Lot 5 DP 838497 Sutton Road, Sutton

Planning Proposal Ecological Investigation

Prepared for
Tony Carey Consulting

July 2018

DOCUMENT TRACKING

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(From top clockwise)	(From top clockwise) Red-Stringybark – Scribbly Gum – Red-anthered Wallaby Grass Open Forest; *Daphoenositta chrysoptera* (Varied Sittella), *Polytelis swainsonii* (Superb Parrot), *Swainsona sericea*.

This report should be cited as 'Eco Logical Australia 2018. *Planning Proposal Ecological Investigation*. Prepared for Tony Carey Consulting.'

ACKNOWLEDGEMENTS

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Methodology
BAMC	Biodiversity Assessment Methodology Calculator
BBAM	BioBanking Assessment Methodology 2014
BC Act	NSW *Biodiversity Conservation Act 2016*
BCAR	Biodiversity Certification Assessment Report
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BOS	NSW Biodiversity Offsets Scheme
BSA	Biodiversity Stewardship Agreement
BSS	Biodiversity Stewardship Site
DoEE	Commonwealth Department of the Environment and Energy
DP&E	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
MNES	Matters of National Environmental Significance
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
PMST	Commonwealth Protected Matters Search Tool
SAII	Serious and Irreversible Impacts
TEC	Threatened Ecological Community

Executive summary

Eco Logical Australia Pty Ltd (ELA) have been engaged by Tony Carey Consulting on behalf of Woodbury Ridge Estate to provide ecological planning advice for Lot 5 DP 838497 Sutton Road, Sutton (the "study area"). The planning advice is to support a Planning Proposal to rezone the study area and has been prepared based on previous ecological work undertaken by ELA. The advice discusses the implications of the new NSW *Biodiversity Conservation Act 2016* (BC Act) and Biodiversity Assessment Method (BAM) in relation to the proposed rezoning, subdivision and future development of the study area.

A previous version of this report (V1) was prepared in May 2018 based on a concept plan that resulted in a deficit of 167 ecosystem credits for impacts to native vegetation and a deficit of 189 species credits for the Superb Parrot. This report (v2) discusses the results of the BAM calculations based on a revised concept plan that aims to reduce the residual impacts of the proposed rezoning/subdivision.

The vegetation communities previously identified in the study area were converted into two Plant Community Types (PCTs), representing six condition states (vegetation zones) for the purposes of assessment under the BC Act using the BAM. These PCTs represent the extent of native vegetation across the study area, and are characterised as 'Ecosystem Credits' under the BAM:

- *349 - Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates in the mid-Murrumbidgee and upper Lachlan catchments mainly in the western South Eastern Highlands Bioregion*
- *277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*

Floristic data and threatened species information ('Species Credits') were collected during the October 2016 survey, from eleven biobank plots and targeted species survey, and input in the new BAM Calculator (BAMC). As the original data was collected using an old methodology, several assumptions were made to convert the data into a useable format for the BAMC. This data was assumed from site photos and included litter cover and tree stem size classes.

The BAMC was used to estimate the offset liability (credits required) from the proposed impacts from the subdivision (development footprint) as defined by the revised Concept Plan. Impacts to native vegetation total 12.68 ha and include the parts of the RU5 Village zone (the rest being exotic vegetation), the proposed building envelopes (1300 m2 or 0.13 ha) within the R5 Large Lot Residential and E3 Environmental Management zones, internal roads (20m wide) and fire-trails.

The revised concept plan includes 95.27 ha of land within E3 zones that will be used to generate credits through the establishment of three Stewardship Sites. The BAMC was used to calculate the credits generated for the proposed Stewardship Site in accordance with the BAM.

The assessment estimated that the proposed revised Concept Plan would require 187 ecosystem credits to be offset (or retired) for impacts to native vegetation. The proposed Stewardship Sites would generate approximately 262 ecosystem credits for the conservation and management of native vegetation. This leaves an extra 75 ecosystem credits that can be sold on the market to generate income.

Furthermore, an estimated 189 species credits would be required for proposed impacts to 12.68 ha of potential breeding habitat for the Superb Parrot, with 34 species credits generated from the proposed Stewardship Sites. This leaves a deficit of 155 species credits for the Superb Parrot. No habitat for

Swainsona sericea is assumed to be impacted by the development footprint, with 41 species credits generated on the Stewardship Sites.

The report details the proposed credit requirements and discusses the implications of the rezoning and subdivision under a 'Development Application' (DA) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act); or 'Biodiversity Certification' under Part 8 of the BC Act. The report also discussions the mechanisms for biodiversity protection of the site and provides recommendations for future work to support the rezoning and subdivision.

It is noted that the BAM credit calculations will need to be reassessed, and additional data collected for any DAs or Biodiversity Certification submitted in relation to the subdivision, as the credits provided in this report are indicative only.

1 Introduction

1.1 Background

Eco Logical Australia Pty Ltd (ELA) have been engaged by Tony Carey Consulting on behalf of Woodbury Ridge Estate to provide ecological planning advice for Lot 5 DP 838497 Sutton Road, Sutton (the "study area"). Figure 1 shows the location of the study area, which is bordered by the Federal Highway to the south, Old Federal Highway and the Yass River to the east, Sutton village to the north and Sutton Road to the west. The study area is approximately 185 ha and is zoned RU1 Primary Production under the Yass Valley LEP 2013.

Tony Carey Consulting and Canberra Town Planning are preparing documentation for a Planning Proposal to rezone the study area. Figure 2 shows the proposed concept development scheme for the study area. This plan has been prepared based on previous ecological work undertaken within the study area by ELA in 2016. These studies and their main findings are listed below:

- *Ecological constraints assessment, ELA July 2016*.
    - The study area has had a long history of agricultural use (>150 years) that has simplified the original woodland vegetation through successive years of cropping, pasture improvement, and livestock grazing.
    - Recent broad scale, regional vegetation mapping that included the study area showed that the threatened ecological community White Box, Yellow Box, Blakely's Red Gum woodland (Box-Gum woodland) was present (OEH 2011c).
    - A rapid site assessment survey validated the vegetation as:
        - Red Stringybark – Scribbly Gum – Red-anther Wallaby Grass tall grass-shrub dry sclerophyll open forest on loamy ridges of the central South Eastern Highlands Bioregion (Red Stringybark – Scribbly Gum open forest)
        - Yellow Box - Apple Box tall grassy woodland of the South Eastern Highlands (Yellow Box - Apple Box woodland).

- *Summary Report – Spring Survey 2016, ELA November 2016*
    - A targeted flora and fauna survey was undertaken from 11 – 14 October 2016, to determine threatened species within the study area and accurately map vegetation communities and condition.
    - Eleven biometric plots consistent with the BioBanking Assessment Methodology 2014 (OEH 2014) were undertaken to sample the different vegetation zones within the study area.
    - The following threatened species were recorded (Figure 3):
        - *Swainsona sericea*
        - Superb Parrot
        - Varied Sittella
        - Large-footed Myotis
        - Eastern Bentwing-bat
        - Yellow-bellied Sheathtailed Bat
    - The vegetation mapping was refined to that shown in Figure 4.
    - The vegetation condition was mapped as shown in Figure 5.

The previous version of this report (V1) was based on the concept plan shown in Figure 6. This concept plan has been revised to that shown in Figure 2 and Figure 7 to address the purpose of the BC Act, which is avoid, minimise the offset impacts. The revised concept plan overlayed on mapped vegetation (Figure 7) demonstrates that residential areas have been situated within exotic vegetation within the northwest and northeast corners of the study area, and the large lot zone has been placed within low condition Box Gum Woodland and moderate condition Scribbly Gum woodland. The highest biodiversity value land will be conserved in Stewardship sites which will conserve and restore moderate, good and high condition Box Gum Woodland and good condition Scribbly Gum Woodland.

1.1.1 Objectives of this report

Since the 2016 reports were prepared, the NSW *Threatened Species Conservation Act 1995* has been repealed and replaced by the *Biodiversity Conservation Act 2016* (BC Act). In addition, the BioBanking Assessment Methodology 2014 (BBAM) has been replaced with a new Biodiversity Assessment Methodology, the *Biodiversity Assessment Method* (BAM) (OEH 2017a). As such, this report discusses the implications of the new BC Act and BAM in relation to the proposed rezoning, subdivision and future development of the study area. In particular, this report discusses the following issues:

- Triggers for the Biodiversity Offset Scheme (BOS) in relation to the proposed subdivision
- Use of the biobank plot data collected in 2016 in the new BAM calculator to determine the potential offsets required and generated by the revised concept plan. This will provide an indicative assessment on what offsets will be required and whether the offsets can be provided within the study area
- Provide a review of Serious and Irreversible Impacts (SAIIs) that may apply to the subdivision of the study area and the implications of exceeding such thresholds
- Provide an assessment of SAIIs in relation to Box Gum Woodland, based on available data
- Discuss further implications of the BC Act in terms of future survey and reporting required
- Discuss mechanisms for future protection of biodiversity within the study area
- Assess Biodiversity Certification as a different development pathway
- Discuss the need for a referral to the Commonwealth Department of Environment and Energy (DoEE) for impacts to Nationally listed threatened ecological communities and threatened species and their habitat under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

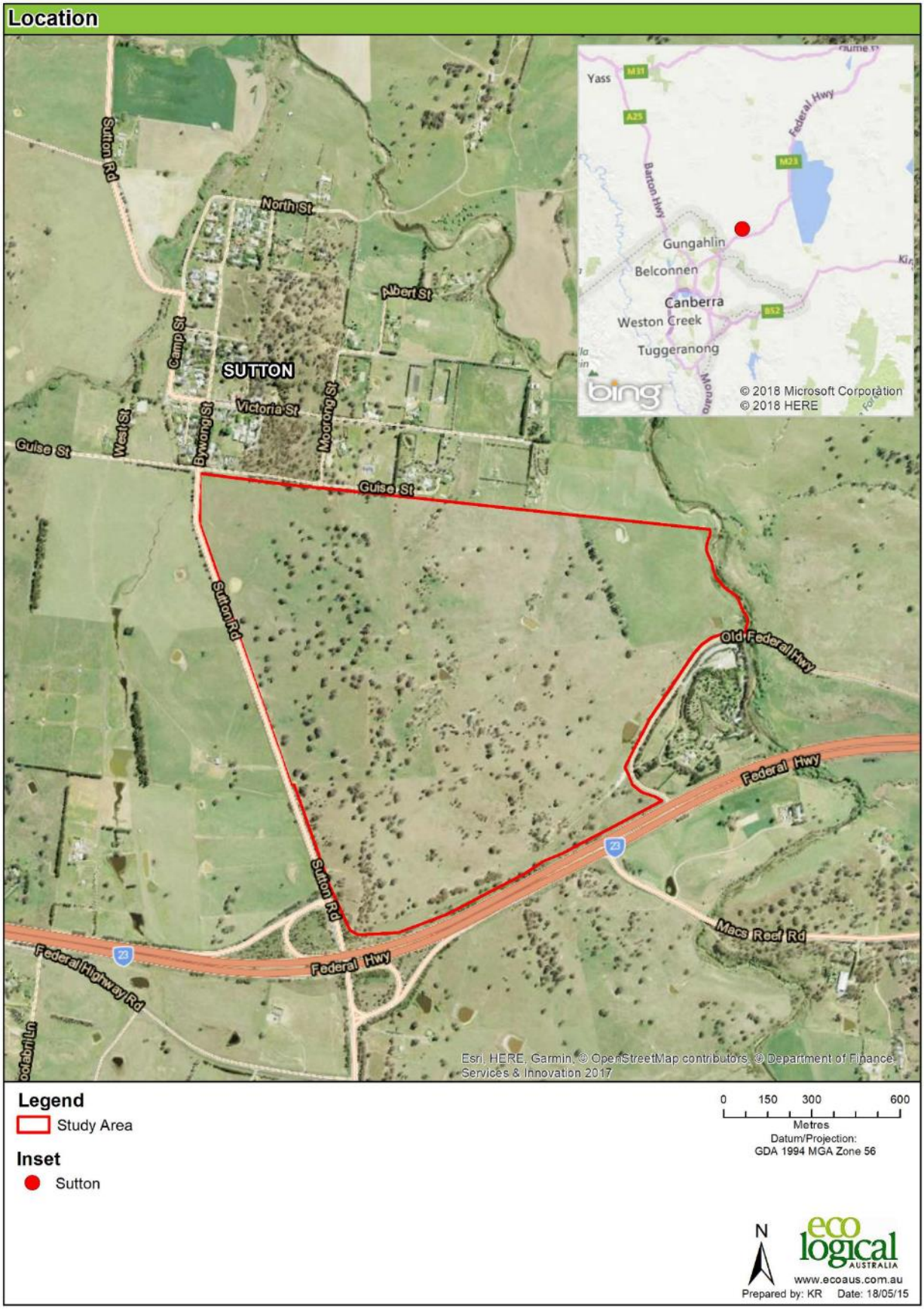

Figure 1: Location of the study area

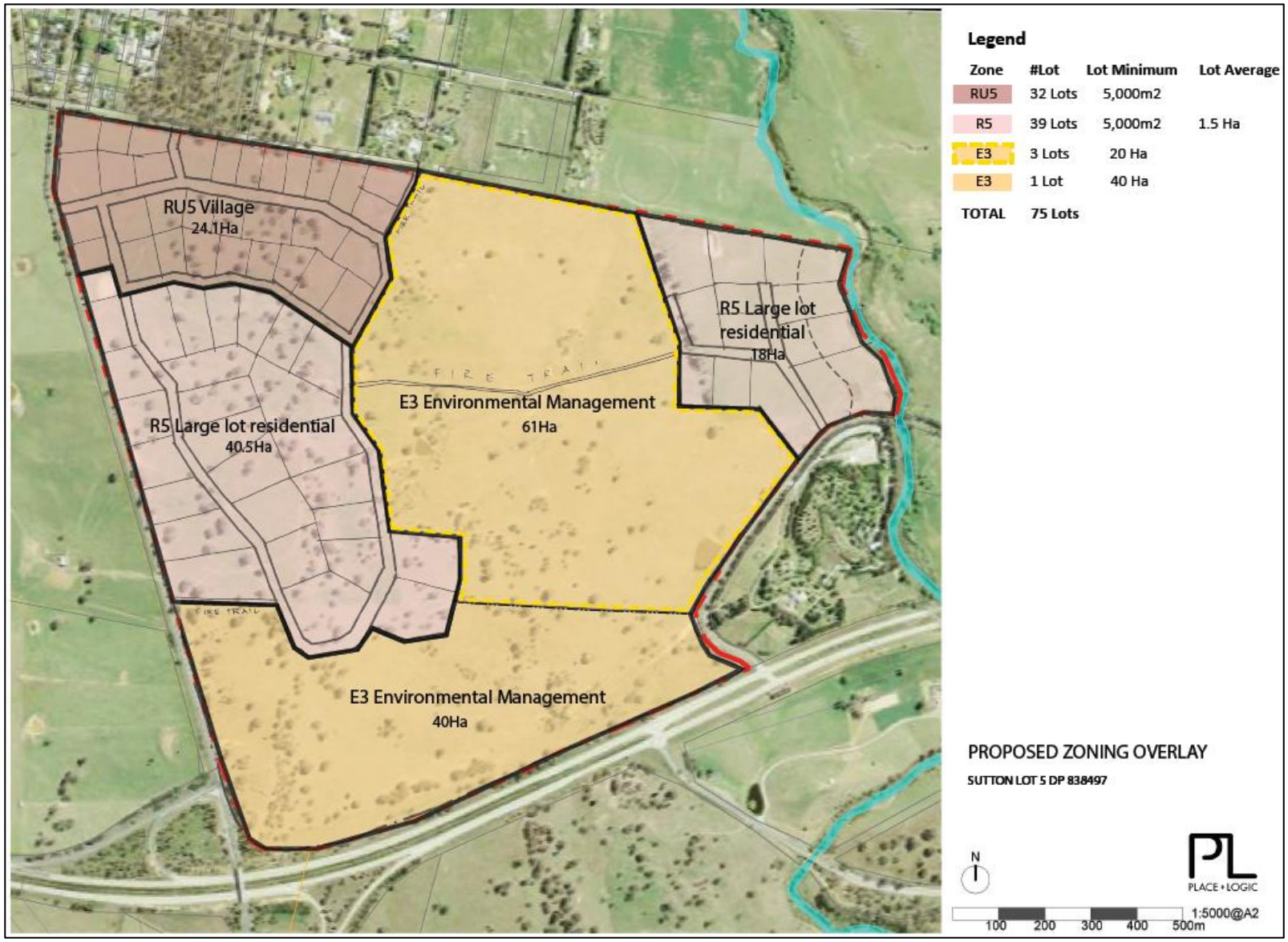

Figure 2: Proposed revised concept development scheme (Place Logic 2018)

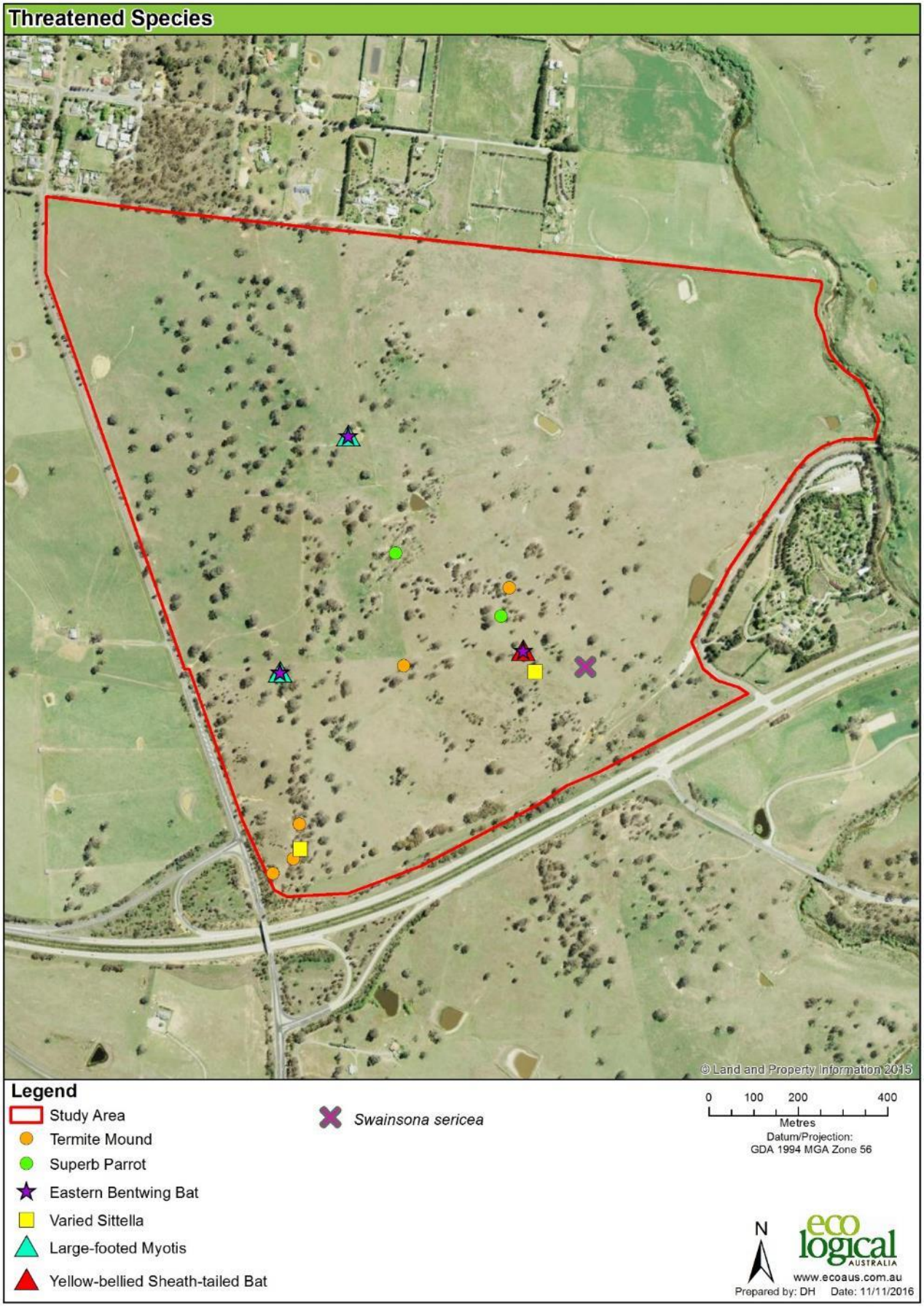

Figure 3: Threatened species and habitat features (ELA 2016)

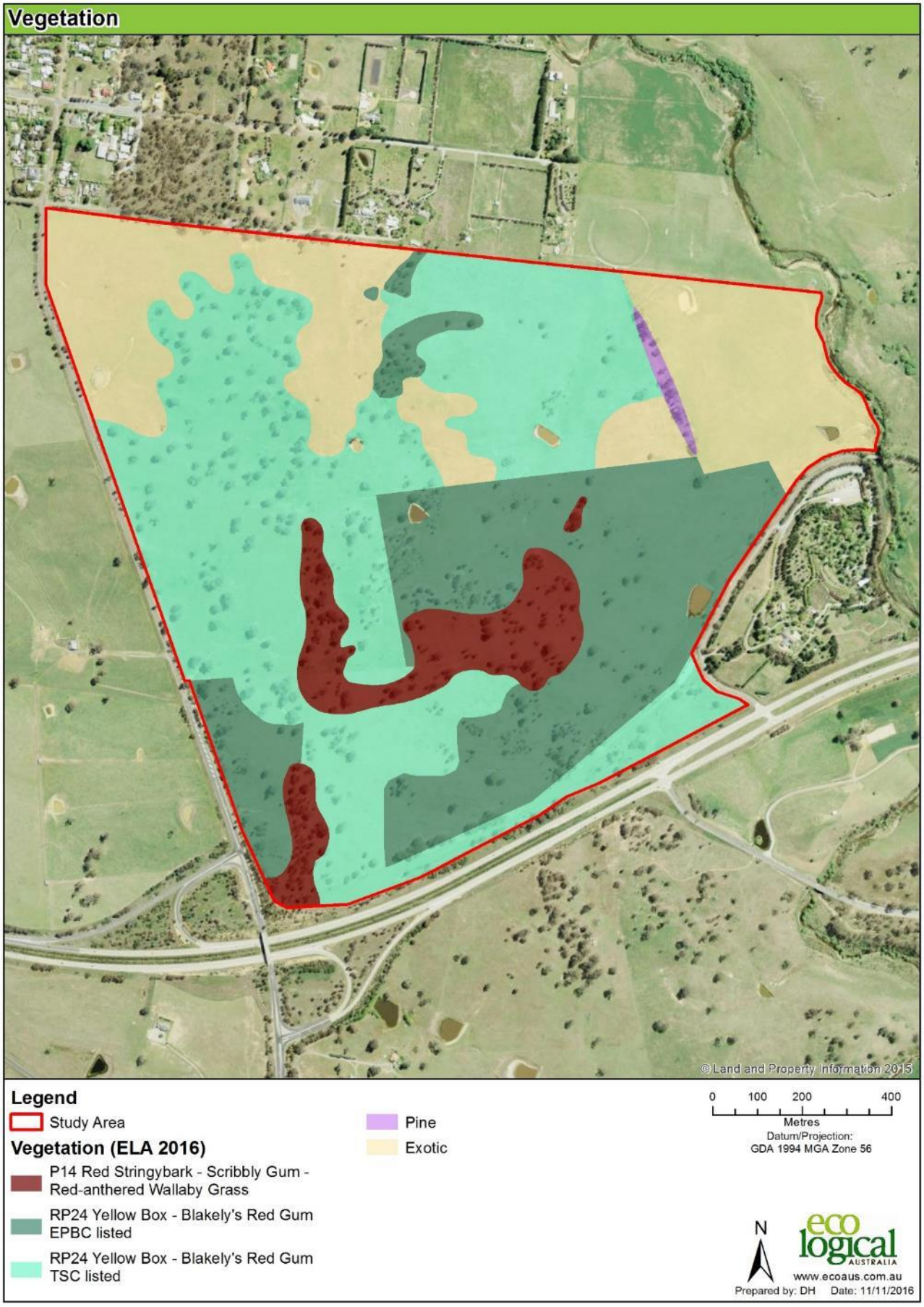

Figure 4: Vegetation map of the study area (ELA 2016)

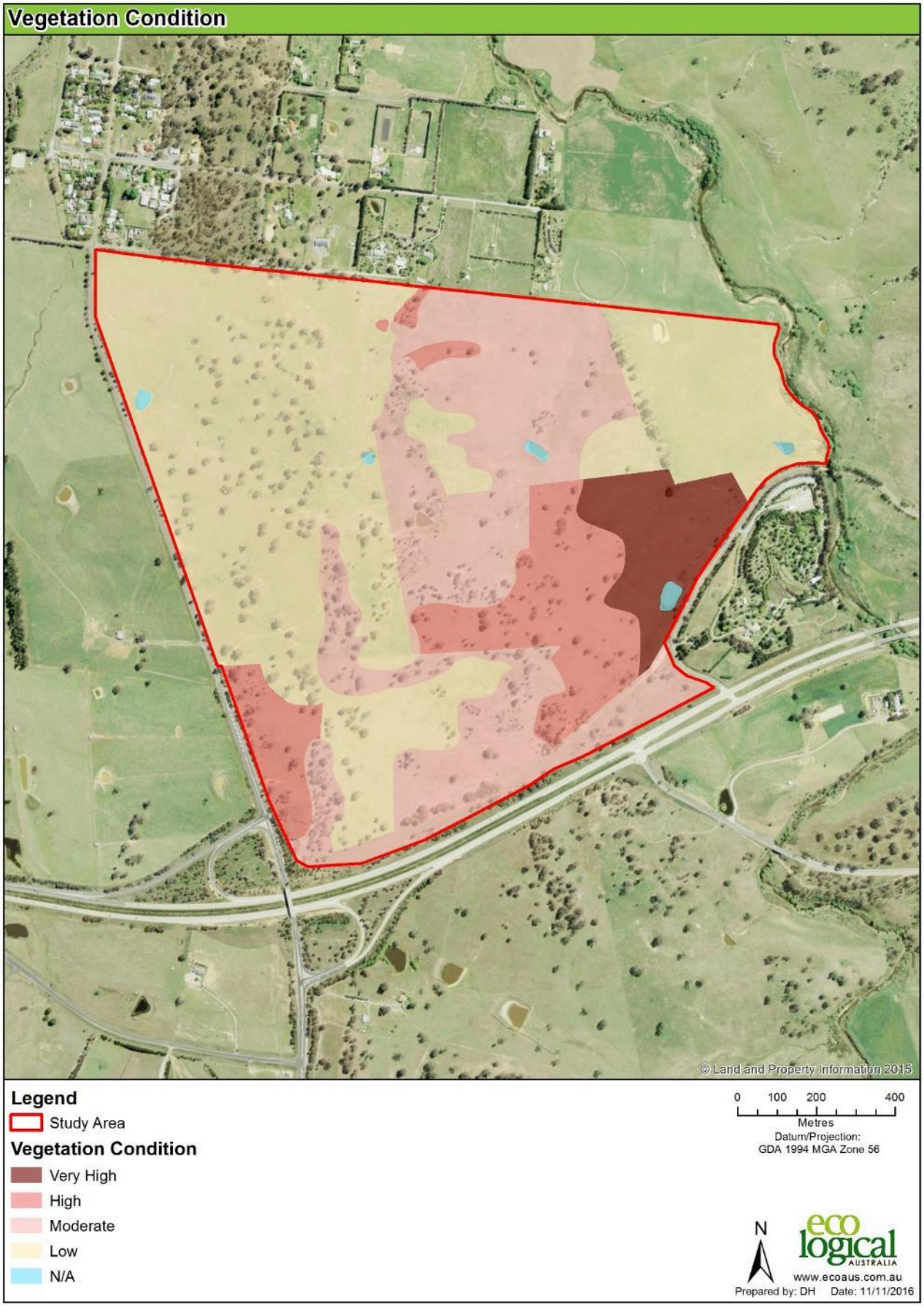

Figure 5: Vegetation condition (ELA 2016)

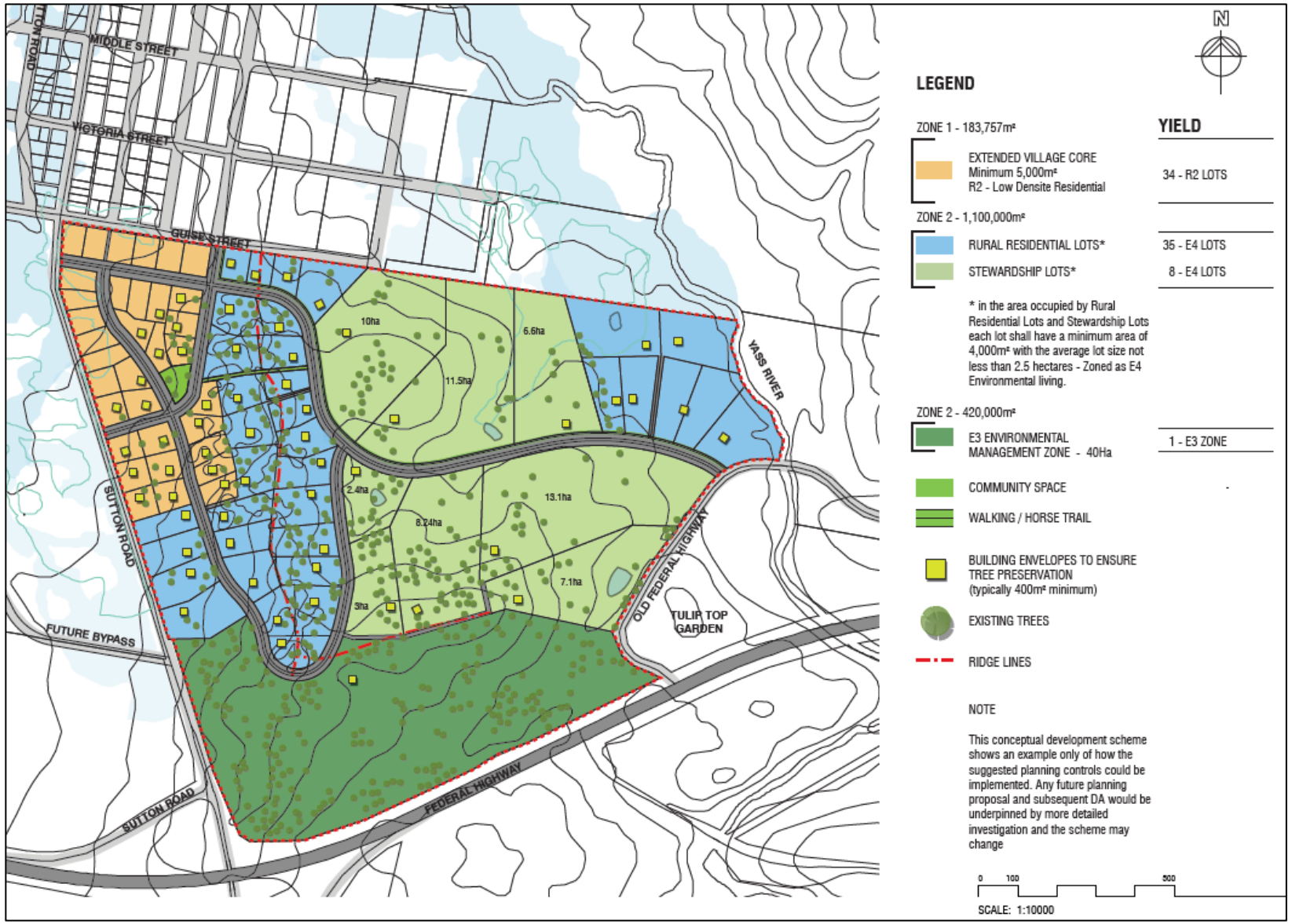

Figure 6: Original concept design which resulted in a deficit for ecosystem and species credits.

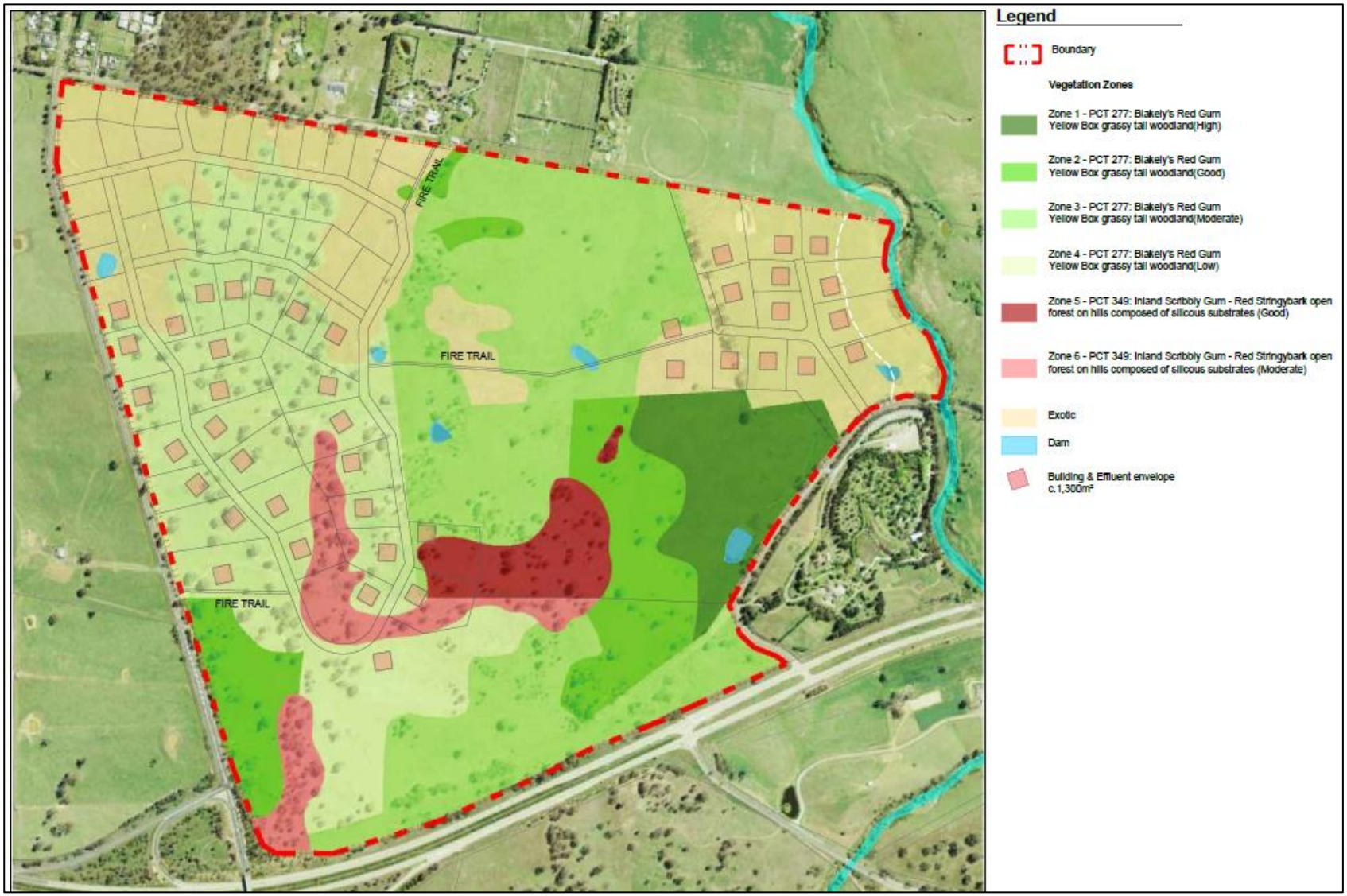

Figure 7: Revised concept plan with impact areas primarily utilising exotic and low condition vegetation

2 Methodology

2.1 Data collation and desktop review

The vegetation communities previously identified in the study area (ELA 2016) were converted into Plant Community Types (PCTs) for the purposes of assessment under the BC Act using the BAM. PCTs were determined using the BioNet Vegetation Classification (OEH 2018a) and were based on landscape features, IBRA region and subregion and the species composition of vegetation communities mapped.

Under the BAM, PCTs must be stratified into vegetation zones based on their broad condition type. The vegetation community and condition mapping undertaken in October 2016 (ELA 2016) was further analysed to determine the vegetation zones within the study area.

Floristic data was collected during the October 2016 survey from eleven biobank plots which aimed to sample each vegetation zone. This data was utilised in this assessment for use in the new BAM Calculator (BAMC). As this data was collected in accordance with the BBAM, it was required to be converted into a format to be in accordance with the BAM. The data required under BAM includes the collection of vegetation integrity survey plots, with several new attributes for composition, structure and function, that were not collected under BBAM and therefore several assumptions were made. The composition and structure attributes from the previous data were able to be converted. However, the function data had several new attributes not previously collected. The following function data was not collected under the BBAM, but has been estimated based on knowledge of the study area, aerial photo interpretation, plot data and plot photos:

- Number of large trees
- Litter Cover within 1m x 1m sub plots.
- Presence of stems in several stem size classes

The BAM requires a minimum number of vegetation integrity plots to be collected for each vegetation zone, based on area. Where the plot requirement hasn't been met by the 2016 data, the plots were duplicated for that vegetation zone for the purpose of this BAM assessment.

2.2 BAM impact calculations for the concept plan

The development footprint, for the purpose of the BAM impact assessment, was taken from the revised concept plan shown in **Figure 2** and includes the entire RU5 Village zone, the proposed building envelopes (1300 m2 or 0.13 ha) within the R5 Large Lot Residential and E3 Environmental Management zones, internal roads (20m wide) and fire-trails. It is understood that the land outside of the building envelope within the R5 Large Lot Residential will be retained and protected under a section 88b instrument. This land is considered to be "retained land" that is not included in the impact calculations. The use of this "retained land" for offsets is not feasible, given that each lot would require its own Stewardship Agreement and the costs to establish this would outweigh the likely gain in terms of credits generated.

For the purpose of the impact assessment, the locations of the proposed building envelopes were assumed to be as shown on the revised concept plan (Figure 2) in order to determine the area of each PCT impacted for input into the BAMC. As this is an indicative assessment to inform the potential offset liability of the proposed future subdivision, the BAM calculations (and additional data collection) will need to be reassessed for any DAs submitted in relation to the subdivision.

BAM credits were calculated for the impacts on native vegetation (ecosystem credits), as well as impacts on threatened species and their habitat (species credits) that were recorded during the ELA October 2016 surveys (ELA 2016b). Species credit species include the Superb Parrot, for impacts to potential breeding habitat. It has been assumed for this assessment that Superb Parrot breeding habitat exists in the remnant trees on the study area, based on the species being recorded on site and the presence of hollow-bearing trees. Additional surveys should be undertaken to refine the area of breeding habitat within the study area and recalculate the credits required (if any breeding habitat is determined to be present). As such, we are assuming a worst case scenario in terms of species credit requirements for Superb Parrot.

No other species credit species were included in this impact assessment. Further surveys may be required to be undertaken to survey for other species credit species that may occur within the study area and development footprint. Potential species likely to require further survey are detailed in **Section 5**.

It is noted that for impact assessments, species credit species are generally assumed to be present on a development site, and targeted surveys are required to exclude species credit species from being present. It is recommended that targeted surveys for species credits requiring survey be undertaken as detailed in **Section 5**.

The OEH BAM Calculator (BAMC) was used to calculate the credits required for the proposed development footprint in accordance with the BAM.

2.3 BAM offset calculations for the concept plan

The proposed concept plan (Figure 2) provides for an offset site with the intent for conservation in the long-term. The extent of this offset area has been increased in the revised plan from 40 ha to 95.27 ha. It is proposed that the area zoned as E3: Environmental Management zone will be established as three separate Biodiversity Stewardship Sites, each with their own building envelope which has been excluded from the credit calculations. These Stewardship Sites will be conserved in perpetuity, each with its own Biodiversity Stewardship Agreement which will include management actions over a 20 year period.

The Stewardship Sites have been assessed for biodiversity values using the data collated and converted in **Section 2.1** above using the BAMC. It should be noted that this dwelling envelope has not accounted for any road access and as such, any future calculations to generate offsets will need to exclude access roads.

BAM credits were calculated for the conservation and management of native vegetation (ecosystem credits) within the Stewardship Sites, as well as the threatened species and their habitat (species credits) recorded during the ELA October 2016 surveys (ELA 2016b). Species credit species included in the offset calculations are habitat for *Swainsona sericea* (Silky Swainson-pea) and breeding habitat for Superb Parrot. This assessment has assumed that habitat for *Swainsona sericea* includes the vegetation zone (Zone 2) that the species was recorded in. Breeding habitat for the Superb Parrot has been determined as per the BAM impact calculation detailed in **Section 2.2** above.

No other species credit species were included in this assessment. Further surveys may be undertaken for additional species credit species that may occur within the study area and Stewardship Site. Potential species that could require further surveys are detailed in **Section 5**. It should be noted that the generation of species credits are optional for a Stewardship Site, with surveys required to confirm species presence and thus generation of credits.

The OEH BAM Calculator (BAMC) was used to calculate the credits generated for the proposed Stewardship Site in accordance with the BAM.

3 Results

3.1 PCTs and vegetation zones

The vegetation communities identified in the study area from ELA (2016b) are shown in Table 1, along with the PCT that has been determined as the best fit.

Table 1: PCTs within the study area

Vegetation community (ELA 2016b)	*PCT*
Red Stringybark – Scribbly Gum – Red-anthered Wallaby Grass tall grass-shrub dry sclerophyll open forest on loamy ridges of the central South Eastern Highlands Bioregion (P14) (Red Stringybark – Scribbly Gum open forest)	349 - Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates in the mid-Murrumbidgee and upper Lachlan catchments mainly in the western South Eastern Highlands Bioregion
Yellow Box - Apple Box tall grassy woodland of the South Eastern Highlands (U178) (Yellow Box - Apple Box woodland).	277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

A review of the PCT mapping (Figure 4**)** and condition mapping (Figure 5) in the study have resulted in the identification of six vegetation zones. The area of each vegetation zone and the number of plots undertaken in 2016 within each zone is shown in Table 2. Note that the plots are set up with star pickets in the field (eleven in total) and could be used to collect the additional data required by the BAM. See **Section 4.1** for further information and Table 7**,** which includes the number of plots required for future survey work.

Table 2: Vegetation zones within the study area

Vegetation Zone	*PCT ID*	*Condition*	*Area (ha)*	*# of plots (ELA 2016)*
1	277	High	10.71	1
2	277	Good	17.40	3
3	277	Moderate	47.86	1
4	277	Low	49.31	3
5	349	Good	6.22	1
6	349	Moderate	8.34	2
n/a	Exotic	Low	44.24	n/a
n/a	Dam	N/A	0.99	n/a
		Total	**185.07**	**11**

3.2 BAM credit calculations

Table 3 presents the BAM credits required for the impacted vegetation zones and the credits that can be created in the Stewardship Site. A total of 187 ecosystem credits are required to be offset for impacts to native vegetation. The Stewardship Sites generate a total of 262 ecosystem credits for the conservation

and management of native vegetation. This leaves a total of 75 ecosystem credits that can be sold on the market to generate income.

Table 3. Ecosystem credits required for impacted native vegetation and generated at the Stewardship Site

Veg Zone	*PCT ID*	*Plant Community Type*	*Condition*	*Impacted*		*Stewardship Site*	
				Area (ha)	*Credits required*	*Area (ha)*	*Credits generated*
1	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	High	0.00	0	10.45	34.7
2	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Good	0.07	2	17.30	40.9
3	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate	0.47	0	46.59	142.5
4	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Low	11.85	177	12.34	16
Sub-total for Box Gum Woodland				***12.39***	***179***	***86.68***	***234.1***
5	349	Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates in the mid-Murrumbidgee and upper Lachlan catchments mainly in the western South Eastern Highlands Bioregion	Good	0.01	1	4.83	20.1
6	349	Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates in the mid-Murrumbidgee and upper Lachlan catchments mainly in the western South Eastern Highlands Bioregion	Moderate	0.28	7	3.77	8
Sub-total for Red Stringybark-Scribbly Gum Open Forest				***0.29***	***8***	***8.6***	***28.1***
Total				**12.68**	**187**	**95.27**	**262.2**

Box Gum Woodland that meets that EPBC Act condition criteria includes vegetation zones 1 and 2 and parts of zone 3. In total, there is 46.9 ha of EPBC Act Box Gum Woodland within the study area of which 0.22 ha will be impacted. The remainder will be protected within the stewardship sites. See Section 5.1 for further information.

The calculations have assumed that three separated Stewardship Sites, each with their own building envelope would be established. The breakdown of credits generated per site is shown below in Table 4. The lots are labelled A (northern lot), B (middle lot) and C (southern lot) with the fire trail forming the property boundary between lot A and B.

Table 4: Credits generated by each Stewardship Site

Veg Zone	*PCT ID*	*Plant Community Type*	**Lot A**		**Lot B**		**Lot C**		**Total**	
			Area (ha)	**Credits**	**Area (ha)**	**Credits**	**Area (ha)**	**Credits**	**Area (ha)**	**Credits**
1	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion			10.15	33.7	0.30	1	10.45	34.7
2	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	1.25	3	6.3	14.9	9.75	23	17.30	40.9
3	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	20.11	61.5	11.44	35	15.03	46	46.58	142.5
4	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	0.24	1	0.74	1	11.37	14	12.35	16
5	349	Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates			4.59	19.1	0.24	1	4.83	20.1
6	349	Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates					3.77	8	3.77	8
TOTAL			**21.6**	**65.5**	**33.22**	**103.7**	**40.46**	**93**	**95.28**	**262.2**

Table 5 shows the species credits required for the proposed development and the credits created for the Stewardship Site. A total of 189 species credits are required for impacts to 12.68 ha of potential breeding habitat for the Superb Parrot, with a total of 34 species credits generated. This leaves a deficit of 155 species credits for the Superb Parrot. No habitat for *Swainsona sericea* is assumed to be impacted by the development footprint with a total of 41 species credits generated on the Stewardship Site.

Table 5. Species credits required for impacts to species credit species habitat and generated at the Stewardship Site

Species	*Impacted*		*Stewardship Site*	
	Area of habitat (ha)	*Credits*	*Area of habitat (ha)*	*Credits*
Superb Parrot (breeding habitat)	12.68	189	14.50	34
Swainsona sericea (Silky Swainson-pea)	-	-	17.30	41

4 Discussion

Rezoning and subdivision of the study area can be undertaken in two main pathways; a Development Application (DA) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act); or Biodiversity Certification under Part 8 of the BC Act. A discussion of each pathway is below.

4.1 Development application for rezoning and subdivision

4.1.1 Biodiversity Offset Scheme Triggers

Under the BC Act, there are three main triggers of the BOS. These triggers are discussed below in relation to the proposed subdivision:

1. The Biodiversity Values Map identifies land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017* and can be assessed online (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap). The study area is not mapped on the biodiversity values map.
2. Clearing thresholds: Clause 7.2 of the *Biodiversity Conservation Regulation 2017* lists clearing thresholds against minimum lot sizes. The minimum lot size for the study area is 10-49.9 ha. As this range sits across two categories for 'minimum lot sizes', we assume the smaller size of 10 ha, which sits within the category of "*Less than 40 ha but not less than 1 ha*". The clearing threshold of native vegetation for this category is 0.5 ha or more. The concept plan shown in Figure 2 will result in the clearing of more than 0.5 ha of native vegetation and thus will trigger entry into the BOS.
3. Test of significance for threatened species or ecological communities or their habitats. Clause 7.3 of the BC Act lists five questions (commonly known as the 5-Part Test) that must be considered in determining whether a proposal is likely to have a significant impact on threatened species, ecological communities or their habitats. These tests would be undertaken for the subdivision DA if the BOS is not triggered by one of the mechanisms above (Biodiversity Values Map or Clearing Threshold). If significant impacts are likely as a result Clause 7.3, then the BOS would be triggered. It is noted that based on the revised concept plan, the BOS / BDAR requirement is triggered by the clearing threshold, and therefore the Test of Significance would not be required.

Entry into the BOS would be triggered by the proposed concept plan shown in Figure 2, based on the area clearing threshold of native vegetation**.** Therefore, a BAM assessment and preparation of a BDAR will need to accompany the DA for subdivision of the study area, but are not required at the rezoning stage. However, Council may request a certain level of information in order to satisfy a rezoning application.

Section 7.1 (3) of the BC Regulation states that where a subdivision is proposed, the clearing of native vegetation is taken to be the area required or likely to be required for the purposes for which the land will be subdivided. This area proposed to be cleared will therefore be subject to the BAM assessment (and a BDAR required) and submitted to Council (the approval authority) to accompany the subdivision DA.

Any additional area of native vegetation subsequently proposed for removal within each newly created lot (outside of the building envelopes or other proposed impact areas, such as access roads or construction compounds) following the subdivision must be assessed for whether the proposed clearing triggers entry into the BOS. Where the BOS is triggered by the individual lot DA's, a BAM assessment will be required and a BDAR prepared for submission to Council. Therefore, the subdivision plan must be as specific as possible about impact areas verses non-impact areas, and how these areas will be managed in the future.

It should also be noted that the BOS (and subsequent BDAR) does not assess or provide offsets for impacts on EPBC Act listed threatened ecological communities, threatened species and their habitats. Impacts to these Matters of National Environmental Significance (MNES) will need to be considered and may need to be assessed separately through a referral to the DoEE. This may include a requirement for additional offsets (see **Section 5.1** for further information).

4.1.2 Likely offsets required and generated

The BAM credit calculations (**Section 3** above) of the proposed development footprint and proposed Stewardship Sites has identified an additional 75 ecosystem credits that will remain after the impacts have been offset. These credits can be sold on the market to generate income.

The proposed Stewardship Sites only satisfies a portion of the required species credits for Superb Parrot breeding habitat, with 189 credits required and only 34 credits generated.

Based on the proposed development footprint used for these calculations, there are further options available to offset the impacts to Superb Parrot. These include:

1. Establishing a Stewardship Site on other land owned by the developer
2. Purchasing matching credits from a third-party seller
3. Paying an equivalent amount (market value for credits required) to the Biodiversity Conservation Trust (BCT) Fund.

The need for additional creation or purchase of credits can be determined at the DA stage, once the actual number of offsets and credits are known. The credits required and generated in this report is indicative only, based on 2016 data collected under the redundant BBAM methodology to assist the consent authority for the rezoning application. This process also assists the developer to gauge the number of credits likely to be required and generated for the revised concept plan.

Establishment of a Stewardship Site

In addition to the Stewardship Sites identified in the revised concept plan (Figure 2) and in **Section 2.3**, if the developer owns other lands with similar biodiversity values, they can be set aside and have Biodiversity Stewardship Agreements established to create the remaining number of species credits required to offset the subdivision. This reduces the costs to the developer in sourcing credits through either a third-party seller or payment into the Biodiversity Conservation Trust (BCT) Fund.

Purchase of matching credits from a third-party seller

Species credits can be purchased from a seller of matching credits. The BioBanking Public Register currently shows the ecosystem and species credits that are available on the market. This option could be explored further to identify whether there are any sellers of the types of credits that match those required for the proposed subdivision (eg. Superb Parrot credits). The excess ecosystem credits (75) could be listed on this register to attract a potential buyer.

There are offset trading rules established under the BOS that determine the matching credits for those required for a proposed development. This includes offsetting impacts on a Threatened Ecological Community (TEC) with the same TEC. In the case of the study area, impacts on Box Gum Woodland can only be offset with matching credits that are also part of the Box Gum Woodland TEC. However, variation rules exist for proponents who can demonstrate to the consent authority that they have completed reasonable steps to seek like-for-like biodiversity credits via searching public registers for a period of 120 days without succeeding in finding like-for-like credits.

Payment into the BCT Fund

The third option for offsetting available is payment into the BCT Fund. The BCT Fund has been established for developers to pay into to fulfil their offset obligations. A price per credit is applied to the credits required for the impacts on native vegetation and threatened species (approximately 25% higher than market value), which includes an administrative cost and a risk premium). The BCT then becomes responsible for sourcing the matching credits and the offset obligation has been fulfilled by the developer.

It should be noted that payment into the BCT Fund is currently not endorsed by the Commonwealth DoEE for offsetting impacts on MNES. If impacts on MNES are required to be offset, the DoEE may require additional offsets be sourced if payment into the BCT Fund is used to fulfil offset obligations under the BAM / BOS and BC Act.

4.1.3 Serious and Irreversible Impacts (SAII)

Serious and irreversible impacts (SAIIs) on biodiversity values must be considered as part of the impact assessment and included in a BDAR prepared for the proposed subdivision DA. Potential SAIIs are listed in the OEH guidance document *Guidance to assist a decision-maker to determine a serious and irreversible impact* (OEH 2017b) along with thresholds considered to result in a SAII.

The list of potential threatened species and ecological communities that meet the principles and criteria for SAIIs was reviewed in relation to the study area and species previously recorded. One threatened species and one ecological community that occur within the study area meet the criteria/principles:

- White Box Yellow Box Blakely's Red Gum Woodland EEC. However, no impact (clearing) thresholds are listed at present. If a threshold was published prior to submitting the BDAR for the subdivision, and the proposed development were to exceed this threshold, Council must refuse the DA on these grounds.
- Eastern Bentwing-bat – is a split Ecosystem (foraging and roosting) and Species (breeding) Credit Species. The SAII threshold states that breeding habitat is to be identified by survey. The species breeds in caves (in the Blue Mountains) and is therefore only likely to use the study area for foraging or roosting. Thus, this species is not considered an SAII for the purposes of assessment within the study area and its foraging habitat is included in the Ecosystem Credits requirements.

As part of the consultation with OEH, they have requested an impact assessment for Box Gum Woodland to be included in this report. The information required for the consent authority to determine if a SAII will result from a proposed development is listed in Section 10.2.2 of the BAM. This information will need to be included in the BDAR for the subdivision DA, but OEH have requested this information be presented at the rezoning stage to provide greater certainty of impacts (see Section 4.1.4).

The list of species and communities that meet the SAII criteria should be reviewed with the subdivision DA to ensure no new species have been listed, and to ensure that new thresholds are considered. ***In particular, the threshold for Box-Gum Woodland EEC is important. If the impact exceeds the threshold, the DA must be refused by Council under a Local Development.*** *However,* Section 6.7(4) of the BC Regs states that there are 90 days grace once a threshold is changed or published to lodge a BDAR under the previous threshold.

4.1.4 Impact assessment for serious and irreversible impacts on Box Gum Woodland

According to 10.2.2 of the BAM, the following information is required to assist the consent authority to evaluate the nature of an impact on a potential entity at risk of a serious and irreversible impact. In this case, the potential entity is Box Gum Woodland EEC.

(a) the action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII

Development of the concept plan for the proposed rezoning and subdivision of the site has been an iterative process involving consultation between the study team and OEH. The revised concept plan has been designed to avoid and protect the biodiversity values of the site. As shown in Figure 2 and Figure 7 areas mapped as high, good and moderate Box Gum Woodland have been avoided and proposed to be managed in perpetuity through three Stewardship Agreements.

Within the southern lot of the eastern R5 zone there is a minor overlap with high condition Box Gum Woodland, however this area will not be impacted, as the building envelop is situated to the north of this lot away from this vegetation zone. The land within the R5 zones that is outside of the building envelopes will be protected under a Section 88b instrument to ensure the biodiversity values are protected.

In the western part of the study area, low condition Box Gum Woodland will be impacted (11.85 ha) through placement of the RU5 Village and R5 Large Lot residential areas. The RU5 village will assume direct impacts over the entire zone, with about two-thirds of this zone comprised of exotic vegetation. Within the R5 zone the direct impacts the Box Gum Woodland will be restricted to a 1,300 m^2 building envelope within each lot. This area is substantial enough to encapsulate the impacts from a large house, effluent disposal and asset protection zones of 10-15 m from the edge of the dwelling. As stated above, the residual land (outside of the building envelope) within each lot will be protected under a Section 88 instrument. This instrument will aim to address indirect impacts on Box Gum Woodland by prohibiting certain actions (eg. vegetation clearing, removal of firewood, keeping of cats and dogs).

Further actions and measures to avoid direct and indirect impacts will be addressed at the DA stage and will likely include:

- Water sensitive urban design to prevent runoff impacting surrounding vegetation
- Sediment and erosion control during establishment of the subdivision and during development of individual lots
- Tree protection measures
- Landscaping within the subdivision to use locally native species and avoid the introduction of environmental weeds

(b) the area (ha) and condition of the TEC to be impacted directly and indirectly by the proposed development. The condition of the TEC is to be represented by the vegetation integrity score for each vegetation zone

Table 6 below provides a breakdown of the direct impacts to Box Gum Woodland. The vegetation integrity score is calculated as stated in the BAM, to determine the current condition of the vegetation zone. This score is based on the estimated 2016 plot data and will be subject to change at the DA stage.

Table 6: Direct impacts to Box-Gum Woodland

Box Gum Woodland EEC condition within the study area	*Vegetation Integrity Score*	*Hectares impacted*
High	44.1	0
Good	63.4	0.07
Moderate	6.8	0.47
Low	29.9	11.85
Total		**12.39 ha**

Note that areas mapped as high condition Box Gum Woodland have been avoided and will be protected in Stewardship Sites. The area of Box Gum Woodland likely to be indirectly impacted has not been quantified, as the building envelopes (1,300 m^2) within each lot aim to provide adequate space for indirect impacts including effluent disposal, potential elevated soil nutrients from households, management of an asset protection zone and vegetation clearing/landscaped gardens around dwellings. A Section 88b instrument will protect the residual land (outside the building envelope) as discussion above in (a).

(c) a description of the extent to which the impact exceeds the threshold for the potential entity that is specified in the Guidance to assist a decision-maker to determine a serious and irreversible impact

There is no threshold listed for Box Gum Woodland in the guidance document.

(d) the extent and overall condition of the potential TEC within an area of 1000ha, and then 10,000ha, surrounding the proposed development footprint

Based on available mapping, there is approximately 138 ha of Box Gum Woodland EEC within an area of 1,000 ha surrounding the study area with the distribution shown in Figure 8 (OEH 2018b, 2015, 2011a,b, DEC 2006).

Approximately 1,832 ha of Box Gum Woodland EEC occurs within 10,000 ha area surrounding the study area as shown in Figure 8.

Condition data for these areas of Box Gum Woodland was not available.

(e) an estimate of the extant area and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development has been taken into consideration

Approximately 102,981 ha of potential Box Gum Woodland EEC has been mapped within the IBRA subregion (Figure 9). Condition data for these areas of Box Gum Woodland was not available (OEH 2018b, 2015, 2011a,b, DEC 2006).

Under the revised concept plan, 12.39 ha of Box Gum Woodland EEC would be cleared, comprised of 11.85 ha of low condition, 0.47 ha of moderate condition and 0.07 ha of good condition Box Gum Woodland. If the proposed subdivision were approved, the amount of Box Gum Woodland would be reduced to 102,969 ha.

(f) an estimate of the area of the potential TEC that is in the reserve system within the IBRA region and the IBRA subregion

The area of likely Box Gum Woodland within the NSW portion of the IBRA region is shown in Figure 10 overlayed by NPWS reserves. The amount of Box Gum Woodland within this NPWS reserve system is estimated to be 244,637 ha (OEH 2018b, 2015, 2011a,b, DEC 2006).

Figure 9 shows the extent of likely Box Gum Woodland within the IBRA sub-region. The area of this community conserved in the NPWS reserve system is estimated to be 5613 ha.

(g) the development, clearing or biodiversity certification proposal's impact on:

(i) abiotic factors critical to the long-term survival of the potential TEC; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns

The study area has had a long history of agricultural use (>150 years) that has simplified the original woodland vegetation through successive years of cropping, pasture improvement, and livestock grazing. This has reduced the structural complexity of the site, removing the native shrub layer and simplifying the ground layer.

Some paddocks in the northwest of the study area have a history of pasture improvement and cropping, and currently have a high cover of *Avena* sp. (Oats), with few native species. These areas area are proposed to be used for the RU5 Village zone.

As such, abiotic factors that have already been impacting the Box Gum Woodland within the study area include fertilizer application, changes in surface water flow through cropping and the establishment of dams, and soil disturbance through use of farm machinery and cropping.

The proposed subdivision is likely to have the following impacts on abiotic factors critical to the long-term survival:

- an increase in non-permeable surfaces from roads and dwellings leading to concentrated areas of runoff
- elevated nutrient levels within runoff
- a reduction in fertilizer application due a change in landuse

These impacts will be concentrated within the RU5 Village zone and within the building envelopes of the R5 zone. These areas have been positioned within exotic vegetation and low condition Box Gum Woodland. They will be addressed in more detail at the DA stage and managed through water sensitive urban design measures to ensure minimal impact to adjacent areas of Box Gum Woodland.

The areas of high, good and moderate condition Box Gum Woodland (approximately 86.98 ha including 46.68 ha of EPBC Act woodland) will be protected within Stewardship Sites and abiotic factors that degrade the community (as listed above) will cease to operate. A 20 year management plan associated with the Stewardship Agreement for the sites will address these will address these factors and removal in greater detail.

(ii) characteristic and functionally important species through impacts such as, but not limited to, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants

The proposed subdivision will impact characteristic and functionally important species within Box Gum Woodland through the removal of canopy species within the RU5 Village zone and selective clearing of canopy species and ground covers within the R5 large lot zone to accommodate building envelopes. Additional survey work is required to map all hollow-bearing trees and determine if the

threatened Superb Parrot is breeding within the study area. Micro-siting of building envelopes and protection of residual (non-impacted) land within the R5 zone will protect canopy and groundcover species.

Within the Stewardship Sites, the management plans will address measures to maintain maximum species diversity and habitat features through appropriate fire regimes, selective grazing to reduce biomass (if required) and weed control.

(iii) the quality and integrity of an occurrence of the potential TEC through threats and indirect impacts including, but not limited to, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the potential TEC

As discussed above, the proposed subdivision has predominantly been positioned within areas of exotic vegetation and low condition Box Gum Woodland to avoid and minimise impacts. Within these impact areas, the quality and integrity of the community has already been impacted through >150 years of agricultural practice including application of fertilizers, cropping and grazing. These impacts will reduce substantially following the change of landuse to residential. Weed control, conservation of native flora, trees and habitat features within the residual (non-impacted) land in the R5 zone will be managed through a Section 88 instrument. Direct and indirect impacts will be contained to the entire RU5 Village zone and the building envelopes within the R5 large lot zone.

The existing threats to Box Gum Woodland within the proposed Stewardship Sites will be managed in perpetuity to remove threats including fertilizer use, grazing, cropping and weeds. In the long-term, the condition of the moderate to high condition Box Gum Woodland within the study area will be improved and used to offset impacts to the low condition Box Gum Woodland.

(h) direct or indirect fragmentation and isolation of an important area of the potential TEC

Figure 8 and Figure 9 demonstrate that Box Gum Woodland within the IBRA region and IBRA subregion is highly fragmented. Beyond the study area, woodland exists to the north (within Sutton Village) and to the south, with mostly cleared land present to the immediate east and west. The Federal Highway forms a barrier to the south a residential road is present along the northern boundary. Given the level of clearing already present within the study area and surrounding areas, it is likely that only highly mobile species (birds and bats) are moving between patches of woodland in the local area. As such, the proposed residential development is unlikely to cause isolation of important areas of Box Gum Woodland.

(i) the measures proposed to contribute to the recovery of the potential TEC in the IBRA subregion.

Approximately 12.39 ha of Box Gum Woodland will be directly impacted, most of which (11.85 ha) is restricted to low condition Box Gum Woodland. The proposed subdivision will protect and enhance (through Stewardship Agreements) approximately 86.68 ha of moderate to high condition Box Gum Woodland.

A 20 year management plan will be developed for each of the three proposed Stewardship Sites to manage threats and improve the biodiversity values of the community. This will result in 95 ha of Box Gum Woodland being restored and added to the reserve system. Given that 5,613 ha of Box Gum Woodland is estimated to be conserved within the IBRA sub-region, an additional 95 ha will contribute to the recovery of this community.

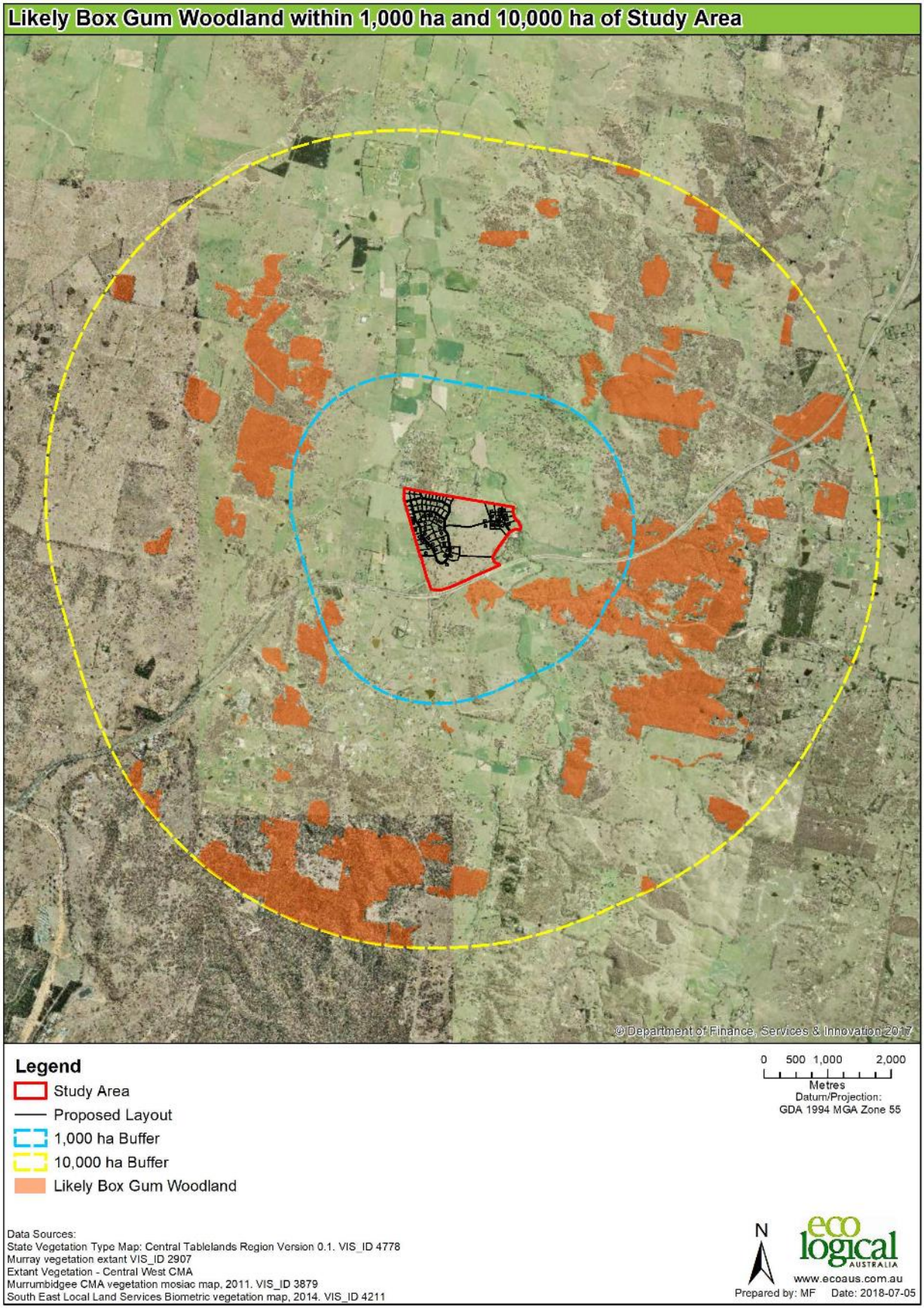

Figure 8: Likely Box Gum Woodland EEC contained within 1,000 and 10,000 ha of the study area

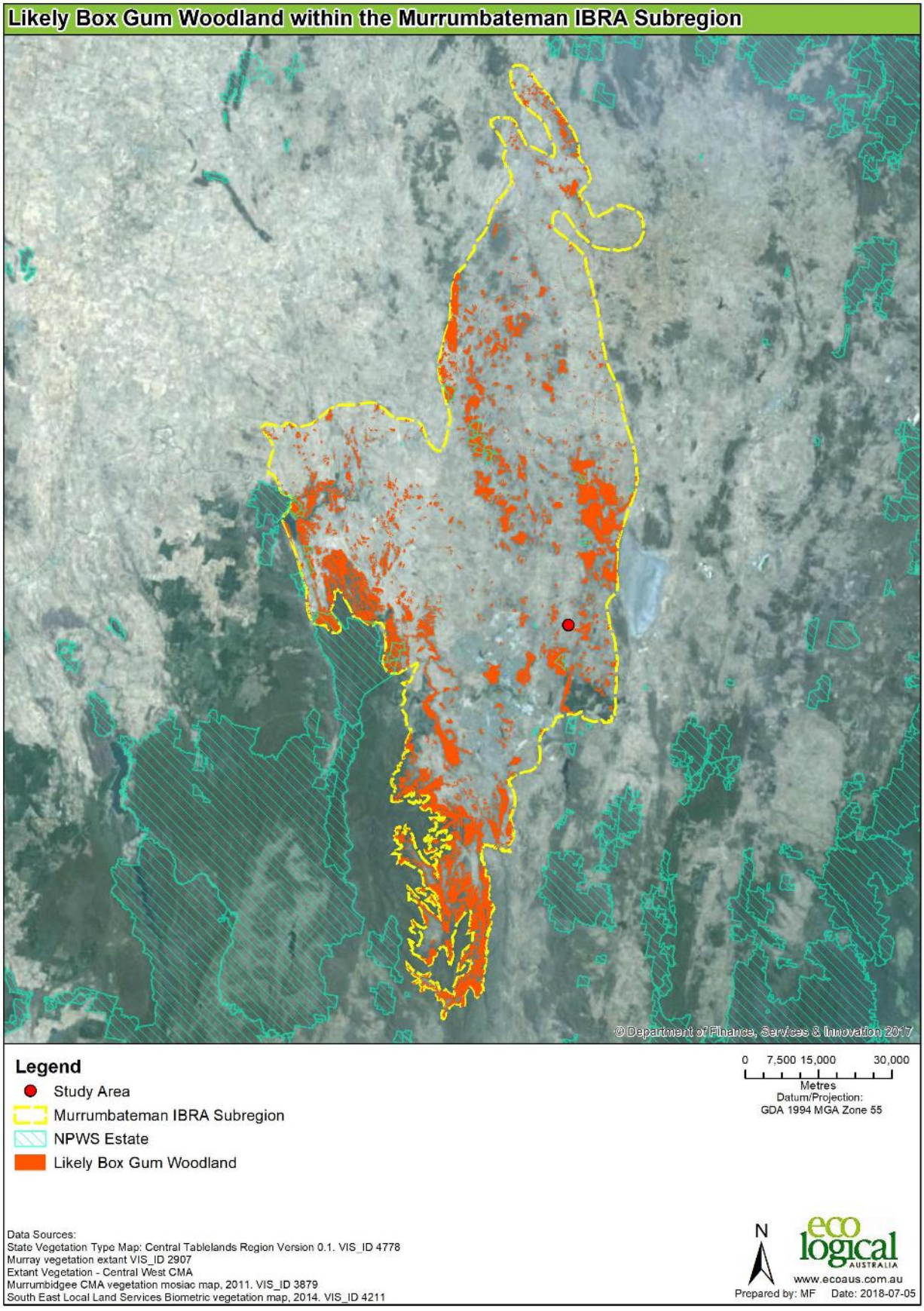

Figure 9: Likely extant Box Gum Woodland within the Murrumbateman IBRA region

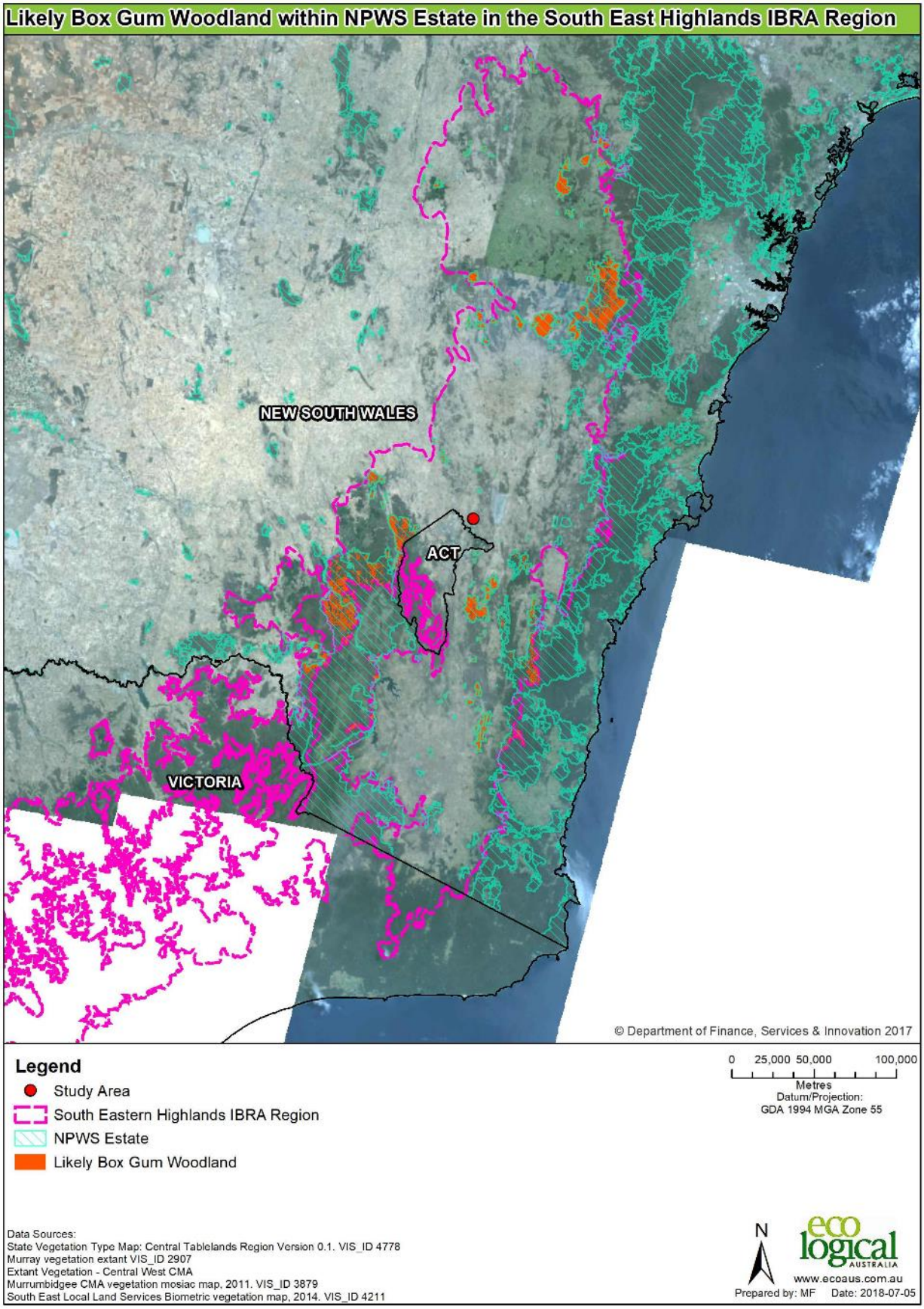

Figure 10: Area of Box Gum Woodland within the IRBR Region

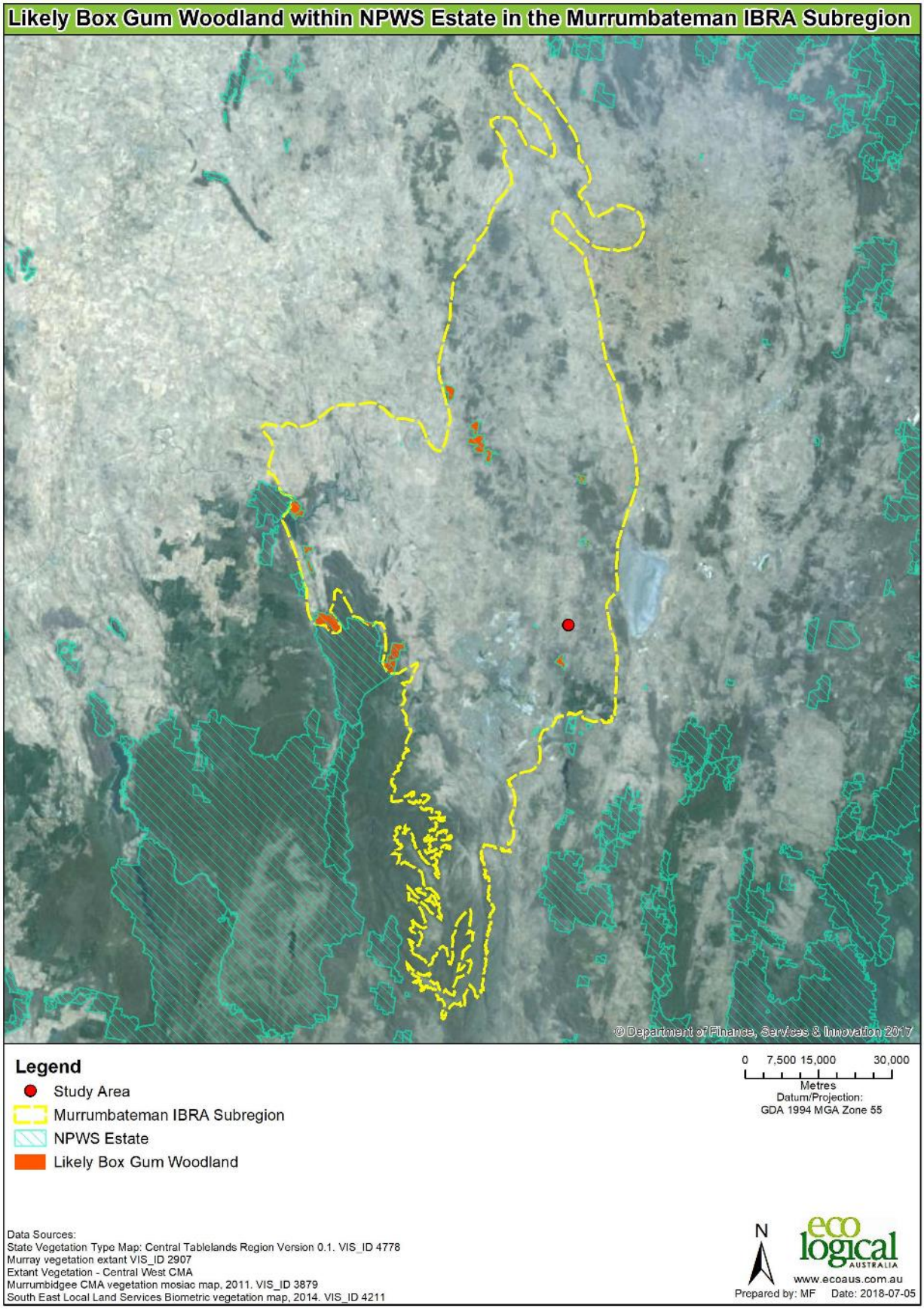

Figure 11: Box Gum Woodland within NPWS reserve system within the IBRA sub-region

4.2 Biocertification of the site as an alternate development pathway

Biodiversity Certification under Part 8 of the BC Act is an option available for the proposed subdivision of the study area. Biocertification is best at a strategic planning level where a landscape approach assesses high conservation areas, including corridors, riparian areas and threatened ecological communities that are to be retained and conserved, and identifies areas of lower conservation significance that can be developed. Both planning authorities and individuals can seek Biocertification under the BC Act.

Biodiversity impacts will be assessed using the same method (BAM) as for a DA. Impacts must be offset by retiring biodiversity credits under the BOS via one of the mechanisms outlined in ***Section 4.1.2*** above. The BAM will be applied to the subdivision concept plan (**Figure 2**) by an Accredited Assessor, who would then produce a Biodiversity Certification Assessment Report (BCAR). The BAM would be applied to the impact and proposed conservation areas. The BCAR would identify the credits proposed to be retired to offset the impact and whether these credits can be generated within the study area. If additional credits are required, payment to the Biodiversity Conservation Trust Fund can be made. If required, the proportion of the credit obligation to be satisfied by the payment is to be reflected in the BCAR. Once the BCAR is completed, a formal application is submitted to OEH.

The BCAR should be reviewed by OEH, followed by consultation and public notification which includes:

- the applicant consulting with Yass Valley Council prior to undertaking public consultation
- the applicant carrying out a public notification process, inviting submissions and providing a report to the Minister for the Environment in response to those submissions
- the Minister for the Environment consulting with the Minister for Planning.

Following this, OEH reviews the application materials against the legislative requirements of the BC Act and the Regulation, and technical requirements of the BAM. This includes a detailed review of the BCAR. OEH will then recommend to the Minister for the Environment whether to confer biodiversity certification to the study area.

In contrast to a Local Development, clearing above the threshold for a 'serious and irreversible impacts' only needs to be considered by the Minister. Along with proposed conservation measures, when deciding whether to certify the proposed certification area, as opposed to an immediate refusal.

Once the biodiversity certification has been conferred, via an order made in the NSW Government Gazette, individual site assessments are no longer required and will not be subject to the Biodiversity Offsets Scheme (BOS). The applicant must ensure it meets any conditions of the biodiversity certification order and implements the terms of any biodiversity certification agreements. OEH will undertake compliance checks to ensure conservation measures required by the certification are being met.

Generally, the Biocertification and rezoning applications are prepared and submitted concurrently and are publicly exhibited at the same time. The benefit of Biocertification is that if the thresholds are exceeded for a SAII (e.g. Box Gum Woodland EEC), then it is not a mandatory refusal and further justification can be provided, for example through retiring additional credits.

Biodiversity Certification of the study area would have the following benefits:

- provides a streamlined biodiversity assessment process for areas proposed for development
- identifies high conservation areas which will offset impact (developed) areas
- once certified, the land can be developed without the usual requirement for biodiversity assessment of each new lot, or as separate DAs.

The assessment of impacts up front in Biocertification allows for the offset liability to be quantified at the planning stage, and for offsets to be satisfied prior to the lodgement of DAs. Certification of the subdivision turns off any further requirement for biodiversity assessment and offsetting at the lot DA stage.

The study area is a good candidate for Biocertification. Once the study area is certified, even if the concept plan for the locations of individual dwelling envelopes changes, no further consideration for biodiversity assessment or offsets will be required as they have already been assessed (if impacts are maintained within the designated impact area). However, Biocertification can involve a larger upfront cost and is a lengthier process than a standard DAs.

4.3 Mechanism for biodiversity protection of the site

4.3.1 Stewardship sites

As discussed in Section 4.1.2, one mechanism for biodiversity protection of land is to retire credits (offset impacts) through establishment of a Biodiversity Stewardship Agreement. Stewardship Sites generate biodiversity credits which represent the expected improvement in biodiversity that will result from the protection and management of the land. A landholder can sell the biodiversity credits to a developer, the Biodiversity Conservation Trust (BCT), or other interested parties. The landholder will receive annual payments in return for undertaking conservation management actions on the property and may earn a profit from selling the biodiversity credits. Biodiversity Stewardship Agreements are established in perpetuity and are required to be managed to improve biodiversity values.

Figure 2 shows three proposed Stewardship Sites within E3 Environmental Management Zone. The BAM calculations have assumed these sites to be an offset with a building entitlement to allow the landowner to manage their sites in perpetuity under a Biodiversity Stewardship Agreement. Based on the 2016 data, these sites will generate enough ecosystem credits to offset the impacts of the proposed development with 75 credits remaining. Additional species credits (155) for Superb Parrot will be required to offset impacts to this species.

4.3.2 Community title

The R5 zone shown in **Figure 2** are proposed to be managed under a Community Title. A community title scheme requires a management statement that includes particular rules associated with the participation in the scheme and the by-laws attached to common areas. To protect the biodiversity values of Zone 2, rules could include:

- No cats or dogs, or pets to be secured at night
- Use of locally native species for landscaping, gardens street trees and parkland
- The building envelope, including sheds, driveways, a dwelling and gardens must be kept within a certain size (for example 1,300 m^2 as proposed in the concept plan) and the remaining area within their lots must be managed for conservation, including retention of all native vegetation and habitat features

Retained land within the study area can be managed through the Community Title for conservation outcomes but is not protected in perpetuity.

4.3.3 Conservation agreements

Conservation Agreements are voluntary agreements between the BCT and landholders to conserve and manage biodiversity on an area of land. The BCT will offer conservation agreements to landholders under the Conservation Management Program or the Conservation Partners Program. Landholders who are eligible to participate in the Conservation Management Program will receive annual conservation management payments to support them in carrying out conservation management actions.

Conservation Agreements do not protect the land in perpetuity, and don't require the level of management that a Biodiversity Stewardship Agreement requires.

Conservation Agreements do not satisfy the requirement to offset biodiversity credits for a BDAR or a BCAR, however, they could be established on areas of retained land within the study area to manage and conserve biodiversity values.

4.3.4 Wildlife Refuge Agreements

A Wildlife Refuge Agreement is a voluntary arrangement between the BCT and a landholder to protect and manage biodiversity on an area of their land.

Similarly, Wildlife Refuge Agreements do not protect the land in perpetuity, and don't require the level of management that a Biodiversity Stewardship Agreement requires. Therefore, Wildlife Refuge Agreements do not satisfy the requirement to offset biodiversity credits for a BDAR or a BCAR. However, they can be a good avenue for landholders who wish to explore options for biodiversity conservation on their property, but do not wish to enter into a permanent agreement.

5 Recommendations for future work

5.1 EPBC Referral

A referral to the Commonwealth DoEE under the EPBC Act may be required for the subdivision based on the likely impacts to MNES. Within the study area, this will include:

- Direct impacts to approximately 0.22 ha of Box-Gum Woodland that meets the EPBC Act criteria (as mapped in Figure 12), which is listed as a critically endangered ecological community under the EPBC Act. Other areas of Box-Gum Woodland proposed to be impacted by the revised concept plan do not meet the EPBC Act listing criteria.
- Superb Parrot, listed as Vulnerable under the EPBC Act

There is currently no bilateral agreement between the State and Commonwealth regarding biodiversity offsets under the new BC Act. The Commonwealth has not endorsed payment into the Biodiversity Conservation Trust Fund as an offsetting mechanism for impacts to MNES. Offsets for MNES are more likely to be accepted by the Commonwealth by establishing Stewardship Sites or purchasing credits from a third-party seller.

Under the EPBC Act, impacts to Box Gum Woodland EEC must be offset with Box Gum Woodland of the same condition state or a higher condition state. In other words, you can't offset impacts to high condition Box Gum Woodland with low condition Box Gum Woodland. Under the revised concept plan 0.22 ha of EPBC Act Box Gum Woodland will be impacted. The proposed offsets include 34.7 credits from high condition, 40.9 credits from good condition and 142.5 credits from moderate condition Box Gum Woodland that will be managed and conserved in perpetuity within the Stewardship Sites. We expect that the DoEE would see this as an appropriate offset and may not require the development to be referred to the Commonwealth for approval regarding impacts to Box Gum Woodland. However, an assessment would still be required at the DA stage following the EPBC Act assessment guidelines.

In regards to Superb Parrot, further survey work is required to map hollow-bearing trees which form potential breeding habitat and identify any trees with nesting pairs. Impacts to this habitat can be minimised through positioning of building envelopes to avoid removal of habitat trees. In the long-term these trees will be protected under the Section 88B instrument.

We recommend meeting with the DoEE to discuss the likely impacts of the subdivision on MNES, the likely offset obligations and whether the proposed offsets under the BC Act would be sufficient to offset impacts to MNES. Having "in principle support" from the DoEE is essential prior to lodging the subdivision DA.

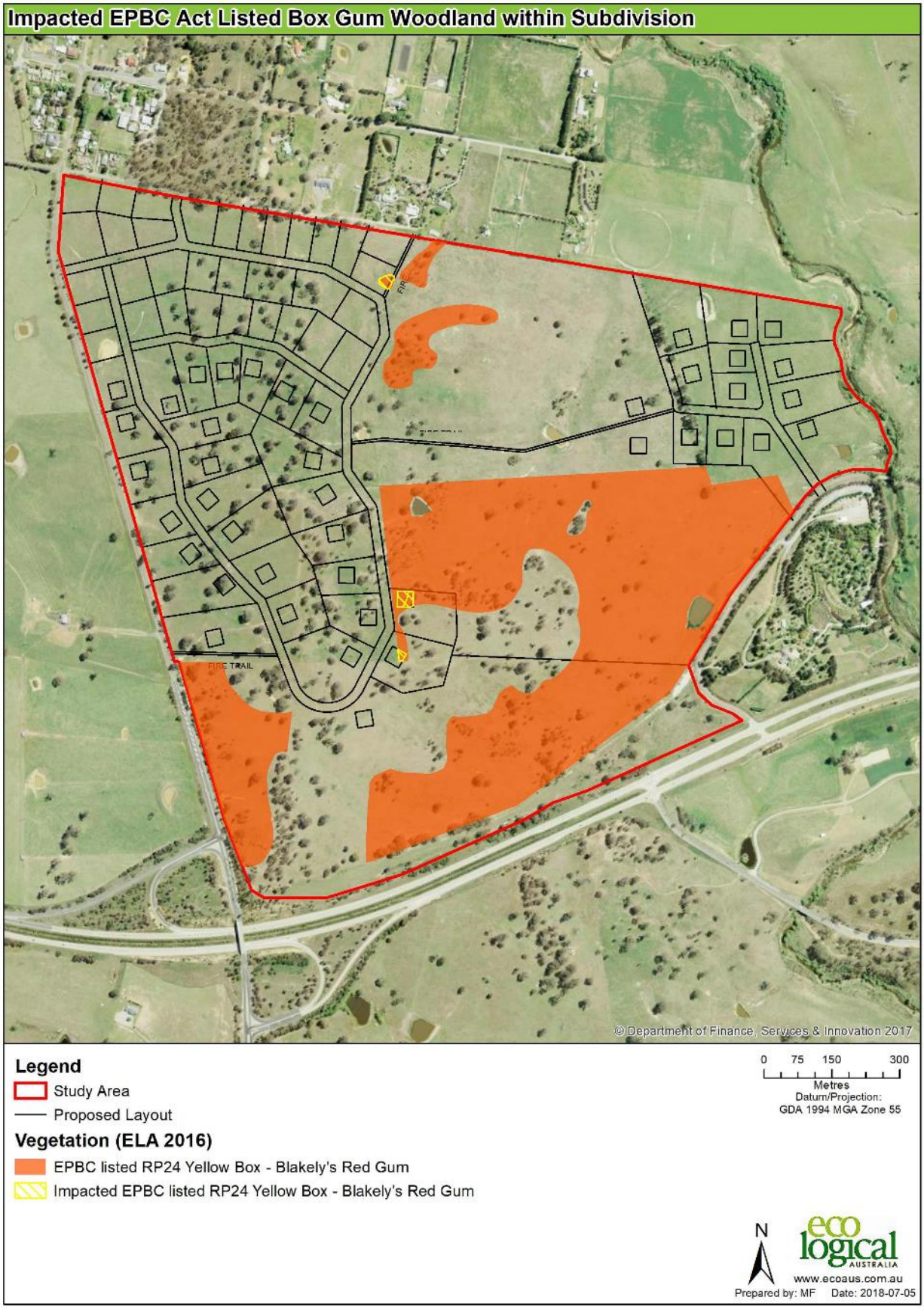

Figure 12: Maps areas of Box Gum Woodland that meet EPBC Act condition criteria

5.2 Future survey work

Further surveys of the study area will be required to be undertaken with the preparation of a DA for the proposed subdivision. This includes additional surveys for PCTs and vegetation zone stratification, collection of flora plots and targeted surveys for threatened species (species credit species).

Verification of the stratification of vegetation zones are required as the vegetation zones presented in this report are based on a desktop assessment and field survey undertaken in 2016. Ground-truthing of these zones is required to provide an accurate representation of the condition of the mapped PCTs.

As previous surveys of the study area (ELA 2016a; ELA 2016b) collected flora plot data in accordance with the BBAM 2014, the floristic plots will need to be re-collected in accordance with the new BAM. As mentioned in **Section 2.1** above, the BAM requirements are different to those of BBAM 2014. Approximately 23 BAM vegetation integrity survey plots will be required to be collected, as detailed below in Table 7. However, we suggest discussing with OEH as to whether any of the 2016 data can be used in the future BAM assessment.

Table 7 outlines the minimum number of BAM vegetation integrity survey plots that will be required for the current proposal. However, these numbers are subject to change with further stratification of the vegetation zones.

Table 7. Minimum number of BAM vegetation integrity survey plots required

Veg Zone	*PCT ID*	*Plant Community Type*	*Condition*	*Development footprint*		*Offset*	
				Area (ha)	*Plots required*	*Area (ha)*	*Plots required*
1	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	High	0.00	0	10.45	3
2	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Good	0.07	1	17.30	3
3	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Moderate	0.47	1	46.59	4
4	277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Low	11.85	3	12.34	3
5	349	Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates in the mid-Murrumbidgee and upper Lachlan catchments mainly in the western South Eastern Highlands Bioregion	Good	0.00	0	4.83	2
6	349	Inland Scribbly Gum - Red Stringybark open forest on hills composed of silicous substrates in the mid-Murrumbidgee and upper Lachlan catchments mainly in the western South Eastern Highlands Bioregion	Moderate	0.28	1	3.77	2
			Total	**12.68**	**6**	**95.27**	**17**

The BAM calculator generates a list of 'species credit' species that are required to be surveyed at the subdivision DA stage. These species are listed below in **Table 8** along with an assessment of their likelihood of occurrence within the study area (i.e. recorded during previous survey, potential or unlikely to occur based on habitat requirements).

Seasonal targeted surveys may be required for these species (in accordance with the BAM) in order to discount the species presence within the subdivision development footprint, if particular habitat features are impacted. If targeted surveys are not undertaken, these species must be assumed to be present within the development footprint and their offset liability calculated. For a Stewardship Site, the generation of species credits is optional and targeted surveys are not required to be undertaken. However, if species credit species are found on the Stewardship Site, credits can be generated and either used to offset the proposed subdivision or can be sold to another developer as a source of income.

Additional species may also require targeted surveys that are identified in the BioNet Atlas database and the EPBC Act Protected Matters Search Tool. Searches of these databases would need to be undertaken prior to a formal BAM assessment of the proposed subdivision, to ensure any proposed surveys encapsulate all threatened species that are required to be surveyed.

Table 8: Species credit species identified in the BAM Calculator that will require targeted surveys

Species	*Presence*	*Survey Months*
Yass Daisy *Ammobium craspedioides*	Unlikely.	Sept, Oct, Nov, Dec, Jan
Pink-tailed Legless Lizard *Aprasia parapulchella*	Unlikely to occur. Targeted searches undertaken in October 2016 (rock rolling) occurred in areas containing surface rock. Potential habitat included partially embedded, dinner plate-sized surface rocks. No individuals were found.	Sept, Oct, Nov
Eastern Pygmy-possum *Cercartetus nanus*	No – no potential habitat within the study area.	Oct, Nov, Dec, Jan, Feb, Mar
Striped Legless Lizard *Delma impar*	No – no potential habitat within the study area.	Sept, Oct, Nov, Dec
Square-tailed Kite *Lophoictinia isura*	Unlikely – not known to occur in the locality.	Sept, Oct, Nov, Dec, Jan
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	Recorded by Anabat in October 2016. No caves (breeding habitat) within the study area. Foraging habitat only.	Nov, Dec, Jan, Feb
Southern Myotis *Myotis macropus* (breeding habitat only)	Possible call recorded from Anabat, October 2016. Further survey required. Important habitat includes bridges, caves or artificial structures and hollow-bearing trees within 200 m of a riparian zone.	Nov, Dec, Jan, Feb, Mar
Squirrel Glider *Petaurus norfolcensis*	Unlikely – habitat not considered suitable.	All year
Koala *Phascolarctos cinereus*	No – no potential habitat within the study area.	All year
Superb Parrot *Polytelis swainsonii*	Recorded in October 2016. Further survey required to confirm if the species is breeding in the study area.	Sep, Oct, Nov
Tarengo Leek Orchid *Prasophyllum petilum*	No – no potential habitat within the study area.	Oct, Nov, Dec
Small Purple-pea *Swainsona recta*	Unlikely. Targeted survey in Oct 2016 did not record any.	Sep, Oct, Nov
Silky Swainson-pea *Swainsona sericea*	Recorded (one individual) in October 2016. Will be conserved in proposed stewardship site.	Sept, Oct, Nov, Dec, Jan, Feb, Mar
Golden Sun Moth *Synemon plana*	Unlikely.	Oct, Nov, Dec
Regent Honeyeater *Anthochaera phrygia*	No – no potential habitat within the study area.	Sept, Oct, Nov, Dec
Gang-gang Cockatoo *Callocephalon fimbriatum*	Unlikely.	Oct, Nov, Dec, Jan

Species	*Presence*	*Survey Months*
Little Eagle *Hieraaetus morphnoides*	Potential – further survey required.	Aug, Sep, Oct

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