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Preliminary Biodiversity Development Assessment Report

515 Crookwell Road, Kingsdale, NSW (Lots 103 and 104 // DP 1007433)

Prepared for: Precise Planning

31/03/2023 Version: 2.0 – Final 2

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PROJECT NAME	Preliminary Biodiversity Development Assessment Report			
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PREPARED FOR	Precise Planning			
AUTHOR/S	Edwin Vaca, Ben Brown, Ed Cooper			
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Glossary and abbreviations

Acronym	Description
BAM	Biodiversity Assessment Method
BC Act	*NSW Biodiversity Conservation Act 2016*
BC Reg	*Biodiversity Conservation Regulation 2017*
BCT	Biodiversity Conservation Trust
BCF	Biodiversity Conservation Fund
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BVM	Biodiversity Values Map
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment
DotE	Commonwealth Department of the Environment (now DAWE)
DPE	NSW Department of Planning and Environment
DPI	NSW Department of Primary Industry
EPBC	*Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
GMLEP	*Goulburn Mulwaree Local Environmental Plan 2009*
HBT	Hollow bearing tree
IBRA	Interim Biogeographic Regionalisation of Australia
LGA	Local Government Area
MNES	Matters of National Environmental Significance

NRAR	Natural Resources Access Regulator
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
SAII	Serious and Irreversible Impacts
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
TSSC	Commonwealth Threatened Species Scientific Committee
WM Act	NSW Water Management Act 2000
VI	Vegetation Integrity
VIS	Vegetation Information System
VMP	Vegetation Management Plan

1 Introduction

1.1 Background

This Preliminary Biodiversity Development Assessment Report (BDAR) has been prepared to accompany a Planning Proposal (PP) seeking to change the land use zoning at 515 Crookwell Road, Kingsdale, NSW (Lots 130 and 104 // DP 1007433; the 'study area' **Figure 1.1**) to facilitate a future redevelopment of the site.

The *NSW Biodiversity Conservation Act 2016* (BC Act) establishes the biodiversity assessment requirements for proposed developments and land use change. Part 6 of the BC Act establishes the Biodiversity Offsets Scheme (BOS) which aims to ensure there is no net loss of biodiversity values. Where a proposed development triggers the BOS, a BDAR prepared in accordance with the Biodiversity Assessment Method (BAM; DPE 2020) must accompany the DA. Triggers for entry into the offset scheme are detailed within Part 7 of the *Biodiversity Conservation Regulation 2017* (BC Reg) and are as follows:

- **Native vegetation clearing thresholds** – the areas of native vegetation clearing proposed in relation to the minimum lot size used to determine whether entry into the BOS is triggered, **AND/OR**
- **Biodiversity Values Map** – Proposed development is said to exceed the biodiversity threshold where it involves the clearing of native vegetation on land included on the Biodiversity Values Map (BVM), **AND/OR**
- **Significant impact** – A Test of Significance (in accordance with Part 7.3 of the BC Act) is required for development proposals that are situated on the BVM and that do not exceed the BOS clearing thresholds. If the Test of Significance indicates that there is likely to be a significant impact, the BOS is triggered.

This Preliminary BDAR has been prepared as the proposed future development was considered to have the potential to trigger entry to the NSW Biodiversity Offset Scheme based on an exceedance of the native vegetation clearing threshold of 1 ha for a lot size 40 ha to less than 1000 ha. Whilst the PP itself would not permit the removal of native vegetation; it would pave the way for a subdivision Development Application (DA) that would be required to consider the impacts of the development in accordance with the NSW Biodiversity Offset Scheme.

This Preliminary BDAR has been prepared in accordance with the BAM (DPE 2020) to document the predicted impacts to biodiversity and has been prepared by Ed Cooper, an Accredited Assessor (#18047) in accordance with the BC Act and NSW BC Reg. This Preliminary BDAR describes the outcome of the development assessment case (00030817/BAAS18047/22/00030818) conducted consistent with the BAM.

Following a review of version 1.2 – Final V1 of this report, council determined that additional site assessment and flora and fauna surveys were required to support the Preliminary BDAR. The result of these additional surveys and assessment have guided the updates in this report.

1.2 Location and site identification

The BAM defines the land to which the BDAR applies as the ***subject land*** which includes areas that are proposed to be directly and indirectly impacted. For the purposes of this Preliminary BDAR, the subject land includes the approximately 54.75 ha of land within the yellow polygon shown in **Figure 1.2**. The subject land includes 53.97 ha of Lot 103 and 0.78 ha of Lot 104 // DP 1007433. The total area size for the study area is 165.37 ha.

The subject land is situated in the Goulburn Mulwaree Local Government Area (LGA) and is zoned under the Goulburn Mulwaree Local Environmental Plan (GMLEP) 2009 as C3 – Environmental Management.

The subject land generally consists of cleared land modified for agricultural practices and subject to several management regimes. Areas of semi-native low-density grasslands, exotic grasslands and planted exotics and non-endemic native trees and shrubs are present within the subject land.

The subject land slopes gradually to the east from its centre and plateaus before reaching Crookwell Road to the east. The subject land is bound by Crookwell Road to the east and by pasturelands on all other boundaries.

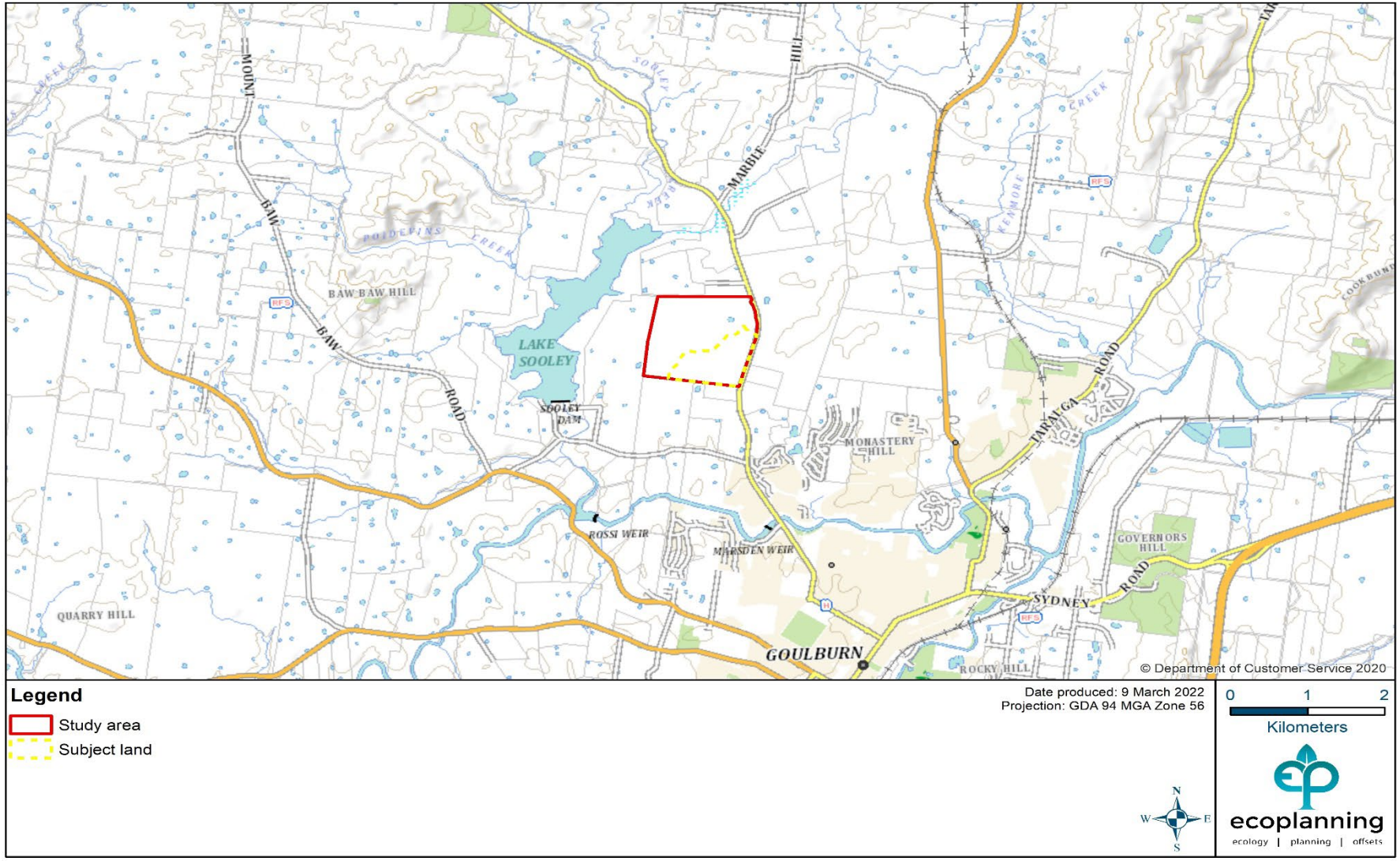

Figure 1.1: Location of study area

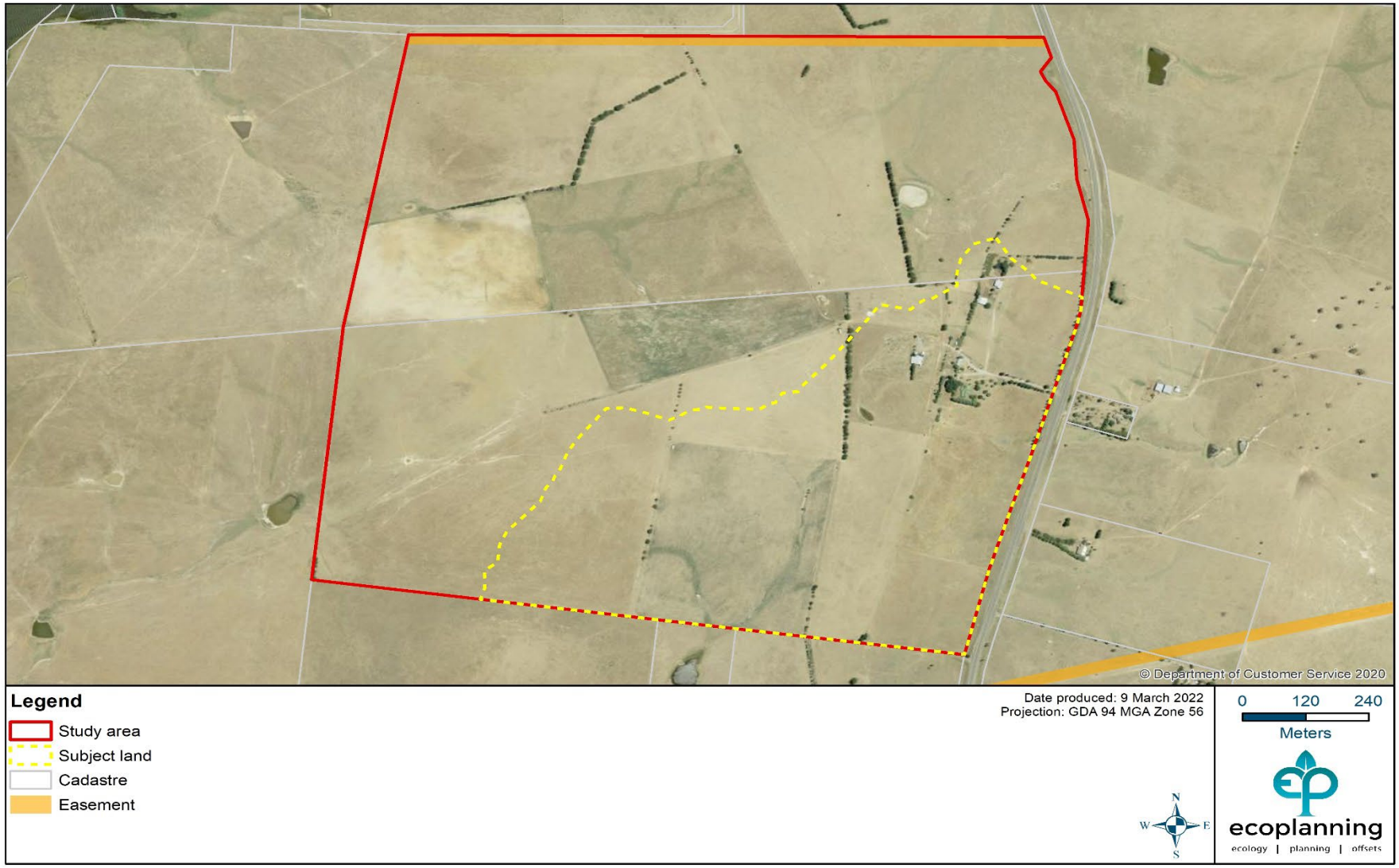

Figure 1.2: Subject land site map

2 Landscape context

2.1 Identifying landscape features

In accordance with the BAM, a number of features are assessed within and surrounding the subject land and a 1,500 m buffer around the subject land (**Figure 2.1**). These landscape features are used to identify biodiversity values that are important for the subject land and inform the habitat suitability of the subject land for threatened species. Other features, such as rivers, streams, estuaries and wetlands, habitat connectivity, karst areas or areas of outstanding biodiversity value are considered, where appropriate.

2.1.1 IBRA regions and subregions

The Interim Biogeographic Regionalisation of Australia (IBRA, DoEE 2015) represents a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna species present. The subject land is located entirely within the '**Monaro'** IBRA subregion (version 7) and within the '**South Eastern Highlands**' IBRA region (version 7) (**Figure 2.1**). These values were entered into the BAM-C.

2.1.2 NSW landscape regions (Mitchell Landscapes)

The subject land is located entirely within the '**Rockley Plains**' (Mitchell Landscapes v3.1) and this was entered into the BAM-C. Land within the 1,500 m assessment circle is located within the 'Gundary Plains' and 'Breadalbane Swamps and Lagoons' Landscapes (**Figure 2.1**).

2.1.3 Other features

Rivers, streams and estuaries

Rivers, streams, and wetlands located within the 1,500 m buffer of the subject land, including the associated riparian buffers calculated in accordance with Appendix 3 of the BAM, are shown in **Figure 2.1**.

The subject land contains three unnamed 1st order watercourses. Two of the watercourses are located within the southern portion of the subject land, the third watercourse intersects the subject land from the north eastern boundary to the south. Development within 40 m of a watercourse will trigger a Controlled Activity Approval under the NSW *Water Management Act 2000* (WM Act). The Natural Resources Access Regulator (NRAR) guidelines (NRAR 2018) require a Vegetated Riparian Zone (VRZ) either side of mapped drainage lines. The width of a VRZ is predetermined and standardised for watercourses based on their Strahler order. Given all the watercourses present with the subject land are 1st order streams they will require a 10 m buffer either side of the channel. The 1st order streams within the subject land did not present any evidence of a discernible bed and bank and analysis of the Department of Primary Industry (DPI) Water (2012) data does not show these mapped streams flowing into any major rivers.

The subject land contains two small farm dams. The dams contained little vegetation and are used for livestock, however, could provide habitat for amphibians and waterfowl.

Local and important wetlands

Under the BAM, a **Local Wetland** is defined as an area of land that is wet by surface water or groundwater, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle (DPE 2020). An **Important Wetland** is a wetland listed under the Directory of Important Wetlands of Australia (DIWA, Environment Australia 2001) or an area included under the State Environmental Planning Policy (Coastal Management) 2018 (SEPP CM).

Two artificial dams are present within the subject land (~0.07 ha). The dams are used for livestock and no native vegetation is present around the dams. No important wetlands are present within the subject and it is not mapped under the SEPP CM. Lake Sooley is located approximately 1 km west of the subject land and Wollondilly River is located approximately 1.8 km south of the subject land.

Habitat connectivity

The subject land does not form part of any recognised biodiversity corridor, flyway, or habitat connectivity feature. The subject land and surrounding properties have been largely cleared and are managed for agricultural activities, which has significantly reduced habitat connectivity across the landscape. Additionally, Crookwell Road, which runs parallel to the eastern boundary of the study area, can potentially act as a hard barrier for some fauna species, interrupting habitat connectivity with farmlands located east of the subject land.

However, the subject land is mapped under the SEPP (Sydney Drinking Water Catchment) 2011 (SEPP SDWC), Sydney Drinking Water Catchment Map. Any land mapped within the Sydney Drinking Water Catchment Map must adhere to Part 2 – Assessment and approval of development and activities of the SEPP SDWC (2011). One of the key conditions of the SEPP SDWC (2011) states that a consent authority must not grant consent for development to land in the Sydney Drinking Water Catchment unless it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on water quality.

Areas of geological significance and soil hazard features

No landscape features including areas of geological significance (including karst, caves, crevices, and cliffs) or soil hazard features have been identified within the subject land. Soil groups present within the subject land are presented in **Figure 2.2**.

Along the north eastern corner of the subject land an area containing a rocky outcrop has been identified (**Figure 2.3**). Incidental and targeted surveys for potential threatened fauna species were conducted in November 2022. Further details are provided in **Section 4.1.3**

Areas of outstanding biodiversity value

No areas of outstanding biodiversity have been identified within the subject land.

2.2 Determining site context

2.2.1 Assessing native vegetation cover

In accordance with Section 3.2 of the BAM, native vegetation cover must be estimated for a 1,500 m buffer around the subject land to determine the landscape context of the subject land. The extent of native vegetation on the subject land and immediate surrounds was mapped using ELA (2015) (**Figure 2.1**).

The total area of the 1,500 m assessment buffer around subject land is 1,239 ha, with the area of native vegetation within the assessment buffer being approximately 409 ha. This is a native vegetation cover of 33 % (i.e., in the >30-70 % class [Section 3.2.3 of the BAM]), and this value was entered into the BAM-C

2.2.2 Assessing patch size

Patch size as defined by the BAM as "*an area of native vegetation that*:

a) occurs on the development site or biodiversity stewardship site, and
b) includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or ≤30 m for non-woody ecosystems).

Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site."

In assessing patch size, stands of native vegetation within 100 m (where in a moderate to good condition) but that are separated by hard barriers, including permanent artificial structures, wide roads or other barriers, have been treated as separate patches. These highly modified breaks in vegetation connectivity would significantly alter ecological function of these areas of native vegetation such that these areas warrant recognition as separate patches.

Section 4.3.2 of the BAM states patch size is required to be assessed as one of four classes per vegetation zone mapped, being <5 ha, 5-24 ha, 25-100 ha or >100 ha. Patch size was calculated for the vegetation within the subject land using the updated native vegetation extent data layer prepared for the 1,500 m buffer (see **Section 2.2.1**).

The patch of PCT 1334 vegetation within the subject land is isolated from other patches of native vegetation within the subject land by stands of exotic vegetation, farm houses and planted trees. To the east, Crookwell Road acts as a barrier to other areas of grasslands, however, the distance between areas of PCT 1334 and other grassland vegetation is not greater than 100 m, therefore the patch size for this vegetation zone is >100 The patch size therefore fits into the >100 ha category and this value was entered into the BAM calculator for patch size.

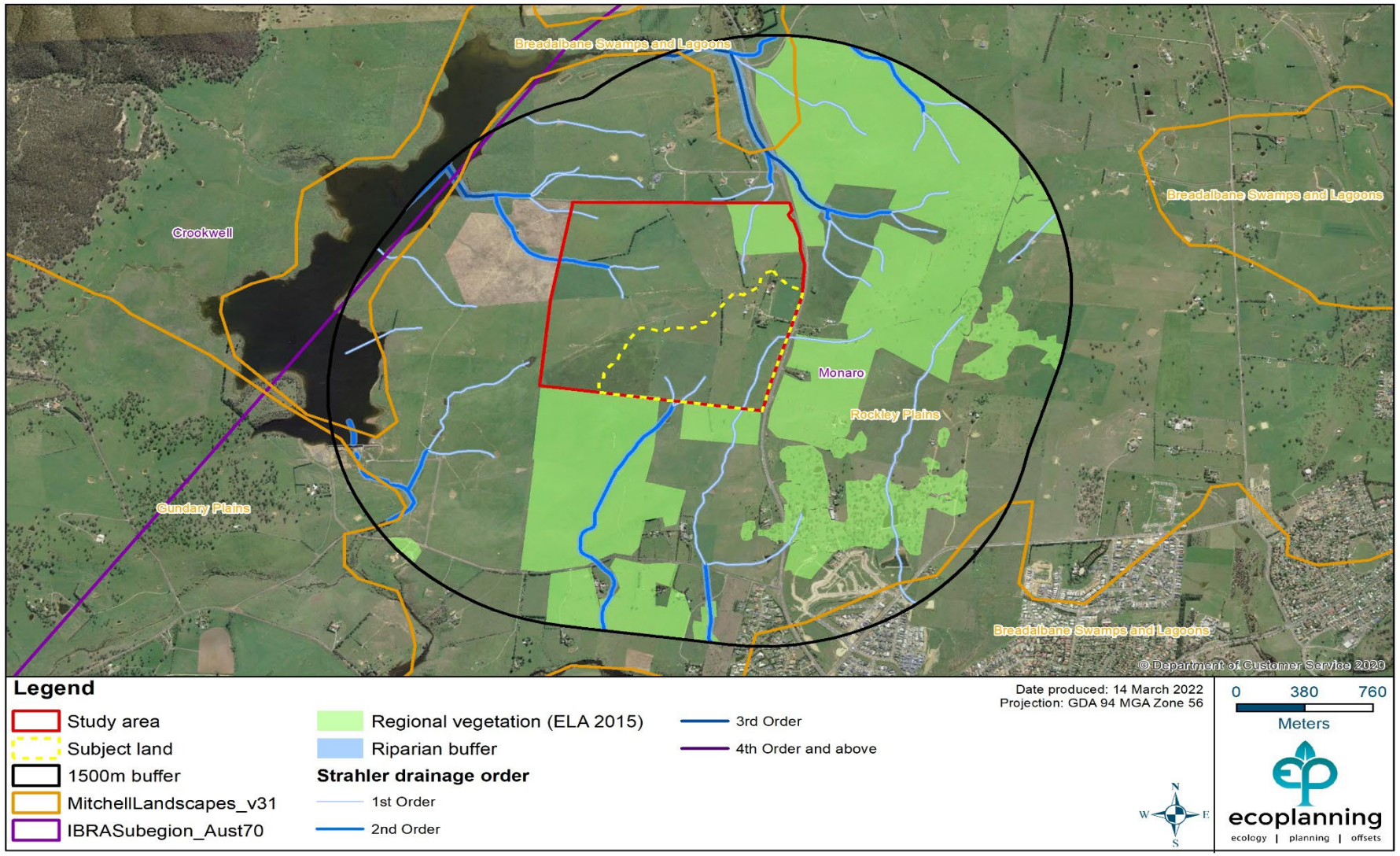

Figure 2.1: Landscape context of the subject land with respect to IBRA subregions, Mitchell Landscapes, Strahler watercourse and Native vegetation mapping

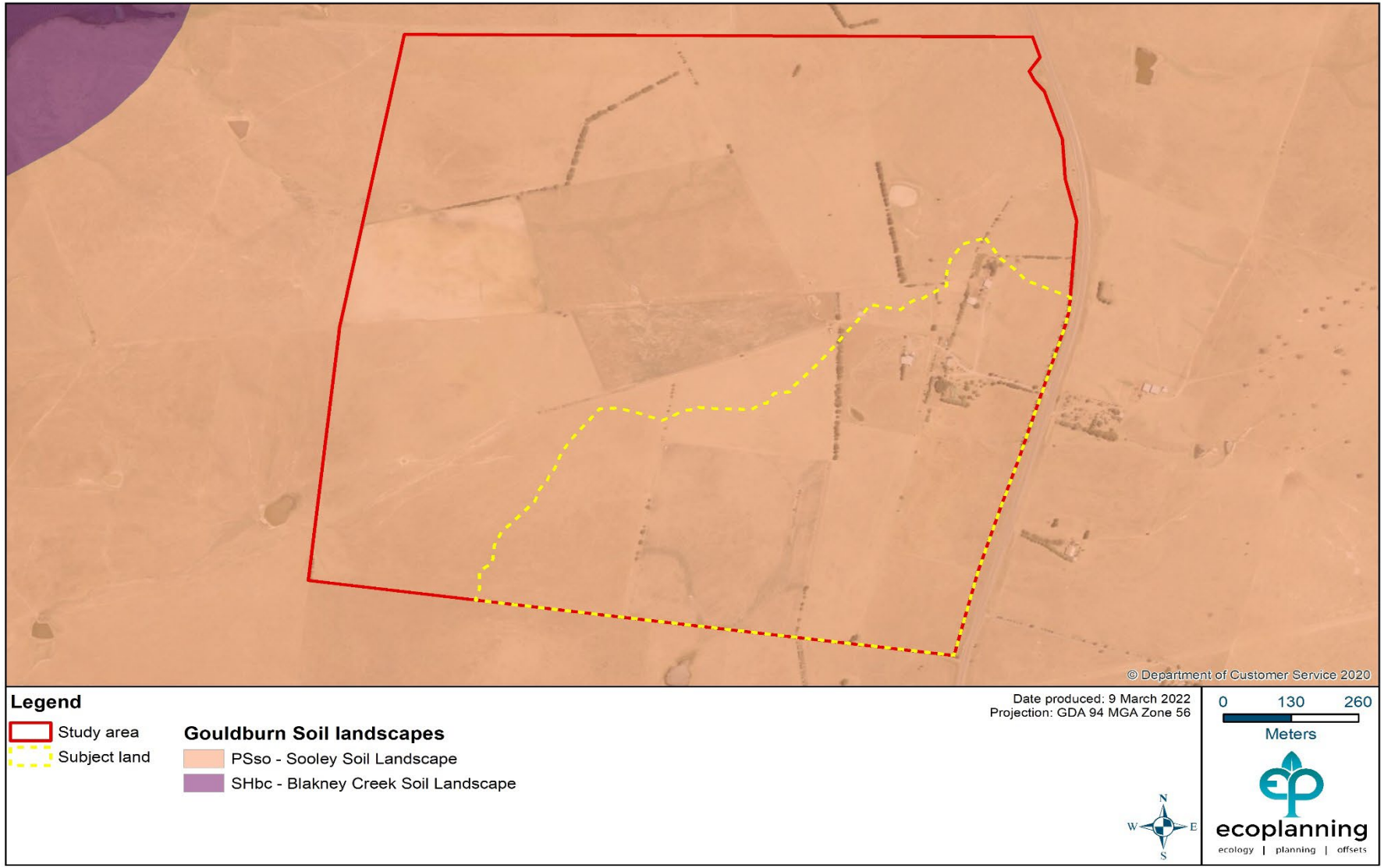

Figure 2.2: Soil landscapes found within the subject land

Figure 2.3: Rocky outcrops located along the north eastern boundary of the subject land.

3 Native Vegetation

3.1 Plant community types (PCTs) and threatened ecological communities

3.1.1 Regional vegetation mapping

In accordance with Section 4.2 of the BAM, existing information relevant to the native vegetation of the subject land and the 1,500 m buffer area has been reviewed. Vegetation information associated with regional vegetation assessments (Tozer et. al 2010 and ELA 2015) have been reviewed.

Regional vegetation mapping by Tozer et. al (2010) did not identify any native vegetation within the subject land and mapped the area as 'Cleared' (**Figure 3.1**). However, vegetation mapping by ELA (2015) indicated the potential for PCT 1377 – *Kangaroo Grass - Snowgrass tussock grassland on slopes and ridges of the tablelands, South Eastern Highlands* to be present within the north eastern section of the study area and a small patch (0.36 ha) within the southern boundary of the subject land (**Figure 3.2**). PCT 1377 is a component of Natural Temperate Grassland of the South Eastern Highlands (NTG-SEH) Threatened Ecological Community (TEC). Presence of this TEC is subject to condition thresholds been met.

3.2 Vegetation extent

In accordance with Section 4.1 of the BAM, the extent of native vegetation was identified and mapped across the subject land. A total of 4.13 ha of the 54.75 ha of the subject land was mapped as supporting native vegetation. Areas that did not support native vegetation included areas of planted mixed exotic and non-endemic native trees and shrubs and exotic grasses in which vegetation clearing had previously occurred for agricultural purposes.

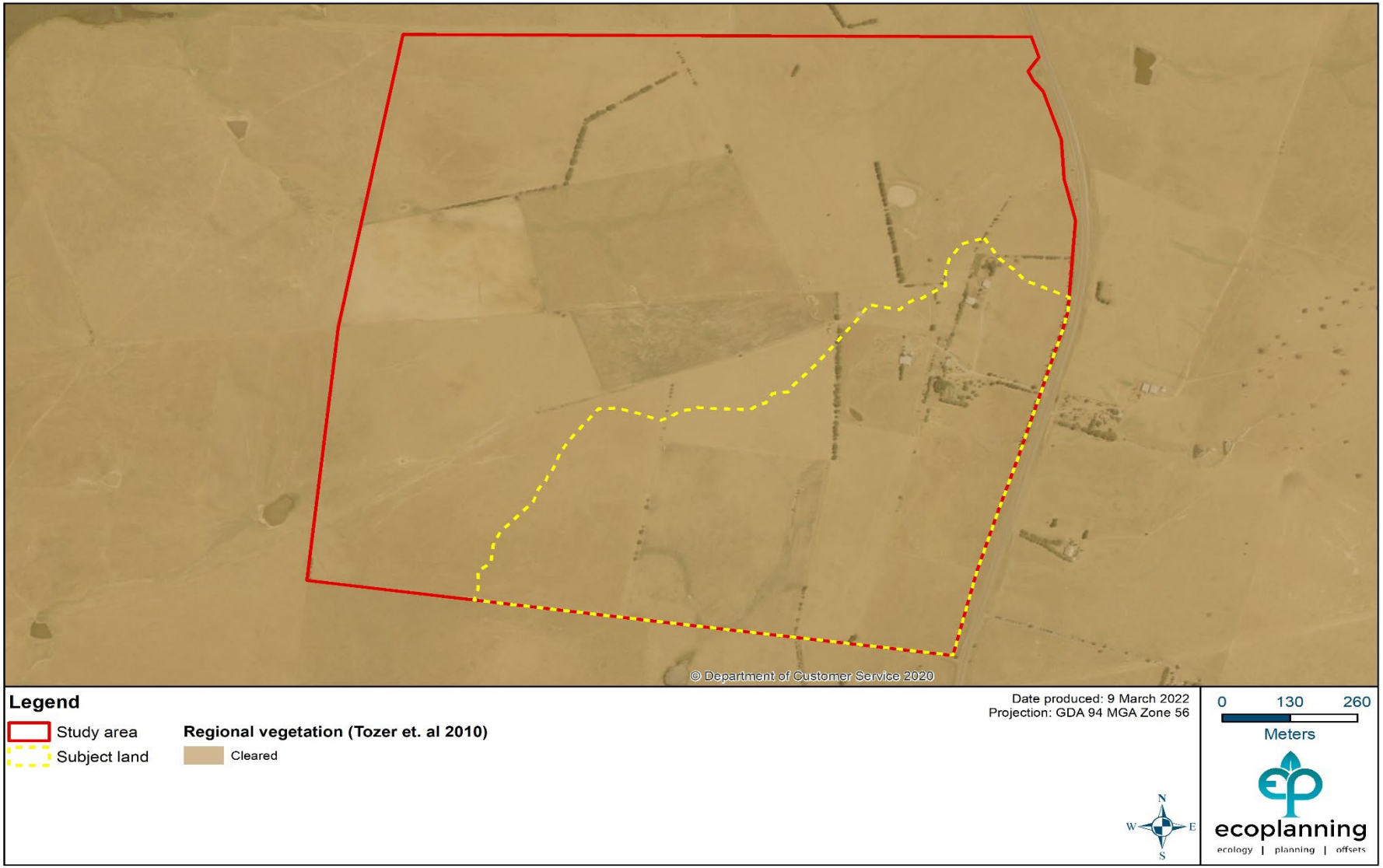

Figure 3.1: Regional vegetation mapping (Tozer et. al 2010)

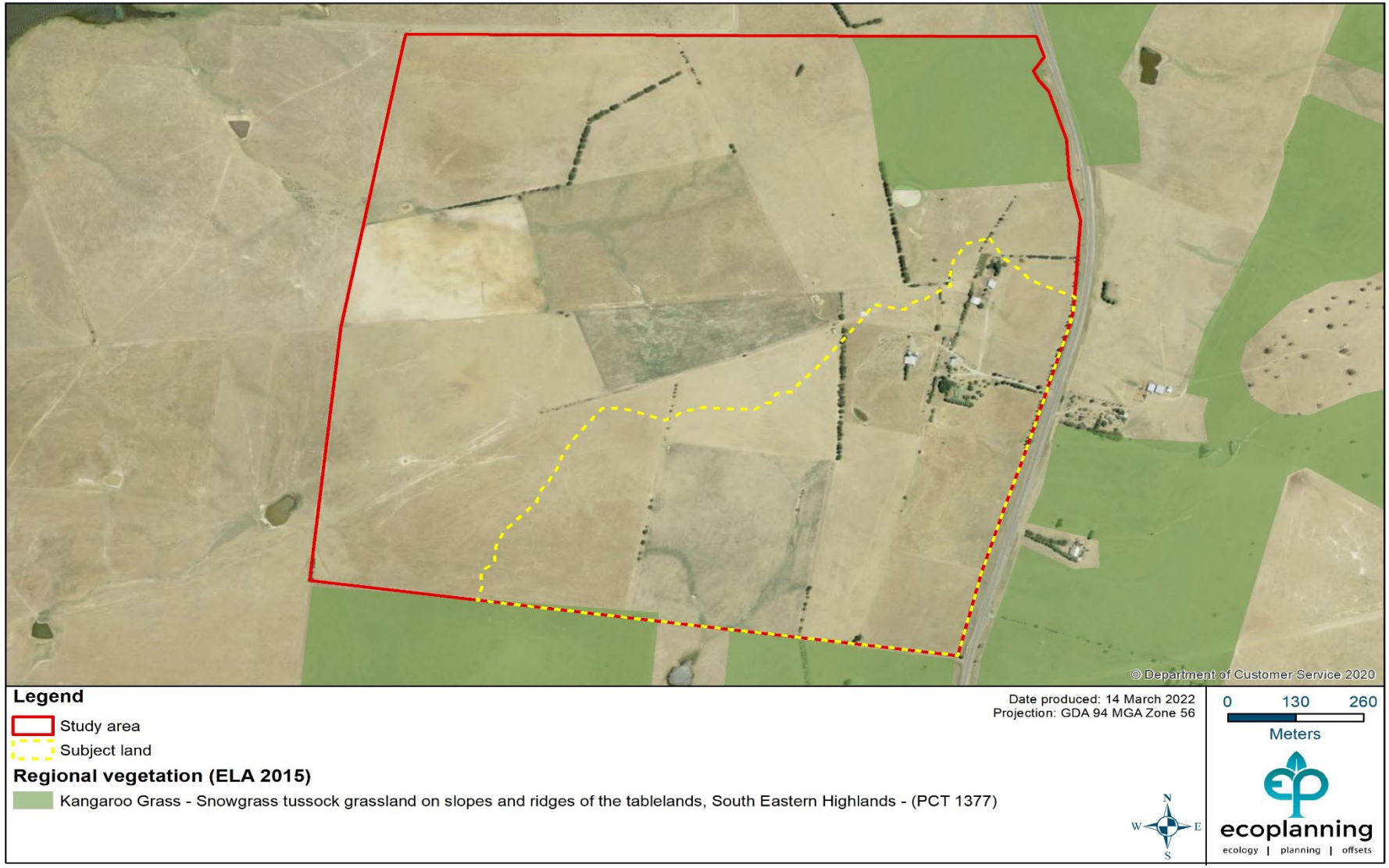

Figure 3.2: Regional vegetation mapping (ELA 2015)

3.2.1 Field assessment of vegetation communities

Assessment and mapping of PCTs was based upon mapping of vegetation communities within the local area (ELA 2015 and Tozer et. al. 2010). A plot-based survey, consistent with the BAM (DPE 2020), was undertaken by Ben Brown (Ecologist) and Edwin Vaca (Ecologist) on 27 – 28 January 2022. The subject land was traversed to sample any spatial variation within vegetation types, validate boundaries between PCTs and to record any variation in the broad condition state of vegetation to identify and map vegetation zones. Based upon traverses of the subject land and revisions to mapped boundaries, vegetation communities present were identified within the subject land and their boundaries were mapped. The floristics of each of these vegetation communities were then sampled by plot-based floristic vegetation surveys consistent with Section 4.3.4.2 of the BAM (**Table 3.1**). The location of floristic plots is shown in **Figure 3.5**. The plot locations also represented the location of vegetation integrity (VI) plots in accordance with Section 4.3 of the BAM. The location of floristic vegetation plots was determined by randomly locating plots in representative areas of each vegetation community.

Due to the timing of the floristic surveys being sub-optimal (i.e., in Winter), a second site assessment and an additional plot-based survey was undertaken by Ed Cooper (Senior Ecologist) and Edwin Vaca (Field Ecologist) on 7 November 2022 (i.e., in Spring). The additional site assessment focused on validating previous vegetation mapping, of areas of native vegetation, and conducting a plot-based floristic survey at more favourable time of the year, both for threatened species and to better assess the native forb diversity within patches of PCT 1334.

Table 3.1: Minimum number of plots required per vegetation zone (Section 4.3.4.2 of the BAM)

Vegetation zone area (ha)	Minimum number of plots required
<2	1 plot
>2-5	2 plots
>20-50	3 plots
>50-100	4 plots
>100-250	5 plots
>250-1000	7 plots; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots; more plots may be needed if the condition of the vegetation is variable across the zone

The identification of PCTs for each vegetation community was undertaken in accordance with the NSW PCT classification as described in the NSW Vegetation Information (VIS) Classification Database (DPE 2022c) Determination of the most appropriate PCTs for vegetation communities within the subject land used the BioNet Vegetation Classification database to identify PCT types which matched the geographic distribution (based upon IBRA subregions), vegetation formation and floristics of vegetation within the subject land. The data for each potential PCT, including vegetation formation, descriptive attributes, and distribution

information, were then reviewed to determine the most appropriate PCT for each of the vegetation communities sampled within the subject land.

Data based on observations of vegetation structure and composition made during traverses of the subject land also informed the determination of most appropriate PCTs for the vegetation communities within the subject land.

Vegetation within the subject land was also assessed against the final determinations for threatened ecological communities (TECs) listed under the BC Act and EPBC Act to determine whether the vegetation within the subject land formed part of any TEC.

3.2.2 Plant Community Types (PCTs)

Plot based floristic surveys consistent with BAM (DPE 2020) within the subject land confirmed a single native vegetation zone within the subject land: 'Semi-native Low Diversity Grassland' (4.13 ha), this community was identified where native cover was >25%, at least one of the dominant species was a native grass, and there was a very low diversity of non-grass native species. An additional floristic survey, conducted within this area resulted in a similar VI score to floristic plots previously collected. However, site assessment on 7 November 2022, identified evidence of old tree stumps scattered across the subject land (**Figure 3.3**). Given the size and potential age of these logs, it's likely that they provide evidence of a past woodland environment present within the subject land. Therefore, on the basis that the presence of these large stumps indicates the area was a woodland area in the prior to clearing, the area identified as 'Semi-native Low Diversity Grassland' community is consistent with PCT 1334 - 'Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion' in a 'degraded' condition.

Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion (PCT 1334)

Field assessment determined that native vegetation within the subject land included PCT 1334 in a degraded condition (**Figure 3.4**). Current and previous land uses and clearing have degraded the vegetation within the subject land to such an extent that PCT 1334 no longer occurs in an intact or unmodified state. The remains of large decaying logs within the subject land indicates that the subject land was likely a woodland area prior to clearing and agricultural land uses.

The 'Semi-native Low Diversity Grassland' of PCT 1334 was located within the south eastern section of the subject land. This patch contained the highest native projected foliage cover (33.2%) within the subject land and was dominated by *Austrostipa bigeniculata* (Yanganbil) and contained other native grasses and forbs such as *Rytidosperma spp*., *Gypsophila tubulosa* (Annual Chalkwort), *Cynodon dactylon* (Common Couch), *Cotula australis* (Common Cotula) and *Eragrostis trachycarpa.* No canopy or mid-storey species were identified within this vegetation patch.

The PCT filtering function was utilised, applying the filters of Monaro IBRA Subregion, Grassland Keith Formation and characteristic species recorded within the subject land. A large number of grassland and woodland PCTs were returned, however PCT 1334 was selected on the basis of the 'descriptive attributes' in the BioNet Vegetation Classification (DPE 2022c).Due

to the lack of native plant diversity within the subject land (as noted above), it would be difficult to allocate a PCT based on 'species by stratum' alone.

A summary of PCT 1334 profile from the Vegetation Information System (VIS) (DPE 2022c) is provided in **Table 3.2**. Species recorded onsite consistent with this PCT area highlighted in bold text.

Figure 3.3: Decaying log identified within the subject land, potentially indicating past woodland community within the subject land.

Table 3.2: VIS plant community type profile (DPE 2022c) – PCT 1334

Plant community type (PCT)	Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion
PCT and BioMetric veg type (BVT) ID	PCT 1334
Vegetation formation	Grassy Woodlands
Vegetation class	Southern Tableland Grassy Woodland
Upper stratum	*Eucalyptus melliodora* (Yellow Box); ***Eucalyptus bridgesiana*** **(Apple Box);** *Eucalyptus pauciflora* (White Sally)*; Eucalyptus rubida* (Candlebark)
Middle stratum	*Acacia dealbata* (Silver Wattle)*; Acacia genistifolia* (Early Wattle)*; Acacia rubida* (Red-stemmed Wattle)*; Cassinia* spp.; *Hibbertia obtusifolia* (Hoary Guinea Flower); *Lissanthe strigosa* (Peach Heath)
Ground stratum	***Austrodanthonia spp. (Rytidosperma spp.)****; Austrostipa* **spp***; Chrysocephalum apiculatum* (Common Everlasting)*; Hydrocotyle laxiflora* (Stinking Pennywort)*; Hypericum gramineum* (Small St. John's Wort); *Plantago varia;*
Landscape position	Occurs on valley flats and midslopes, and occasionally crests. Occurs in the Murrumbidgee River valley south of Royalla and the upper Shoalhaven River valley south of Bungonia; also found in the east of Queanbeyan and south of Bungendore.
Full reference details	Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254;Tozer, M.G., Turner, K., Simpson, C., Keith, D.A., Beukers, P., MacKenzie, B., Tindall, D. & Pennay, C., 2010 Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Version 1.0;
Estimate remaining pre-European extent rounded to nearest 5%	10%
TEC Name (Listing status)	Critically Endangered Ecological Community – EPBC Act: White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Part) – BC Act: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part)

3.2.3 Other vegetation

'Exotic grasslands'

Vegetation within the subject land was largely dominated by exotic grasses (48.1 ha) in pastureland occupied by sheep. Numerous fenced paddocks divided the subject land with paddocks subject to different management regimes. Depending on the management regime, the cover and abundance of native vegetation varies greatly. One paddock has been cropped and is dominated by *Hordeum vulgare** (Barley) and contains less than 1% native cover. The most common exotic grass species included *Eleusine tristachya** (Crabgrass), *Bromus catharticus** (Prairie Grass), *Phalaris aquatica** (Phalaris) and *Dactylis glomerata** (Cocksfoot). Amongst the grasses were numerous herbaceous weeds such as *Hypochaeris radicata** (Catsear), *Plantago lanceolata** (Lamb's Tongues), *Cirsium vulgare** (Spear Thistle), *Paronychia brasiliana** (Brazilian Whitlow), and *Trifolium* spp.* (Clover) (**Figure 3.4**).

Although, the presence of native vegetation within this vegetation was low, or across the majority of the zone non-existent, assessment using VI plots was conducted to verify that native vegetation cover within this zone did not contain any other patches of vegetation community identified as 'Semi-Native Low Diversity Grasslands'. No further patches of PCT 1334 were identified.

'Planted exotic and non-endemic native trees and shrubs'

Vegetation within this zone included various tree species dispersed throughout the site in corridor plantings along paddock fence lines. With the exception of *Eucalyptus bridgesiana* (Apple Box) that is an endemic species, trees identified within the subject land are highly unlikely to be remnant as they are not endemic to the area. Species identified included *Eucalyptus baueriana* (Blue Box), and *Pinus radiata** (Radiata Pine). Traditional farmlands often use trees such as *Pinus radiata** (Radiata Pine) as windbreaks.

This vegetation zone made up 2.44 ha of the subject land. As native vegetation within this zone predominately included non-endemic native and exotic trees, one VI plot was used to assess the condition and structure of this zone.

3.2.4 Threatened Ecological Communities

The Bionet Vegetation Classification database highlights that PCT 1334 forms part of Critically Endangered Ecological Community (CEEC) White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions listed under the BC Act and the CEEC White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland listed under the EPBC Act.

The conservation Advise for White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, hereafter referred to as Box Gum Woodland, (TSSC 2006) provides condition classes for when a patch of vegetation is considered a Matter of National Environmental Significance (MNES):

- A patch must have a predominantly native understorey.

- In absence of overstorey trees, an understorey patch must have:
    - A high level of native floral species diversity
    - Patch size of ≥0.1 ha
- A patch in which perennial vegetation of the ground layer is dominated by native species, and which contains at least 12 native non-grass understorey species (such as forbs, shrubs, ferns, grasses and sedges)
- In order to indicate a reasonable condition, at least one understorey species should be an important species (e.g., grazing-sensitive, regionally significant or uncommon species, such as Kangaroo Grass or orchids)
- Areas with both an overstorey and understorey present are also considered of sufficiently good condition to be part of the listed ecological community if:
    - The understorey meets any of the conditions above, or
    - The understorey is predominantly native,
    - The area is ≥ 2 ha in size, and
    - Have either natural regeneration of the overstorey species or 20 or more mature trees per hectare.

A review of the approved Conservation Advice concluded that Box Gum Woodland in a 'degraded' condition within the subject land didn't fulfill the Listing Advice outlined by the condition classes (TSCC 2006). Four VI plots were conducted within the potential Box Gum Woodland vegetation. Two of the four plots (BAM02 and BAM07) showed a higher percentage cover of native vascular plants (including annual and perennial species) than the percentage cover of exotic species. Three of the plots (BAM02, BAM07 and BAM10), contain higher percentage cover of perennial native species, however, collectively the plots do not contain at least 12 native non-grass understorey species. Additionally, none of the native species recorded are listed as an important species. .

Box Gum Woodland vegetation within the subject land was found to ***not meet the condition classes required to be considered an MNES***. As such an assessment in accordance with the Significant Impact Guidelines (DoE 2013) has not been undertaken.

It should be noted that the original plots completed within the subject land (BAM01 to BAM09) were conducted in January which is not the optimal time for flora surveys of grasslands in the Southern Tablelands. A second site assessment was conducted in November. The subsequent site assessment did not identify any other patches of vegetation dominated by native vegetation, nevertheless, in order to validate the floristic composition within the Box Gum Woodland patch, at a favourable time of the year, an additional plot (BAM10) was recorded. Vegetation recorded in BAM10 plot was predominantly exotic and exotic cover score for BAM10 was higher when compared with BAM02 and BAM08, recorded in January within the same location.

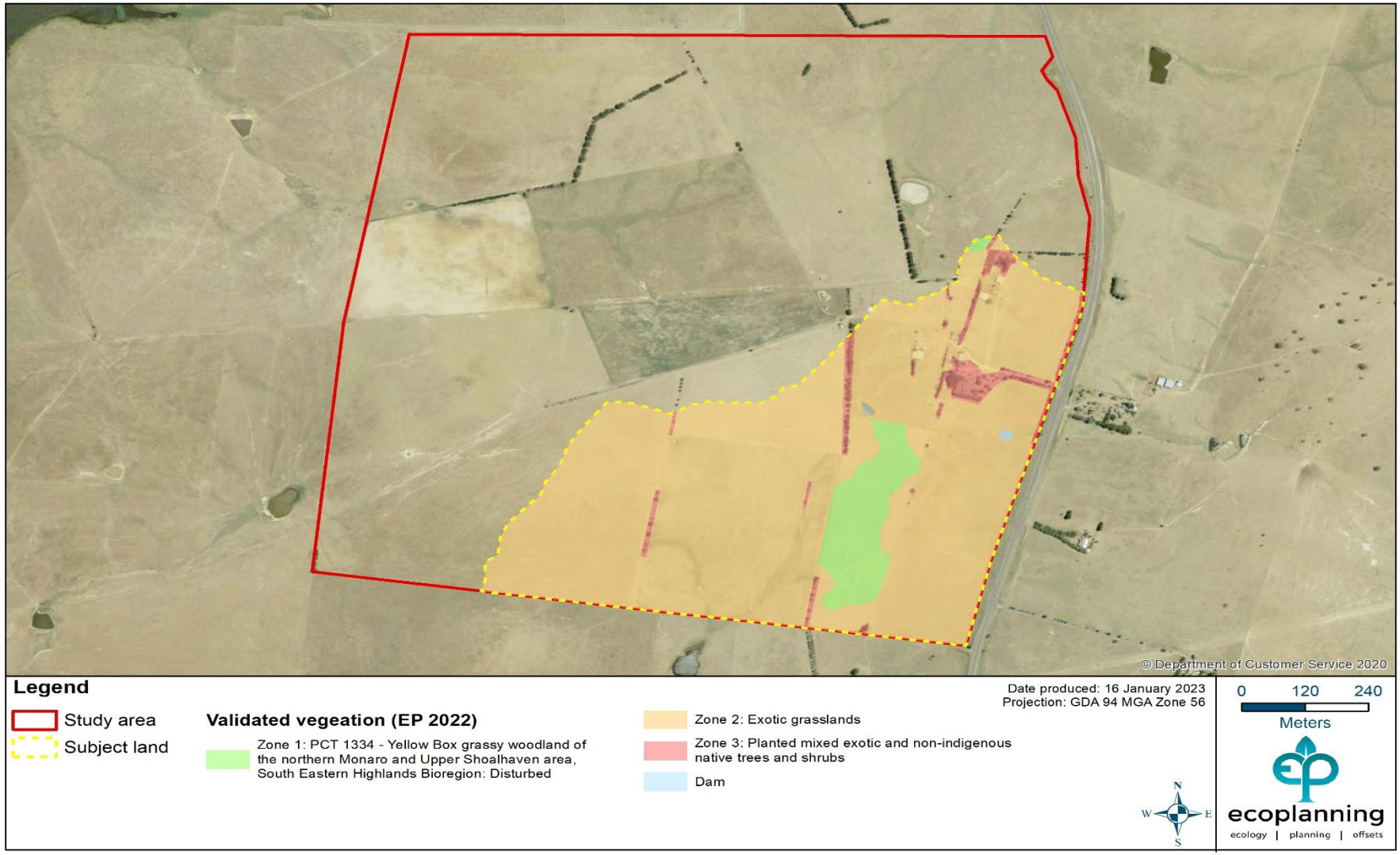

Figure 3.4: Validated vegetation zones

3.3 Vegetation zones

3.3.1 Vegetation integrity survey plots

Four VI plots were completed within the vegetation zone associated with 'Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion' (PCT 1334), to meet the requirements of the BAM (See **Appendix A** for data collected) (**Figure 3.5**).

Although the remainder of the subject land was dominated by 'exotic grasslands' and 'planted exotic and non-endemic native trees and shrubs' VI plots were completed within these vegetation zones to accurately validate the vegetation present. **Table 3.3** gives details on the vegetation zones, areas and the number of VI plots completed per community and vegetation zone.

Placement of each VI plot was aimed to capture data that most represented the vegetation and attributes in each vegetation zones within the subject land.

Table 3.3: Number of VI plots required for each vegetation zone based on their respective sizes.

PCT name	Vegetation zone	Area (ha)	Number of plots required (completed)*
PCT 1334 – Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	Degraded	4.13	2 (BAM02, BAM07, BAM08, BAM10)
-	Exotic grassland	48.1	4 (BAM01, BAM03, BAM04, BAM05, BAM06,)
	Planted exotic and non-endemic native trees and shrubs	2.44	2 (1 completed BAM09)

Section 4.1.2 of the BAM eliminates the requirement for assessment using VI plots for vegetation zones where native vegetation is low or non-existent. Results of VI plots for the 'Exotic grassland' and 'Planted exotic and non-endemic native trees and shrubs' vegetation zones determined native vegetation within these vegetation zones was low, or non-existent, however, to verify the current and future VI scores for these zones the VI plot data was entered into the BAM calculator.

3.3.2 Current and future vegetation integrity scores

VI scores were calculated based on the VI survey plots collected for each vegetation zone. Data collected for each plot including details on vegetation structure and composition is provided in **Appendix A**. The VI scores for each vegetation zone are provided in **Table 3.4**.

The current VI score for PCT 1334 in a 'degraded' condition class was 4.9/100. For vegetation identified within the subject land, the project would involve complete clearing of all 'Exotic grasslands' and 'Planted exotic and non-endemic native trees and shrubs' vegetation. Impacts to areas of PCT 1334 within the subject land have been predominately avoided by design, resulting in a total of 0.14 ha of PCT 1334 vegetation impacted within the subject land. Details regarding avoidance measures are detailed in **Section 5** of this BDAR. As such, the default future VI score would result in a value of 0 for PCT 1334.

Current VI scores for vegetation zones 2 and 3 are 2.6 and 1.9, respectively, demonstrating the highly degraded nature. Future VI scores for both these zones will also be 0.

Patches of Box Gum Woodland vegetation with a VI score lower than 15 do not require offsetting.

Table 3.4: Vegetation integrity scores

Veg zone	Plant community type	Condition class	Area (ha)	Area impacted (ha)	Vegetation Integrity score	
					Before development	After development
1	Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion (PCT 1334)	Degraded	4.13	0.14	4.9	0
2		Exotic grasslands	48.1	48.1	2.6	0
3		Planted exotic and non-endemic native trees and shrubs	2.44	2.44	1.9	0

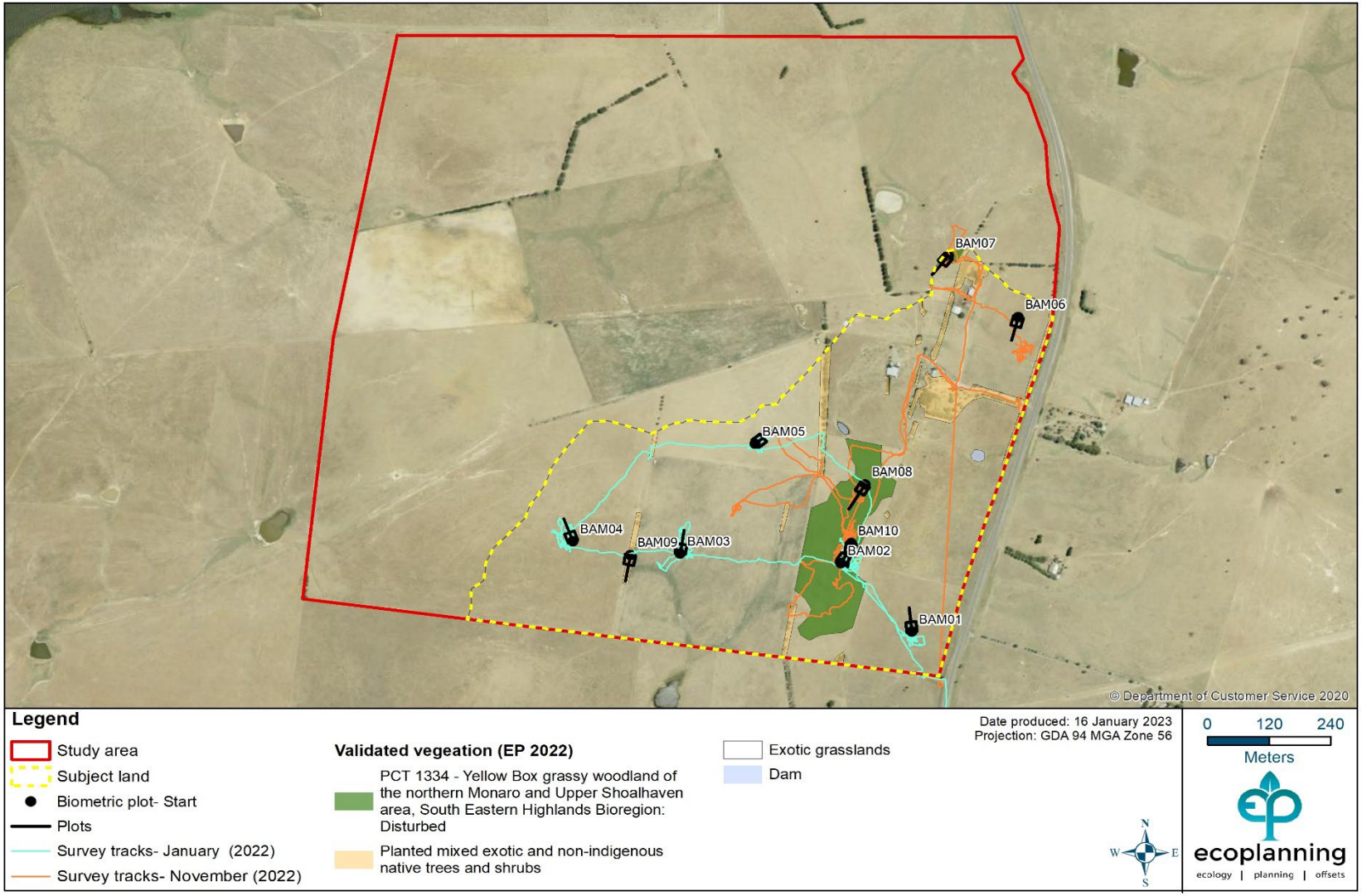

Figure 3.5: Ecoplanning (2022) survey effort, including VI plot location and survey tracks.

4 Threatened species

Section 5 of the BAM details the process for determining the habitat suitability for threatened species.

Under the BAM, threatened species are separated into two classes, 'ecosystem' and 'species' credit species. Those threatened species where the likelihood of occurrence of a species or elements of the species' habitat can be predicted by vegetation surrogates and landscape features, or for which a targeted survey has a low probability of detection, are identified as 'ecosystem' credit species. Targeted surveys are not required for ecosystem species and potential impacts to these species are assessed in conjunction with impacts to PCTs.

Threatened species where the likelihood of occurrence of a species or elements of suitable habitat for the species cannot be confidently predicted by vegetation surrogates and landscape features and can be reliably detected by survey are identified as 'species' credit species. A targeted survey or an expert report is required to confirm the presence or absence of these species on the subject land.

For some threatened species, they are identified as both ecosystem and species credit species, with different aspects of the habitat and life cycle representing different credit types. Commonly, threatened fauna species may have foraging habitat as an ecosystem credit, while their breeding habitat represents a species credit.

The following sections outline the process for determining the habitat suitability for threatened species within the subject lands, and the results of targeted surveys for candidate threatened species.

4.1 Threatened species for assessment

Threatened species that require assessment are initially identified based upon the following criteria:

- the distribution of the species includes the IBRA subregion in which the subject land occurs (Monaro IBRA subregion),
- the subject land is within any geographic constraints of the distribution of the species within the IBRA subregion,
- the species is associated with any of the PCTs identified within the subject land,
- the native vegetation cover within an assessment area including a 1500 m buffer around the subject land is equal to or greater than the minimum required for the species,
- the patch size that each vegetation zone is part of is equal to or greater than the minimum required for that species, and
- the species is identified as an ecosystem or species credit species in the Threatened Biodiversity Data Collection.

The process for identifying threatened species which meet the above criteria is completed through the BAM Calculator. The PCT identified within the subject land, patch size and native vegetation cover, as outlined in **Sections 2** and **3**, were entered into the BAM Calculator and a preliminary list of threatened species were identified.

Additionally, a RFI from Council determined twelve species of flora and fauna were known or predicted to be present within the Goulburn Mulwaree LGA and may be present on site:

- *Aprasia parapulchella* (Pink-tailed Legless Lizard)
- ***Delma impar* (Stripped Legless Lizard)**
- ***Diuris aequalis* (Buttercup Doubletail)**
- *Keyacris scurra* (Key's Matchstick Grasshopper)
- ***Lepidium hyssopifolium* (Aromatic Peppercress)**
- *Rutidosis leptorrhynchoides* (Button Wrinklewort)
- *Suta flagellum* (Little Whip Snake)
- *Swainsona recta* (Small Purple-pea)
- *Swainsona sericea* (Silky Swainson-pea)
- *Synemon plana* (Golden Sun Moth)
- ***Tympanocryptis lineata* (Canberra Grassland Earless Dragon)**
- ***Tympanocryptis osbornei* (Monaro Grassland Earless Dragon)**

Of the twelve species, five were not predicted by the BAM calculator (highlighted in bold above). Nevertheless, these species have been added to the BAM calculator for formal assessment (apart from the Little Whip Snake, as it is not a species credit species). It should also be noted that a follow up discussion with Council, prior to the second site assessment in November, determined that given the disturbed condition and limited habitat availability within the subject land for the seven fauna species, incidental observation and rock rolling surveys would be sufficient to determine the presence of the fauna species. For the five flora species detailed by council, targeted surveys were conducted in accordance with the 'Surveying threatened plants and their habitats' (DPE 2020) guidelines. **Section 4.1.3** details the results of the targeted surveys.

4.1.1 Ecosystem credit species

Table 4.1 lists all ecosystem credit species generated by the BAM calculator and gives the reasoning for their omitting or retaining. Information gathered from the site assessment and species data from BioNet Atlas (DPE 2022b) was used to assist the determination for each ecosystem credit species.

Potential habitat for many of the predicted species within the subject land is considered marginal, however they could conceivably utilise the subject land on occasion or when travelling between patches of higher condition habitat. As such, all of these species have been left as a predicted species within the calculator.

Table 4.1: Assessment of habitat constraints and geographic limitations of ecosystem credit species

Scientific Name Common Name	Habitat constraints Geographic limitations	Sensitivity to Gain	Maintained as an ecosystem credit species
Anthochaera phrygia Regent Honeyeater (Foraging)		High	Yes

Scientific Name Common Name	Habitat constraints Geographic limitations	Sensitivity to Gain	Maintained as an ecosystem credit species
Artamus cyanopterus cyanopterus Dusky Woodswallow		Moderate	Yes
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)		Moderate	Yes
Chthonicola sagittata Speckled Warbler		High	Yes
Circus assimilis Spotted Harrier		Moderate	Yes
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)		High	Yes
Daphoenositta chrysoptera Varied Sittella		Moderate	Yes
Dasyurus maculatus Spotted-tailed Quoll		High	Yes
Falsistrellus tasmaniensis Eastern False Pipistrelle		High	Yes
Glossopsitta pusilla Little Lorikeet		High	Yes
Hieraaetus morphnoides Little Eagle (Foraging)		Moderate	Yes
Hirundapus caudacutus White-throated Needletail		High	Yes
Lathamus discolor Swift Parrot (Foraging)		Moderate	Yes
Lophoictinia isura Square-tailed Kite (Foraging)		Moderate	Yes
Melanodryas cucullata cucullata Hooded Robin (south eastern form)		Moderate	Yes

Scientific Name Common Name	Habitat constraints Geographic limitations	Sensitivity to Gain	Maintained as an ecosystem credit species
Miniopterus orianae oceanensis Large Bent-winged Bat (foraging)		High	Yes
Neophema pulchella Turquoise Parrot		High	Yes
Ninox connivens Barking Owl (Foraging)		High	Yes
Petroica boodang Scarlet Robin		Moderate	Yes
Petroica phoenicea Flame Robin		Moderate	Yes
Stagonopleura guttata Dimond Firetail		Moderate	Yes
Suta flagellum Little Whip Snake		High	Yes
Varanus rosenbergi Rosenberg's Goanna		High	Yes

4.1.2 Identify candidate species for further assessment

In accordance with Section 5.2.1 (4) of the BAM, a predicted candidate species can be considered unlikely to occur with the subject land (or specific vegetation zones) where habitat is substantially degraded such that the species is unlikely to use the area, or where an expert report identifies that the species is unlikely to be present within the subject land (or a vegetation zone within the subject land). A predicted candidate species credit species that is not considered to have suitable habitat on the subject land (or specific vegetation zones) in accordance with Section 5.1.2 (4) of the BAM does not require further assessment on the subject land (or specific vegetation zones). The justification for determining that a predicted species credit species is unlikely to have suitable habitat on the subject land (or specific vegetation zones) is provided in **Table 4.2**.

Table 4.2: Candidate species credit species, identified by the BAM calculator

Scientific Name Common Name	Habitat constraints and/or Geographic Limitations	Surveys conducted or justification for rejection
Flora		
Diuris aequalis Buttercup Doubletail		Targeted survey for the species did not identify the species subject land. Therefore, the species has been omitted.
Eucalyptus macarthurii Paddy's River Box, Camden Woollybutt		Targeted survey for the species did not identify the species subject land. Therefore, the species has been omitted.
Lepidium hyssopifolium Aromatic Peppercress		Targeted survey for the species did not identify the species subject land. Therefore, the species has been omitted.
Leucochrysum albicans var. tricolor Hoary Sunray		Targeted survey for the species did not identify the species subject land. Therefore, the species has been omitted.
Rutidosis leptorrhynchoides Button Wrinklewort		Targeted surveys within the subject land did not find the species. Therefore, the species has been omitted.
Swainsona recta Small Purple-pea		Targeted surveys for the species did not identify the species within the subject land. As such the species has been omitted.
Swainsona sericea Silky Swainson-pea		Targeted survey within the subject land didn't identify the species. As a result, the species has been omitted.
Fauna		

Scientific Name Common Name	Habitat constraints and/or Geographic Limitations	Surveys conducted or justification for rejection
Anthochaera phrygia Regent Honeyeater (Breeding)	• Other • As per Important Habitat Map	The subject land is not identified within the species Important Habitat Map. The two known breeding locations with NSW are not located within the locality. Therefore, the species has been omitted.
Aprasia parapulchella Pink-tailed Legless Lizard	• Rocky areas • Or within 50 m of rocky areas	Targeted surveys did not identify the species within the subject land. Habitat. As a result, the species has been omitted.
Callocephalon fimbriatum Gang-gang Cockatoo (Breeding)	• Hollow bearing trees • Eucalypt tree species with hollows at least 3 m above the ground and with hollow diameter of 7 cm or larger	No hollow baring trees have been identified within the subject land. Therefore, the species has been omitted.
Delma impar Striped Legless Lizard		The species mainly occurs within grasslands with high structural complexity. The subject land is highly disturbed and with low diversity of flora species. Consistent grazing and farming practices cause mortality through trampling and displacement and increase predation risk to the species. Therefore, the habitat within the subject land is unsuitable for the specie. Additionally, survey for the species did not identify the species within the subject land. As a result, the species has been omitted.
Heleioporus australiacus Giant Burrowing Frog		Habitat within the subject land mainly consists of exotic pastures, disturbed by agricultural practices such as grazing and crop management, given the species preferred woodland, heath and dry sclerophyll forest, the subject land does not present potential habitat for the species. As a result, the species has been omitted.

Scientific Name Common Name	Habitat constraints and/or Geographic Limitations	Surveys conducted or justification for rejection
Hieraaetus morphnoides Little Eagle (Breeding)	• Other • Nest trees - live (occasionally dead) large old trees within vegetation)	This species occupies eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW. Therefore, unsuitable habitat is present within the subject land. Additionally, no nest or remnant nest have were identified during field survey. As a result, the species has been omitted.
Keyacris scurra Key's Matchstick Grasshopper		Incidental targeted surveys did not identify the species within the subject land. Therefore, the species has been omitted.
Lathamus discolor Swift Parrot (Breeding)	• Other • As per Important Habitat Map	Swift Parrots breed in Tasmania and the subject land is not mapped under the Important Habitat Map. As a result, the species has been omitted.
Lophoictinia isura Square-tailed Kite (Breeding)	• Other • Nest trees	Nest sites are generally located along or near watercourses, in a fork or on large horizontal limbs, large trees are limited within the subject land and evidence of stick nest were not identified during site assessments. Therefore, the species has been omitted. .
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	• Caves • Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave • Observation type code "E nest-roost • with numbers of individuals >500	No suitable breeding habitat within the subject land. The subject land does not contain caves, tunnel, mine, culvert or other structure known or suspected to be used for breeding. No breeding colony is found with a population of >500 individuals in or near the subject land. As such this species has been omitted as a SCS (Section 5.2.3.2 (a i)).
Myotis macropus Southern Myotis	• Waterbodies • Waterbodies with permanent pools/stretches 3 m or wider, including rivers, large creeks, billabongs, lagoons,	Three dams, each stretching over 3 m wide, are present within the study area, two of which are located within the subject land. Although, the condition of the PCT within the subject land (PCT 1334 - degraded condition) is of low potential habitat for the species, presence of the

Scientific Name Common Name	Habitat constraints and/or Geographic Limitations	Surveys conducted or justification for rejection
	estuaries, dams and other, on or within 200 m of the site	species has been assumed due to the potential foraging habitat provided by the dams. More details are provided in **Section 4.1.3**
Ninox connivens Barking Owl (Breeding)	• Hollow bearing trees • Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground	No hollow bearing trees are present within the subject land. As a result, the species has been omitted.
Phascogale tapoatafa Brush-tailed Phascogale		No hollow bearing trees are present within the subject land; therefore, no potential shelter or nest trees are available for the species. Additionally, the species prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. As a result, the species has been omitted.
Phascolarctos cinereus Koala	• Other • Presence of koala use trees - refer to Survey Comments field in TBDC	Only one Koala use tree species, *Eucalyptus bridgesiana*, has been recorded within the subject land. The majority of the tree species within the subject land consist of *Pinus* spp., which has been planted as wind breaks and are limited within the subject land. Habitat connectivity with surrounding vegetation does not contain woodland or forest areas, instead areas are mapped as cleared or as grassland communities, which are not suitable habitat for the species. Therefore, the species has been omitted.
Synemon plana Golden Sun Moth	• N/A| Other • Wallaby grass (Rytidosperma spp), Chilean needlegrass (Nassella nessiana) or Serrated Tussock (Nassella trichotoma)) • Not east of Lake George Escarpment or Great Dividing Range	The species is currently only known from single site in New South Wales, found in the area between Queanbeyan, Gunning, Young and Tumut. Microhabitat for the species requires bare ground between tussocks, vegetation within the subject land has a high cover of grasses dominated by exotic species. The species has not been recorded within 5 km of the subject land in the past 20 years. Therefore, it is unlikely that the species would be present within the subject land, additionally, incidental targeted

Scientific Name Common Name	Habitat constraints and/or Geographic Limitations	Surveys conducted or justification for rejection
		surveys did not identify the species within subject land, as a result the species has been omitted.
Tympanocryptis lineata Canberra Grassland Earless Dragon		Habitat within the subject land is degraded and regularly disturbed by grazing and other farming practices. The species has not been recorded within 5 km of the subject land in the past 20 years. Targeted surveys did not identify the species within the subject land. As a result, the species has been omitted.
Tympanocryptis osbornei Monaro Grassland Earless Dragon		Habitat within the subject land is degraded and regularly disturbed by grazing and other farming practices. The species has not been recorded within 5 km of the subject land in the past 20 years. Targeted surveys did not identify the species within the subject land. As a result, the species has been omitted.

4.1.3 Targeted surveys

Targeted fauna surveys

A RFI from council determined seven species of fauna species (listed below) required further investigation, however, it was agreed that due to the disturbed condition of the subject land and lack of suitable habitat features for the seven species, incidental observation and rock rolling target surveys for the species would be sufficient to validate their presence within the subject land.

- *Aprasia parapulchella* (Pink-tailed Legless Lizard)
- *Delma impar* (Stripped Legless Lizard)
- *Keyacris scurra* (Key's Matchstick Grasshopper)
- *Suta flagellum* (Little Whip Snake)
- *Synemon plana* (Golden Sun Moth)
- *Tympanocryptis lineata* (Canberra Grassland Earless Dragon)
- *Tympanocryptis osbornei* (Monaro Grassland Earless Dragon)

Targeted incidental observation and rock rolling surveys were conducted on 7 November 2022, by Ed Cooper (Senior Ecologist) and Edwin Vaca (Field Ecologist) over 16 person hours. The subject land was traversed whilst turning any loose rock and recoding any additional fauna, with a focus on the seven target species. None of the targeted species or any other threatened fauna species were recorded during the field survey.

Myotis macropus (Southern Myotis)

Review of available literature, habitat constraints and vegetation conditions within the subject land indicated that suitable habitat is present for one of the predicted candidate species credit species, *Myotis macropus* (Southern Myotis), and therefore requires targeted surveys.

Presence was assumed for the retained species credit species, meaning no further targeted surveys are required. Three permanent dams, each stretching over 3 m wide, are present within the study area. Two of the dams are located within the subject land and will be directly impacted by the proposed development. Although, areas of vegetation validated as PCT 1334 in a degraded condition within the subject land, do not contain habitat features, such as hollow bearing trees, the presence of the permanent dams, can provide potential foraging habitat for the species. The species is cryptic and if present around the study area may only utilise these dams sporadically, given their disturbed nature, therefore, presence has been assumed for this species.

In accordance with section 5.2.5 of the BAM (2020), a species polygon has been produced for the species, further details are provided in the below.

Assumed presence for the species within the subject land has been determined. Potential foraging habitat for the species is present within the study area in the form of three permanent dams, two of which are located within the subject land and will be directly impact by the proposal. Assuming presence of the species ensures that potential habitat is offset via the BOS. BioNet requires a species polygon for Southern Myotis to include PCTs that are within 200 m of a waterbody greater than 3 m wide. These waterbodies can be determined from field survey and review of areal imagery. Total area for the Southern Myotis species polygon buffer

(200 m around each dam) within the study area is 35.77 ha, of which 18.91 ha is within the subject land (**Figure 4.1**). The 18.91 ha area within the subject land, which is within the 200 m buffer, does not include suitable habitat for the species, given the area is largely dominated by exotic grasslands, lacks canopy cover and the absence of hollow bearing trees. Nevertheless, as the three potential dams can potentially provide foraging habitat, a breakdown by PCT within the subject land, which is within the 200 m species buffer is presented in **Table 4.3**. A total of 1.75 ha of land mapped as PCT 1334 is identified within the species 200 m buffer, however, only 0.10 ha of PCT 1334 will be impacted by the proposal, therefore, only the impacted area has been entered into the BAM calculator.

Table 4.3: Area of Southern Myotis species polygon within each vegetation zone impacted in the subject land

Species	Vegetation zone area (ha)	
	PCT 1334 – degraded – impacted	PCT 1334 – degraded – retained
Myotis macropus (Southern Myotis)	0.10	1.65

Flora targeted surveys

Additionally, council determined five flora species (listed below) required targeted surveys to validate their presence/absence from the subject land.

- *Diuris aequalis* (Buttercup Doubletail)
- *Lepidium hyssopifolium* (Aromatic Peppercress)
- *Rutidosis leptorrhynchoides* (Button Wrinklewort)
- *Swainsona recta* (Small Purple-pea)
- *Swainsona sericea* (Silky Swainson-pea)

An additional two predicted flora candidate species were predicted by the BAM calculator as having a likelihood of occurring within the subject land, *Eucalyptus macarthurii* (Paddy's River Box, Camden Woollybutt) *and Leucochrysum albicans var. tricolor* (Hoary Sunray). These species were also included as target species for the targeted flora surveys.

For the seven flora species, targeted surveys were conducted in accordance with the 'Surveying threatened plants and their habitats' (DPE 2020) guidelines. The targeted flora survey was conducted on 7 November 2022, by Ed Cooper (Senior Ecologist) and Edwin Vaca (Field Ecologist). **Figure 4.2** shows the area surveyed and survey effort. No threatened flora species were recorded.

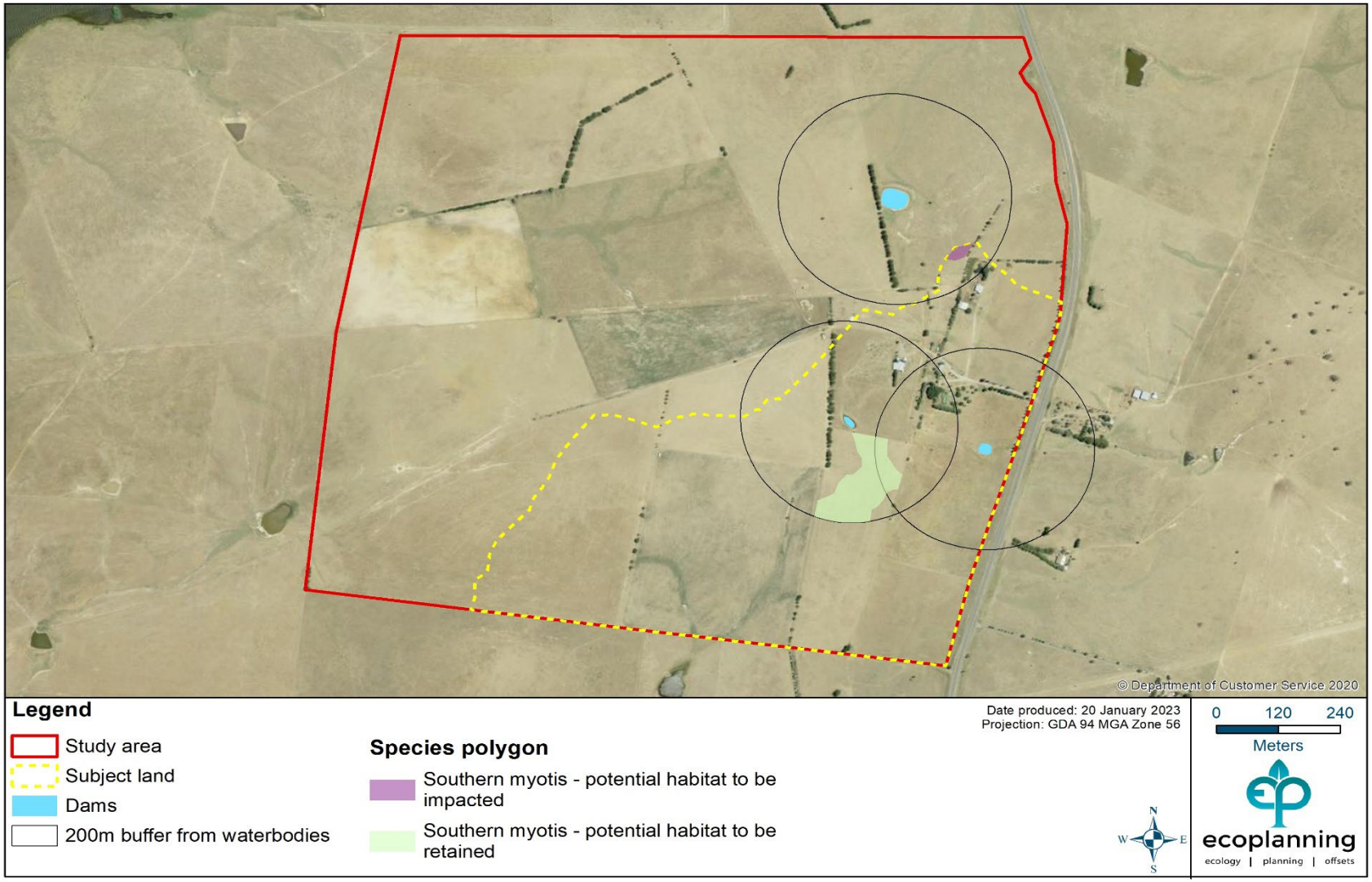

Figure 4.1: Species polygon for Myotis macropus within the subject land, based on waterbodies >3 m wide

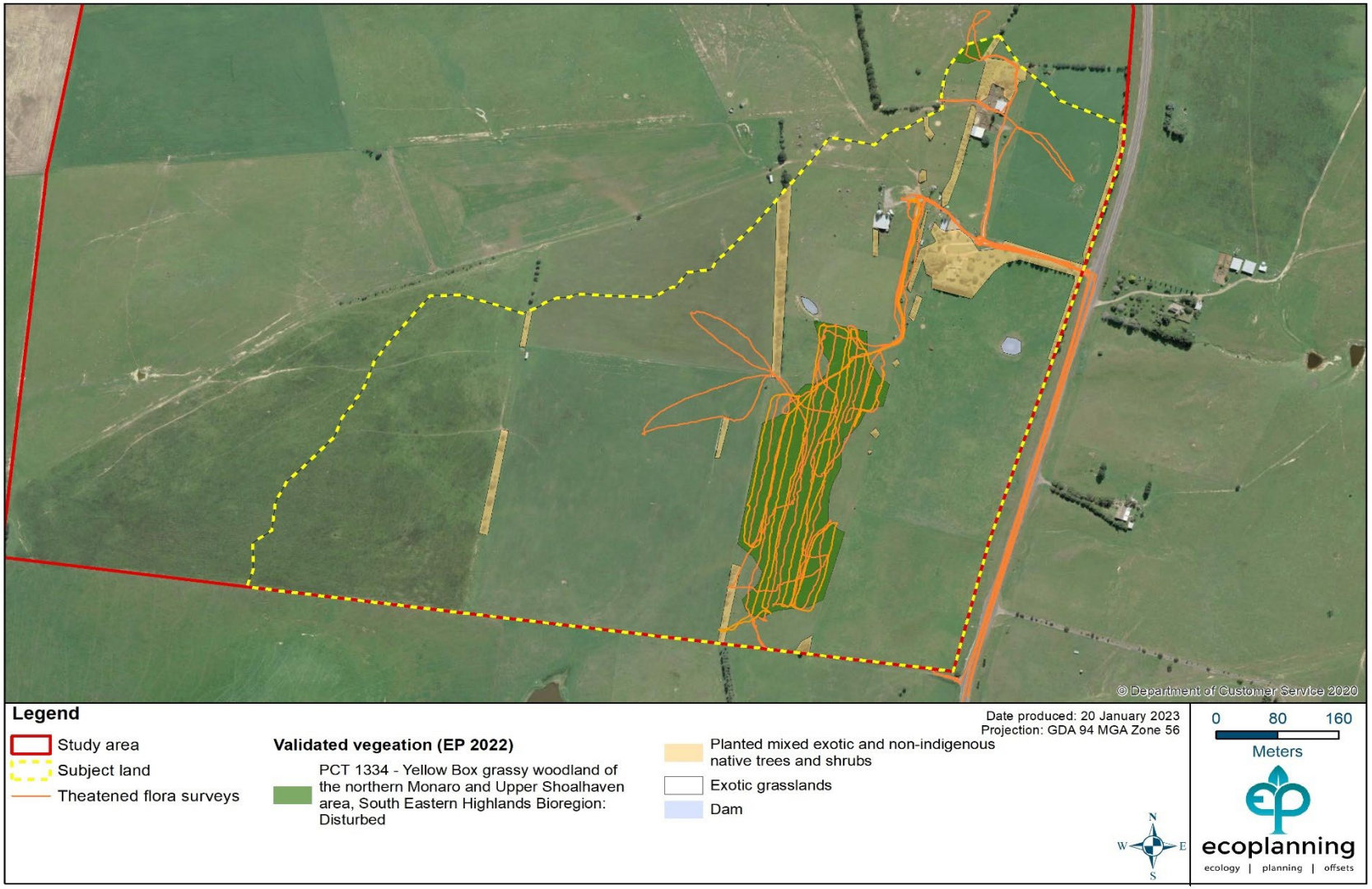

Figure 4.2: Threatened flora survey location and effort within subject land

4.2 Identifying potential prescribed biodiversity impacts on threatened species

The presence of biodiversity values prescribed by the BC Regulation have been considered in context of the subject land (**Table 4.4**). It is unlikely that potential prescribed biodiversity impacts on threatened species would occur because of the proposal.

Table 4.4: Prescribed Biodiversity Impacts

Prescribed Biodiversity Impacts	Presence within the Subject Land
(a) the impacts of development on the following habitat of threatened species or ecological communities: (i) karst, caves, crevices, cliffs and other geological features of significance, (ii) rocks, (iii) human made structures, (iv) non-native vegetation,	The subject land does not contain areas of cliffs, crevices and other geological areas of significance. An outcrop, along the north eastern boundary of the subject land and loose and embedded surface rocks scattered across the subject land, have been identified. Rock turning survey techniques, were utilised to survey for potential fauna inhabiting these rocky areas. Much of the scattered rocks were small and embedded, rock turning and survey of the outcrop did not identify any threatened fauna. Human-made structures within the subject land include the existing dwelling, a large shed used for livestock management and associated infrastructure. These features do not support threatened species or ecological communities, hence do not constitute a prescribed biodiversity impact. Non-native vegetation within the subject land includes areas mapped as 'exotic grasslands' and 'planted exotic and non-endemic native trees and shrubs'. The future proposal would impact this non-native vegetation. Non-native vegetation within the subject land does not conform to any ecological community, nor is it likely to support any threatened species with the potential to occur. Land surrounding the subject land has been subject to similar historical disturbances and therefore contains similar non-native vegetation resources to that impacted by a future development. The removal of non-native vegetation within the subject land does not constitute a prescribed biodiversity impact.
(b) the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,	No threatened species were found within the subject land. The subject land is bound by Crookwell Road to the east and farm lands on all other boundaries. Clearance of native vegetation within the subject land is therefore not likely to impact the movement of threatened species across the landscape.
(c) the impacts of development on movement of threatened species that maintains their lifecycle,	

Prescribed Biodiversity Impacts	Presence within the Subject Land
(d) the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),	Three unnamed 1st order watercourses are mapped the southern and eastern boundary of the subject land. Evidence of bed and bank was not present during field assessment, instead they comprise wet depressions in the landscape offering little ecological value. Two small, constructed farm dams will also be impacted by the proposal. Water bodies located within in the subject land do not support any threatened species. The design of the future stormwater management system will be an important part of the future Development Assessment (DA) process. It is anticipated that the stormwater system will be designed to have a neutral or beneficial effect on the quality and quantity of water leaving the subject land, however this would be assessed in more detail at a future DA stage. A further four 1st order streams and one 2nd order stream are mapped within the study area, these are located on the north and western part of the study area, outside the subject land. Development within these areas of the study area has been avoided by design, to avoid impacts to these watercourses and Lake Sooley which is 1 km west of the study area.
(e) the impacts of wind turbine strikes on protected animals,	Not applicable.
(f) the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.	The greatest risk of vehicle strike within the subject land is associated with Crookwell Road. Risk of vehicle strike on Crookwell Road is considered unlikely to be altered by a future development of the site.

5 Avoiding and minimising impacts on biodiversity

5.1 Avoiding and minimising impacts on native vegetation and habitat during project planning

In accordance with Section 7.1.1.6 of the BAM, actions taken to avoid and minimise impacts through locating the project must be documented and justified in the BDAR. Additionally, Section 7.1.1.4 of the BAM states that in selecting a project location, the following should be addressed, as they apply to the project:

- alternative modes or technologies that would avoid or minimise impacts on biodiversity values,
- alternative routes that would avoid or minimise impacts on biodiversity values,
- alternative locations that would avoid or minimise impacts on biodiversity values,
- alternative sites within a property which the proposal is located that would avoid or minimise impacts on biodiversity values.

To avoid and minimise impacts to native vegetation present within the subject land, the proposed development has been predominantly located on land dominated by exotic grasslands, planted mixed exotic and non-endemic native trees and shrubs, which is used by livestock and associated infrastructure, and contains a dwelling, totalling 50.62 ha. Early lot layouts would have resulted in the complete clearing of 4.13 ha of PCT 1334, however following revisions to the lot arrangement and access roads, retention of the majority of this vegetation has been achieved. By locating the proposed development away from areas of native vegetation, consistent with PCT 1334, a total of 3.99 ha of PCT 1334 in a degraded condition is to be retained within the subject land through the use of larger lots and nominated building envelopes. The 0.14 ha of native vegetation to be impacted by a future development is subject to high abundance of weed disturbance, has been historically cleared and is currently grazed. This 0.14 ha of native vegetation loss is attributed to APZ impacts on the northern boundary of the subject land and a 2 m buffer to compensate for fence impacts within the centre of the subject land. Approximately 22.73 ha of 'Semi-native low diversity grassland' native vegetation (Ecoplanning 2021) would be retained within the study area, including a patch of higher condition native grassland (Native low diversity grassland) to the north of the subject land (**Figure 5.1**).

Development has also avoided areas on the western, north eastern and north western side of the study area as these areas generally drain towards Lake Sooley, approximately 1 km west of the study area.

It's anticipated that additional avoidance measures can be investigated and implemented at the DA stage. Measures that could be considered are a S88b covenant to retain the 3.99 ha of PCT 1334 within the subject land and a Vegetation Management Plan (VMP), for this patch of native vegetation. These measures could ensure future development does not adversely impact native vegetation within the subject land whilst improving the degraded condition of PCT 1334 found within the subject land.

5.2 Avoiding and minimising prescribed biodiversity impacts during project planning

Prescribed biodiversity impacts are defined under clause 6.1 of the BC Reg and include impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation

and/or loss of habitat. Prescribed biodiversity impacts are outlined within **Section 4.2** including their relevance to the proposal. It is not anticipated that the proposal would result in any prescribed biodiversity impacts, provided the stormwater management system is suitably designed at the future DA stage. All prescribed impacts are therefore anticipated to be avoided by the future proposal.

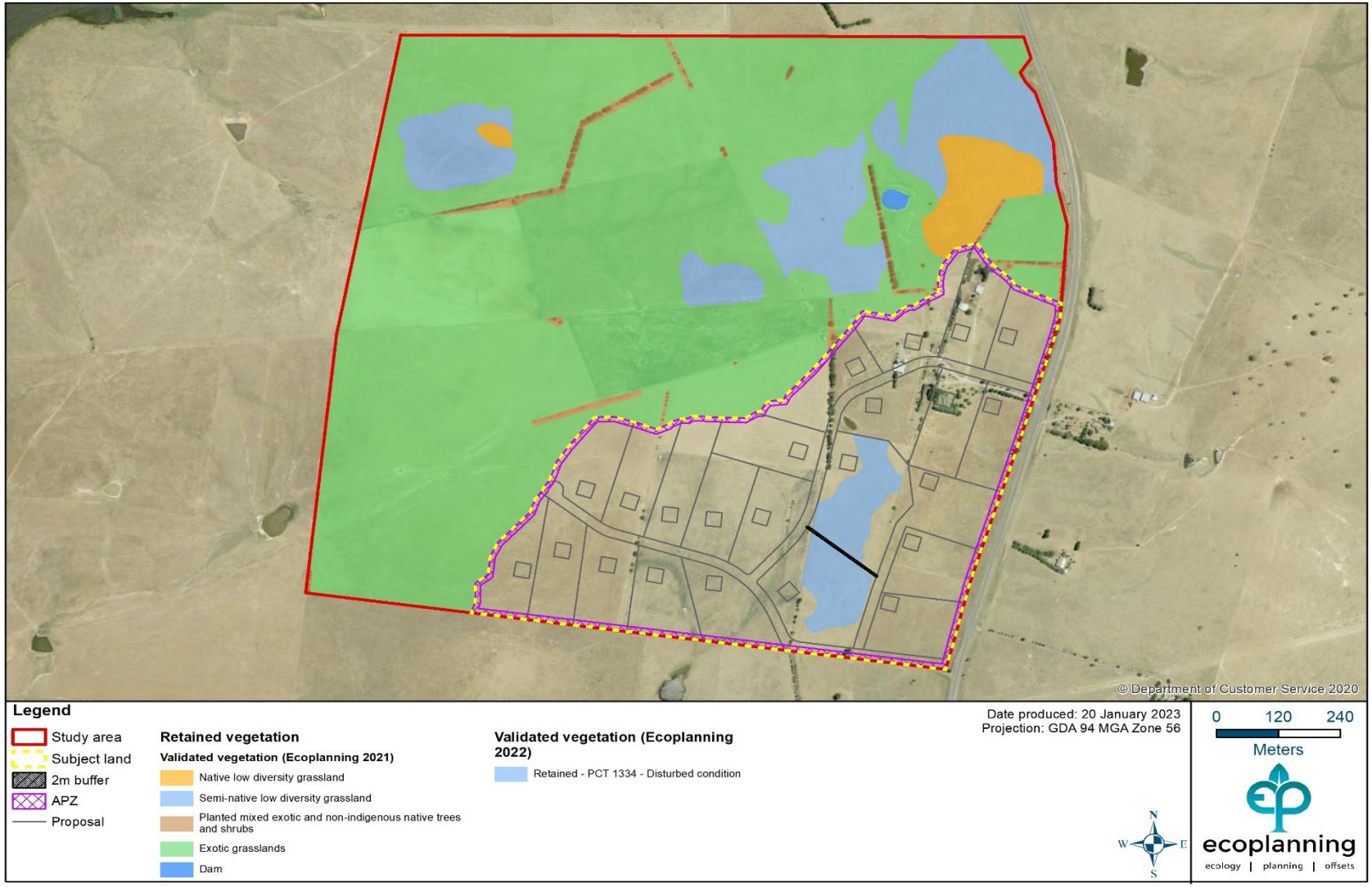

Figure 5.1: Retained vegetation within the study area (Ecoplanning 2021 and Ecoplanning 2022)

6 Assessing and offsetting impacts

6.1 Assessing direct impacts to native vegetation and habitat

The proposed development could include direct impacts to 0.14 ha of PCT 1334 'Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion ' in a 'degraded' condition. As mentioned in **Section 5.1**, options to avoid and minimise impacts to the PCT 1334 within the subject land have been considered during design of the development at the planning proposal stage.

A further 48.1 ha of exotic grassland and 2.44 ha of planted exotic and non-endemic native trees and shrubs could be impacted by the proposal. Two farm dams may also be impacted by the current proposal, which comprise 0.08 ha. The direct clearing and subsequent development of the subject land would represent a permanent impact, or loss, of this native vegetation and habitat. As outlined in **Section 3.3.2** of this Preliminary BDAR, and in accordance with Section 8.1.1.5 of the BAM, the future VI score for all vegetation within the subject land has been assigned 0.

6.2 Assessing indirect impacts on native vegetation

It is difficult to quantify indirect impacts associated with the project at this early stage, but these may include impacts such as runoff, noise and/or erosion associated with the project. The project is considered unlikely to reduce viability of any adjacent native vegetation or habitat due to edge effects, noise, dust or light spill as surrounding vegetation is mapped as cleared land and is used for farming. Further, within adjacent areas of potential native vegetation and habitat, the project is considered unlikely to cause any increase in tramping of flora, rubbish dumping, or introduce any pests, weeds or pathogens.

Indirect impacts will be managed through the development of a Construction Environmental Management Plan (CEMP), whereby sediment and erosion controls will be put in place. An assessment of indirect impacts is provided in **Table 6.1**. Furthermore, development of a VMP, for the 3.99 ha of PCT 1334 which is to be retained within the subject land would be put in place to maintain and improve the condition of PCT 1334.

Table 6.1: Assessment of indirect impacts

Indirect impact type	Nature	Extent	Frequency	Duration	Timing
Inadvertent impacts on adjacent habitat or vegetation	The subject land is bound by Crookwell Road to the east and managed farmlands on all other boundaries. Potential impacts to grasslands outside the subject land will be avoided through control measures outlined in the CEMP and mitigation methods stated in **Section 6.4**. Clearing activities in proximity to other mapped native vegetation presents a risk of inadvertent impacts including accidental vegetation damaged during works etc. The consequence of inadvertent impacts to nearby vegetation is considered moderate without any control measures in place. However, with the implementation of relevant mitigation measures and the CEMP, the probability of indirect impacts occurring is considered low.	Mapped native vegetation outside the subject land	Ongoing during clearing phase	Ongoing during clearing phase	Ongoing during clearing phase
Reduced viability of adjacent habitat due to edge effects	The subject land bound by Crookwell Road to the east and managed farmlands on all other boundaries. Regional vegetation mapping by ELA (2015) maps some areas outside the southern boundary of the study area and a patch within the north eastern corner of the study area as PCT 1377. The risk of additional edge effects to these areas is considered low with a low consequence, give that land immediately surrounding the subject land is managed farmland with livestock.	Mapped native vegetation outside the subject land	Ongoing during clearing phase	Ongoing during clearing phase	Potentially long term
Reduced viability of adjacent habitat due to noise, dust or light spill	Indirect impacts from noise, dust and light spill on nearby habitat is considered low. Any impacts will be temporary and intermittent. It is anticipated that clearing will be restricted to daytime, therefore artificial light spill is unlikely to occur. The proposal is not anticipated to significantly increase ambient noise. Clearing of the grassland vegetation could lead to dust spill, however this can be controlled as part of the CEMP.	Subject land	Ongoing during clearing activities	Ongoing during clearing activities	Short term
Transport of weeds and pathogens from the site to adjacent vegetation	There is low potential to transport weeds and pathogens to nearby vegetation, following the implementation of the CEMP. The current condition of nearby vegetation is likely to be low and if similar to the subject land contains a high portion of exotic grasses and weeds. Weed management measures will be implemented during construction and operational phases to reduce the risk of pathogens and weeds invading.	Subject land	Ongoing during clearing activities	Ongoing during clearing activities	Potentially long term
Increased risk of starvation, exposure and loss of shade or shelter	The proposal is not expected to result in any indirect impacts resulting in an increased risk of starvation, exposure and loss of shade or shelter.	NA	NA	NA	NA
Loss of breeding habitats	The proposal is not expected to result in any indirect loss of breeding habitats located adjacent or nearby to the site.	NA	NA	NA	NA

Indirect impact type	Nature	Extent	Frequency	Duration	Timing
Trampling of threatened flora species	The proposal is not expected to result in any indirect impacts resulting from trampling of threatened flora species given no individuals are present within the subject land, and none were observed in adjacent areas.	NA	NA	NA	NA
Inhibition of nitrogen fixation and increased soil salinity	The proposal is not expected to result in any inhibition of nitrogen fixation.	NA	NA	NA	NA
Fertiliser drift	The proposal is not expected to result in any fertiliser drift.	NA	NA	NA	NA
Rubbish dumping	The proposal could result in a minor increase in rubbish dumping during the clearing phase. This would likely be minor in nature and managed by providing waste disposal facilities.	Subject land	Ongoing during clearing activities	Ongoing during clearing activities	Ongoing during clearing phase
Wood collection	Wood collection as a result of the proposal is considered to be low and of minor impact. Trees planted along corridor plantings within the subject land are to be removed from the subject land as part of the vegetation clearing phase of the proposal.	Corridor plantings with subject land	Ongoing during clearing activities	Ongoing during clearing activities	Ongoing during clearing activities
Bush rock removal and disturbance	The proposal is not expected to result in any bush rock removal or disturbance.	NA	NA	NA	NA
Increase in predatory species populations	The proposal is not expected to result in an increase of predatory species populations.	NA	NA	NA	NA
Increase in pest animal populations	The proposal could result in a minor increase in pest and vermin animal species as people use the subject land during the clearing phase of the proposal. This would likely be minor in nature.	Ongoing during clearing activities	Ongoing during clearing activities	Ongoing during clearing activities	Potentially long term
Increased risk of fire	The proposal is not expected to result in any increased risk of fire.	NA	NA	NA	NA
Disturbance to specialist breeding and foraging habitat, e.g., beach nesting for shorebirds.	The proposal is not expected to result in any disturbance to specialist breeding and foraging habitat.	NA	NA	NA	NA

6.3 Assessing prescribed biodiversity impacts

As described in **Table 4.4**, no prescribed biodiversity impacts are anticipated from the proposed development. Impacts to habitat associated with native vegetation has been calculated and included in **Section 7**.

6.4 Other legislative requirements

6.4.1 State Environmental Planning Policy (SEPP) (Biodiversity Conservation) 2021

Chapter 4 –Koala habitat protection 2021

The SEPP applies to the site given that subject land occurs in Goulburn Mulwaree LGA, which is listed in Schedule 2 of the SEPP. A Koala Plan of Management for the LGA has not been prepared.

Known Koala use trees, as per schedule 3 of the SEPP, have been identified within the subject land, within the area of planted native no-indigenous and exotic trees (*Eucalyptus bridgesiana*). Within the study area, there are no large areas of canopy, instead the only canopy remaining within the study area is as corridor plantings, which are typically used by farmer as wind breaks. These wind break areas are dominated by *Pinus* spp. (not listed as a Koala use tree as per schedule 3 of the SEPP) with occasional occurrences of *Eucalyptus bridgesiana*. The rest of the study area lacked any canopy trees and is regularly disturbed by maintenance and grazing, therefore not providing suitable habitat for the species.

Lastly, there have not been records of Koala within 5 km of the subject land in the past 20 years. Therefore, the site is therefore not considered core Koala habitat, and further consideration of the SEPP is not required.

Chapter 6 - Water catchments

Chapter 6 – Water catchments applies to land mapped within the Sydney Drinking Water Catchment Map. The subject land is within the mapped boundary of the Greater Sydney Drinking Water Catchment map and within the Upper Wollondilly River sub-catchment. Assessments against relevant provisions of Part 6.5 Sydney Drinking Water Catchment section of the SEPP are provided below.

Section 6.58(b) aims to provide for development in the Sydney Drinking Water Catchment to have a neutral or beneficial effect on water quality.

It is anticipated that direct and indirect impacts such as surface and ground water flows will be mitigated through the implementation of a CEMP and sediment controls, which will include the current recommended practices and standards. It is also anticipated that the stormwater infrastructure design will ensure a neutral or beneficial effect on the quality and quantity of water leaving the site. These designs will be further developed at the future DA stage.

Section 6.61 - Development consent cannot be granted unless neutral or beneficial effect on water quality.

In accordance with Chapter 6 of the SEPP (2021) development consent must not be granted to development on land identified within the Sydney Drinking Water Catchment Map unless consent authority is stratified that:

- That the carrying out of the proposed development would have a neutral or beneficial effect on water quality
- For the purposes of determining whether the carrying out of the proposed development on land in the Sydney drinking water catchment would have a neutral or beneficial effect on water quality, the consent authority must, if the proposed development is one to which the NorBE Tool applies, undertake an assessment using that Tool.

There are three first order streams within the subject land which will be impacted by development. During field assessment of the subject land no evidence of bed and bank were present for any of the mapped streams. Therefore, it is unlikely that the proposed development will have a negative impact on the ecological or hydraulic function of these streams. Impacts to all other streams outside the subject land have been avoided. Indirect impacts such as surface and ground water flows will be mitigated through the implementation of a CEMP and sediment controls.

Additionally, the location of the development (subject land) within the study area has been selected as the development area slopes in a south eastern direction away from Lake Sooley, further reducing any potential negative impact on the water quality of the catchment.

6.5 Mitigating and managing impacts on biodiversity values

Efforts to avoid and minimise impacts to biodiversity values were undertaken during the siting of the subject land location within the study area. The subject land has been positioned to avoid impacts to biodiversity values that are located in the surrounding area and the proposed development layout has been designed to predominately avoid impacts to native vegetation within the subject land. For instance, the subject land avoids impacts to areas along the western, northern and north western parts of the study area as these areas slope and drain west towards Lake Sooley (515 Crookwell Road, catchment analysis 2020). Additionally, the proposed development layout has avoided development of access roads and building envelopes in areas of PCT 1334 vegetation within the subject land (**Figure 6.1**).

The complete avoidance of impacts to native vegetation would prohibit the development of the site, therefore the subject land has been located to avoid and minimise impacts to the fullest extent practical. As impacts on biodiversity values could not be avoided entirely and biodiversity values within the subject land are considered to be moderate to low given the abundant cover of exotic species and active grazing. Additionally, multiple measures will be implemented to mitigate and manage direct and indirect impacts where possible, including preparation of a Construction Environmental Management Plan (CEMP), a S88b covenant to retain native vegetation within the subject land, a Vegetation Management Plan (VMP) to manage and improve the condition of native vegetation to be retained within the subject land, and appropriate pre-clearance protocols. Details are provided below.

6.5.1 Pre-clearance protocols

Appropriate pre-clearance protocols are to be put in place at the time of vegetation clearing to mitigate and avoid potential harm or injury to any fauna present and edge effects of the

vegetation clearing required. These protocols should be adaptive depending on site specific conditions. As habitat trees (where nests or other habitat features are identified) have not been identified within the subject land (at the time of survey), a pre-clearance survey should aim to identify any active nests, within the 'planted exotic and non-endemic native trees and shrubs, a week prior to clearing. If any active nests, for threatened species, are found within the subject land, clearing of these areas should be avoided until the breeding period for the species is completed. All tree species cleared should be removed from the study area and disposed of at an appropriate facility.

As outcrops are present within the subject land, pre-clearance protocol should be in place at the time the outcrops are to be removed to avoid potential impacts to fauna. Pre-clearance surveys for the outcrop areas can be conducted concurrent with other pre-clearance surveys within the site. Nevertheless, protocols should be adaptive depending on site conditions or if any fauna is found at the time of clearance.

The subject land contains two farm dams that may contain habitat for non-threatened aquatics species. Appropriate dam decommissioning protocols are to be put in place at the time of clearance to mitigate and avoid potential harm or injury to these individuals. A suitability qualified ecologist is to be engaged and dam dewatering protocols should be conducted in two stages.

- **Stage 1**: Reduce the dam capacity by two thirds.
- **Stage 2**: Reduce capacity by the final third while a suitably qualified ecologist is present to capture/release/humanely dispose of fish (including eels), reptile and crustaceans.

At the completion of Stage 2 the ecologist will provide clearance for activities to proceed after each dam dewatering.

Additionally, prior to clearing of vegetation:

- The boundary of the subject land should be fenced to avoid impacts to other areas within the study area.
- Signs should be clearly located along the fence to ensure no access to areas outside the subject land by works personnel or machinery.
- Fencing and signage should remain in place until all works are completed within the subject land.
- WIRES and the nearest veterinary clinic should be notified of the works and the potential for injured wildlife.

6.5.2 Construction Environmental Management Plan

To avoid potential indirect offsite impacts during construction, an appropriate erosion and sedimentation control plan should be in place following best practice protocols such as Landcom (2004). It is recommended that this is included in a site-specific CEMP prior to any construction works commencing.

The CEMP will be required to span the pre, during, and post construction periods, include the above pre-clearance, and incorporate any of the relevant Authority's current recommended practices and standards as detailed by the SEPP (SDWC) (2011).

6.5.3 Vegetation Management Plan

Approximately 22.73 ha of native vegetation within the study area will be retained, and of this approximately 3.99 ha could be restored within the subject land by implementing a VMP. Furthermore, it's possible that a S88b covenant agreement with Council could ensure that PCT 1334 to be retained within the subject land is protected from any future development or impacts.

6.6 Adaptive management of uncertain impacts

Section 8.5 of the BAM outlines uncertain impacts that would require adaptive management. Impacts associated with the proposal are largely certain and associated with the direct impacts resulting from the vegetation clearing as documented in **Section 6.1**. Uncertain impacts associated with the proposal would be limited to potential runoff, however, the risk of these impacts is relatively low and can be mitigated. During the clearing phase of this project, the works should be undertaken in accordance with best practice sediment and erosion controls and in accordance with any conditions issued by Council.

Excluding the need for a CEMP, no additional adaptive management measures are proposed.

6.7 Thresholds for the assessment and offsetting of impacts of development

6.7.1 Serious and Irreversible Impacts (SAII)

This section documents the additional impact assessment provisions for communities and species at risk of SAII (Section 9.1.1 and Section 9.1.2 of the BAM) relevant to the proposal:

- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions TEC (Box Gum Woodland) – in a degraded condition.

Detailed consideration of whether impacts on the patch of Box Gum Woodland are serious and irreversible are included in **Table 6.2**. Consideration was given to the principles and criteria set out in the Guidance to assist a decision-maker to determine a serious and irreversible impact (OEH 2017b)

Table 6.2: SAII Assessment for Box Gum Woodland

SAII (BAM [2020], Section 9.1.1)	Response
1) The action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII	The actions and measures taken to avoid direct and indirect impacts on the patch of Box Gum Woodland within the subject land are outlined in Section 5 of this report. The proposed development has been predominantly located on land dominated by exotic grasslands, planted mixed exotic and non-endemic native trees and shrubs, which is used by livestock and associated infrastructure, and contains a dwelling, totalling 50.62 ha (~92% of the subject land).

SAII (BAM [2020], Section 9.1.1)	Response
	Early lot layouts would have resulted in the complete clearing of 4.13 ha of PCT 1334 within the subject land, however following revisions to the lot arrangement and access roads, retention of 3.99 ha this vegetation has been achieved (~96% of the Box Gum Woodland vegetation within the subject land). This 0.14 ha of native vegetation loss is attributed to APZ impacts on the northern boundary of the subject land and a 2 m buffer to compensate for fence impacts within the centre of the subject land. Vegetation within this patch is subject to high abundance of weed disturbance, has been historically cleared and is currently grazed. Furthermore, site assessment of vegetation within the study area (Ecoplanning 2021) indicates an additional area approximately 18.75 ha in size, which is classed as 'Semi-native low diversity grassland', is to be retained within the study area. A CEMP will be implemented for the during of the project to reduce the potential of indirect or inadvertent impacts outside of the development footprint.
2) The assessor must consult the TBDC and/or sources to report on the current status of the TEC including: a) Evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	The TSSC (2020) final determination for the TEC details that the ecological community occurs over a very large range across NSW, the ACT, the South Eastern Queensland Bioregion in Queensland and the Victorian Midlands Bioregion in Victoria. Furthermore, TSSC (2006) highlights that there is no mapping which encompasses the entirety of the distribution, therefore estimates of extant and pre-clearing extent of the community are based on a number of different studies, which could lead to some overlap. Nevertheless, within NSW, the TBDC estimates that the community has undergone a population reduction of >=80% in 10 years or three generations. There have been various studies into the reduction in geographic extent of the TEC since 1970 across NSW. Austin et al. (2000) found that this ecological community had been reduced to less than 1% of its pre-1750 extent in the Central Lachlan region. Thomas et al. (2000) estimated <4% remaining in the NSW South Western Slopes and Southern Tablelands. Gibbons and Boak (2002) estimated 7.4% of Yellow Box/Blakely's Red Gum woodland remaining in 30,000 ha on the NSW South West Slopes, which is reduced to 3.4% when isolated trees, remnants of less than 1 ha and small, modified patches were excluded. The TSSC (2006) estimates the extent of reduction for the community compared to the extent pre-1750. In NSW, estimates for the extent of the community pre-1750 is 3,717,366 ha. Compared to the current area estimates of 250,729 ha, it constitutes to 93% of the community cleared.
2) b) extent of reduction in ecological function for the TEC using evidence that describe the degree of	A number of threatening processes have caused severe declines in biotic processes and interactions throughout the range of the TEC. Multiple

SAII (BAM [2020], Section 9.1.1)	Response
environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: i) change in community structure ii) change in species composition iii) disruption of ecological processes iv) invasion and establishment of exotic species v) degradation of habitat, and vi) fragmentation of habitat	sources attest to an almost complete conversion of the community to agricultural production (Prober 1996, Prober and Thiele 2004, Keith 2004, Benson 2008). Agricultural practices such as grazing, soil structure change and methods to improve pasture (fertilizer application, augmentation with exotic or native species) have severely altered the species composition, ecological process and increased the invasion and establishment of exotic species, primarily through clearing of the canopy. Grazing has been shown to lead to a reduction in understorey species diversity and richness due to the loss of native species that are both highly palatable and intolerant of grazing by domestic stock (Keith 2004). Prober and Thiele (1995) has determined that previously widespread species such as *Dianella revoluta*, *Diuris dendrobioides*, *Microseris lanceolata*, *Pimelea curviflora* and *Templetonia stenophylla* are now confined to the least disturbed remnants of the community. An increase of grazing intensity has indicated a shift in dominance of pasture species from *Themeda triandra*, *Austrostipa aristiglumis* and *Poa* spp. *to Austrostipa scabra subsp. falcata*, *Rytidosperma* spp. and *Bothriochla macra,* Moore (1953) attributes this cane in species composition to differential palatability and resilience to grazing among species. Changes in soil composition by increasing the nutrient content of the soil for this TEC, though practise such as fertiliser, manure and decomposing annual weeds have led to increasing advantages for weed establishment (TSSC 2002). Austin et al (2000) found that only 8% of Yellow Box – Red Gum Woodland sites had greater than 50% cover of native species. Furthermore, the structure and composition of the community is impacted by fire regimes, given that fire mediates competitive interactions among understory species, therefore, the prolonged absence of fire may result in declines in species diversity as less competitive species are excluded (Lunt and Morgan 2002).

SAII (BAM [2020], Section 9.1.1)	Response
2) c) evidence of restricted geographic distribution (Principle 3, clause 6.7(2)(c) BC Regulation), based on the TEC's geographic range in NSW according to the: i) extent of occurrence ii) area of occupancy and iii) number of threat-defined locations	The geographic distribution of White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland is not restricted (TSSC 2020). The ecological community occurs over a very large range across four jurisdictions, and there is no mapping that encompasses the entirety of its distribution. The existing broad scale mapping has generally been based on tree cover, which did not consider remnant condition. Using this work to estimate remaining extent will therefore overestimate the extent of this ecological community (TSSC 2006). Bland et al. (2017), recommends a method of assessment based on a minimum convex polygon enclosing likely occurrences of the community. The best estimate of the extent of occurrence (EOO) of this community utilises this method and estimates an EOO of 702,800 km^2 within NSW. Similarly, the area of occupancy (AOO) is difficult to estimate. Bland et al. (2017) recommends calculating the AOO based on a 10 x10 km grid cells method (with a minimum of 1% occupied by the community). Utilising this method, the best estimate of the AOO for this community is 151,100 $km^{2.}$ The best estimates of EEO and AOO derive from a compilation of maps from multiple sources. Not all of the areas occupied by the community are covered by maps of appropriate scale and accuracy. Therefore, the values for EOO and AOO quoted above may underestimate the true values (TSSC 2020) Threat-defined locations are geographically or ecologically distinct areas where a single threatening event could rapidly affect the whole community present. The size of the location depends on the area covered by the threatening event. Where a community is affected by more than one threatening event, location should be defined by considering the most serious plausible threat. Currently, there are no listed threat-defined locations for this community (DPE 2022), however, given the large-scale impacts, through historic clearing and agricultural practices, it would be right to assume a location where the community is found in an intact condition or largely undisturbed condition, would represent a threat-defined location.
2) d) evidence that the TEC is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation)	TSSC (2006) considers that areas of this TEC, in which an overstorey exists without a substantially native understorey are degraded and are no longer a viable part of the ecological community. Although some native species may remain, in most of these areas the native understorey is effectively irretrievable. However, the National Recovery Plan for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (2010) aims at increasing landscape function of the community through management and restoration of degraded sites. Although, the plan does not detail the results of its restoration targets through management it

SAII (BAM [2020], Section 9.1.1)	Response
	provided potential performance criteria which could help restore, achieve no net loss of the community extent, via actions and performance criteria. The current proposal will aim to stablish a VMP for the retained 3.99 ha of PCT 1334 within the subject land, by establishing the appropriate protocols for restoration, targets and performance criteria, it's possible that the 3.99 ha of PCT 1332 within the subject land can respond positively to management,
3) Where the TBDC indicates data is 'unknown' or 'data deficient' for a TEC for a criterion listed in Subsection 9.1.1(2.), the assessor must record this in the BDAR or BCAR.	Given the community expands across four jurisdictions (NSW, ACT, Queensland and Victoria) and the lack of mapping which encompasses the entire distribution. The existing broad scale mapping has generally been based on tree cover and did not consider remnant condition. Therefore. using this work to estimate remaining extent will therefore overestimate the extent of this ecological community (TSSC 2006). Furthermore, given the community primarily occurs on the most fertile soils, much of the land on which the community occurs currently and pre-European settlement is privately owned, which limits accessibility for mapping studies. Despite the likelihood of overestimating the current extent of this community, corroboration of studies by Benson (2008), Tozer et al. (2010) and Armstrong et al. (2013) all further indicate that the remaining amount of this community is less than 10% of its pre-1750 estimates.
4) a) In relation to the impacts from the proposal on the TEC at risk of an SAII, the assessor must include data and information on: i) in hectares, and ii) as a percentage of the current geographic extent of the TEC in NSW	Within the study area a total of 22.88 ha of vegetation mapped as 'Semi-native low diversity grassland' (Ecoplanning 2021), corresponding to the TEC is present. The proposal will impact 0.14 ha of this vegetation (within the subject land), which constitutes to ~0.63% of the occurrence of the TEC within the study area. Impacts the 0.14 ha area are related to the establishment of the APZ required for the development. The proposed impact of 0.14 ha of Box Gum Woodland within the subject land constitutes to approximately >0.00006% of the occurrence of the TEC, within its current geographic extent in NSW.
4) b) the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by: i) estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals	Within 500 m of the proposed development footprint regional vegetation mapping by ELA (2015) and Tozer et. al (2010) estimate different amounts of areas corresponding to the TEC. ELA (2015) estimates that 1.03 ha of the community will remain outside the subject land, whereas Tozer et. al (2010) estimates that 3.73 ha of the community will be remain within 500 m of the subject land. The proposal will only impact 0.14 ha of the community as part of the development within the subject land, which results in a total of 22.73 ha of potential PCT 1334 remaining within the study area. As validating the extent of this community in NSW has proven difficult (as detailed in earlier sections of this SAII assessment), within a 500 m radius of the proposed development it's possible that a

SAII (BAM [2020], Section 9.1.1)	Response
ii) describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by: • distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and • estimated maximum dispersal distance for native flora species characteristic of the TEC, and • other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development iii) describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone	total area size, of this community, between 23.76 ha and 26.45 ha could remain. The 22.88 ha of potential PCT 1334 identified within the study area, of which 4.13 ha is located within the subject land and of which only 0.14 ha is to be impacted by the proposed development, has already been fragmented from other areas of native vegetation, largely due farming practices (past and current), such as clearing, grazing and crop harvesting. ELA (2015) and Tozer et. al (2010) map areas of potential Box Gum Woodland approximately 510 m south east from the Box Gum Woodland patch of vegetation within the subject land, given that only 0.14 ha of this patch is to be removed, the approximate distance to the nearest potential area of Box Gum Woodland would be the same (~510 m) Three vegetation zones have been assessed as present within the subject land. VI scores for all the vegetation zones fall be the offsetting threshold of a VI score of ≥15, where the PCT is representative of an endangered or critically endangered ecological community. Details of relevant composition, structure and function scores for each vegetation zone, present within the subject land, are detailed in Appendix A and Section 3.3 of this report.
5.) The assessor may also provide new information that demonstrates that the principle identifying that the TEC is at risk of an SAII is not accurate.	No new information is provided.

6.7.2 Impacts which require an offset

Section 9.2.1. of the BAM indicates that the following vegetation zones require offsets:

a) vegetation zones that have a vegetation integrity score ≥15 where the PCT is representative of an endangered or critically endangered ecological community.
b) a vegetation zone that has a vegetation integrity score of ≥17 where the PCT is associated with threatened species habitat or is a vulnerable ecological community.

c) a vegetation zone that has a vegetation integrity score ≥20.

None of the vegetation zones, within the subject land, have a VI score ≥15, therefore, they do not require offsets in accordance with Section 9.2.1 of the BAM.

6.7.3 Impacts that do not require offset

The VI score for the area identified as PCT 1334 (4.13 ha) was 0.5 VI score, which falls below the offset threshold of ≥15, therefore will not require offsetting. Additionally, areas within the subject land identified as 'exotic grasslands' (48.1 ha) and 'planted exotic and non-endemic native trees and shrubs' (2.44 ha), do not require offsetting as they have a VI score below the offsetting threshold for non-CEEC/EEC vegetation that provides habitat for ecosystem credit species. VI scores for these vegetation zones were below 17, at 4 and 0.3 respectively, and therefore do not require offsetting.

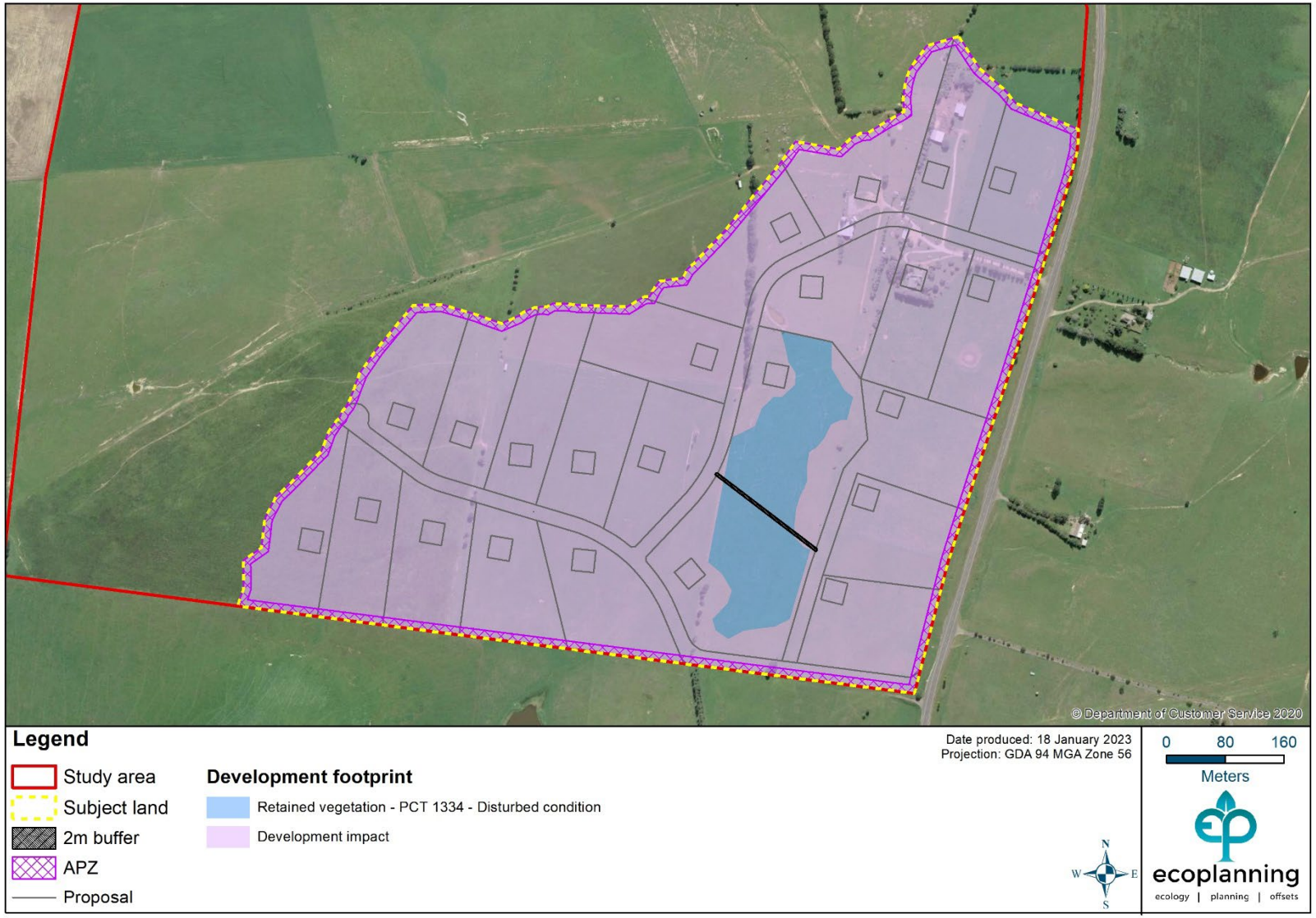

Figure 6.1: Development footprint and proposed areas of PCT 1334 to be retained within subject land

7 Estimated credit calculations

A biodiversity offset requirement for residual impacts of a proposed development, must be calculated in accordance with Section 10 of the BAM. The following section outlines the estimated credit requirements for the development in order to achieve the 'no net loss standard' as established by the BAM. These calculations assume complete loss but as mentioned above, there will be opportunities to further consider the avoidance and minimisation of impacts to native vegetation during the design development stage of the subdivision DA.

It should be noted that Biodiversity Offsets Payment Calculator (BOPC) was replaced by the Biodiversity Conservation Fund (BCF) Charge System on 17 October 2022. The new BCF Charge System will now be used to determine the amount a proponent may pay into the BCF to meet a biodiversity offset obligation. Quotes for current credit pricing can be obtained directly from the Biodiversity Conservation Trust (BCT).

7.1 Credit calculations and classes

7.1.1 Ecosystem credits

As detailed in **Sections 3** and **4**, no ecosystem credits are required to offset the proposal.

7.1.2 Species credit

The species credits required to offset the proposal are provided in **Table 7.1**. A total of 1 species credit is required to offset the proposed development.

Table 7.1: Species credits required

Species	Credits required
Fauna	
Myotis macropus (Southern Myotis)	1

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Appendix A Plot data collected

Plot No.	PCT	Area (ha)	Condition class	Zone	Easting	Northing	Bearing
1	1334	48.1	Exotic grassland	56	197925	6153447	330
2	1334	4.13	Degraded	56	197785	6153603	30
3	1334	48.1	Exotic grassland	56	197472	6153622	18
4	1334	48.1	Exotic grassland	56	197263	6153648	341
5	1334	48.1	Exotic grassland	56	197619	6153850	14
6	1334	48.1	Exotic grassland	56	198132	6154113	180
7	1334	4.13	Degraded	56	197996	6154240	224
8	1334	4.13	Degraded	56	197833	6153766	204
9	1334	2.44	Planted exotics and non-endemic native tress shrubs	56	197375	6153620	183
10	1334	4.13	Degraded	56	197806	6153644	182

Plot No.	Composition					
	Tree	Shrub	Grass	Forb	Fern	Other
1	0	0	3	4	0	0
2	0	0	5	5	0	0
3	0	0	5	1	0	0
4	0	0	2	0	0	0

Plot No.	Composition					
	Tree	Shrub	Grass	Forb	Fern	Other
5	0	0	3	4	0	0
6	0	0	2	3	0	0
7	0	0	8	4	0	0
8	0	0	6	4	0	0
9	1	0	1	2	0	0
10	0	0	2	3	0	0

Plot No.	Structure					
	Tree	Shrub	Grass	Forb	Fern	Other
1	0	0	20.7	0.9	0	0
2	0	0	32.6	0.6	0	0
3	0	0	1.9	0.1	0	0
4	0	0	0.6	0	0	0
5	0	0	10.3	0.4	0	0
6	0	0	2.1	0.3	0	0
7	0	0	28	0.4	0	0
8	0	0	28.2	0.4	0	0
9	2	0	0.5	0.2	0	0
10	0	0	10.2	1.4	0	0

Plot No.	Function										
	Large trees	Hollow trees	Litter cover (%)	Fallen logs (m)	Tree steam 5-10 cm	Tree stem 10-20 cm	Tree stem 20-30 cm	Tree steam 30-50 cm	Tree stem 50-80 cm	Tree regen	High threat exotic
1	0	0	24	0	0	0	0	0	0	0	1.1
2	0	0	2	0	0	0	0	0	0	0	0.3
3	0	0	3	0	0	0	0	0	0	0	0
4	0	0	0.2	0	0	0	0	0	0	0	0
5	0	0	2.2	0	0	0	0	0	0	0	0.2
6	0	0	2	0	0	0	0	0	0	0	0.1
7	0	0	2	0	0	0	0	0	0	0	0.1
8	0	0	5	0	0	0	0	0	0	0	0.2
9	0	0	21	0	0	0	0	0	0	0	5.5
10	0	0	5	0	0	0	0	0	0	0	1.2

Appendix B Flora and fauna inventories

Flora

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
Plot-1	Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	Forb (FG)	native	0.2	30
		Amaranthus spp.	Amaranth	Forb (FG)	native	0.5	50
	Asteraceae	*Cirsium vulgare*	Spear Thistle		exotic	1	50
		Taraxacum officinale	Dandelion		exotic	0.5	50
		Xanthium spinosum	Bathurst Burr		high threat	0.5	30
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	0.1	30
	Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic		exotic	0.2	30
		Trifolium glomeratum	Clustered Clover		exotic	0.1	10
		Trifolium subterraneum	Subterranean Clover		exotic	0.5	50
	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		exotic	0.1	20
	Oxalidaceae	*Oxalis* spp.		Forb (FG)	native	0.1	20
	Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues		exotic	5	500
	Poaceae	*Bromus catharticus*	Praire Grass		exotic	0.2	20
		Bromus molliformis	Soft Brome		exotic	0.1	5
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	0.5	50
		Echinochloa crus-galli	Barnyard Grass		exotic	20	1000
		Eleusine tristachya	Goose Grass		exotic	1	50
		Hordeum spp.			exotic	0.5	30
		Lolium spp.			exotic	2	100
		Nassella trichotoma	Serrated Tussock		high threat	0.1	1
		Paspalum dilatatum	Paspalum		high threat	0.5	30
		Paspalum distichum	Water Couch	Grass & grasslike (GG)	native	0.2	50
		Phalaris aquatica	Phalaris		exotic	10	1000

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
		Rytidosperma spp.		Grass & grasslike (GG)	native	20	1000
	Polygonaceae	*Polygonum aviculare*	Wireweed		exotic	2	100
		Rumex brownii	Swamp Dock	Forb (FG)	native	0.1	2
		Rumex crispus	Curled Dock		exotic	0.1	1
Plot-2	Amaranthaceae	*Amaranthus spp.*	Amaranth	Forb (FG)	native	0.1	1
	Asteraceae	*Carthamus lanatus*	Saffron Thistle		high threat	0.1	5
		Cirsium vulgare	Spear Thistle		exotic	0.1	10
		Conyza spp.			exotic	0.1	5
		Cotula australis	Common Cotula	Forb (FG)	native	0.1	5
		Euchiton sphaericus	Star Cudweed	Forb (FG)	native	0.2	30
		Gamochaeta spp.			exotic	0.1	5
		Hypochaeris radicata	Catsear		exotic	0.2	40
		Sonchus oleraceus	Common Sowthistle		exotic	0.1	1
		Xanthium spinosum	Bathurst Burr		high threat	0.1	1
	Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse		exotic	0.1	1
		Hirschfeldia incana	Buchan Weed		exotic	0.1	2
		Lepidium africanum	Common Peppercress		exotic	0.1	5
	Caryophyllaceae	*Gypsophila tubulosa*	Annual Chalkwort	Forb (FG)	native	0.1	20
		Paronychia brasiliana	Chilean Whitlow Wort, Brazilian Whitlow		exotic	0.5	50
	Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	Forb (FG)	native	0.1	20
	Fabaceae (Faboideae)	*Trifolium glomeratum*	Clustered Clover		exotic	0.1	5
		Trifolium spp.			exotic	0.1	1
		Trifolium subterraneum	Subterranean Clover		exotic	0.5	100
	Geraniaceae	*Erodium cicutarium*	Common Crowfoot		exotic	0.1	5
	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		exotic	0.2	30
	Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues		exotic	0.2	30
	Poaceae	*Austrostipa bigeniculata*	Yanganbil	Grass & grasslike (GG)	native	25	1000

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
		Austrostipa scabra subsp. falcata	Rough Speargrass	Grass & grasslike (GG)	native	5	100
		Bromus catharticus	Praire Grass		exotic	0.2	30
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	0.5	50
		Dactylis glomerata	Cocksfoot		exotic	0.5	20
		Eleusine tristachya	Goose Grass		exotic	20	1000
		Eragrostis trachycarpa		Grass & grasslike (GG)	native	0.1	5
		Hordeum spp.			exotic	0.1	20
		Nassella trichotoma	Serrated Tussock		high threat	0.1	1
		Phalaris aquatica	Phalaris		exotic	0.5	50
		Rytidosperma spp.		Grass & grasslike (GG)	native	2	50
	Polygonaceae	*Polygonum aviculare*	Wireweed		exotic	0.1	5
		Rumex brownii	Swamp Dock	Forb (FG)	native	0.1	2
Plot-3	Asteraceae	*Gamochaeta calviceps*	Cudweed		exotic	0.1	5
		Hypochaeris radicata	Catsear		exotic	0.1	5
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	20	1000
	Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	Forb (FG)	native	0.1	5
	Fabaceae (Faboideae)	*Trifolium glomeratum*	Clustered Clover		exotic	0.1	10
		Trifolium subterraneum	Subterranean Clover		exotic	0.5	50
	Juncaceae	*Juncus spp.*		Grass & grasslike (GG)	native	0.1	5
	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		exotic	0.5	30
	Poaceae	*Avena spp.*	Oats		exotic	0.2	50
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	1	50
		Digitaria sanguinalis	Crab Grass		exotic	0.1	10
		Eleusine tristachya	Goose Grass		exotic	20	1000
		Eragrostis spp.		Grass & grasslike (GG)	native	0.1	5

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
		Eragrostis trachycarpa		Grass & grasslike (GG)	native	0.2	20
		Lachnagrostis filiformis		Grass & grasslike (GG)	native	0.5	50
		Lolium perenne	Perennial Ryegrass		exotic	20	1000
		Vulpia spp.	Rat's-tail Fescue		exotic	0.5	50
	Polygonaceae	*Polygonum aviculare*	Wireweed		exotic	20	1000
		Rumex brownii	Swamp Dock	Forb (FG)	native	0.1	5
Plot-4	Asteraceae	*Conyza spp.*			exotic	0.1	10
		Gamochaeta calviceps	Cudweed		exotic	0.1	20
	Poaceae	*Dactylis glomerata*	Cocksfoot		exotic	20	1000
		Eleusine tristachya	Goose Grass		exotic	1	50
		Eragrostis trachycarpa		Grass & grasslike (GG)	native	0.1	5
		Hordeum spp.			exotic	30	1000
		Lachnagrostis filiformis		Grass & grasslike (GG)	native	0.5	50
		Lolium perenne	Perennial Ryegrass		exotic	0.1	10
		Panicum gilvum			exotic	5	200
		Phalaris aquatica	Phalaris		exotic	20	1000
		Vulpia spp.	Rat's-tail Fescue		exotic	0.1	10
	Polygonaceae	*Polygonum aviculare*	Wireweed		exotic	1	100
Plot-5	Amaranthaceae	*Amaranthus spp.*	Amaranth	Forb (FG)	native	0.1	5
	Asteraceae	*Arctotheca calendula*	Capeweed		exotic	0.1	2
		Cirsium vulgare	Spear Thistle		exotic	5	100
		Cotula australis	Common Cotula	Forb (FG)	native	0.1	10
		Gamochaeta calviceps	Cudweed		exotic	0.1	20
		Hypochaeris radicata	Catsear		exotic	0.2	20
		Xanthium spinosum	Bathurst Burr		high threat	0.1	5
	Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse		exotic	0.1	5
	Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell	Forb (FG)	native	0.1	10

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	5	500
	Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	Forb (FG)	native	0.1	20
	Fabaceae (Faboideae)	*Trifolium glomeratum*	Clustered Clover		exotic	0.1	10
		Trifolium subterraneum	Subterranean Clover		exotic	5	500
	Geraniaceae	*Erodium crinitum*	Blue Crowfoot	Forb (FG)	native	0.1	10
	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		exotic	0.1	5
	Poaceae	*Bromus catharticus*	Praire Grass		exotic	10	500
		Bromus molliformis	Soft Brome		exotic	0.2	30
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	0.2	20
		Cynodon dactylon	Common Couch	Grass & grasslike (GG)	native	10	1000
		Digitaria sanguinalis	Crab Grass		exotic	2	100
		Eleusine tristachya	Goose Grass		exotic	20	500
		Hordeum spp.			exotic	0.1	10
		Lachnagrostis filiformis		Grass & grasslike (GG)	native	0.1	5
		Lolium spp.			exotic	2	200
		Panicum gilvum			exotic	0.2	30
		Vulpia spp.	Rat's-tail Fescue		exotic	0.5	50
	Polygonaceae	*Acetosella vulgaris*	Sheep Sorrel		high threat	0.1	5
		Polygonum aviculare	Wireweed		exotic	1	50
	Solanaceae	*Solanum nigrum*	Black-berry Nightshade		exotic	0.1	2
Plot-6	Amaranthaceae	*Amaranthus spp.*	Amaranth	Forb (FG)	native	0.1	5
	Asteraceae	*Cirsium vulgare*	Spear Thistle		exotic	5	100
		Hypochaeris radicata	Catsear		exotic	0.1	20
		Onopordum acaulon	Stemless Thistle		exotic	0.1	1
	Boraginaceae	*Echium plantagineum*	Patterson's Curse		exotic	0.1	1
	Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse		exotic	0.1	20
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	10	1000

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
	Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	Forb (FG)	native	0.1	10
	Fabaceae (Faboideae)	*Trifolium glomeratum*	Clustered Clover		exotic	0.2	30
		Trifolium repens	White Clover		exotic	0.2	50
		Trifolium subterraneum	Subterranean Clover		exotic	30	1000
	Geraniaceae	*Erodium cicutarium*	Common Crowfoot		exotic	0.1	20
	Malvaceae	*Malva parviflora*	Small-flowered Mallow		exotic	0.1	2
		Modiola caroliniana	Red-flowered Mallow		exotic	0.1	10
	Oxalidaceae	*Oxalis spp.*		Forb (FG)	native	0.1	20
	Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues		exotic	0.5	50
	Poaceae	*Bromus catharticus*	Praire Grass		exotic	20	1000
		Bromus molliformis	Soft Brome		exotic	0.5	50
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	0.1	10
		Cynodon dactylon	Common Couch	Grass & grasslike (GG)	native	2	200
		Eleusine tristachya	Goose Grass		exotic	2	100
		Hordeum spp.			exotic	0.1	20
		Lolium perenne	Perennial Ryegrass		exotic	2	100
		Nassella trichotoma	Serrated Tussock		high threat	0.1	1
		Vulpia spp.	Rat's-tail Fescue		exotic	0.2	50
	Polygonaceae	*Polygonum aviculare*	Wireweed		exotic	0.1	5
		Rumex brownii	Swamp Dock	Forb (FG)	native	0.1	10
	Solanaceae	*Solanum nigrum*	Black-berry Nightshade		exotic	0.1	5
Plot-7	Asteraceae	*Cirsium vulgare*	Spear Thistle		exotic	0.2	10
		Cotula australis	Common Cotula	Forb (FG)	native	0.1	5
		Euchiton sphaericus	Star Cudweed	Forb (FG)	native	0.1	10
		Gamochaeta calviceps	Cudweed		exotic	0.2	50
		Hypochaeris radicata	Catsear		exotic	0.1	20
		Pseudognaphalium luteoalbum	Jersey Cudweed	Forb (FG)	native	0.1	5
		Sonchus oleraceus	Common Sowthistle		exotic	0.1	1

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
	Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse		exotic	0.1	10
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	2	100
		Stellaria media	Common Chickweed		exotic	0.1	1
	Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	Forb (FG)	native	0.1	20
	Fabaceae (Faboideae)	*Trifolium repens*	White Clover		exotic	1	100
		Trifolium subterraneum	Subterranean Clover		exotic	1	100
	Geraniaceae	*Erodium cicutarium*	Common Crowfoot		exotic	0.1	10
	Juncaceae	*Juncus spp.*		Grass & grasslike (GG)	native	0.1	1
	Malvaceae	*Malva parviflora*	Small-flowered Mallow		exotic	0.1	5
		Modiola caroliniana	Red-flowered Mallow		exotic	0.1	5
	Poaceae	*Austrostipa bigeniculata*	Yanganbil	Grass & grasslike (GG)	native	10	500
		Austrostipa scabra subsp. falcata	Rough Speargrass	Grass & grasslike (GG)	native	0.2	20
		Bromus catharticus	Praire Grass		exotic	1	100
		Bromus molliformis	Soft Brome		exotic	0.1	5
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	2	100
		Cynodon dactylon	Common Couch	Grass & grasslike (GG)	native	10	1000
		Eleusine tristachya	Goose Grass		exotic	10	500
		Eragrostis spp.		Grass & grasslike (GG)	native	0.5	50
		Holcus lanatus	Yorkshire Fog		exotic	5	200
		Hordeum spp.			exotic	0.1	10
		Lachnagrostis filiformis		Grass & grasslike (GG)	native	0.2	20
		Lolium perenne	Perennial Ryegrass		exotic	0.5	100
		Nassella trichotoma	Serrated Tussock		high threat	0.1	2
		Phalaris aquatica	Phalaris		exotic	0.2	30
		Rytidosperma spp.		Grass & grasslike (GG)	native	5	200

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
	Polygonaceae	*Rumex brownii*	Swamp Dock	Forb (FG)	native	0.1	2
Plot-8	Asteraceae	*Carthamus lanatus*	Saffron Thistle		high threat	0.1	1
		Cirsium vulgare	Spear Thistle		exotic	0.1	5
		Cotula australis	Common Cotula	Forb (FG)	native	0.1	10
		Gamochaeta calviceps	Cudweed		exotic	0.1	10
		Hypochaeris radicata	Catsear		exotic	0.2	30
		Xanthium spinosum	Bathurst Burr		high threat	0.1	3
	Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse		exotic	0.1	10
		Lepidium africanum	Common Peppercress		exotic	0.1	10
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	2	100
	Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed	Forb (FG)	native	0.2	50
	Fabaceae (Faboideae)	*Trifolium subterraneum*	Subterranean Clover		exotic	10	1000
	Geraniaceae	*Erodium cicutarium*	Common Crowfoot		exotic	0.1	5
		Erodium crinitum	Blue Crowfoot	Forb (FG)	native	0.1	5
	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		exotic	0.1	10
	Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues		exotic	0.1	5
	Poaceae	*Austrostipa bigeniculata*	Yanganbil	Grass & grasslike (GG)	native	20	1000
		Bromus catharticus	Praire Grass		exotic	10	500
		Chloris truncata	Windmill Grass	Grass & grasslike (GG)	native	1	50
		Cynodon dactylon	Common Couch	Grass & grasslike (GG)	native	5	500
		Eleusine tristachya	Goose Grass		exotic	10	500
		Eragrostis spp.		Grass & grasslike (GG)	native	0.1	10
		Eragrostis trachycarpa		Grass & grasslike (GG)	native	0.1	10
		Hordeum spp.			exotic	0.1	10
		Lolium perenne	Perennial Ryegrass		exotic	0.5	100
		Rytidosperma spp.		Grass & grasslike (GG)	native	2	500

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
	Polygonaceae	*Rumex brownii*	Swamp Dock	Forb (FG)	native	0.1	2
	Portulacaceae	*Portulaca oleracea*	Pigweed	Forb (FG)	native	0.1	1
Plot-9	Amaranthaceae	*Amaranthus spp.*	Amaranth	Forb (FG)	native	0.1	10
	Asteraceae	*Cirsium vulgare*	Spear Thistle		exotic	0.2	10
		Hypochaeris radicata	Catsear		exotic	0.1	10
		Onopordum acaulon	Stemless Thistle		exotic	0.1	3
		Xanthium spinosum	Bathurst Burr		high threat	0.5	10
	Boraginaceae	*Echium plantagineum*	Patterson's Curse		exotic	0.1	1
	Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse		exotic	0.1	10
	Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow		exotic	0.2	30
	Chenopodiaceae	*Chenopodium album*	Fat Hen		exotic	0.2	20
		Dysphania pumilio	Small Crumbweed	Forb (FG)	native	0.1	20
	Fabaceae (Faboideae)	*Medicago sativa*	Lucerne		exotic	0.2	10
		Trifolium subterraneum	Subterranean Clover		exotic	2	200
	Malvaceae	*Malva parviflora*	Small-flowered Mallow		exotic	0.5	20
		Modiola caroliniana	Red-flowered Mallow		exotic	0.1	10
	Myrtaceae	*Eucalyptus baueriana*	Blue Box	Tree (TG)	native	2	1
	Pinaceae	*Pinus radiata*	Radiata Pine		high threat	5	1
	Poaceae	*Austrostipa bigeniculata*	Yanganbil	Grass & grasslike (GG)	native	0.5	50
		Bromus catharticus	Praire Grass		exotic	10	500
		Dactylis glomerata	Cocksfoot		exotic	1	100
		Digitaria sanguinalis	Crab Grass		exotic	0.1	5
		Eleusine tristachya	Goose Grass		exotic	1	200
		Hordeum spp.			exotic	0.2	20
		Hordeum vulgare	Barley		exotic	15	1000
		Lolium perenne	Perennial Ryegrass		exotic	0.5	100
		Panicum gilvum			exotic	1	100
		Phalaris aquatica	Phalaris		exotic	5	5000

Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
	Polygonaceae	*Polygonum aviculare*	Wireweed		exotic	0.5	50
		Rumex brownii	Swamp Dock	Forb (FG)	native	0.1	5
Plot-10	Alliaceae	*Nothoscordum borbonicum*	Onion Weed		exotic	0.1	10
	Amaranthaceae	*Amaranthus spp.*	Amaranth	Forb (FG)	native	0.2	20
	Asteraceae	*Euchiton sphaericus*	Star Cudweed	Forb (FG)	native	1	100
		Gamochaeta calviceps	Cudweed		exotic	0.1	50
		Hypochaeris radicata	Catsear		exotic	1	200
		Sonchus oleraceus	Common Sowthistle		exotic	0.2	20
		Taraxacum officinale	Dandelion		exotic	1	100
	Brassicaceae	*Brassica spp.*	Brassica		exotic	0.2	20
		Lepidium africanum	Common Peppercress		exotic	0.5	50
	Cyperaceae	*Schoenus spp.*		Grass & grasslike (GG)	native	0.2	30
	Fabaceae (Faboideae)	*Trifolium spp.*			exotic	3	100
	Geraniaceae	*Erodium cicutarium*	Common Crowfoot		exotic	0.2	50
	Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		exotic	0.2	30
	Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues		exotic	0.1	30
	Poaceae	*Arrhenatherum elatius*	Oatgrass		exotic	0.5	50
		Austrostipa scabra	Speargrass	Grass & grasslike (GG)	native	10	1000
		Bromus catharticus	Praire Grass		exotic	3	200
		Bromus hordeaceus	Soft Brome		exotic	5	500
		Dactylis glomerata	Cocksfoot		exotic	0.2	50
		Eleusine tristachya	Goose Grass		exotic	3	200
		Eragrostis curvula	African Lovegrass		high threat	1	50
		Holcus lanatus	Yorkshire Fog		exotic	0.2	30
		Hordeum leporinum	Barley Grass		exotic	2	200
		Lolium perenne	Perennial Ryegrass		exotic	3	200
		Nassella trichotoma	Serrated Tussock		high threat	0.2	20
		Phalaris aquatica	Phalaris		exotic	0.1	5

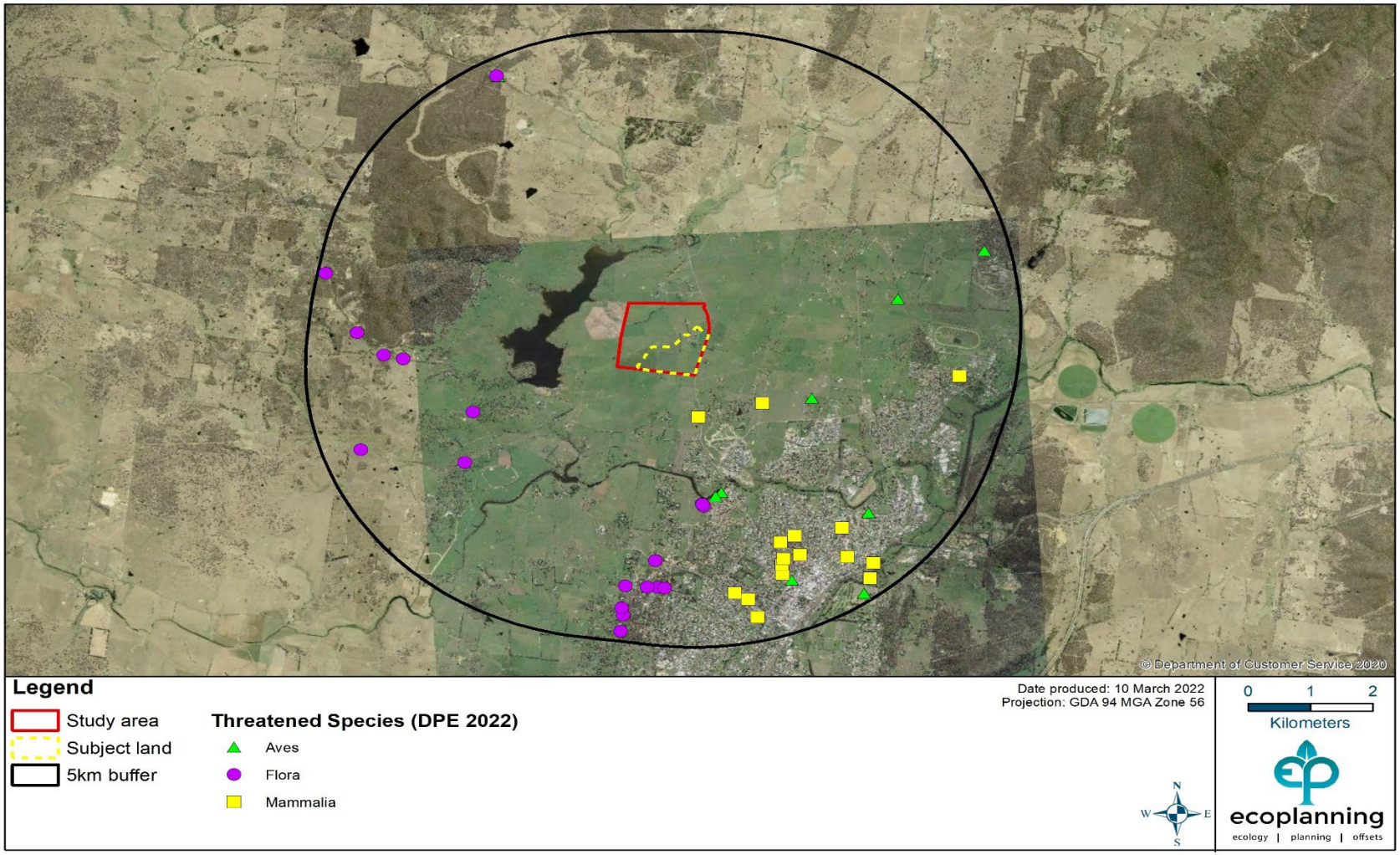
Plot	Family name	*Scientific name*	Common name	Growth form	Native / Exotic	Cover	Abundance
		Vulpia spp.	Rat's-tail Fescue		exotic	25	1000
	Polygonaceae	*Rumex brownii*	Swamp Dock	Forb (FG)	native	0.2	50

Fauna

Order	*Scientific Name*	Common name	Native/Exotic	Observation
Aves	*Ocyphaps lophotes*	Crested Pigeon	Native	O
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill	Native	W
	Anthus novaeseelandiae	Australasian Pipit	Native	OW
	Corvus coronoides	Australian Raven	Native	OW
	Carduelis carduelis	European Goldfinch	Exotic	OW
	Passer domesticus	House Sparrow	Exotic	Ow
Mammalia	*Oryctolagus cuniculus*	European Rabbit	Exotic	O
Reptilia	*Egernia cunninghami cunninghami*	Cunningham's Skink	Native	O

O = seen, W = heard, OW = seen and heard

Appendix C Near analysis and likelihood of occurrence table



Location of all threatened species recorded on the BioNet Atlas (DPE 2022) within 5 km of the subject land and within the past 20 years

Scientific Name Common Name	Legal Status	Number of records	Closest records and date	Most recent and proximity	Likelihood of occurrence	
					Prior to field assessment	Post field assessment
KINGDOM: Animalia, CLASS: Aves						
Anthochaera phrygia (Regent Honeyeater)	BC Act = E4A EPBC Act = CE	1	3.8 km (04/09/2009)	(04/09/2009) 3.8 km	Low	Not present
Calidris acuminata (Sharp-tailed Sandpiper)	EPBC Act = C,J,K	1	4.9 km (19/11/2011)	(19/11/2011) 4.9 km	Low	Not present
Callocephalon fimbriatum (Gang-gang Cockatoo)	BC Act = V,3 EPBC Act = E	2	3.1 km (08/10/2004)	(04/09/2009) 3.8 km	Low	Not present
Daphoenositta chrysoptera (Varied Sittella)	BC Act = V	1	4.6 km (26/11/2005)	(26/11/2005) 4.6 km	Low	Not present
Epthianura albifrons (White-fronted Chat)	BC Act = V,	1	3.8 km (04/09/2009)	(04/09/2009) 3.8 km	Low	Low
Gallinago hardwickii (Latham's Snipe)	EPBC Act = J, K	2	2.3 km (26/11/2005)	(19/02/2022) 4.8 km	Low	Not present
Hieraaetus morphnoides (Little Eagle)	BC Act = V	3	1.9 km (22/11/2019)	(22/11/2019) 1.9 km	Low	Not present
Petroica boodang (Scarlet Robin)	BC Act = V	2	3.8 km (04/09/2009)	(04/09/2009) 3.8 km	Low	Not present
KINGDOM: Animalia, CLASS: Mammalia						
Miniopterus orianae oceanensis (Large Bent-winged Bat)	BC Act = V	3	0.8 km (27/10/2021)	(27/10/2021) 0.8 km	Low	Low
Pteropus poliocephalus (Grey-headed Flying-fox)	BC Act = V, EPBC Act = V	20	3.4 km (14/01/2018)	(31/03/2019) 4.1 km	Low	Low
KINGDOM: Plantae						
Leucochrysum albicans var. tricolor (Hoary Sunray)	EPBC Act = E	16	2.5 km (29/09/2021)	(29/09/2021) 2.5 km	Low	Not present
Rutidosis leptorrhynchoides (Button Wrinklewort)	BC Act = E1 EPBC Act = E	3	2.4 km (03/11/2009)	(19/12/2020) 2.4 km	Low	Not present

* Unless other stated, text is taken from the OEH Threatened Species (http://www.environment.nsw.gov.au/threatenedspecies/); Legal Status codes from the Atlas of NSW Wildlife: V = Vulnerable, E1 = Endangered, E2 = Endangered Population, E4A = Critically Endangered, C = China and Australia Migratory Bird Agreement (CAMBA), J = Japan and Australia Migratory Bird Agreement (JAMBA); BC Act = NSW *Biodiversity Conservation Act 2016,* EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999..*

** The potential for each threatened species, population and/or migratory species to occur was then considered and the necessity for targeted field surveys was determined. Following field surveys and review of available habitat within the Subject land, the potential for species to utilise the site and be affected directly or indirectly by the proposal were considered as either:

- “Recent record” = species has been recorded in the subject land within the past 5 years
- “High” = species has previously been recorded in the subject land (<5 years ago) or in proximity (for mobile species), and/or habitat is present that is likely to utilised by a local population
- “Moderate” = suitable habitat for a species is present onsite but no evidence of a species detected and relatively high number of recent records (5-20 years) in the locality or species is highly mobile
- “Low” = suitable habitat for a species is present onsite but limited or highly degraded, no evidence of a species detected and relatively low number of recent records in the locality
- “Not present” = suitable habitat for the species is not present onsite or adequate survey has determined species does not occur in the subject land

Appendix D BAM-C Credit Reports

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030817/BAAS18047/22/00030818	2021-012 515 Crookwell Rd	01/02/2023
Assessor Name	Report Created	BAM Data version *
Ed Cooper	31/03/2023	57
Assessor Number	BAM Case Status	Date Finalised
BAAS18047	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
6	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion												
1	1334_Degraded	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	4.9	4.9	0.14	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0

2	1334_Exotic_grassland	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	2.6	2.6	48.1	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0

3	1334_Planted_trees	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	1.9	1.9	2.4	Population size	High Sensitivity to Gain	Critically Endangered Ecological Community	Not Listed	2.50	True	0
											Subtotal	**0**
											Total	**0**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Myotis macropus / Southern Myotis (Fauna)									
1334_Degraded	4.9	4.9	0.1			Vulnerable	Not Listed	False	1
								Subtotal	**1**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00030817/BAAS18047/22/00030818

Assessor Name
Ed Cooper

Proponent Names

Assessment Revision
6

BOS entry trigger
BOS Threshold: Area clearing threshold

Proposal Name
2021-012 515 Crookwell Rd

Assessor Number
BAAS18047

Report Created
31/03/2023

Assessment Type
Part 4 Developments (General)

BAM data last updated *
01/02/2023

BAM Data version *
57

BAM Case Status
Open

Date Finalised
To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Critically Endangered Ecological Community	1334-Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

BAM Biodiversity Credit Report (Like for like)

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1334-Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	50.7	0	0	0

1334-Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South	-	1334_Degraded	No	0	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	East Corner and Riverina Bioregions This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
	White Box - Yellow Box - Blakely's Red Gum	-	1334_Exotic_grassland	No	0	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro,

	Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710,					Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298,	-	1334_Planted_trees	No	0	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	**1334_Degraded**	0.1	1.00

Credit Retirement Options

Like-for-like credit retirement options

Myotis macropus / Southern Myotis	Spp	IBRA subregion
	Myotis macropus / Southern Myotis	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id

00030817/BAAS18047/22/00030818

Proposal Name

2021-012 515 Crookwell Rd

BAM data last updated *

01/02/2023

Assessor Name

Ed Cooper

Assessor Number

BAAS18047

BAM Data version *

57

Proponent Name(s)

Report Created

31/03/2023

BAM Case Status

Open

Assessment Revision

6

Assessment Type

Part 4 Developments (General)

Date Finalised

To be finalised

BOS entry trigger

BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Critically Endangered Ecological Community	1334-Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Variations)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1334-Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	50.7	0	0	0.00

1334-Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived	-	1334_Degraded	No	0	Monaro,Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal

	Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332,	-	1334_Exotic_grassland	No	0	Monaro,Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					
	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions This includes PCT's: 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840,	-	1334_Planted_trees	No	0	Monaro,Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1606, 1608, 1611, 1691, 1693, 1695, 1698					

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	**1334_Degraded**	0.1	1.00

Credit Retirement Options

Like-for-like options

Myotis macropus/ Southern Myotis	Spp	IBRA region	
	Myotis macropus/Southern Myotis	Any in NSW	
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Monaro, Bungonia, Crookwell, Kybeyan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.