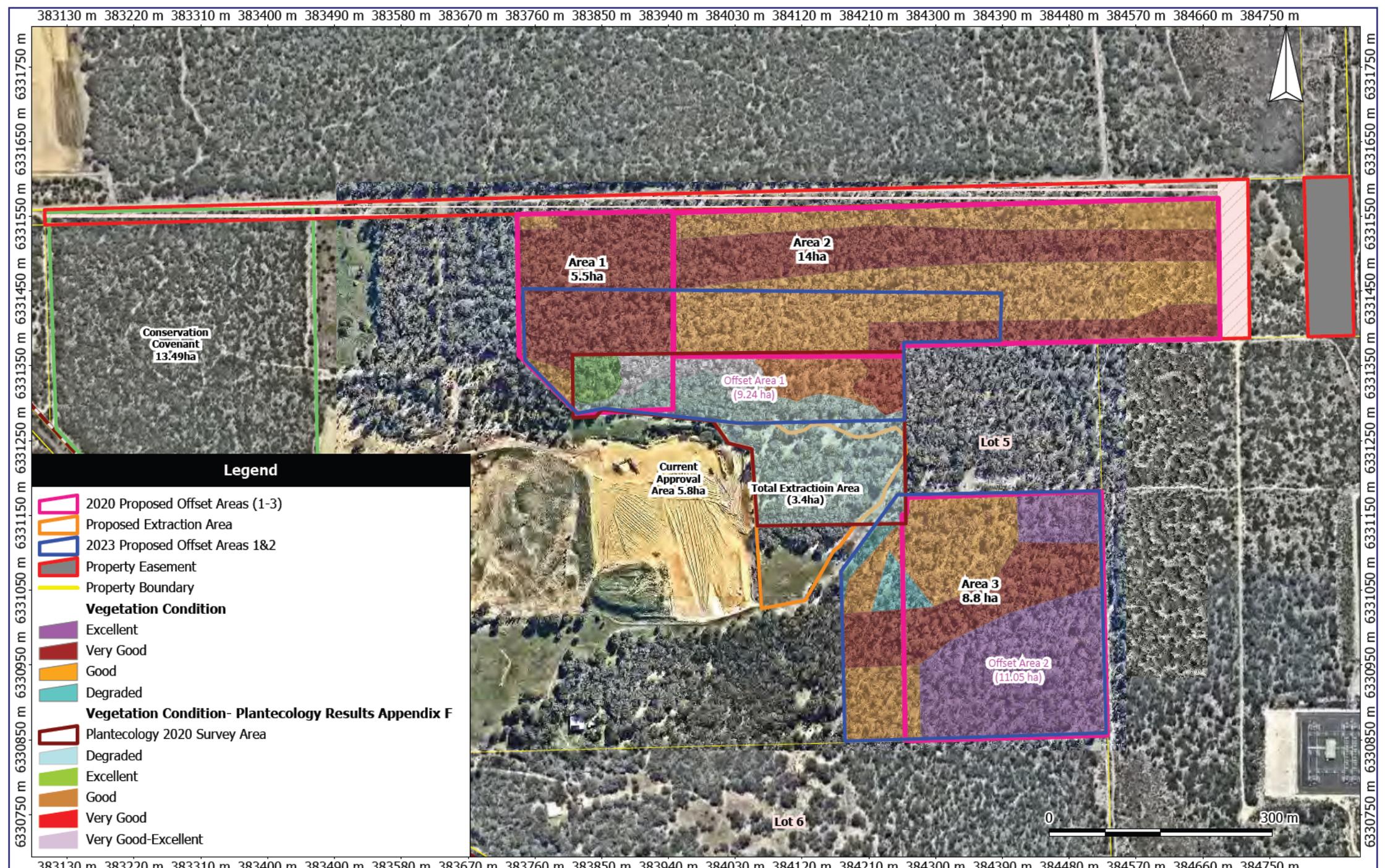


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Projection: Australia MGA94 (50)

Client: Carbone Bros Pty Ltd
Project: Offset Proposal
Location: Lot 5 Wellesley Rd,
Wellesley

Figure 3
**Vegetation Type of Proposed
Offset Areas**



383130 m 383220 m 383310 m 383400 m 383490 m 383580 m 383670 m 383760 m 383850 m 383940 m 384030 m 384120 m 384210 m 384300 m 384390 m 384480 m 384570 m 384660 m 384750 m

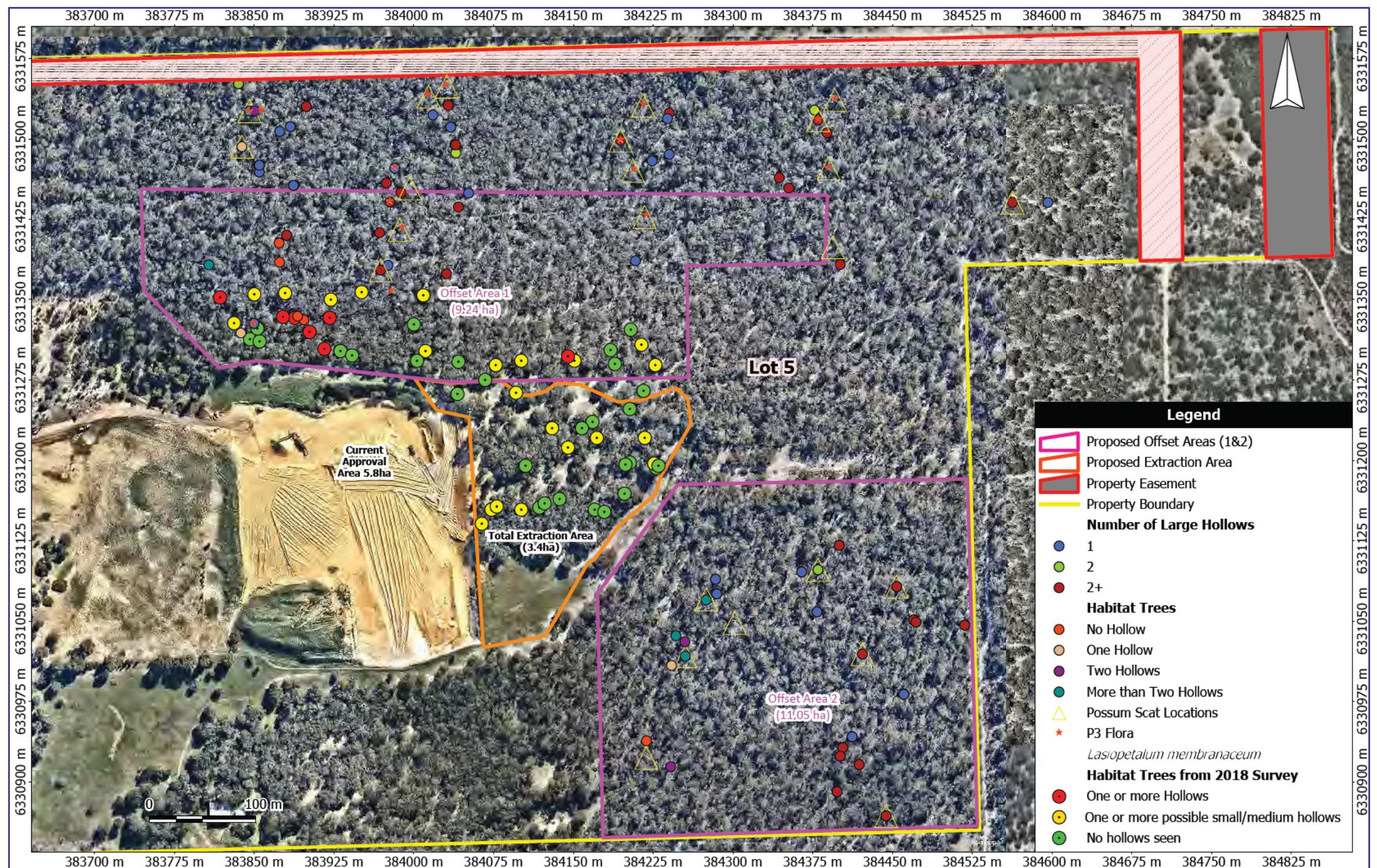


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Datum: GDA94
Projection: Australia MGA94 (50)

Client: Carbone Bros Pty Ltd
Project: Offset Proposal
Location: Lot 5 Wellesley Rd,
Wellesley

Figure 4
**Vegetation Condition of Proposed
Offset Areas**



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 Datum: GDA94
 Projection: Australia MGA94 (50)

Client: Carbone Bros Pty Ltd
 Project: Offset Proposal
 Location: Lot 5 Wellesley Rd, Wellesley

Figure 5
Environmental Values of Proposed Offset Areas

Photographic Plates

OFFSET AREA 1:

Open Woodland of *Eucalyptus marginata* and *Banksia attenuata* with *Agonis flexuosa*.



Plate 1. Habitat tree with multiple hollows.



Plate 2. Habitat tree with multiple hollows.



Plate 3. Woodland patch with a higher percentage of *Banksia attenuata* and *Banksia grandis*.



Plate 4. Woodland patch with a higher percentage of Peppermint (*Agonis flexuosa*).

OFFSET AREA 2

Open Woodland of *Eucalyptus marginata* and *Banksia attenuata* with *Agonis flexuosa*.



Plate 5. Habitat tree with a large hollow >30cm



Plate 6. Woodland patch with a higher percentage of Peppermint (*Agonis flexuosa*)



Plate 7. Woodland patch with a higher percentage of shrubland.



Plate 8. Woodland patch with a higher percentage of Peppermint (*Agonis flexuosa*)

OFFSET AREA 3

Open Woodland of *Eucalyptus marginata* and *Banksia attenuata*



Plate 9.



Plate 10.



Plate 11.



Plate 12. Habitat tree with multiple large hollows.

BLACK COCKATOO OBSERVATIONS ON LOT 5 WELLESLEY RD



Plate 13. Evidence of recent foraging.
Conservation Covenant Area



Plate 14. Evidence of recent foraging.
Conservation Covenant Area



Plate 15. Forest Red-Tailed Black Cockatoos.
Regular Visitors to the study site



Plate 16. Forest Red-Tailed Black Cockatoos.
Regular Visitors to the study site

SCATS



Plate 17: Offset Area 1. Common Brushtail Possum



Plate 18: Offset Area 2. Potential Western Ringtail Possum



Plate 19: Offset Area 2. Potential Western Ringtail Possum



Plate 20: Offset Area 3. Common Brushtail Possum



Plate 21: Offset Area 3. Potential Western Ringtail Possum



Plate 22: Offset Area 2. Potential Western Ringtail Possum

Appendix 1

DWER Correspondence Ref: CPS 8561/1

If you have any queries regarding the above information, please contact the Environmental Officer, as listed above.

Yours sincerely

Ryan Mincham
MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

1 September 2020

Att: Schedule 1
Offset calculator for Land Acquisition
Offset calculator for Revegetation

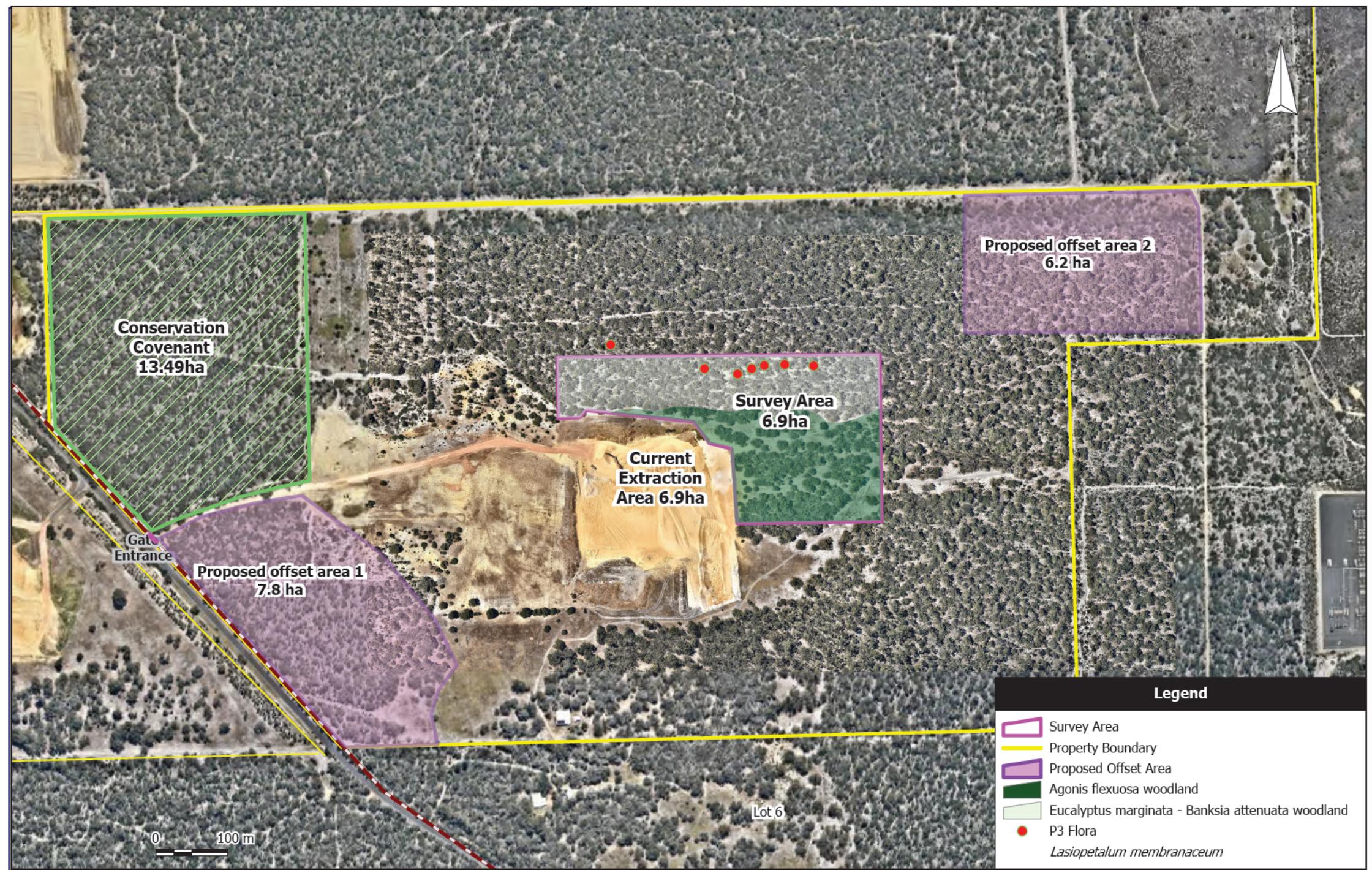
Schedule 1:

Item	Information requirements	Specifications	Rationale
1.	Identification of satisfactory environmental offsets.	<p>The <i>WA Environmental Offsets Policy</i> (2011), <i>WA Environmental Offsets Guidelines</i> (2014) and DWER's <i>Clearing of Native Vegetation Offsets Procedure</i> outlines the assessment and decision making processes for the use of environmental offsets and can be found at: https://www.der.wa.gov.au/your-environment/offsets.</p>	<p>The preliminary assessment has identified that residual impacts of the proposed clearing remain significant, even after the application of avoidance and minimisation techniques.</p> <p>An offset is required to counterbalance the significant residual impacts of the proposed clearing including:</p> <ul style="list-style-type: none"> - the removal of 3 hectares of vegetation mapped as 'Agonis flexuosa Woodland' which is determined to be significant habitat for the Western Ringtail Possum; - 2.18 hectares of very high quality foraging habitat for all three conservation significant black cockatoo species; and - removal of 2.18 hectares of the commonwealth listed 'Banksia Woodlands of the Swan Coastal Plain IBRA Bioregion' Threatened Ecological Community. <p>Based on the current application area, DWER has undertaken some preliminary calculations of an appropriate offset, including both the conservation of remnant native vegetation (27.99 ha) or revegetation (13.46 ha), using a calculation broadly consistent with the Commonwealth Department of the Environment and Energy (DotEE) offset calculator. These calculations have assumed particular variables that directly impact on the adequacy of an offset, and as such are to be used as a guide only. The final offset areas may have differing variables and would alter the calculations accordingly.</p> <p>Offset calculation identified that the conservation of remnant native vegetation in a very good condition, as specified below, may be sufficient to adequately address the impacts of the proposed clearing (noting that these values can all be present within one larger remnant):</p> <ul style="list-style-type: none"> - approximately 17.75 hectares of native vegetation that provides suitable habitat for Western Ringtail Possums; - approximately 10.24 hectares of native vegetation that provides suitable habitat for black cockatoo foraging; and - approximately 7.32 hectares of native vegetation that provides vegetation representative of the commonwealth listed TEC Banksia Woodlands of the Swan Coastal Plain.

			<p>Offset calculation has identified that revegetation from a good to very good condition, as specified below, may be sufficient to adequately address the impacts of the proposed clearing:</p> <ul style="list-style-type: none">- approximately 7.95 hectares of native vegetation that provides suitable habitat for Western Ringtail Possums;- approximately 5.51 hectares of native vegetation that provides suitable habitat for black cockatoo foraging; and- approximately 3.94 hectares of native vegetation that provides vegetation representative of the commonwealth listed TEC Banksia Woodlands of the Swan Coastal Plain. <p>Please note that for revegetation to be considered, a comprehensive revegetation plan would be required, and the site would have to be conserved in perpetuity. A guide to revegetation can be found at https://www.der.wa.gov.au/our-work/clearing-permits/48-guidelines-clearing-permits.</p> <p>It should be noted that in both calculations, it was assumed that the acquisition, or rehabilitation of vegetation representative of the commonwealth listed TEC 'Banksia Woodlands of the Swan Coastal Plain' could be included as part of the larger acquisition, or rehabilitation of suitable foraging habitat for black cockatoos, given the TEC vegetation is generally considered as high quality foraging habitat for black cockatoo species.</p>
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Appendix 2

Extracts From the Detailed Flora and Vegetation Survey (Plantecology, 2020)

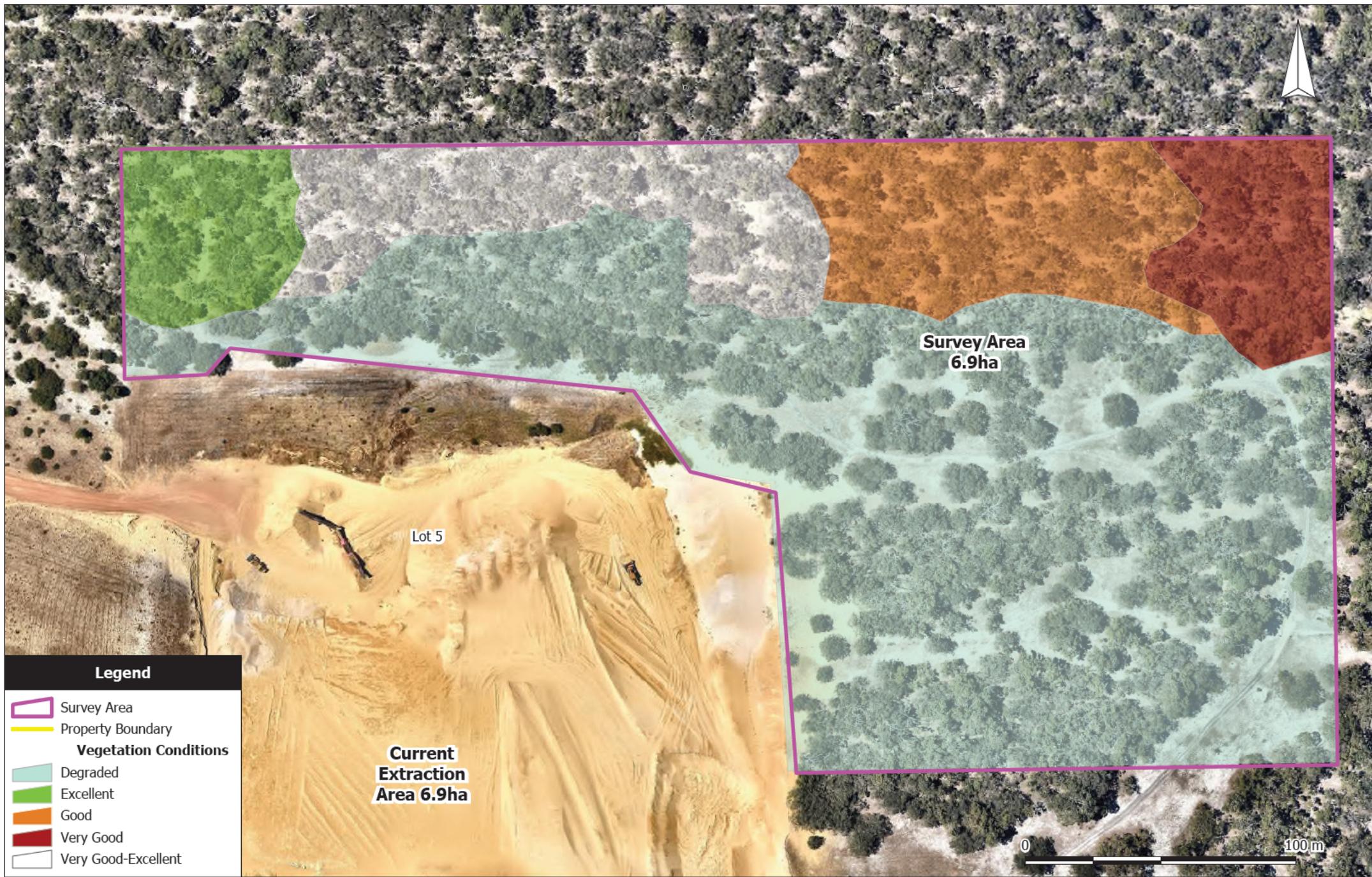


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Datum: GDA94
Projection: Australia MGA94 (50)

Client: Carbone Bros Pty Ltd
Project: Flora and Vegetation
Assessment
Location: Lot 5 Wellesley Rd
Wellesley

**Figure 2
Plant Communities**



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Scale: 1:1800
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Datum: GDA94
Projection: Australia MGA94 (50)

Client: Carbone Bros Pty Ltd
Project: Flora and Vegetation
Assessment
Location: Lot 5 Wellesley Rd
Wellesley

**Figure 3:
Vegetation Condition**



Plate 1: View of sampling plot W01: *Eucalyptus marginata* – *Banksia attenuata* woodland



Plate 2: View of sampling plot W02: *Eucalyptus marginata* – *Banksia attenuata* woodland



Plate 3: View of sampling plot W03: *Eucalyptus marginata* – *Banksia attenuata* woodland



Plate 4: View of sampling plot W04: *Eucalyptus marginata* – *Banksia attenuata* woodland



Plate 5: View of sampling plot W05: *Agonis flexuosa* woodland

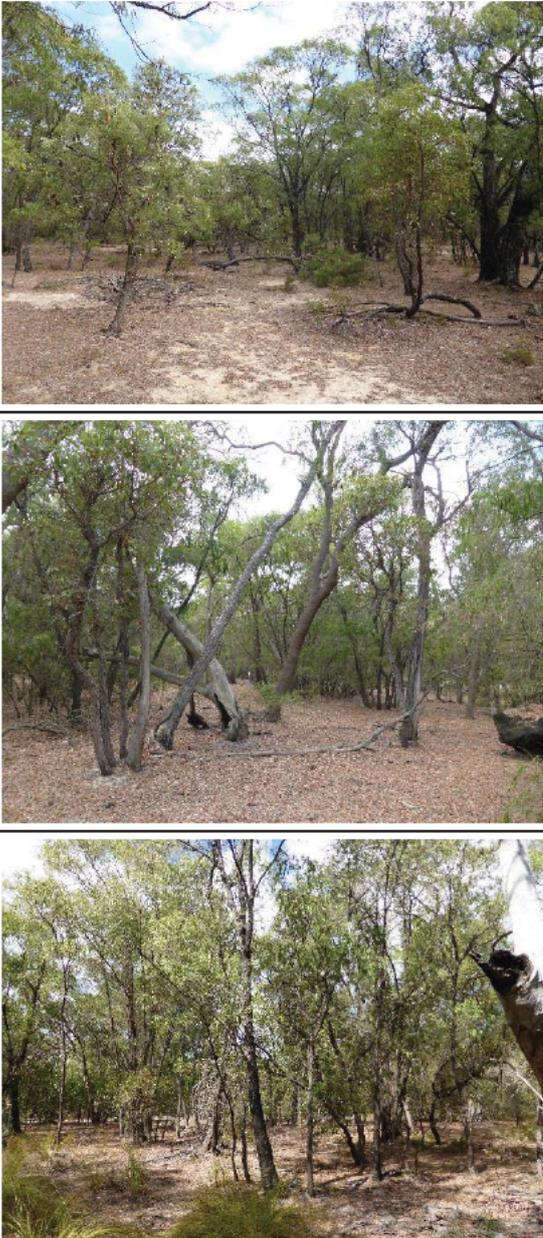
Keighery (1994) Condition Rating Categories & Description

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact Disturbance affecting individual species Weeds are non-aggressive species.
Very Good (3)	Vegetation structure altered Obvious signs of disturbance eg by repeated fires Presence of some more aggressive weeds, dieback, logging and grazing
Good (4)	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it eg disturbance to structure caused by very frequent fires. Presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded (6)	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. Often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix 3

Extracts From the Fauna Assessment (Greg Harewood, 2018)

Table 1: Main Fauna Habitats within the Subject site

Unit	Fauna Habitat Description	Example Images
1	<p>Open woodland of <i>Eucalyptus marginata</i> with very occasional <i>Corymbia calophylla</i> over a low woodland dominated by <i>Agonis flexuosa</i> with very occasional <i>Banksia attenuata</i> and <i>B. grandis</i> over a low open shrubland or very open grassland of introduced species or bare sand on dune crest with grey to light grey/white sands (grading to yellow at depth).</p>	 <p>The 'Example Images' column contains three photographs stacked vertically. The top photo shows a wide view of an open woodland with scattered trees and a sandy ground covered in dry leaves. The middle photo is a closer view of several trees with thick, gnarled trunks. The bottom photo shows a similar view with more trees and a slightly different ground composition.</p>

Because of the level of historical disturbance which has occurred at the site fauna habitat values have been compromised significantly, mainly as a consequence of an absence of significant shrub and groundcover. This would make these areas unsuitable or at best marginal for some fauna species which would originally have occurred, in particular some ground dwelling reptiles and mammals in addition to birds which favour dense low vegetation.

The original fauna assemblage present before disturbance has therefore been depleted with most species now present being generally common and widespread fauna species