STAGE 1 BIODIVERSITY CERTIFICATION ASSESSMENT REPORT

Under the *Biodiversity Conservation Act 2016*

-Mrs Shearman-
Proposed Land Rezoning
259 Averys Lane
Buchanan

PREPARED BY:

PEAK LAND MANAGEMENT

APRIL 2022

Updated Nov 2022

PEAK LAND MANAGEMENT

Land management consulting services:

-Bush Fire- **-Ecological-** **-Environmental-**

PO Box 3083
MEREWETHER NSW 2291
Ph: 02 49 63 3323
Mobile: 0410 633 837
Email: ted@peaklandmanagement.com
Web site: peaklandmanagement.com

Cover Photo: View of part of development site.

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TERMS AND ABBREVIATIONS

Abbreviation	Meaning
APZ	Asset Protection Zone
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BC Act	*Biodiversity Conservation Act 2016*
BAR	Biodiversity Assessment Report incld 5 Part Test. Prepared when under the clearing threshold, not on BV Map (or incorrectly mapped), no significant impact on any threatened species or Endangered Ecological Community or over a declared Outstanding Biodiversity Area, or a Part 5 activity where authority chooses not to opt in to BOS scheme.
BCAR	Biodiversity Certification Assessment Report
BDAR	Biodiversity Development Assessment Report
BSSAR	Biodiversity Stewardship Site Assessment Report
BTA	Bushfire Threat Assessment
CEEC	Critically Endangered Ecological Community
Defendable Space	An area within the asset protection zone that provides an environment in which a person can undertake property protection after the passage of a bush fire with some level of safety.
Development site	The area of native vegetation impact from the proposed development footprint.
DPE	NSW Department of Planning and Environment
Ecological community	An assemblage of species occupying a particular area.
Ecosystem credit species	A measurement of the value of vegetation communities, EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development.
EEC	Endangered Ecological Community
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FDI	Fire Danger Index
Ha	Hectare
HBT	Hollow bearing habitat tree
Habitat	(a) an area periodically or occasionally occupied by a species or ecological community, and (b) the biotic and abiotic components of an area.
IPA	Inner Protection Area
Key threatening process	A threatening process listed in Schedule 4 of the *Biodiversity Conservation Act 2016*.
LEP	Local Environment Plan
LGA	Local Government Area
LLS Act	*Local Land Services Amendment Act 2016*
Native Vegetation	Native vegetation means any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub or any scrub), (b) understorey plants, c) groundcover (being any type of herbaceous vegetation),

	(d) plants occurring in a wetland.
Native Vegetation clearing	Clearing native vegetation means any one or more of the following: (a) cutting down, felling, uprooting, thinning or otherwise removing native vegetation, (b) killing, destroying, poisoning, ringbarking or burning native vegetation.
Native vegetation regulatory map	A native vegetation regulatory map prepared and published under Division 2 of the LLS Act 2016.
NRAR	Natural Resources Access Regulator (NSW Water)
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection
PCT	Plant Community Type
Preferred Koala Feed Trees	Tree species used preferentially as forage for Koalas. In the context of SEPP (Koala Habitat Protection) around 65 tree species are listed regionally including Swamp Mahogany (*Eucalyptus robusta)*, *Eucalyptus punctata* (Grey Gum), Parramatta Red Gum (*Eucalyptus parramattensis),* Scribbly Gum *(E.haemastoma),* Tallowood *(E. microcorys),* Forest Red Gum (*Eucalyptus tereticornis),* Narrow leafed Ironbark (*Eucalyptus crebra)* and Spotted Gum *(Corymbia maculata).*
Protected Animal	Any of the following that are native to Australia or that periodically or occasionally migrate to Australia (including their eggs and young): amphibians—frogs or other members of the class amphibia. Birds—birds of any species. Mammals—mammals of any species (including aquatic or amphibious mammals but not including dingoes). Reptiles—snakes, lizards, crocodiles, tortoises, turtles or other members of the class reptilia.
Protected plant	(a) a plant that is of a threatened species, or (b) a plant that is part of a threatened ecological community, or (c) a protected plant (as listed in Schedule 6 of the BCA 2016).
RoTAP	Rare or Threatened Australian Plant
RF Act	*Rural Fires Act 1997*
RF Regulation	Rural Fires Regulation
SBDAR	Streamlined Biodiversity Development Assessment Report
Species/candidate credit species	Threatened species or components of species habitat that are identified in the Threatened Species Data Collection as requiring assessment for credit species. These species cannot be reliably predicted to use an area of land based on habitat surrogates.
Study area	The locality including the subject land/development site and surrounding areas.
Subject site/land	The entire extent of the land holdings associated with the development. Includes vegetation and land that is not being developed, but may have indirect impacts upon it.
Threatening process	A process that threatens, or that may threaten, the survival or evolutionary development of species or ecological communities
VIS	NSW Vegetation Information System
VMP	Vegetation Management Plan

CERTIFICATION AND DECLARATIONS

I certify that this report has been prepared on the basis of the requirements of, and information provided under, the Biodiversity Assessment Method and s6.15 of the BC Act.

In preparing this assessment I have acted in accordance with the Accredited BAM ASSESSOR Code of Conduct.

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

Signature: _  _____

Date: __29th April, 2022__(updated 17th Nov, 2022)_____

BAM Assessor Accreditation no: BAAS 17076____

Document History

Document Id.	Prep. Date	Version	Submitted to:
Stage 1 Biodiversity Certification Assessment Report (BCAR)	28.4.22	1	Complete Planning Solutions
Stage 1 Biodiversity Certification Assessment Report (BCAR)	29.4.22	2	Complete Planning Solutions
Stage 1 Biodiversity Certification Assessment Report (BCAR)	17.11.22	3	Complete Planning Solutions

STAGE 1- BIODIVERSITY ASSESSMENT

1.0 INTRODUCTION

1.1: Overview

PEAK LAND MANAGEMENT has been engaged by Complete Planning Solutions on behalf of Mrs Shearman to prepare a Stage 1 Biodiversity Certification Assessment Report (BCAR) for a proposed rezoning of land & potential 1 into 14 lot residential subdivision over land located at Lot 10 DP 1085485/ 259 Averys Lane, Buchanan.

259 Averys Lane, Buchanan is referred to as "subject site", and proposed building envelope, new boundaries, Asset Protection Zone, and access road where is termed "development site." The subject site is currently zoned RU2 under the provisions of Cessnock Local Environmental Plan 2011.

Lot 10 is referred to as "subject site or subject land", and proposed rezoning developable R2 land is termed "developable area or development site." It is noted the development/ Certification site includes all potential native vegetation impact/clearing area such as roads, Asset Protection Zone, lots, etc. Areas off the development site are not assessed and do not form part of the BCAR as they are unaffected by any rezoning impact or works.

The subject site is zoned RU2 Rural Landscape under Cessnock LEP 2011. Part of the RU2 land is proposed for rezoning to R2 land.

The purpose of this assessment is to apply the NSW Biodiversity Assessment Method (BAM 2020) to the proposed subdivision development site in accordance with the *Biodiversity Conservation Act 2016* (BC Act), and provide the proponent with a Biodiversity Certification Assessment Report (BCAR). The BCAR is to be submitted to Cessnock City Council /NSW Department of Planning & Environment (DPE) as the approval/consent authority, as part of a Part 3 Rezoning Application.

A Stage 1 BCAR report is required as the proposed development area (including proposed subdivision boundary) is over an area mapped under the Biodiversity Values Map (BV Map) (Fig 17), and a Stage 1 BCAR is required as advised by NSW Department of Planning (DP).

Request for further information (NSW DPE):

NSW Department of Planning and Environment (DPE- 30th March, 2022) advise:

The Biodiversity and Conservation Division (BCD) considers that the proposal could proceed, however; there are matters that warrant further consideration. BCDs recommendations are provided in Attachment A and detailed comments are provided in Attachment B. If you require any further information regarding this matter, please contact Sarah Warner, Senior Conservation Planning Officer, on 4904 2748 or via email at huntercentralcoast@environment.nsw.gov.au.

BCD's detailed comments
Planning Proposal – 259 Averys Lane, Buchanan

1. *SAII assessment is required for regent honeyeater and swift parrot. The SAII assessment for regent honeyeater and swift parrot 'important areas' should consider the following matters:*
    a. *Condition/age of feed trees including occurrence and quality of the favoured blossom feed trees outlined in the Swift Parrot and Regent Honeyeater Recovery Plans*
    b. *Diversity of Eucalypt species present*
    c. *Occurrence and quality of favoured lerp trees and mistletoe*
    d. *Occurrence of competitor species (e.g. rainbow lorikeets, noisy miners, red wattlebirds, noisy friarbirds etc.)*
    e. *Connection to other habitat areas and fragmentation*
    f. *Availability of water to the site*
    g. *Landscape productivity (soil types/fertility, slope)*
    h. *Any evidence of site fidelity (i.e. preference to use the site)*
    i. *Cumulative impacts where known.*

2. *Biodiversity assessment is required*

The Planning Proposal will affect mapped 'biodiversity value' land. Should the Planning Proposal proceed, development on the site is likely to trigger a Biodiversity Development Assessment Report (BDAR) under the BC Act. The BDAR would need be assessed in accordance with the BAM and include seasonal surveys in accordance with the Threatened Biodiversity Data Collection (TBDC).

Ministerial Direction 1.4 aims to ensure that local environmental plan (LEP) provisions encourage the efficient and appropriate assessment of development, given this it is recommended that these biodiversity planning provisions be considered early in the process. It is recommended that Stage 1 BAM assessment and TBDC survey requirements be considered early in the planning process to avoid delays at the development application stage.

3. *It is recommended that waterfront land be zoned conservation.*

This has been addressed.

Request for further information (Cessnock City Council):

Cessnock City Council requested:

I have reviewed the information you provided in the revised report. I am just hoping to get some more detailed information, specifically in relation to the Regent Honeyeater.

I note that the subject site is in very close proximity to the known key breeding area in the Hunter Valley (Figure 1 of the National Recovery Plan for the Regent Honeyeater, Department of Environment, 2016). I would like to see this considered as part of the Serious and Irreversible Impact (SAII) assessment. Also if the site does only provide marginal foraging habitat for the

species, will the proposed rezoning, intensification of land use and long term edge effects impact that foraging habitat and more importantly the use of the adjoining water source. And lastly, the NSW Bionet Report attached to the Biodiversity Certification Assessment Report (BCAR) states that 23 records of the species can be found within a 10km radius of the subject site. With a global population estimated to be no more than 300 individuals, this constitutes almost 8% of the remaining population. I believe this too should be considered as part of the SAII assessment.

Given that the Minister for the Environment will confer biodiversity certification, it is important that matters such as this are addressed in the formal consultation with Council.

Rachael Brown Ecologist, Development Services
62-78 Vincent St | PO Box 152 | Cessnock NSW 2325

These comments arise from the NSW DPE assessment of the project (24th Oct, 2022) noting that "*Further assessment should be undertaken on impacts to potential SAII species if Council considers the development to be a SAII*".

This has been further addressed in Section 6.2 of this BCAR.

Note Stage 1 (BAM 2020) includes Biodiversity Assessment including Prescribed Impacts and Serious and Irreversible impact assessment (SAII) only, and not Stage 2 Impact assessment/offset credits, etc (which are shown in Appendix 7 nevertheless). The Stage 1 BCAR will be undertaken according to the Biodiversity Assessment Method 2020 (BAM). The BCAR also considers potential impacts to Matters of Environmental Significance in accordance with the *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

The report is prepared in reference to the Biodiversity Assessment Method Operational Manual-Stage 1, and documents Stage 1 & and part Stage 2 (only Prescribed & SAII where relevant as Stage 1 assessment only at this stage) including Serious and Irreversible impacts assessment of the BAM, required for a BCAR project under the *Biodiversity Conservation Act 2016* (BC Act), and *Biodiversity Regulations 2017*.

It is noted that 5 Part Tests are not required under the BAM.

1.2 Project Background and subject site

Complete Planning advise:

"Potential Yield

The information required relies on the potential yield for the proposed planning controls.

A draft subdivision plan has been created to demonstrate the potential yield of the rezoned area. The proposed rezoned land area is approximately 13,800m$^{2.}$ The road reserve area of approximately 5,647m^2. Resulting in a developable land area of approximately 8,153m^2.

Cessnock City Council's minimum lot size for R2 Low Density Residential Zone is 450m^2. With a developable land area of 8,153m^2, 18 lots could be accommodated. However, given the environmental constraints such as bush fire and Council's DCP requirements the conclusions of the draft subdivision being a potential yield of 14 lots is considered to be more practical. Biodiversity considerations will further reduce the potential yield. The updated biodiversity assessment report details the current situation in relation to biodiversity land.

The proposed lot sizes will allow for a variety of housing stock, including single dwellings, secondary dwellings and dual occupancy developments.

The draft subdivision plan utilises the upgrade and extension of Averys Lane which is to be constructed as Stage 1 of Buchanan Ridge Estate located to the west of the subject site. The Developer, Hunter Lands, of Buchanan Ridge (adjacent urban release area) have advised that construction of Averys Lane is expected within 12 months. A perimeter road will be constructed, to assist with providing an asset protection zone (APZ) for bush fire purposes.

Adjacent Urban Release Area

According to Hunter Land the first stage of Buchanan Ridge is expected to start construction in the near future with delivery of the first stage in 9 to 12 months. Once stage 1 is completed services such as sewer, water and electricity will be made available to any proposed development upon Lot 10.

Water delivery to the adjacent urban release area, Buchanan Ridge, has been identified by Hunter Water as effectively an extension of the Averys Village Residential Development. Hunter Water have acknowledged that there is sufficient bulk capacity within the water supply system to supply Buchanan Ridge. Hunter Water have also provided advice that there is sufficient capacity in the Kurri Waste Water Treatment Works to accommodate Buchanan Ridge.

Buchanan Ridge is a 173 Lot subdivision. The maximum lot yield for Lot 10 is 14 lots. It is understood that Hunter Water would have the capacity to service the water and sewer requirements of any future development of Lot 10.

The extension of Averys Lane will be constructed within stage 1 of Buchanan Ridge and then would be available for use by any proposed subdivision of Lot 10.

Provision for the retention of vegetation has not been taken into consideration with the above calculations.

Lot 1, 3, 5, 7, 9, 11 and 13 will be accessed via Averys Lane which is to be upgraded with the Buchanan Ridge development to occur to the west of the subject site. After speaking to the developer the first stage of Buchanan Ridge is to occur within the next 12 months.

The Proponents have advised that they are only interested in a one (1) into two (2) lot subdivision at this stage and that no additional dwellings will be constructed. However, it is acknowledged that the proposed R2 area has the potential to create 14 residential lots

depending on layout and requirements of any future subdivision with a minimum lot size of 450m2, perimeter road & Asset Protection Zone as shown in the Bush Fire Report prepared by PEAK LAND MANAGEMENT, 2021. Any bushfire implication of future subdivision (other than the one (1) into two (2) lot proposed) would be addressed at that time when the size and scope of any future development are accessed".

Note: - This assessment assumes no retention of any vegetation over the development site, including Biodiversity Values Mapped land over the proposed R2 land (Fig 3a-3c).

The proponent has considered NSW DPE comments regarding conservation land zoning to east of development site (ie waterfront land adjoining Wallis Creek). They are happy to adopt this recommendation and include this land zoning within rezoning proposal. There is scope to consider this environmental land to be utilised as an offset or protected land in the future. This would however require further BAM assessment (Stage 1, 2 & 3) if to be used to generate credits at DA stage for any proposal.

In this case the area of impact proposed for native vegetation removal is 0.7Ha (but 0.3Ha only over Category 2 LLS land which is used throughout this report as the impact area/within BAM Calculator, etc). The proposed subdivision boundary is located over mostly cleared land, with some understorey present over the southern fence line only. No trees with hollows were recorded over the proposed R2 land, or are affected. The total impact area is therefore under the 2Ha threshold, and site is located within an area mapped on the Biodiversity Values Map. It has no significant impact on threatened species or Endangered Ecological Communities. The development does trigger the BOS, and does require a Streamlined Stage 1 BCAR (BCAR).

A Bushfire Report has also been prepared by PEAK LAND MANAGEMENT, dated December, 2021 which recommends a perimeter road, and Asset Protection Zone. This has been approved in principle by Department of Planning and Environment (DPE).

- This BCAR is based upon the site characteristics as inspected on the day, in accordance and consistent with Cessnock City Council advice.
- All area measurements have been made using a Geographic Information System (GIS), from georeferenced Nearmap images, and the site ground truthed, and reference made to the dwelling plan which has accurate measurements.

Figures 1-3 show the subject site map and 1500m buffer zone location map.

1.3 Purpose of this assessment

This BCAR will:

- Address the BAM and the Biodiversity Offsets Scheme.
- Identify how the proponent proposes to avoid and minimise impacts to biodiversity.
- Identify any potential impact that could be characterised as prescribed or serious and irreversible in accordance with the BAM.
- Describe the offset obligations required to compensate for any unavoidable biodiversity impacts resulting from the proposed development (assumes all vegetation cleared over the subject site).

- Describe and assess the significance of potential impacts to Matters of National Environmental Significance (MNES) in accordance with relevant provisions of the EPBC Act.

1.4 Sources of information

Sources of information used in the assessment include relevant databases, spatial data, literature and previous site reports (see literature review). In order to provide a context for the subject land, records of flora and fauna from within 5 kilometres (the 'locality') were collated from the following databases and were reviewed:

- Commonwealth Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- NSW Department of Infrastructure and Environment (DPIE) BioNet Atlas of NSW Wildlife, for species, populations and ecological communities listed under the Biodiversity Conservation Act 2017 (BC Act).
- Plantnet (The Royal Botanic Gardens and Domain Trust).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2021.
- NSW Department of Primary Industry (DPI) Spatial Data Portal.
- SIX maps & nearmap.
- Other sources of biodiversity information relevant to the study area were sourced from:
    - The NSW Plant Community Types, as held within the BioNet Vegetation Classification database (NSW DPIE).
    - Relevant vegetation mapping (LHCCREMS, 2003).

Mapping was conducted using hand-held Garmin handheld GPS 60CSx unit, generally accurate to within 6m depending on canopy cover (reading +/- 6m accuracy at time of survey) to record plots, transects, hollow bearing trees, and threatened species sightings.

Base map data was obtained from nearmap, using the latest most recent photography (3rd Nov, 2021).

The following spatial datasets were utilised during the development of this report:

- Mitchell Landscapes Version 3.0;
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7;
- Directory of Important Wetlands (DIWA);
- NSW Soil and Land Information System (SALIS);
- NSW Soils- eSPADE;
- Australian Groundwater Dependent Ecosystems (BOM);
- Biodiversity Values Map v12.7;
- NSW DPIE Regent Honeyeater & Swift Parrot & Shorebirds Important Areas Mapping.

Mapping has been produced using a Geographic Information System (QGIS). The following maps and data have been produced to support the BCAR:

- Digital aerial photography from nearmap showing 1:1000 resolution or finer.
- Site map as described in the BAM.

- Location Map as described in the BAM.
- Landscape map with features including 1500 metre buffer, as described in the BAM.

1.5 Literature review

A Bush Fire Report has been completed by PEAK LAND MANAGEMENT, December, 2021 for the site rezoning for the DA (Fig 9) . This has been adopted for this report. It assumes all vegetation over the development site including Asset Protection Zone site is approved to be cleared. It is understood DPE & NSW Rural Fire Service have assessed and accepted this.

1.6 Legislative and policy requirements

The project has been assessed against relevant biodiversity legislation and government policy, including:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Planning and Assessment Act 1979*
- *Biodiversity Conservation Act 2016*
- *Fisheries Management Act 1994* - -not applicable
- *Water Management Act 2000*
- *Biosecurity Act 2015*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021*
- *State Environmental Planning Policy (Koala Habitat Protection) 2021*.
- Cessnock City Council DCP- *Flora & Fauna Survey Guidelines*.

Figure 1: Site Map

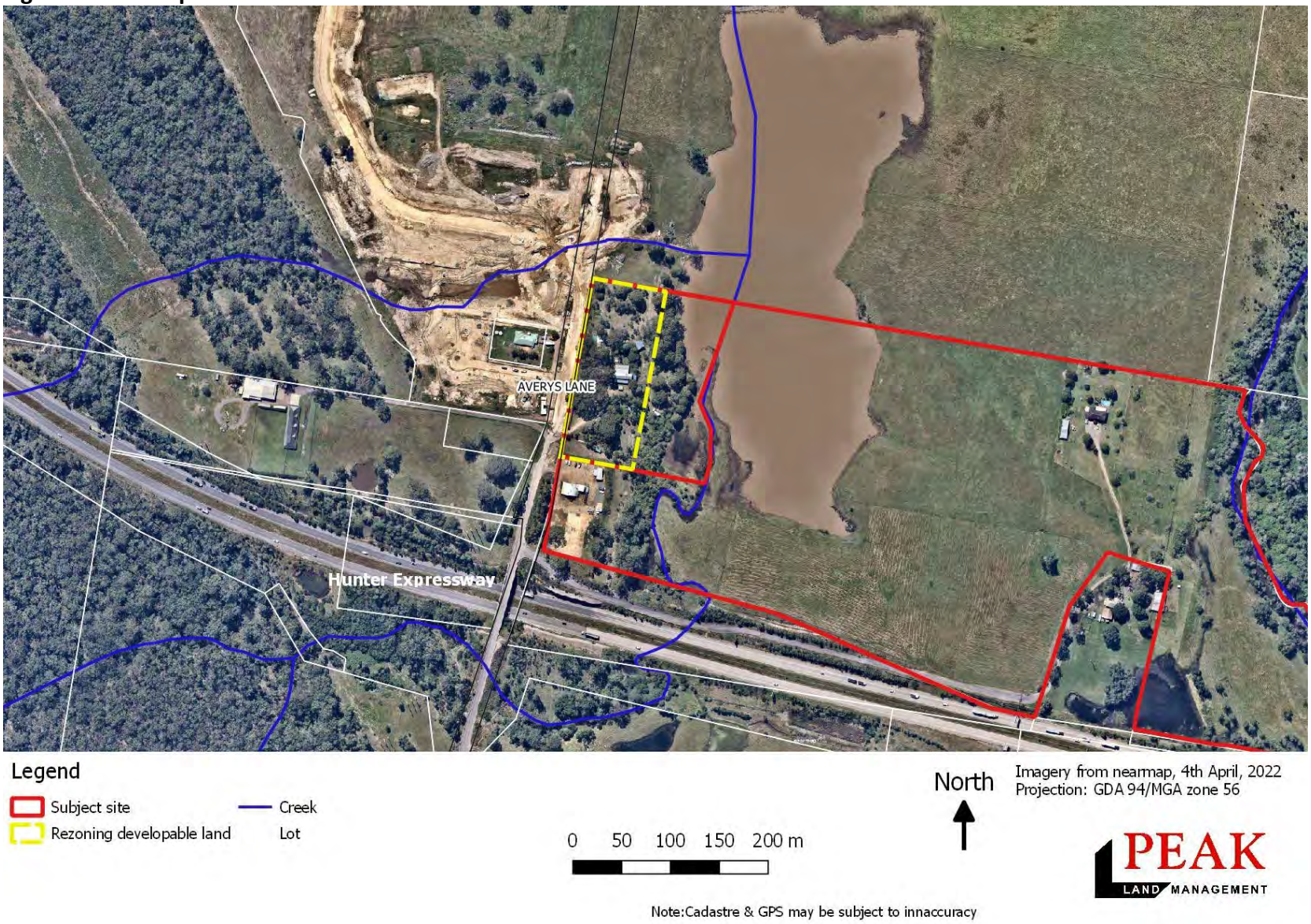


Figure 2: Aerial photo showing subject site, and R2 developable area.

Figure 3a: Site plan (from Complete Planning Solutions, vC dated 25.09.20)

Figure 3b: Site rezoning plan (from Complete Planning Solutions, dated vC dated 25.09.20)

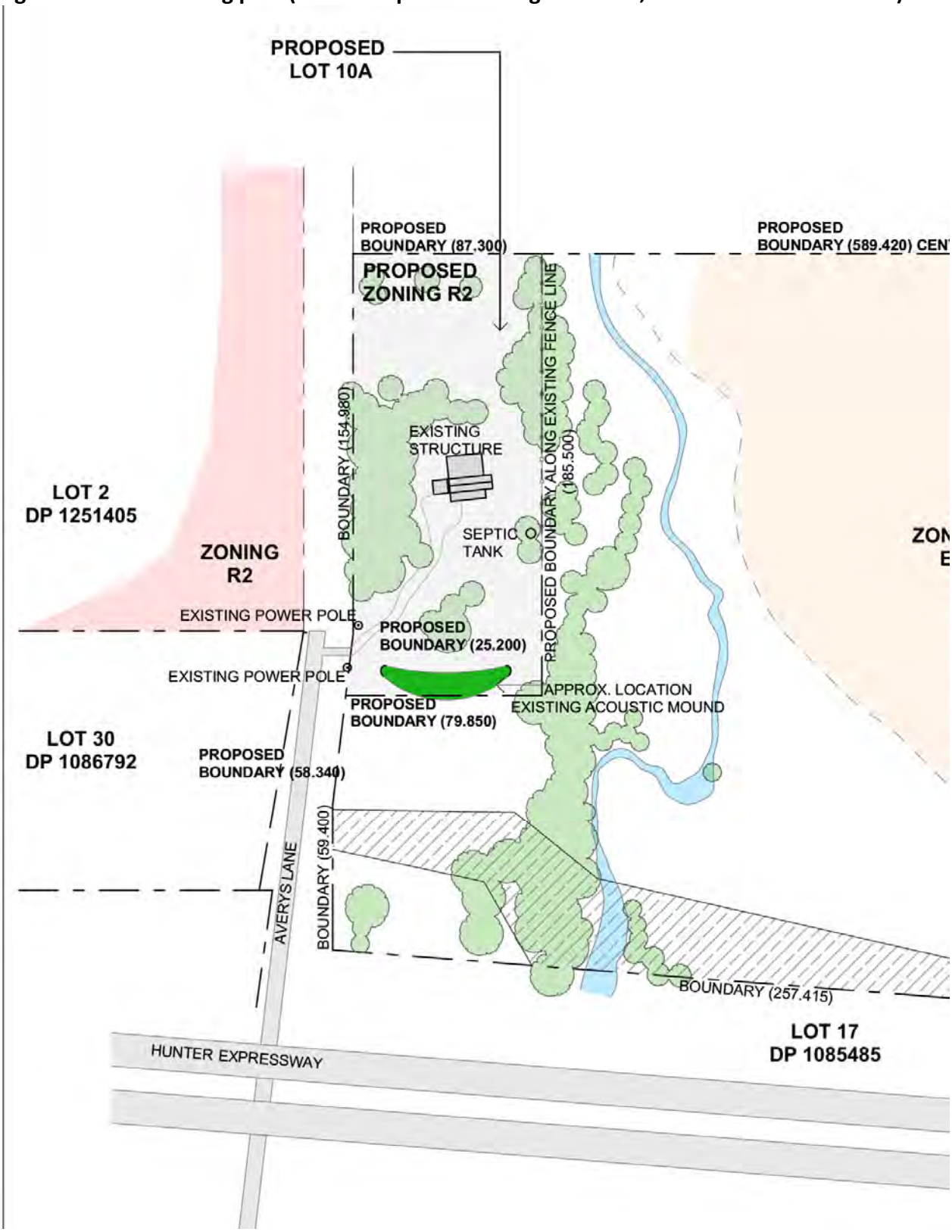


Figure 3c: Potential Subdivision plan (from Complete Planning Solutions, undated)

Figure 3d: Current land zoning (from NSW Government ePlanning, 2022)

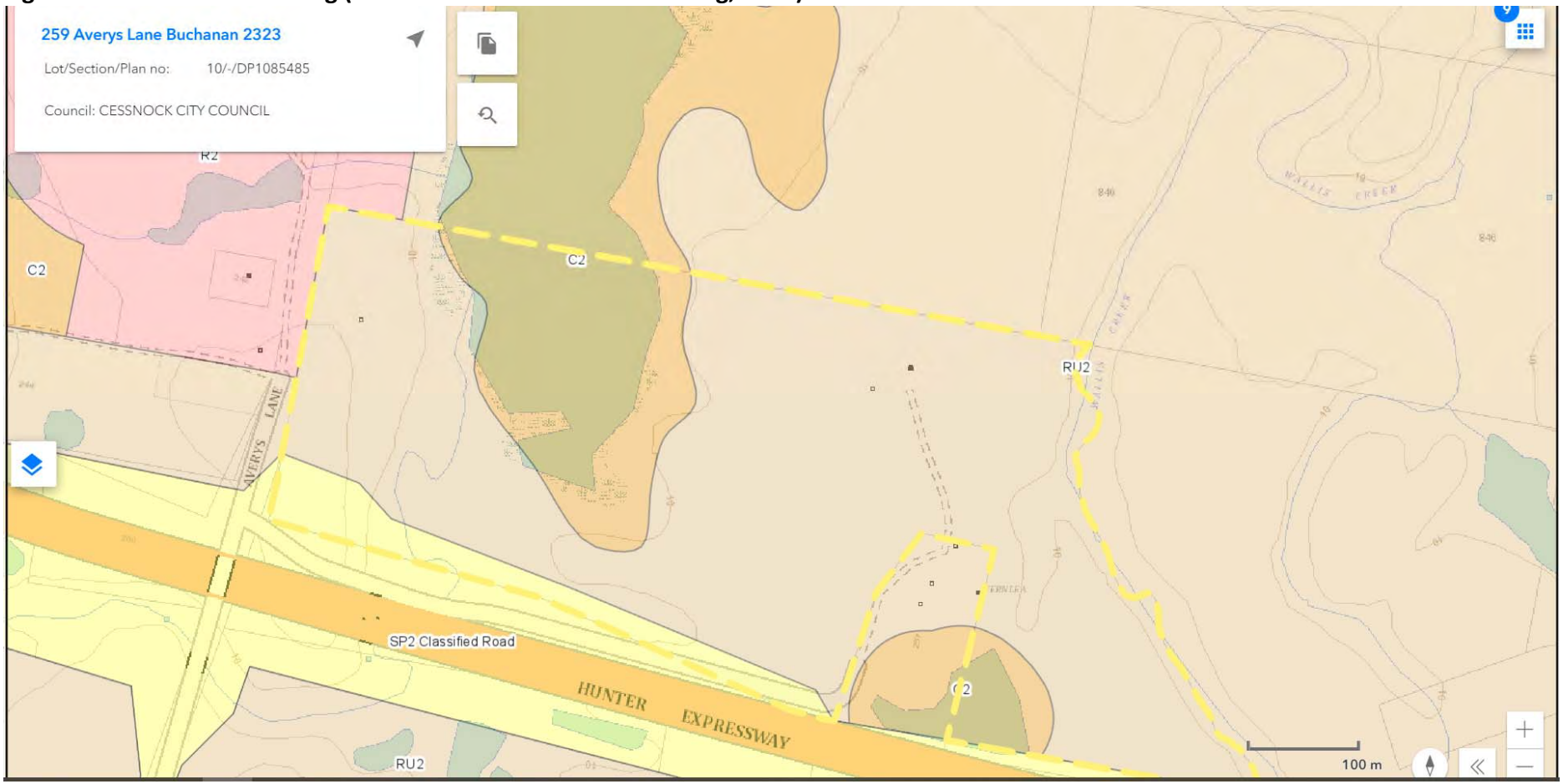


Figure 3e: Original site rezoning plan (from Complete Planning Solutions, dated 21.7.20)

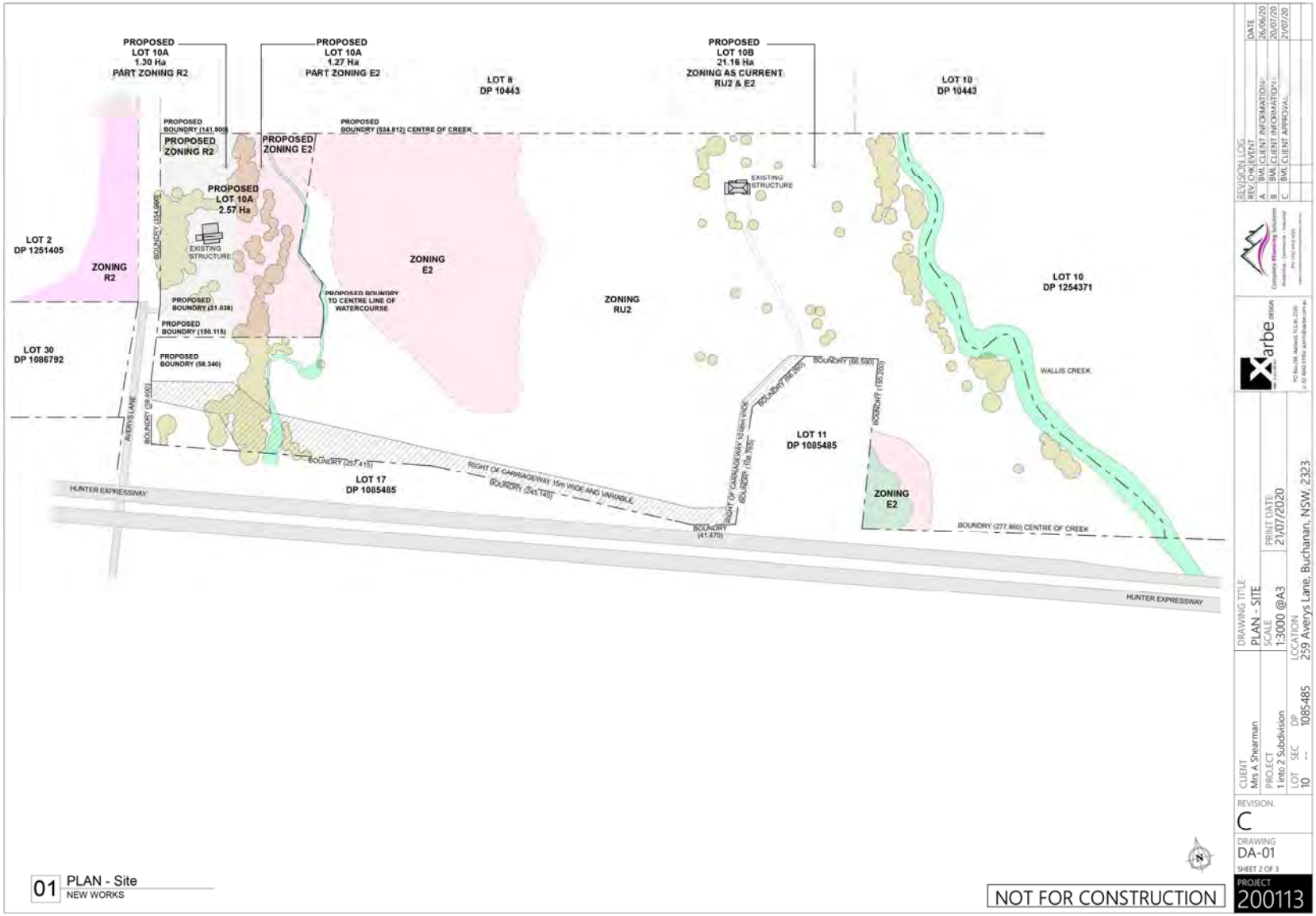


Figure 3f: Original site rezoning plan detailed (from Complete Planning Solutions, dated 21.7.20)

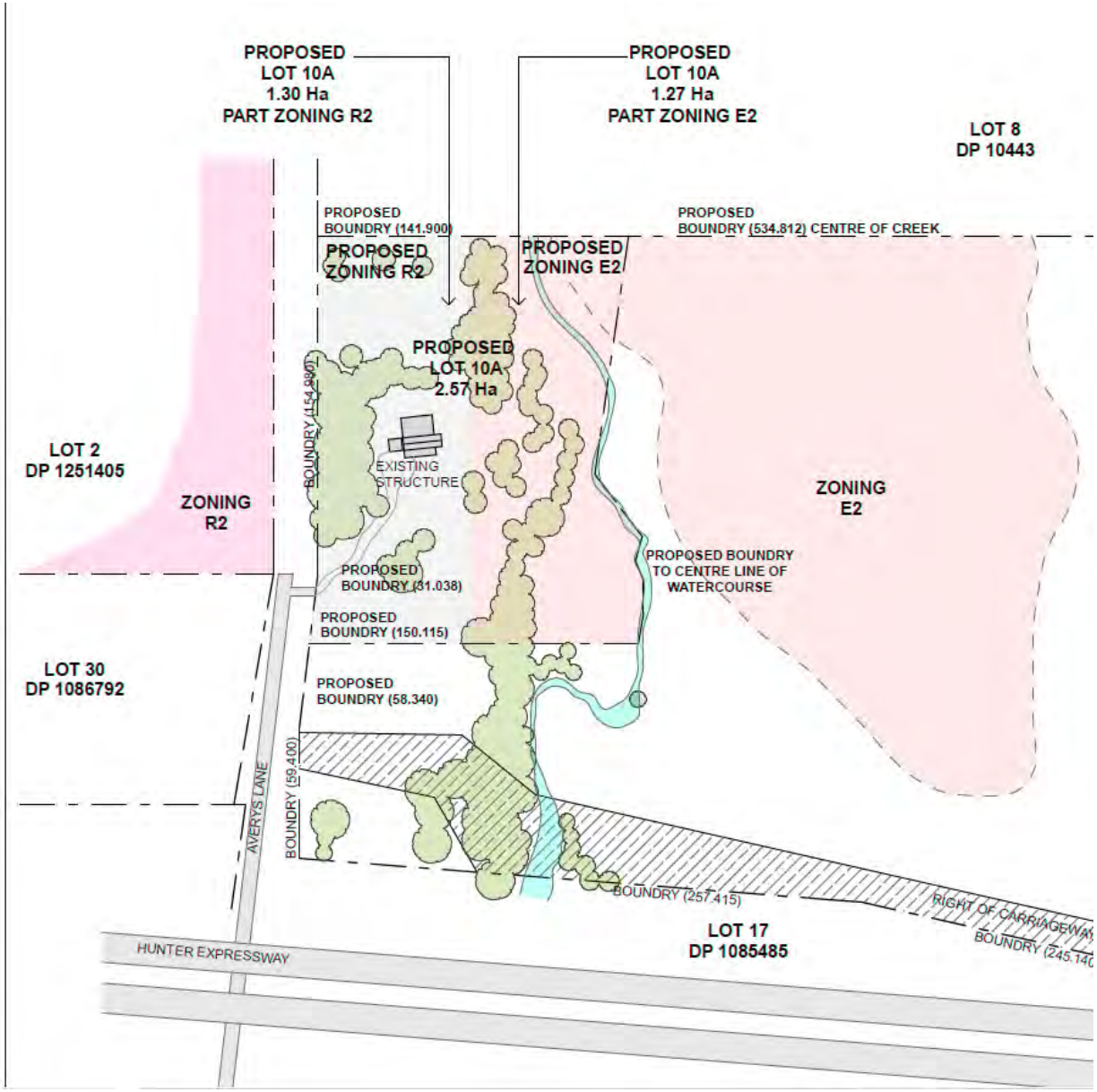


Figure 4: Site Map – IBRA, CMA, Mitchell Landscapes

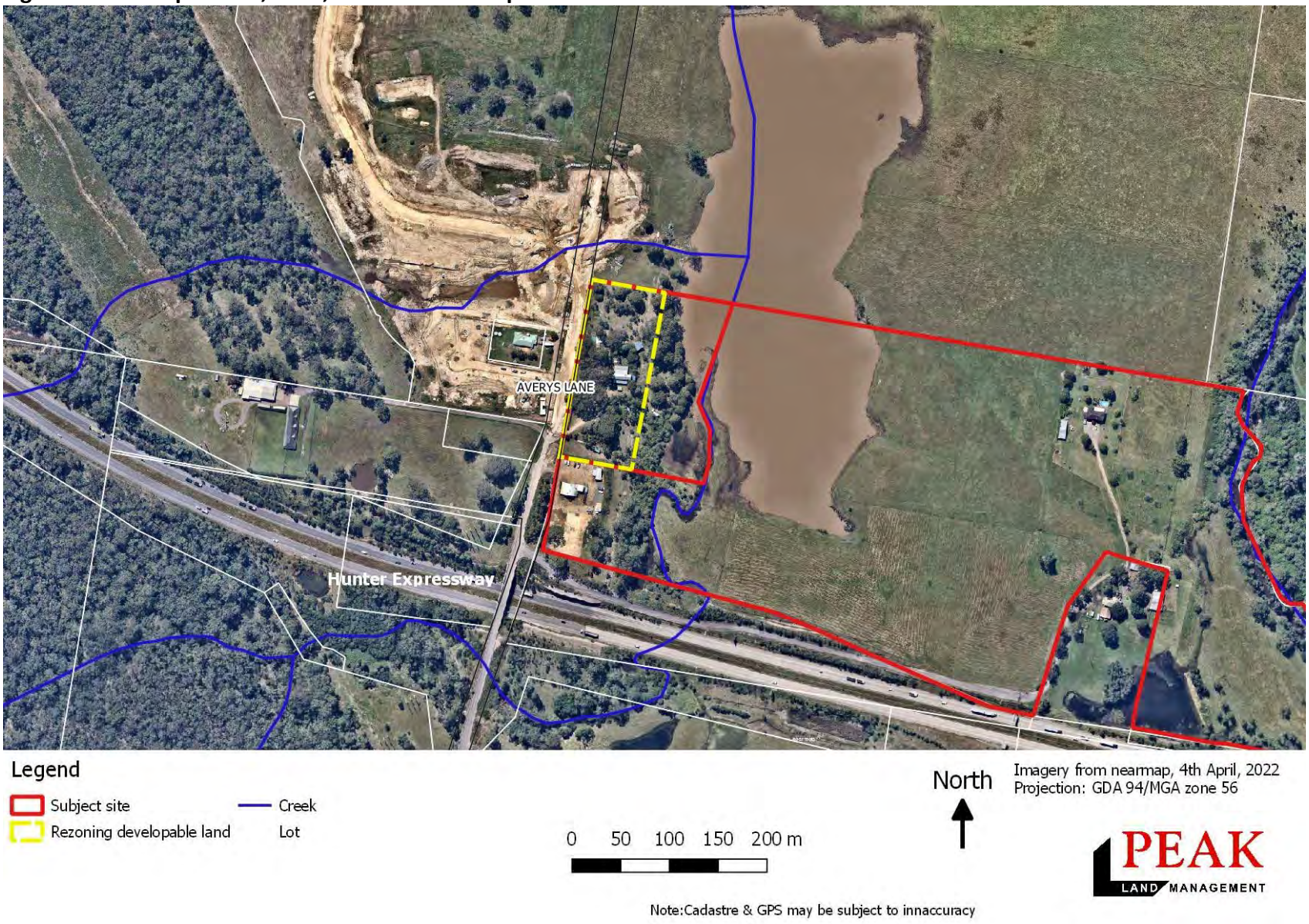


Figure 5: Topographic map showing subject site (imagery from SIX maps, Lands Department)

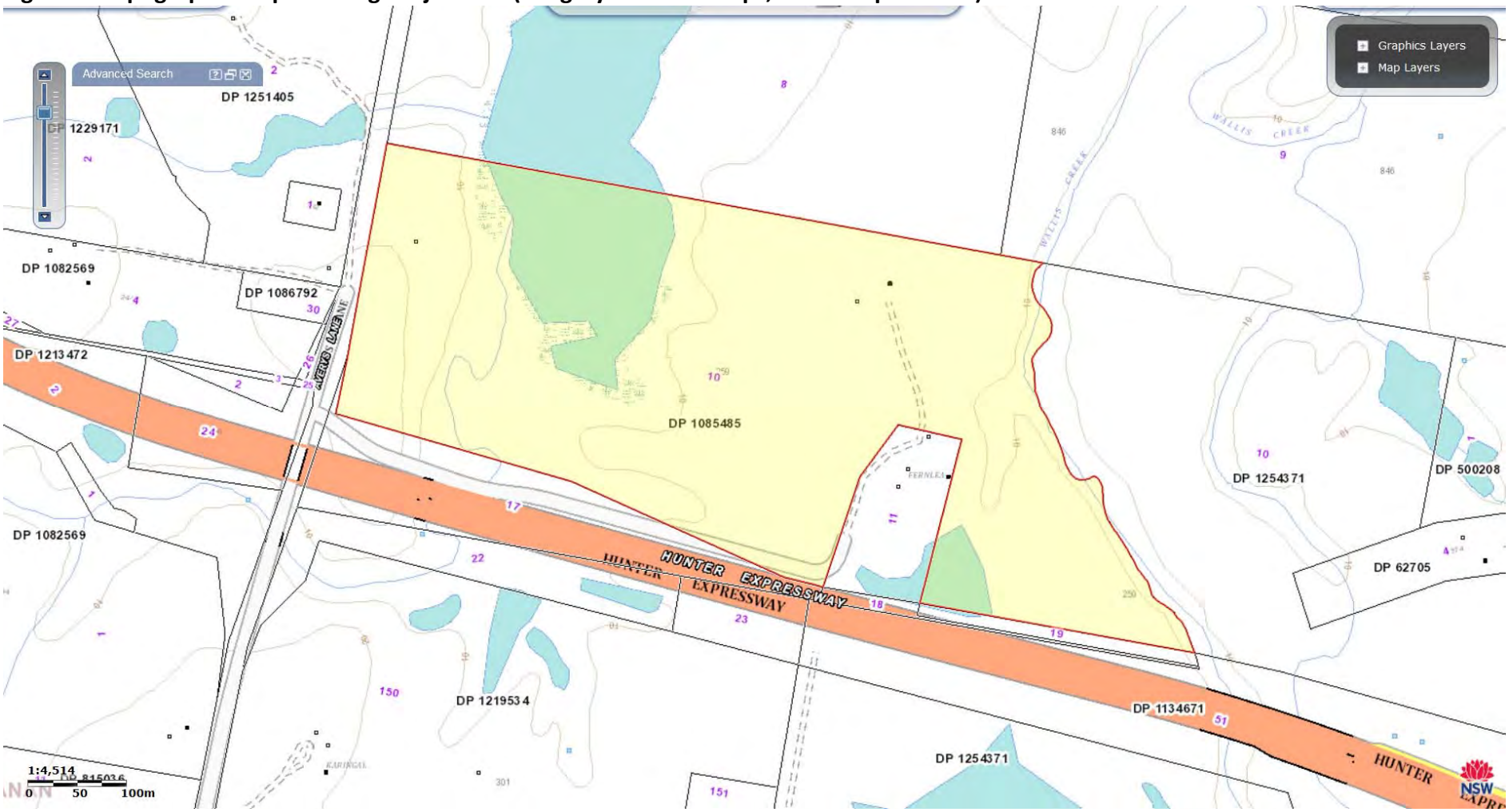


Figure 6: Location Map and 1500m buffer native vegetation cover

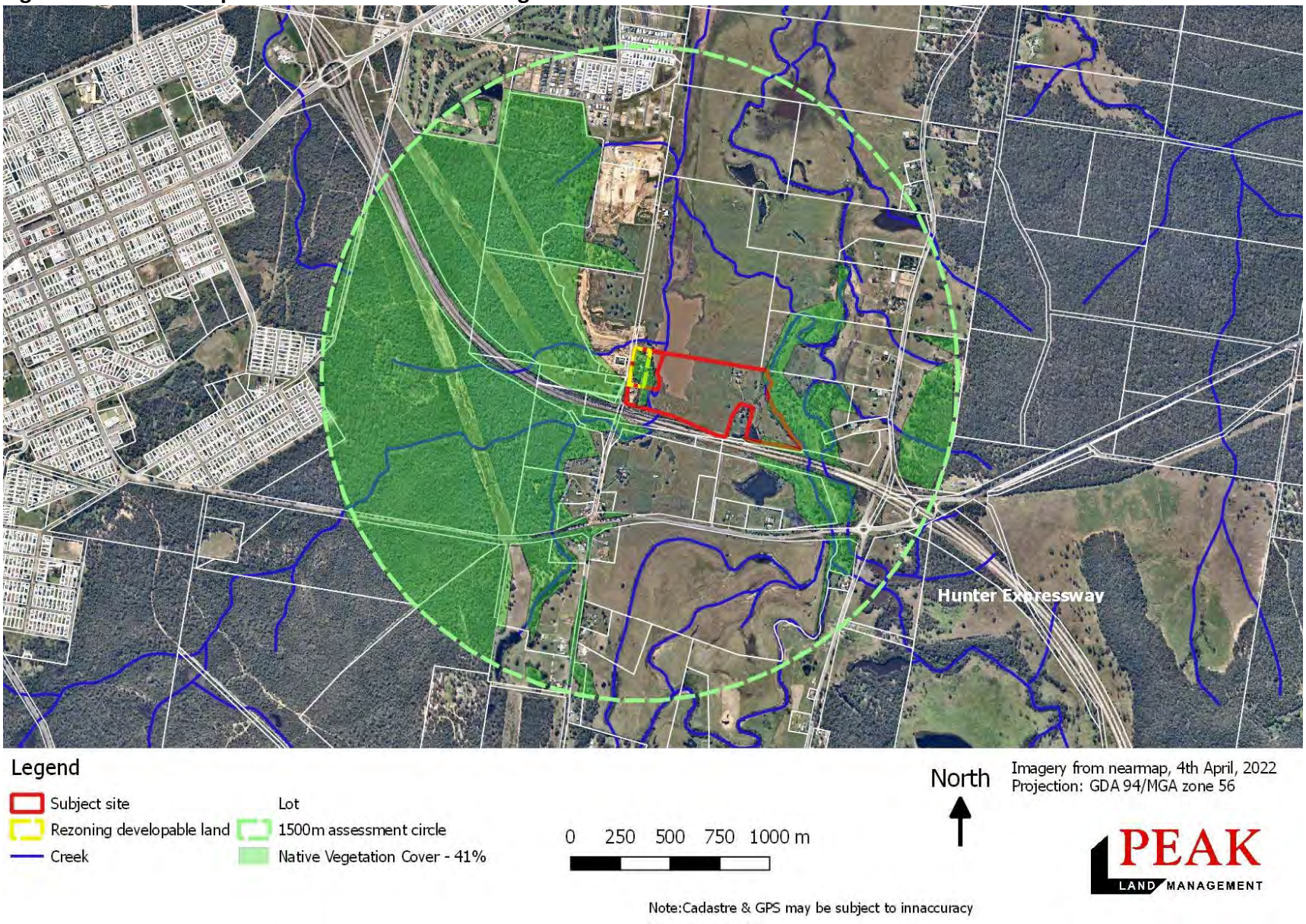


Figure 7: Biodiversity Values map V13

Figure 8: Wildlife/habitat connectivity

Figure 9a: Soils (from Central Eastern NSW Soils/ eSPADE, SEED data portal)

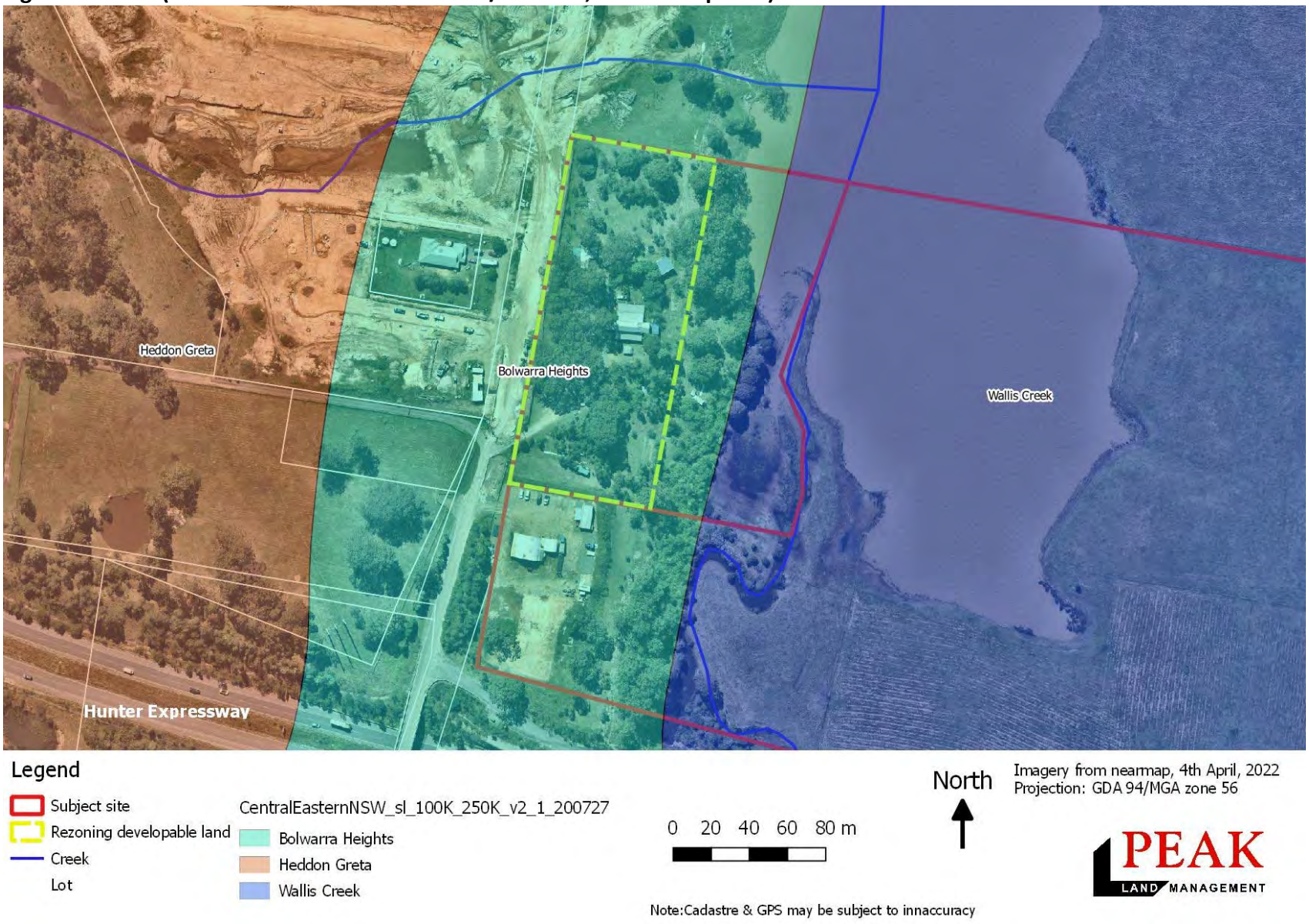


Figure 9b: Acid sulphate soil risk (from Central Eastern NSW Soils)

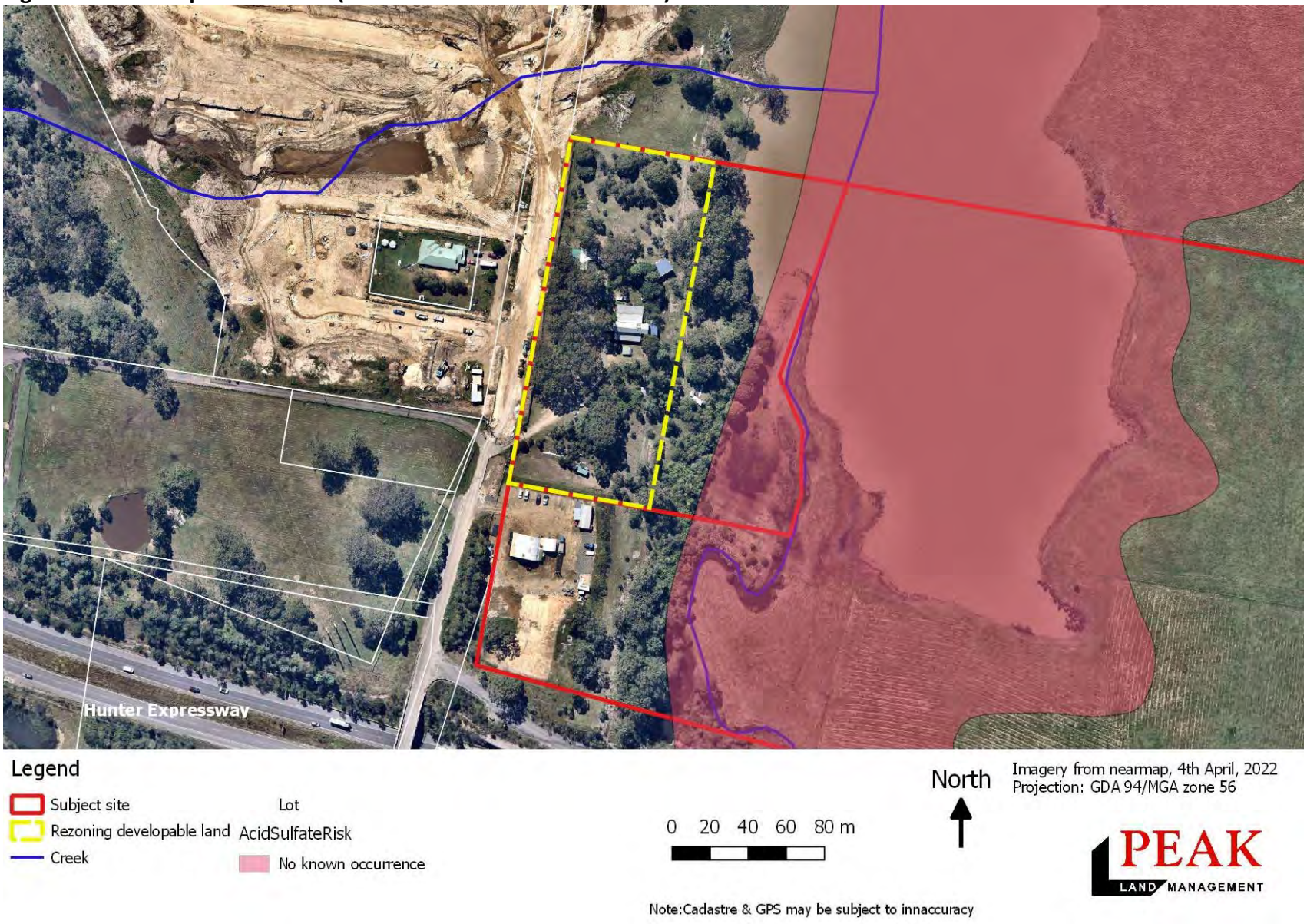
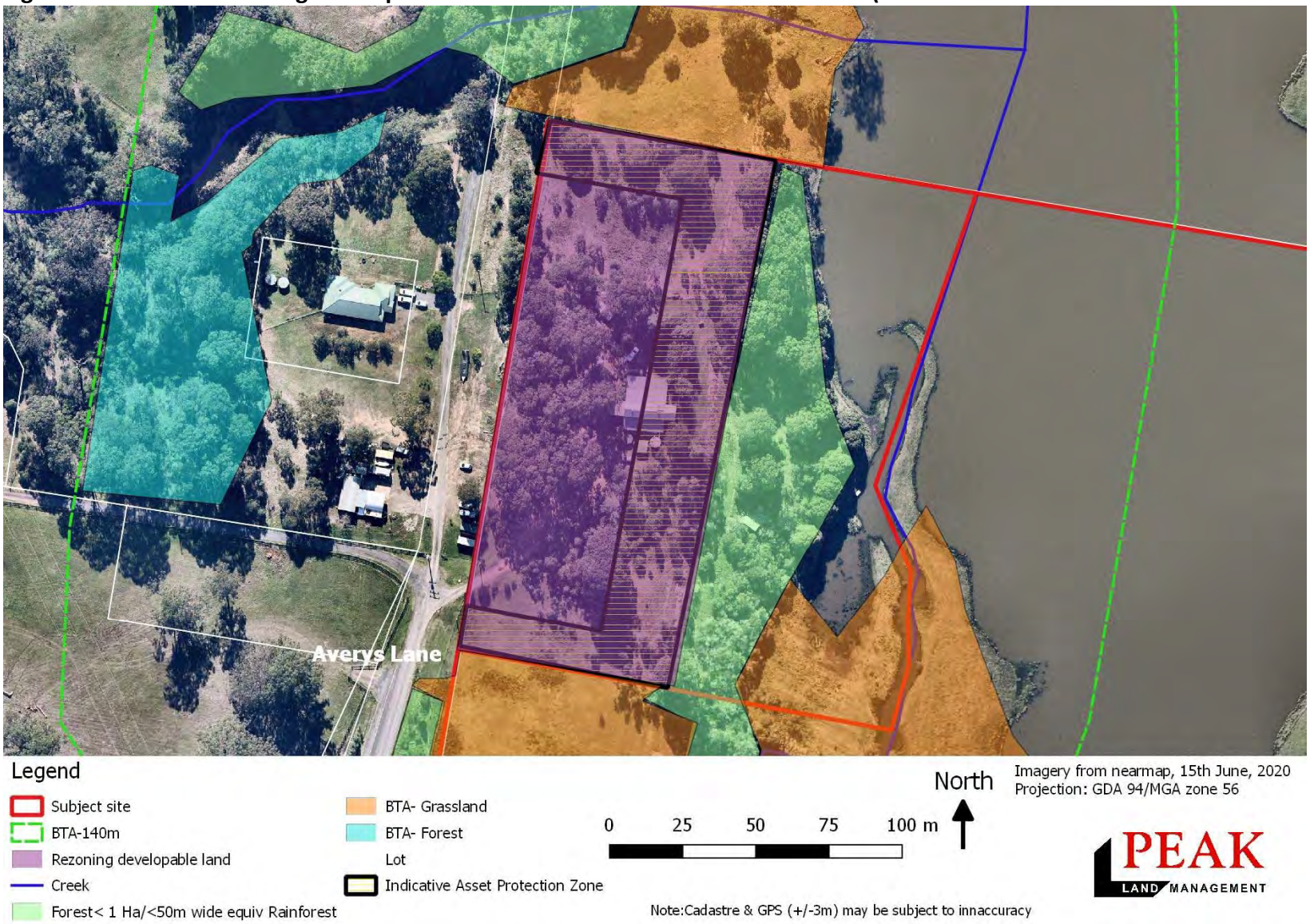


Figure 10: Potential rezoning developable land with Asset Protection Zone shown (from PEAK LAND MANAGEMENT Bush Fire Report, 2021)



2.0 LANDSCAPE FEATURES AND SITE CONTEXT

2.1 IBRA Region

IBRA Region: - Sydney Basin
IBRA Sub Region: - Hunter
CMA: - Hunter
Sub CMA- Hunter- Central Rivers

2.2 Mitchell Landscape

- Lower Hunter Channels and Floodplains.

2.3 Rivers & Streams

The subject land is located within the Hunter Central Rivers Local Land Services Region and the Hunter catchment.

There are mapped creek lines over the subject site, but not over the development site. Wallis Creek flows through the property. The proposed Environmental Zone subdivision boundary is located over the middle of Wallis Creek, and may affect the creek directly. Recommendations are made to avoid any impacts.

2.4 Important and Local Wetlands

There are no listed DIWA nationally important Wetlands within the 1500m buffer.

No local wetlands or dams occur over the subject development site. A local wetland (Wallis Creek) occurs over the subject site, adjacent to the proposed development site. It is unaffected by the proposal directly.

2.5 Habitat connectivity

Habitats within the study area are primarily those associated with dry sclerophyll forests. The subject site is part vegetated, consisting of patchy fragmented areas of forest, with limited connectivity off site to the west and north, although cleared land to the north being grazed farmland.

Native vegetation occurs over part of the site and surrounds, but is limited to predominantly tree cover with most understorey removed/grazed. There is some understorey along parts of a steep bank adjoining Wallis Creek floodplain. There are patches of remnant vegetation over the subject site, including off site to the south (but freeway stops all connectivity further south), and north, and west. Connectivity is fragmented to these remnants, with grazed cleared areas and roads/dwellings/dogs present. The proposal is not anticipated to affect terrestrial wildlife corridor connectivity.

Figure 5 shows the mapped wildlife connectivity.

Vegetation is recommended to be retained along the eastern side of the site (Environmental Zone) adjoining the wetland, also acting as a riparian zone.

2.6 Areas of geological significance

There were no recorded karst, caves, crevices & cliffs or other areas of geological significance within the subject land.

2.7 Soils and soil hazard features (clearing projects only)

Soils occur on the property as a result of parent material, geology, slope, landscape position, landuse, aspect, time, and to a lesser degree vegetation and climate. The soil landscapes have been mapped for this area by espade Eastern NSW Soil Landscape mapping /Murphy & Tille, 1993 (Fig 8a). Soil landscapes are mapped using a combination of slope, soil type, and terrain to give a broad picture of major soil groups occurring over the landscape. The soil landscape mapped over the site is:

- Bolwarra Heights (Bh): Landscape- rolling hills on Permian sediments. Moderately deep Yellow & Red & Brown Podzolics with some moderately deep lithosols on crests, and moderately deep yellow soloths on lower slopes. Water erosion hazard, seasonal waterlogging, localised steep slopes with mass movement hazard.

There are no mapped Acid Sulphate Soils, with no known occurrence mapped to east off the development site (Fig 8b).

2.8 Any other landscape features

Land slopes towards Wallis Creek floodplain, with a steep bank present, particularly towards the south of the site, off the development site. Land is gently undulating over the development site, with no other features.

2.9 Areas of outstanding biodiversity values identified under the BC Act

None identified as per register of outstanding biodiversity values identified under the BC Act.

3.0 NATIVE VEGETATION, TEC'S AND VEGETATION INTEGRITY

3.1 Assess native vegetation cover within 1500m

Vegetation within the study area and within the 1500 metre buffer area was assessed using aerial photographic interpretation, field survey results and existing vegetation mapping.

In this case native vegetation cover within the 1500m buffer zone was measured at 41% (Fig 6).

3.2 Identifying native plant communities over the subject site

3.2.1 Methodology and limitations

Regional vegetation mapping (Lower Hunter Central Coast Regional Environment Management Strategy (LHCCREMS, 2003), Greater Hunter Vegetation mapping v4, database searches (See Section 1.3) & literature reviews were reviewed to inform the site investigations. Based on the results of the background review and the requirements of the BAM with respect to this BCAR, appropriate surveys were designed for the development site.

All flora, diurnal one day fauna survey, and fauna habitat assessment field work was undertaken by Ted Smith, Ecologist, PEAK LAND MANAGEMENT (see Table 1).

This was undertaken in conformance with NSW DPIE & Cessnock City Council Flora & Fauna Survey Guidelines. No hollow bearing habitat trees are to be removed from the development site. A full fauna survey involving trapping, spotlighting, owl and bat call detection, etc was not undertaken in this case, and is not required under the BAM for a streamlined assessment.

The author is familiar with flora & fauna in this locality, having conducted surveys over this locality and surrounds over many years (see author experience Appendix 1). This site has been surveyed previously for flora & fauna, with an additional flora & fauna survey was conducted for this BCAR.

The survey BAM Plot design was based upon the constraints of the subject site, being part cleared, with plots based over native vegetation. All vegetation was considered the same PCT. One plot was measured as natural vegetation was a similar structure and level of disturbance and same PCT over the entire site (ie all one PCT zone), in accordance with the BAM 2020 requirements.

The field survey collected plant species, ecological community, and habitat information. Vegetation was assessed by use of BAM plots and further meander/parallel transects in accordance with the BAM, and NSW DPIE, 2020 threatened flora species guidelines, and Cessnock City Council Flora & Fauna Survey Guidelines. The survey also targeted threatened species identified in the BAM Calculator as credit species, and to verify vegetation zones. A flora survey occurred as shown in Table 1.

All transects, and any hollow bearing trees or threatened species were recorded by a Garmin handheld GPS 60CSx unit, generally accurate to within 6m depending on canopy cover (reading +/- 6m accuracy at time of survey).

Detailed surveys included the completion of the requisite number of vegetation integrity survey plots within each broad condition state of each mapped PCT in accordance with the BAM. The locations of the surveyed plot is shown in Figure 7. Areas of native vegetation for which a PCT could validly be assigned were identified and delineated in the field, and their condition determined. Identification of PCTs within the subject land was confirmed with reference to the community profile descriptors, and diagnostic species tests held within the NSW BioNet Vegetation Classification database, OEH 2017b, and in reference to LHCCREMS, 2003 Vegetation mapping.

Special attention was paid to any potential threatened species. This has enabled identification and assessment of most species on the site. The survey is limited by:

- Non flowering of cryptic orchid/grass/sedge species at time of survey as described above making identification impossible/problematic.

To help overcome these limitations surveys are carried out where feasible during known flowering seasons (as stated within the BAM Calculator) , and if this cannot occur and habitat requirements are suitable for a species to be present, then an additional targeted survey will be recommended if impact is expected, or presence assumed (which has not occurred here).

Any plants that were not readily identifiable in the field were sampled and analysed in the office. Potential threatened species are sent to NSW Herbarium for identification /ratification, and NSW DPIE informed of locations for recording on the NSW Bionet database as per NPWS scientific licence requirements. This was not required in this instance.

All field work for this current flora & fauna survey was undertaken by Ted Smith, Ecologist, PEAK LAND MANAGEMENT, as shown in Table 1.

Table 1: Flora & fauna survey effort

Type of survey	Survey dates	Weather conditions	Survey outline	Survey Effort
Flora	27th July, 2020 3pm-5pm	20^{0}C, clear low wind.	Systematic flora survey and targeted threatened species surveys over site including transects, and meander transect over surrounds.	2hrs
BAM Plot/Flora transect	26th April, 2022	25^{0}C, light SE wind, cloudy, no rain, high humidity.	Systematic flora survey and targeted threatened species surveys over site (BAM Plot) including transects, and meander transect over surrounds.	2hrs
Diurnal fauna	27th July, 2020 3pm-5pm	20^{0}C, clear low wind.	Opportunistic and targeted searches for fauna, for amphibians, birds, mammals, and reptiles. Searches included auditory and	2hrs

Type of survey	Survey dates	Weather conditions	Survey outline	Survey Effort
			visual surveys, using binoculars and searches for scat, tracks, hollows and nests/feathers/owl regurgitation pellets, quiet periods to listen, turning over rocks/ground shelter.	
Diurnal fauna	26th April, 2022	25^{0}C, light SE wind, cloudy, no rain, high humidity.	Opportunistic and targeted searches for fauna, for amphibians, birds, mammals, and reptiles. Searches included auditory and visual surveys, using binoculars and searches for scat, tracks, hollows and nests/feathers/owl regurgitation pellets, quiet periods to listen, turning over rocks/ground shelter.	2hrs

3.2.2 Field survey results

A flora species list of all plants recorded during survey and over the BAM plot is shown in Appendix 3. Raw BAM Plot field sheet data is shown in Appendix 2. More information presented in Section 4.6 of this BCAR.

In summary:-

- 113 flora species were recorded on the site (Appendix 1), comprising 59 native flora species, no threatened species, and 54 weed species including 6 declared priority weeds.
- The site has low flora biodiversity, with one native vegetation community present over the development site being *Forest Red Gum grassy open forest on floodplains of the lower Hunter* (PCT 1598) which is equivalent to *Hunter Lowland Redgum Forest* Endangered Ecological Community.
- Site is slashed and grazed regularly with horses, but retains part native tree overstorey & understorey where mapped in Fig 11.
- Some tree planting of exotic, and non-endemic and endemic native species has occurred around the house.
- High weed presence including dense lantana in parts.

The LHCCREMS map (Fig 12) is considered somewhat inaccurate in this case, as is the Greater Hunter Vegetation mapping v4 which maps the site as no vegetation and is incorrect (Fig 13). A more accurate map has been prepared by PEAK LAND MANAGEMENT (Fig. 11).

Figure 11 provides a map of the native vegetation extent recorded within the subject land. The figure includes all areas of native vegetation (native ground cover and areas with native tree canopy). Areas not shown as native vegetation cover within Figure 11 (clear) are not included for further assessment in accordance with the BAM, 2020.

Note: OEH 2018 (from BOSET user guide) define cleared land as:

"*Cleared land is land on which the native over storey has been cleared, there is no native mid-storey (or has been cleared), and less than 50% of the ground cover vegetation is indigenous species or greater than 90% of the ground cover (dead or alive) is cleared*."

Therefore the majority of the development site is assessed as native (which includes Couch) as >50 % native ground cover. Couch is not listed as a native species within the Endangered Ecological Community scientific description however, and is likely a planted native species in this case.

Table 1 provides a list of Plant Community Types (PCTs) identified over the subject land.

Those areas shown as LLS Act Category 2 land (Fig 15) have trees & vegetation that predate 1990 (Fig 16- historic 1993 aerial image), and these areas only are assessed within the BOS (Category 1 land is exempt).

All areas of native vegetation over the development site however are assessed within this report as per Cessnock City Council Flora & Fauna Survey Guidelines.

Table 2 provides a list of Plant Community Types (PCT's) and zones identified over the subject land.

Table 2: Plant community type (PCT) over subject development site and details (from Bionet Vegetation Classification, 2021)

PCT 1598- Forest Red Gum grassy open forest on floodplains of the lower Hunter	
Vegetation formation	Forested Wetlands
Vegetation Class	Coastal Floodplain Wetlands
Area within subject site	0.74Ha
Area to be retained	0Ha
Area within development site & assessed within BCAR to be removed	0.74Ha
LLS Category 2 land assessed for removal	0.3Ha
Condition	Generally Moderate to Good as tree cover remaining, but very little native understorey remaining apart from Couch.
Vegetation Zones	Mod-Good condition – 0.74Ha (Plot 1 & 2), ascribed to one zone. 0.3Ha clearing over Cat 2 Land used in BAM calculator.
Description	Forest Red Gum grassy open forest on floodplains of the lower Hunter. Characterised over the development site in moderate to good condition areas by a canopy of *Eucalyptus tereticornis* with sparse mainly cleared mid & shrub storey, with few native understorey species present, but high cover being mainly Couch. Exotic understorey in parts with species such as Kikuyu

	and other annual and perennial exotic weeds including Lantana, and Fireweed, all high threat exotic weeds.
Survey effort	Two BAM plots over PCT, same/one zone over site (Fig 14), and transect elsewhere.
PCT justification	Best fit - Fitted the same Mitchell landscape, and IBRA region & subregion, same or similar diagnostic canopy (Forest Redgum) and understorey species, same landscape and soils description as the Bionet PCT description. Did not occur over the floodplain, but close to it, over sandstone & shallow soils. Other PCT's/vegetation communities which are located nearby include Lower Hunter Spotted Gum Ironbark Forest and Kurri Kurri Swamp Woodland, with neither community considered present over the site due to lack of dominant Spotted Gum, Ironbark or Parramatta Redgum canopy trees, and associated diagnostic understorey species.
TEC status	EPBC- not listed NSW BC Act – *Hunter Lowland Redgum Forest* EEC
% Cleared (from Bionet Veg. Class.)	48% (from Bionet VIS)

3.2.3 Threatened Ecological Communities (TEC's)

PCT 1598- F*orest Red Gum grassy open forest on floodplains of the lower Hunter* within the subject land is consistent with *Hunter Lowland Redgum Forest* Endangered Ecological Community (TECs) listed under the NSW BC Act, and is not equivalent to any Federal EPBC Act listed TEC.

3.3 Vegetation integrity assessment

3.3.1 Vegetation Zones

PCTs within the development site were stratified, based on broad condition state. This resulted in one vegetation zone within the development site, ascribed to one PCT (Table 2).

Vegetation Zone 1 has a mix of remnant and regrowth canopy trees, some historically past cleared no/little mid or shrub storey, and is slashed and/or grazed. It maintains native understorey cover generally >50%.

It was considered mapping part cleared areas as a different vegetation zone, however the second plot which was for this purpose still had a high site score, and it was therefore considered all the one vegetation zone.

Note: cleared land with planted derived native vegetation (or on NSW DPIE widely cultivated native plant species list) and/or land <50% native ground cover with no native tree cover is shown as clear/not mapped within Figure 3, and has not been assigned a vegetation zone.

Table 3: Vegetation Zones and Patch size over development site

Vegetation Zone	PCT	Ancillary description	Area (Ha)	Patch size class
1	1598	Forest -slashed/grazed, and very disturbed with tree cover present, and some understorey, but missing most mid and shrub storey.	0.7Ha (0.3Ha over Cat 2 land)	>100Ha
TOTAL			**0.3 Ha**	

Picture –Plot 1

Picture –Plot 2

3.3.2 Patch size

Patch size was assessed as per the BAM (OEH 2020), and BAM Operations Manual, 2020 & measured using QGIS (Table 3).

Vegetation within the subject land meeting this criteria was mapped sequentially. Total area of each patch zone for each PCT was measured. All native vegetation meeting the definition outlined in the BAM Operations Manual, 2020 was mapped.

The patch size is >100Ha patch size class, as the site is within 100m of other patches, which are within 100m of extensive forested areas exceeding hundreds of hectares in size.

3.3.3 Vegetation integrity assessment

Vegetation integrity was assessed using data obtained from BAM plots completed within each PCT & Zone in accordance with the methodology outlined in the BAM, 2020. Plot data was collected via:

- A 20 metre x 50 metre quadrat and 50 metre transect for assessment of site attributes and function.
- A 20 metre x 20 metre quadrat, nested within the larger quadrat for full floristic survey to determine composition and structure of the PCT.

The minimum number of BAM plots per vegetation zone was determined through application of Table 4 of the BAM 2020 to the total extent of each PCT mapped in the subject land (Table 3). A total of two BAM plots were therefore completed within the development site, in excess of the minimum one required. An assessment of vegetation integrity was undertaken using benchmark data collected as outlined in the BAM.

Vegetation integrity plots were undertaken in each vegetation zone (two plots in total).

No additional local data was used for this assessment. A list of flora species was compiled (collected both on BAM field data sheets, Appendix 2, and a list of species collated during other meander & parallel targeted transects, Appendix 3) . Records of all flora species will be submitted to NSW DPIE for incorporation into the Atlas of NSW Wildlife.

3.3.4 Vegetation integrity score

Plot data were entered into the BAM calculator to determine vegetation integrity score. Plot data is presented in Appendix 2 and 3. Vegetation integrity scores for the vegetation zone in the subject land is provided in Table 4. No hollow-bearing trees to be directly impacted by the proposed development. The vegetation integrity score calculated for each zone is shown.

Table 4: Vegetation integrity scores

PCT	Plot number	Applicable Vegetation Zones	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score
1598	Plot 1	1	36.8	78.5	15.1	35.2
1598	Plot 2	2	31.8	78.5	34.1	44

Note: All BAM plots were assessed during normal land management practices (ie Plot 1 was grazed and slashed), and normal climatic conditions.

As outlined in the BAM, 2020 an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥15 where the PCT is representative of an endangered or critically endangered ecological community.
- ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community.
- ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

As shown in Table 4, the integrity score for the vegetation zone is above 15 for mapped Zone as an Endangered Ecological Community, and is therefore required to be offset. Therefore, offsets will be required for all impacts to all mapped native vegetation zones impacted within the subject land, except unmapped areas/Category 1 exempt land under LLS Act.

Figure 11: Vegetation PCT's and zones (none) over development site

Figure 12: Vegetation mapping (from LHCCREMS, 2003)

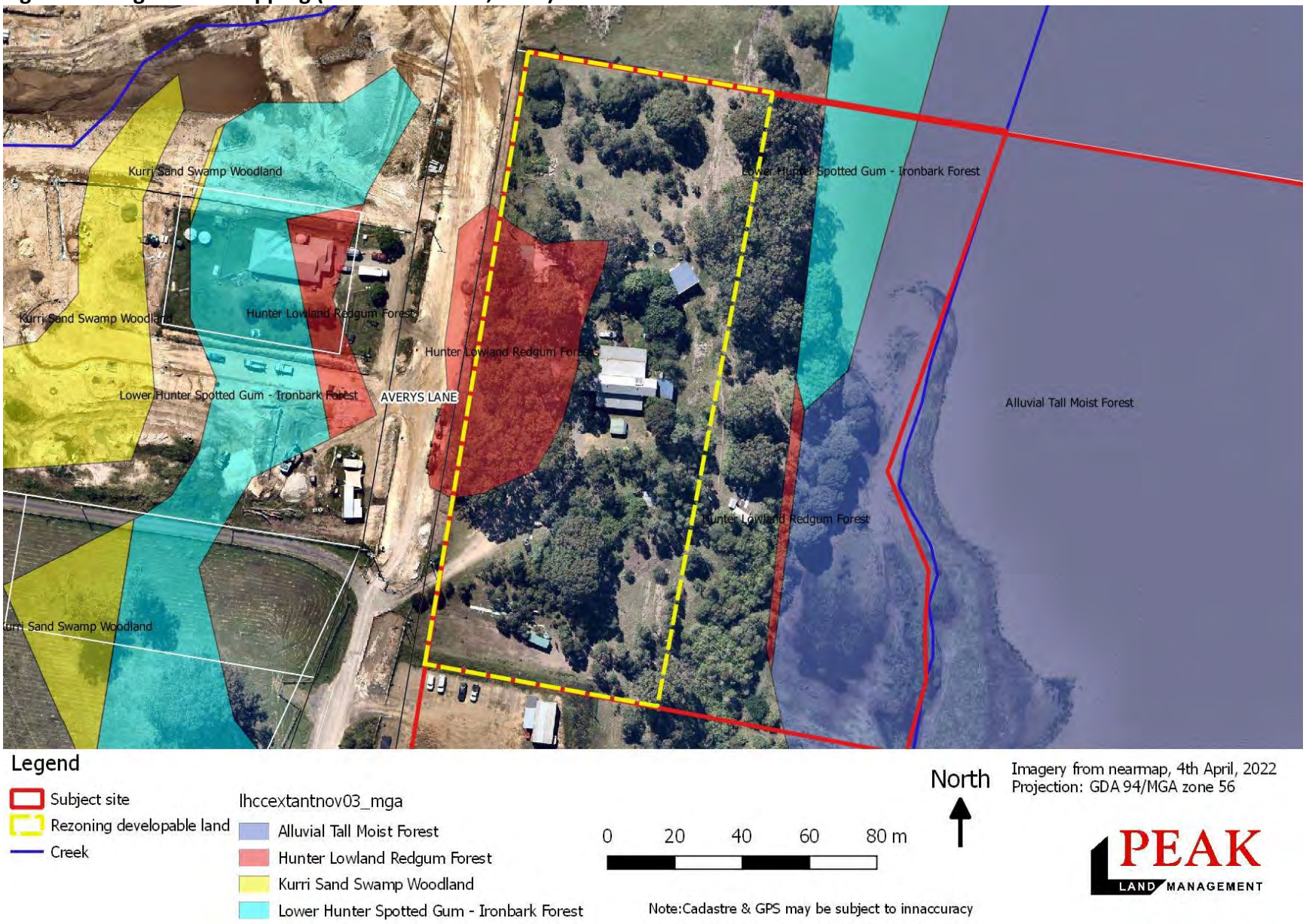


Figure 13: Vegetation mapping (from Greater Hunter Mapping V4)

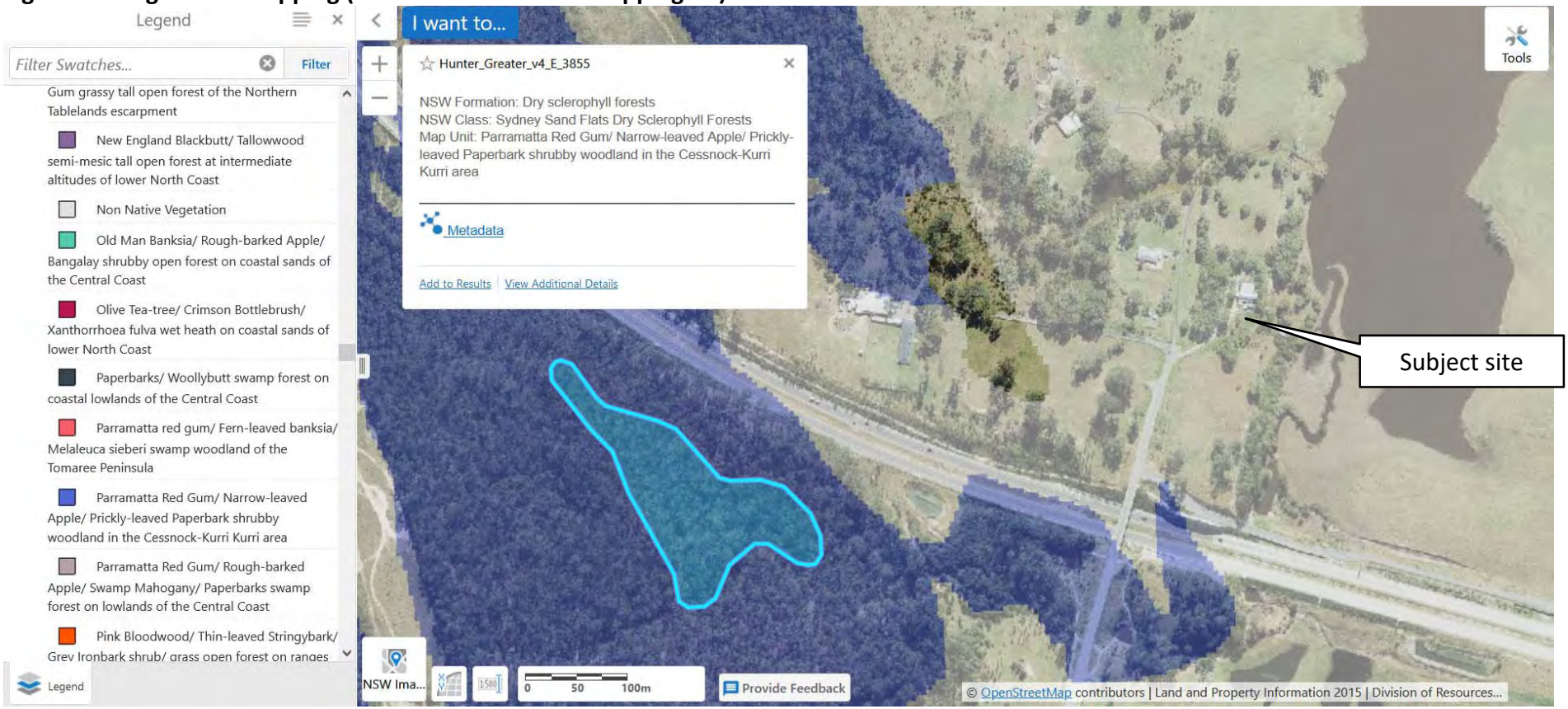


Figure 14: Flora & fauna survey over development site and BAM Plots

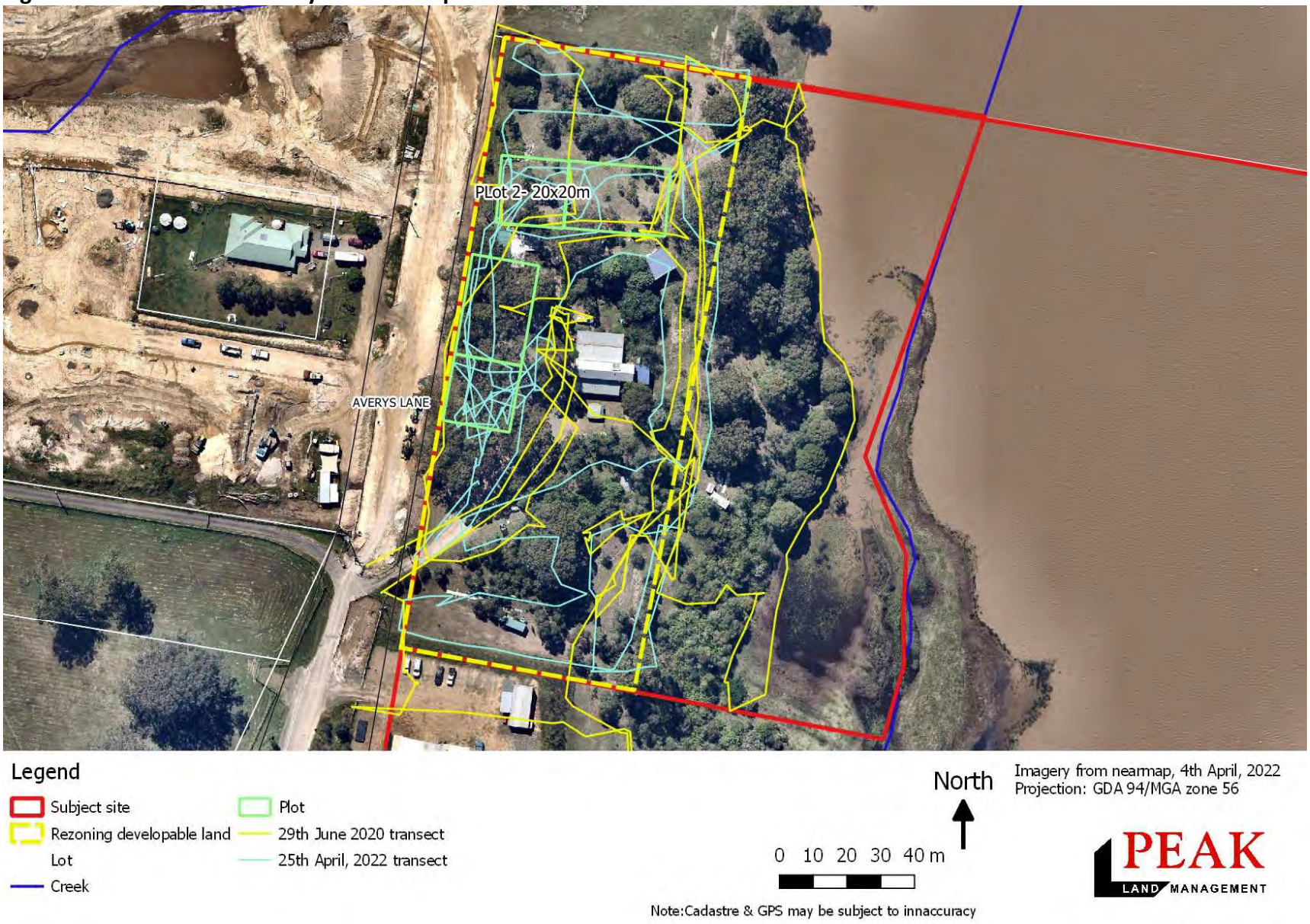


Figure 15: Transitional native vegetation regulation mapping under LLS Act (from NVR map by NSW DPIE).

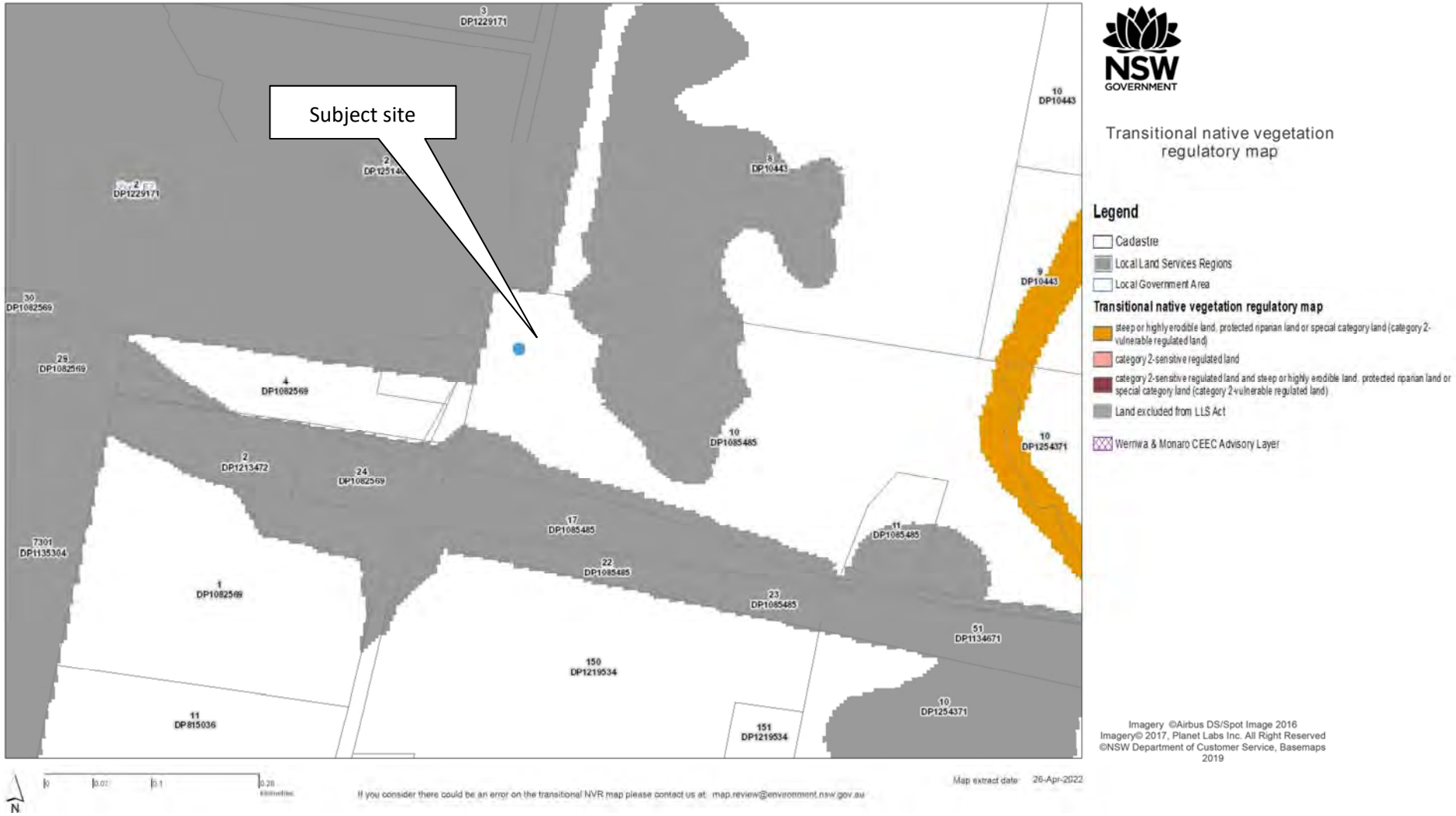


Figure 16: Aerial photo of subject site from 1993 (from SIX Maps historical aerial photos, NSW Lands Department)

Figure 17: Land Category under LLS Act as mapped by PEAK LAND MANAGEMENT

Figure 18: Important Areas Map- Regent Honeyeater- development site mapped (from NSW DPIE)

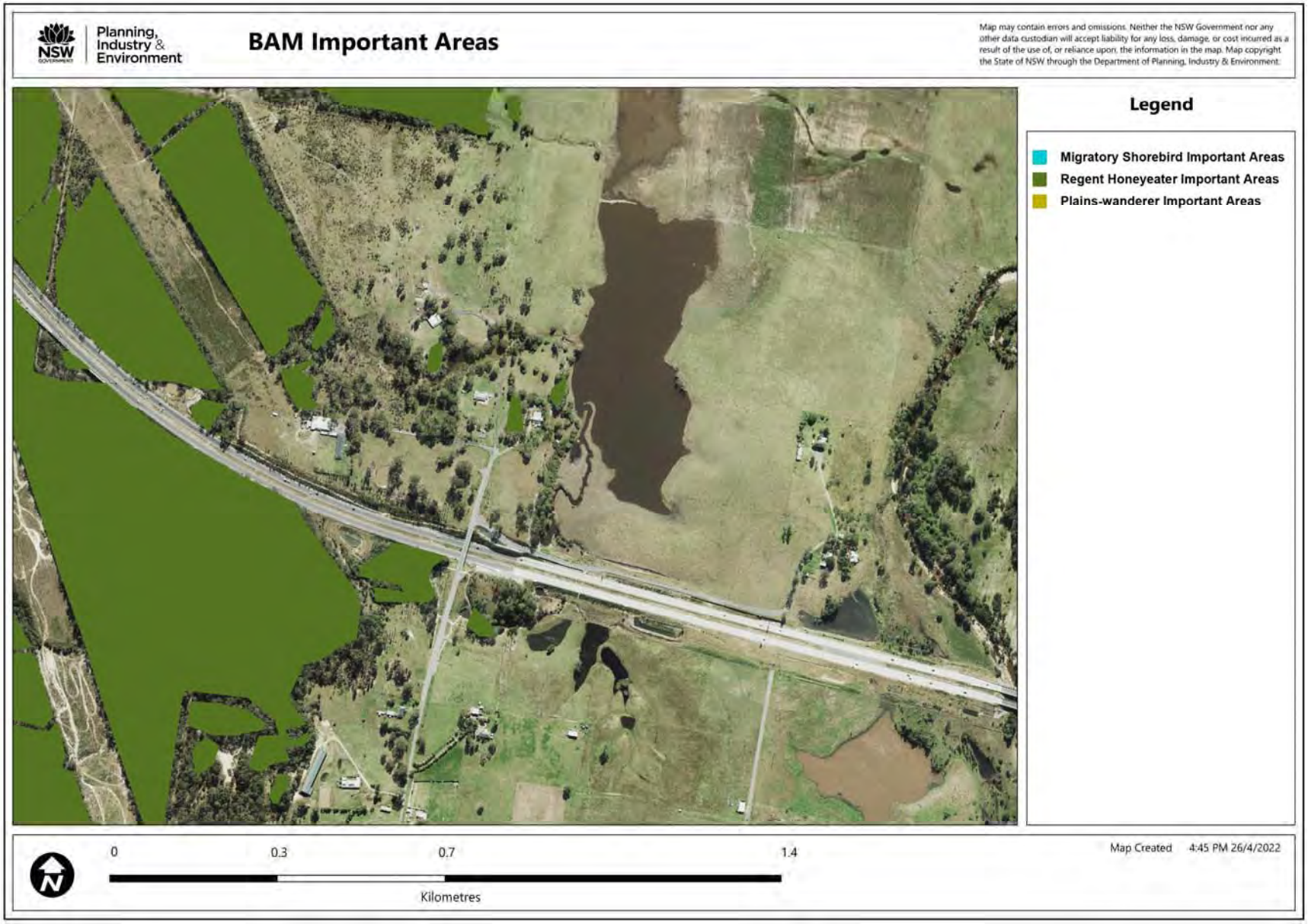


Figure 19: Important Areas Map- Swift Parrot- development site mapped (from NSW DPIE)

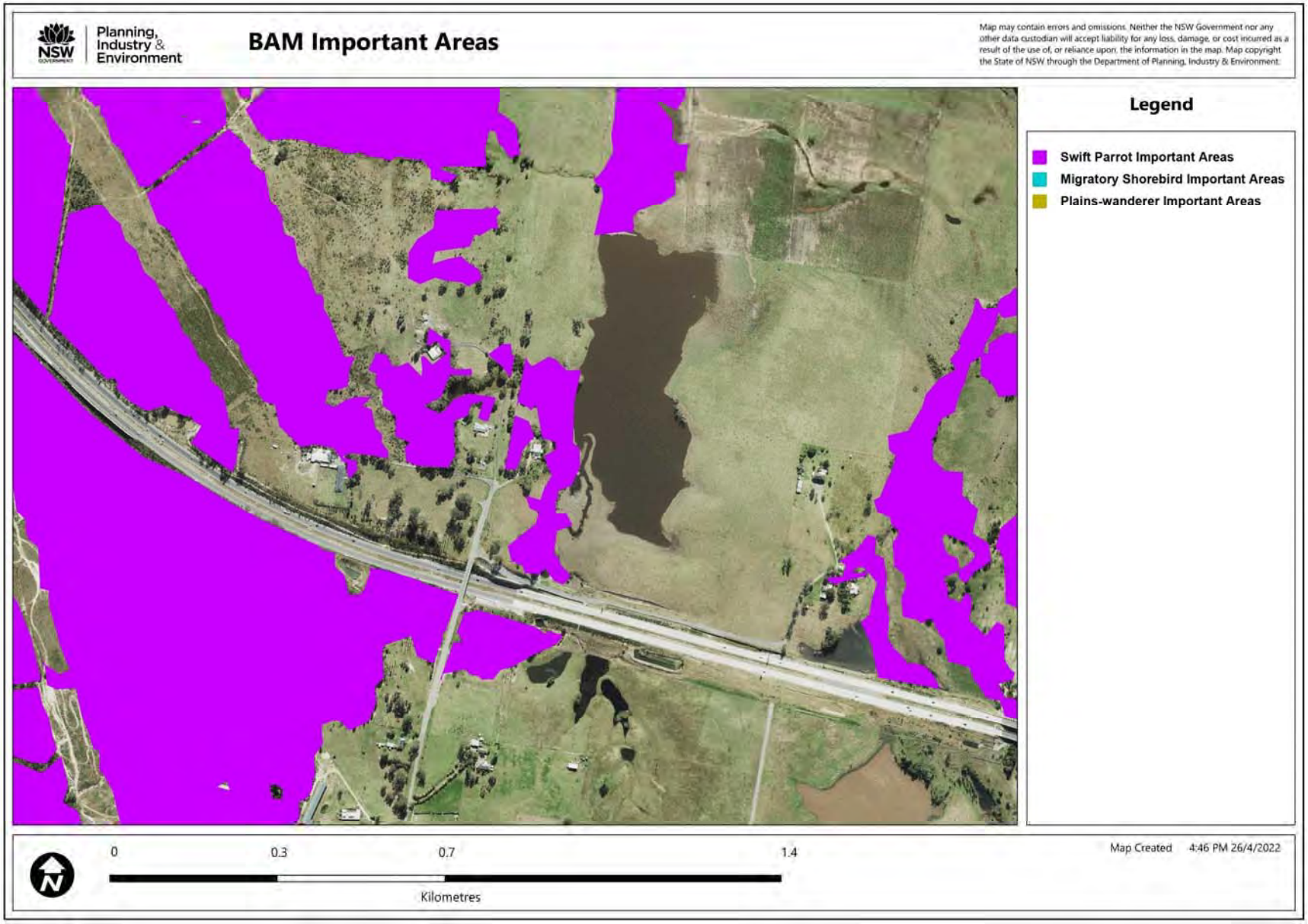


Figure 20: Impact area over LLS Category 2 land

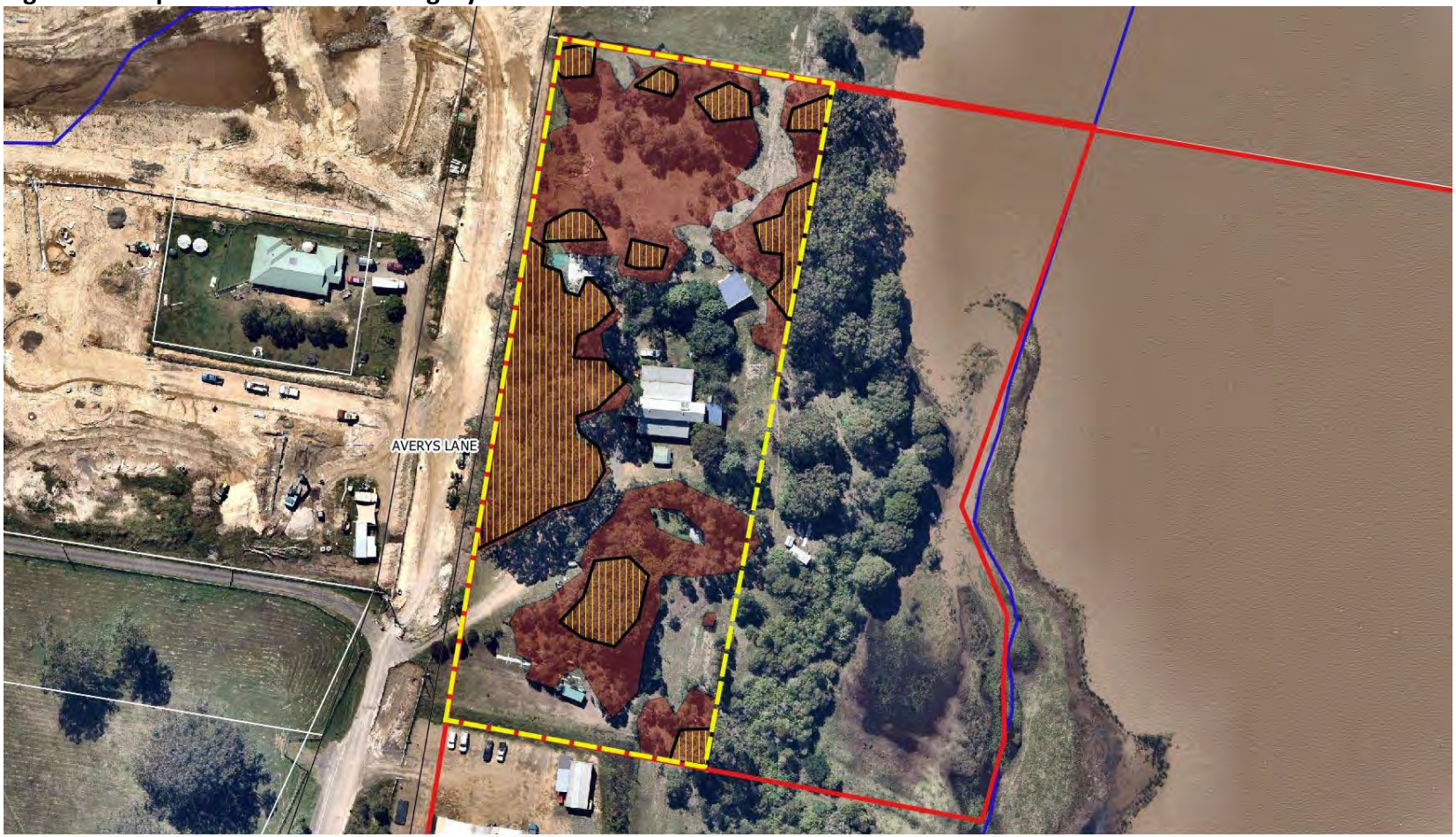


Figure 21: Riparian Zone

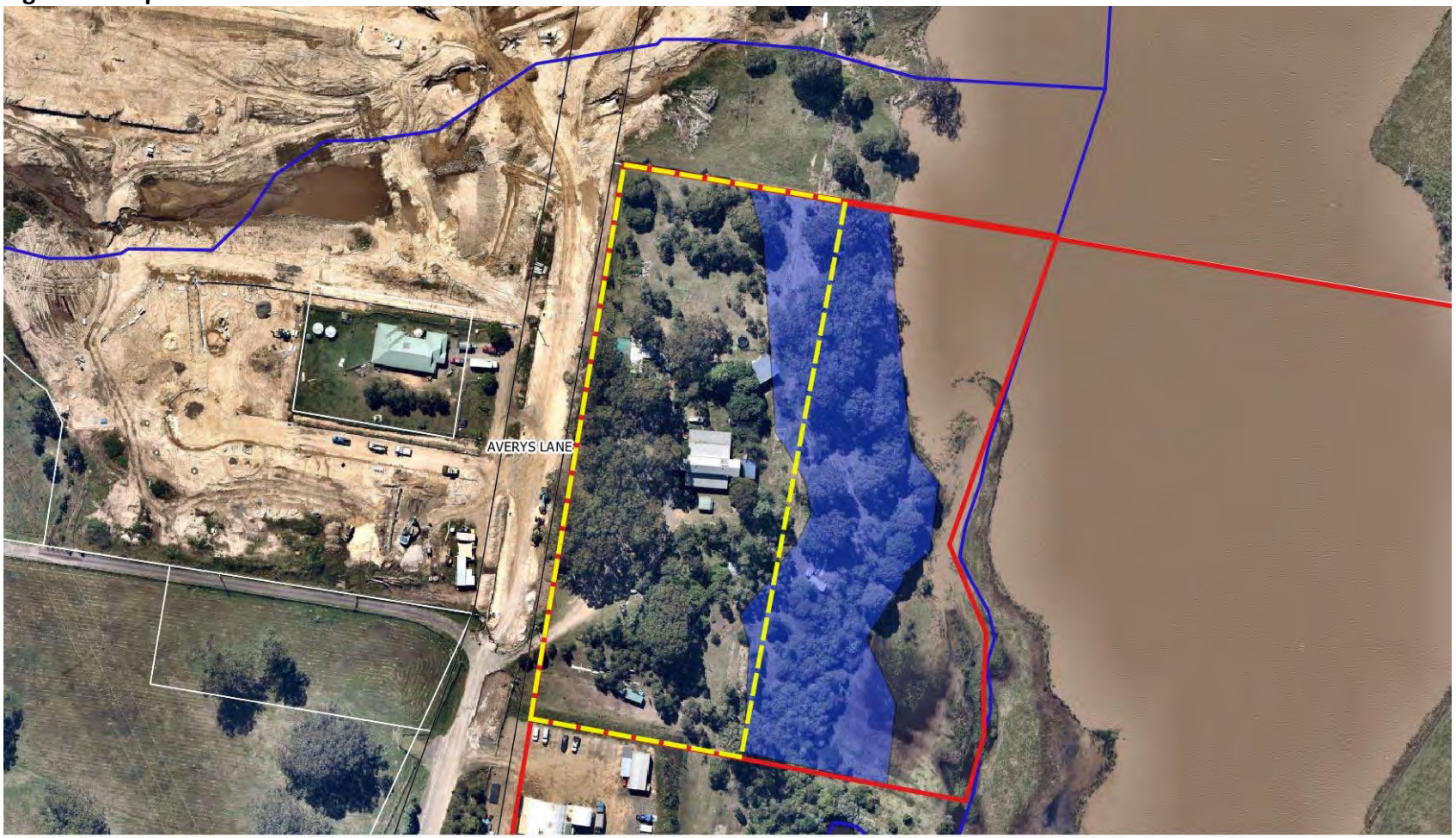


Figure 22: Location of hollow bearing habitat trees (none) & threatened species

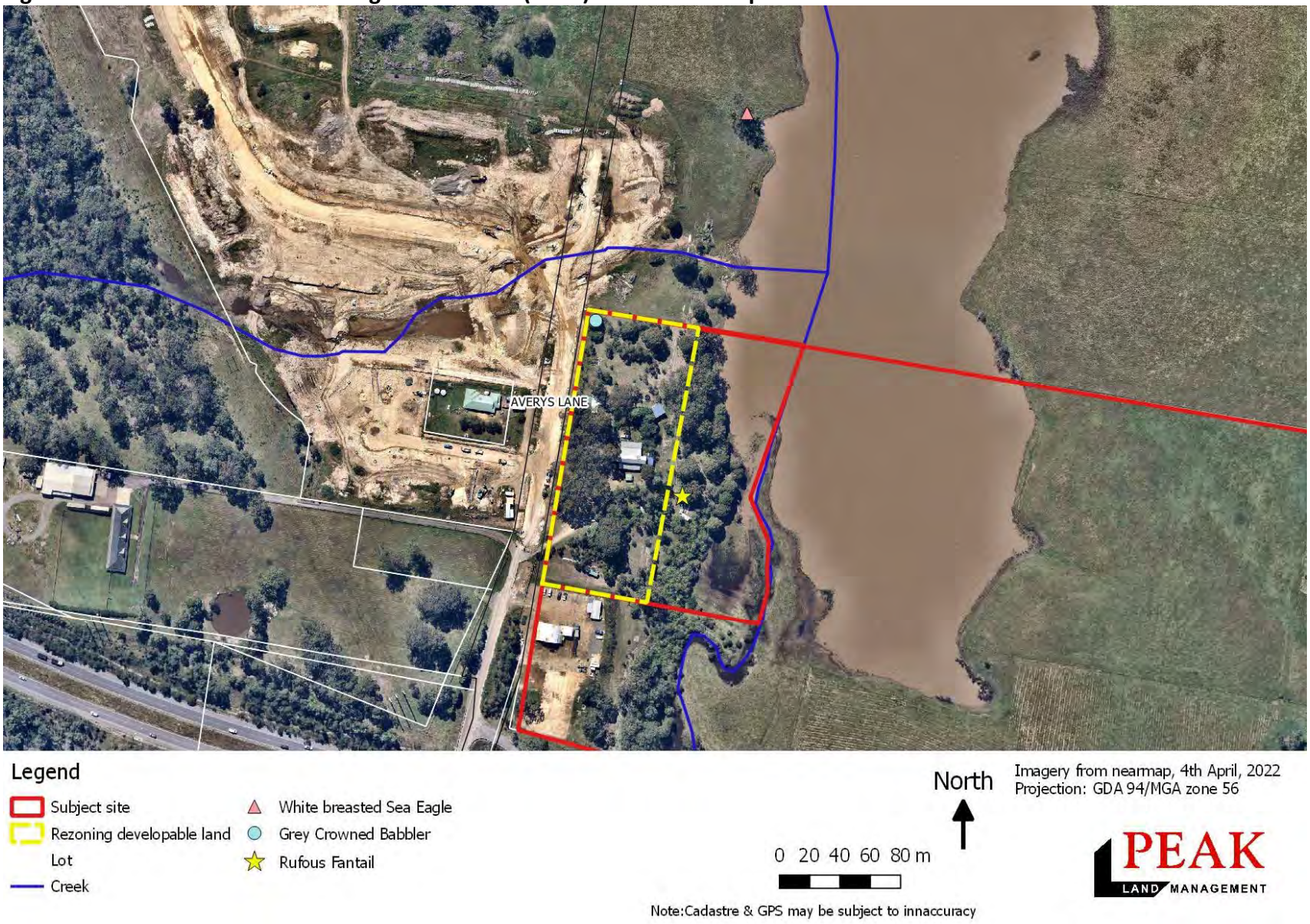


Figure 23: Candidate species polygon area- Swift Parrot

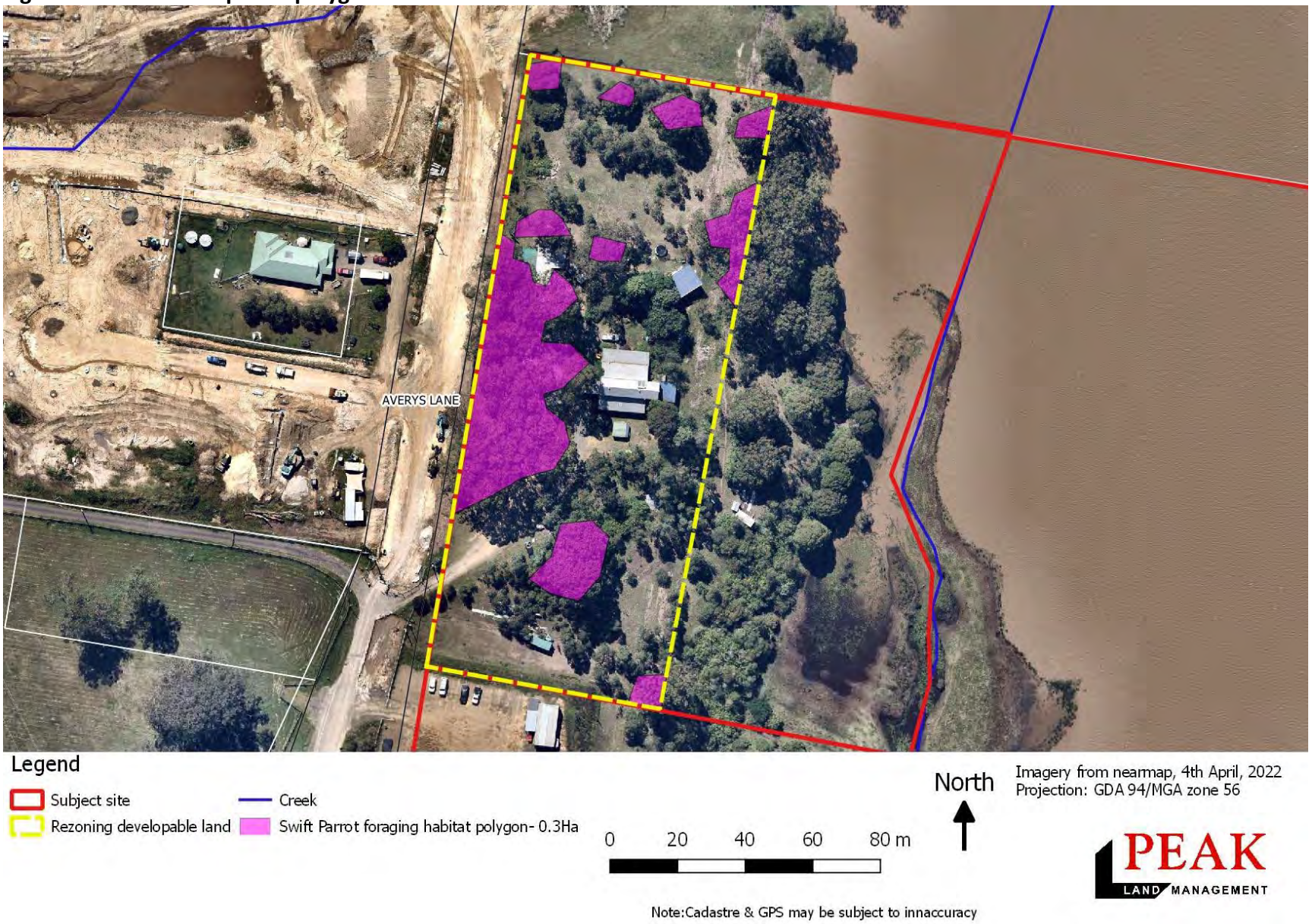


Figure 24: Candidate species polygon area- Regent Honeyeater

4.0 HABITAT SUITABILITY FOR THREATENED SPECIES

4.1 Fauna habitat assessment

To inform the assessment of ecosystem credit species predicted to occur within the development site and to assist in developing a list of Candidate species requiring further assessment in accordance with the BAM, 2020, a habitat-based fauna assessment was undertaken, seeking to identify the following fauna habitat features within the site boundary. The following features were identified:

- No hollow-bearing trees within development site;
- Flowering shrubs and feed tree species, including winter flowering species such as Forest Red Gum suitable for Regent Honeyeater & Swift Parrot foraging;
- No local Bionet records of Regent Honeyeater, or Swift Parrot;
- No sandstone rocky outcrops or caves within development site, some rocky outcrops with no observed caves off site, or hollow bearing logs present;
- Fragmented patches of regrowth forest to south and south-west of site, but gaps present such as Avery Lane/cleared paddocks, and recent clearing of all vegetation to north-west of site for an approved residential subdivision, with only remnant large hollow bearing trees along Wallis Creek riparian zone retained to north /off site of development site.
- Wildlife connectivity is therefore very limited over and around the development site (Fig 8);
- Creek line not present over development site, but a fourth order creek (Wallis) nearby. The APZ does encroach its 40m riparian zone.
- No dams, but a local wetland present nearby off site to east- Wallis Creek wetland. Unaffected directly by proposal;
- *Allocasuarina* Glossy Black Cockatoo feed trees not present over development site, but are present off site (Swamp Oak in places).

Table 4b: Hollow bearing habitat tree/other details over development site & surrounds

Tree Species	Common name	Number	Hollow details/other
Nil			

Hollow sizes:
Small (S) <15cm
Medium (M)- 15-30cm diameter
Large (L) - >30cm diameter
Fissure (F) -crack in trunk suitable for microbats
Spout (SP)

4.2 Ecosystem credit species assessment

Species reliably predicted to occur based on PCT's present within the subject land (i.e. ecosystem credit species) and information obtained from the Threatened Biodiversity Data

Collection, were returned from the BAM Offsets Calculator. In addition as required by Cessnock City Council Bionet listed species (Appendix 5) were examined for whether they are Ecosystems or Species Credit species as per NSW DPIE Threatened Species Database listing, and assessed and added where relevant if habitat is present as per Section 6 of the BAM (Table 4). Impacts to these species may require offsetting as shown in Table 4.

Habitat & targeted survey has occurred as per Table 4 & 6 detailed below.

Species added from Bionet have been shown below within Figure 15, and also those discounted due to patch size being too small or disturbed, lack of habitat, vagrancy, or other habitat constraints such as site being regrowth. No additions or discounted species in this case.

Figure 25: Ecosystem credit species (from BAM Calculator)

NSW GOVERNMENT

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00032651/BAAS17076/22/00032652	BCAR- Stage 1 - 259 Averys Lane Buchanan	24/11/2021
Assessor Name	**Report Created**	**BAM Data version ***
Ted Smith	27/04/2022	50
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS17076	Biocertification	Open
Assessment Revision		**Date Finalised**
0		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.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Black Falcon	Falco subniger	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Little Lorikeet	Glossopsitta pusilla	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Scarlet Robin	Petroica boodang	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Speckled Warbler	Chthonicola sagittata	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Spotted-tailed Quoll	Dasyurus maculatus	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Varied Sittella	Daphoenositta chrysoptera	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
White-bellied Sea-Eagle	Haliaeetus leucogaster	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter

NSW GOVERNMENT

BAM Predicted Species Report

White-throated Needletail	Hirundapus caudacutus	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

4.3 Species excluded/added from assessment

Ecosystem credit species can be excluded from the assessment, if incorrect habitat requirements, or are considered vagrant, or other reason.

In this case all are considered to have habitat present and are therefore assumed to occur and contribute to ecosystem credits. No species were added.

4.4 Species Credit Species

A list of species credit species potentially occurring within the subject land was generated in accordance with the BAM Offsets Calculator (Fig 25), including information obtained from the Threatened Biodiversity Data Collection. Further species were added from the Bionet search results. An assessment of whether suitable habitat occurs within the subject land, and therefore whether a species is to be considered a candidate species credit species is also provided, and rationale for their assumed presence or exclusion. The identification of candidate species credit species was assessed in accordance with the BAM.

No additional species listed under the EPBC (and not listed under the BC Act) was assessed.

All candidate species considered likely to inhabit the subject land and shown as having suitable habitat & geographic location and PCT association are assumed present. Swift Parrot & Regent Honeyeater are included and were added to the BAM Calculator, as site is also a Mapped Important Area (Fig 18 & 19) for both these species.

Species added to assessment into BAM Calculator for assessment are shown in Table 5.

Species excluded from assessment after site survey are shown in Table 6.

Table 5: Species added to candidate species assessment

Candidate credit species	Habitat constraints and / or geographic restrictions	Rationale
Petaurus norfolcensis Squirrel Glider	Breeding- requires hollows on site.	Bionet records (although sparse) within 10km search area, and habitat presence for this species.
Phascolarctos cinereus Koala (Breeding)	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.	Feed trees are present over the site, and foraging habitat present.

Candidate credit species	Habitat constraints and / or geographic restrictions	Rationale
Swift Parrot (*Lathamus discolour*)	A migratory species found in mainland Australia during winter where it feeds on nectar, lerp insects and sometimes soft fruit and berries. It is generally associated with winter flowering species such as swamp mahogany, red ironbark, yellow gum, and Spotted Gum. Spotted Gum occurs on site. Roderick, et. al. 2013 reports: "*The significance of the Lower Hunter was again highlighted during 2012, when substantial numbers of both species were found within the Lower Hunter. This was due to widespread blossoming of Corymbia maculata (Spotted Gum) within the Cessnock-Kurri forests. Swift Parrots were present in large numbers (estimated to be between 200-300 birds) and were recorded from mid-autumn (9th May) to mid-spring (26th September). A further approximately 100 birds were also present in Spotted Gum-Ironbark-Grey Box forests just outside of the study area north of the Broke-Cessnock Road.* *Following this, and after analysing available data, it is considered that the most important part of the Lower Hunter for Regent Honeyeaters and Swift Parrots is the Cessnock-Kurri woodlands. This area stretches from approximately Wallis Creek (south of Kurri Kurri) west to about Millfield, north to Keinbah and south to Quorrobolong. Disjunct areas of habitat that would once have been linked to this broader mosaic of forested remnants still exist at North Rothbury and on Department of Defence lands in the far north-west corner of Cessnock LGA along Broke Road. The dominant forest-type here is Spotted Gum-Ironbark dominated, with many other Eucalypts occurring within these vegetation assemblages".* OEH, 2017 state: • *Migrates to the Australian south-east mainland between March and October.* • *On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.* • *Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Mugga Ironbark E. sideroxylon, and White Box E. albens.* • *Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and Blackbutt E. pilularis.* • *Return to some foraging sites on a cyclic basis depending on food availability.* • *Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.*	Bionet records in search area, and habitat presence for this species but not associated with this PCT, and clay soil over sandstone present. On Important Areas Map, and therefore added.

Candidate credit species	Habitat constraints and / or geographic restrictions	Rationale
Regent Honeyeater (*Anthochaera phrygia)*	Within the region, mostly recorded in Box- Ironbark Eucalypt Forest Associations and Swamp Mahogany forest when flowering in winter. Roderick, et. al. 2013 reports: *"The significance of the Lower Hunter was again highlighted during 2012, when substantial numbers of both species were found within the Lower Hunter. This was due to widespread blossoming of Corymbia maculata (Spotted Gum) within the Cessnock-Kurri forests. It is likely that at least 100 Regent Honeyeaters were present within the study area in 2012 (see Roderick and Ingwersen 2012), representing potentially around 20-25% of the total known current population. Of importance, records spanned from mid-autumn (6th May) virtually until summer (28th November) and it is feasible that the species may have bred in the region but went undetected.* *Following this, and after analysing available data, it is considered that the most important part of the Lower Hunter for Regent Honeyeaters and Swift Parrots is the Cessnock-Kurri woodlands. This area stretches from approximately Wallis Creek (south of Kurri Kurri) west to about Millfield, north to Keinbah and south to Quorrobolong. Disjunct areas of habitat that would once have been linked to this broader mosaic of forested remnants still exist at North Rothbury and on Department of Defence lands in the far north-west corner of Cessnock LGA along Broke Road. The dominant forest-type here is Spotted Gum-Ironbark dominated, with many other Eucalypts occurring within these vegetation assemblages.*	No Bionet records in search area, and habitat presence (Forest Redgum is winter flowering) for this species and not associated with this PCT, and clay soil over sandstone present. On Important Areas Map, and therefore added.

4.5 Species excluded from candidate species assessment

Some candidate/species credit species are to be excluded from the assessment, with incorrect habitat requirements, or are considered vagrant, or location constraints, or site degraded, or not recorded despite intensive flora & fauna /habitat surveys being conducted.

These are shown in Table 6:

All others have habitat present and are therefore assumed to occur and contribute to candidate credits, unless flora & fauna surveys undertaken do not record their presence and/or specific habitat features. These excluded species after surveys were undertaken are assessed and rationale why they are discounted in Table 6.

Figure 26: Candidate credit species with habitat suitability within development site

NSW GOVERNMENT

BAM Candidate Species Report

Proposal Details

Assessment Id 00032651/BAAS17076/22/00032652	Proposal Name BCAR- Stage 1 - 259 Averys Lane Buchanan	BAM data last updated * 24/11/2021
Assessor Name Ted Smith	Report Created 27/04/2022	BAM Data version * 50
Assessor Number BAAS17076	Assessment Type Biocertification	BAM Case Status Open
Assessment Revision 0	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.

List of Species Requiring Survey

Name	Presence	Survey Months
Anthochaera phrygia Regent Honeyeater	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Lathamus discolor Swift Parrot	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Phascolarctos cinereus Koala	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

PEAK LAND MANAGEMENT

BAM Candidate Species Report

Threatened species Manually Added

Common Name	Scientific Name
Regent Honeyeater	Anthochaera phrygia
Swift Parrot	Lathamus discolor
Squirrel Glider	Petaurus norfolcensis
Koala	Phascolarctos cinereus

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat constraints
Green and Golden Bell Frog	Litoria aurea	Habitat degraded
Green-thighed Frog	Litoria brevipalmata	Habitat degraded
North Rothbury Persoonia	Persoonia pauciflora	Refer to BAR
Pterostylis chaetophora	Pterostylis chaetophora	Habitat degraded
Slaty Red Gum	Eucalyptus glaucina	Refer to BAR
Squirrel Glider	Petaurus norfolcensis	Habitat degraded
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints

4.5 Additional Habitat Features Relevant to Prescribed Biodiversity Impacts

The following relevant habitat features are located over the development site:

- Bushland that allows connectivity of habitats of threatened species;
- Bushland that facilitates movement of threatened species.
- Development site and surrounds has a mix of cleared land, and forest with no hollows.
- Stream & wetland present adjacent to site.

Connectivity is shown in Figure 8.

4.6.1 Threatened fauna species & habitat surveys

Flora and fauna surveys were undertaken as shown in Table 1. A threatened flora survey was undertaken, and fauna survey for all candidate listed species occurred over the development site, and broader subject land study area by PEAK LAND MANAGEMENT as shown within Table 1. The location of transects are shown in Figure 11 & 12. Hollow bearing trees were not recorded (Fig 20 & Table 4), with two listed NSW threatened fauna species recorded over or near the site, and one migratory EPBC /Federal listed species recorded.

Fauna habitat assessment was undertaken to determine whether the vegetation to be impacted within the proposed development site contained microhabitats suitable to support the threatened fauna species outlined in the BAM Calculator, and Bionet searches. The habitat assessments focused on the presence/absence of the following features within the subject land:

- Habitat trees including large hollow-bearing trees, availability of flowering shrubs and feed tree species;
- Caves, rock outcrops;
- Wetlands, creeks;
- Condition & structure of native vegetation and the presence of exotic species;
- Condition of waterways and associated habitat for aquatic threatened species;
- Quantity of ground litter and logs;
- Searches for indirect evidence of threatened species (e.g. scats, tracks, etc.);
- General degradation of the site as a result of past land management practices;
- Predators;
- Connectivity.

The fauna survey occurred over the entire development site & parts of the surrounding subject land including:

- Habitat description and distribution in the vicinity;
- Habitat fragmentation & corridors;
- Significant tree survey including mapping all hollow bearing trees (present);
- Habitat for significant species including surveying any rock outcrops or caves (none present);
- Diurnal avifauna & other fauna survey;
- Scat & tracks analysis;

- Incidental observations;
- SPOT assessment for Koalas.

4.6.2 Threatened fauna habitat assessment and field survey results

The development site adjoins fragmented bushland, with some connectivity present, and poor water quality over Wallis Creek & wetland. Hollow bearing trees not present over the subject site, and poor – moderate quality habitat present for a range of species, with high disturbance from horse grazing and Lantana/other weeds.

Fauna habitat was degraded over the site due to these factors.

The representative Plot sites were found to consist of trees, limited/no shrubs, native understorey, leaf litter, and no hollow bearing habitat trees. There is a creek & wetland present to the east of the development site, and no rocks (apart from surface sandstone with no fissures present) and no caves present over the development site.

The full list of fauna recorded during surveys conducted by PEAK LAND MANAGEMENT is shown in Appendix 4, and transects for both flora & fauna surveys, over two time periods, are shown in Figure 14.

Three threatened fauna species were recorded, being White Breasted Sea Eagle, Rufous Fantail and Grey Crowned Babbler (Fig 22).

The White Breasted Sea Eagle was recorded flying over Wallis Creek wetland, and roosting on a tree to the north of the development site. No nest could be observed. No nests recorded over the development site, or nearby. Most/all trees over this site and surrounds are younger regrowth, and not suitable for nest trees.

Rufous Fantail, a listed EPBC Act migratory species, was observed to the east of the development site, within thick Lantana.

Grey Crowned Babbler occurred over the development site, over a tree to the north-west, with around 5 individuals recorded. They have been forced out of recently cleared land to the north-west (pers comm proponent).

Habitat present for many other bird and mammal species, including Swift Parrot & Regent Honeyeater (but degraded).

There are a number of potential threatened fauna species over the site, with habitat presence as described in Table 5. None of these species were recorded during fauna survey. Survey was generally conducted within the stated BAM calculator survey period, or if not has assumed presence unless habitat not present.

SPOT assessment: - The Koala SPOT assessment was conducted over the entire development site, around each feed tree. No Koala scat was recorded, or any evidence/observations of Koala. It is therefore concluded that although Koala feed trees are present, & sparse Koala Bionet records are present, the site has a low activity level. No breeding Koala present.

Note: - Cleared land over the development area, has been assessed on its merits at time of survey, and if habitat is now missing has been assessed this way within this BCAR. Species such as Regent Honeyeater and Swift Parrot however are assumed to be present over that area mapped on the Important Areas Map, as habitat is present, and other areas of suitable habitat over the site, in accordance with the BAM. Species polygons show the mapped areas (Fig's 23, 24).

All discounted species are as shown in Table 6. These species are excluded due to either unsuitable habitat, not recorded during fauna survey, or vagrancy (transient basis only, as they fly over, or pass through the site foraging as part of their larger home range), and lack of Bionet records in this area. Hollow bearing remnant old growth habitat trees are not present. All hollow dependant species that rely on these hollows for nesting/denning etc if listed as a breeding requirement under the BAM calculator are assumed as not having suitable breeding habitat.

Hollow dependent species include some microbats, owls, and other hollow dependant bird and mammal threatened species.

No other habitat features were noted including:

- No stick nests were recorded;
- No scat, trails, burrows, or any other sign of threatened fauna;
- No owl regurgitation pellets under any hollow bearing trees, or other owl guano.

Some forest birds were present (Appendix 4). The subject land is likely to be influenced by introduced predators (e.g. European Fox, Rat, Mice, and Cat & Dog) pressure.

Habitat within the development site may provide foraging resources for some threatened species in the form of large flowering eucalypts. Forest Redgum & Spotted Gum are winter-flowering species and therefore the broader development site is/was likely to provide nectar resources for nectivorous birds, including threatened species. The development site is mapped as an important area for Swift Parrot, and Regent Honeyeater, and habitat is considered present pre clearing for these birds. This is further discussed in Section 6.1 Serious and irreversible impacts.

4.6.3 Threatened flora & habitat survey & results

A flora survey was undertaken (Table 1), in order to inform the survey and determine whether threatened flora species or populations are present and may be impacted either directly or indirectly (e.g. as a result of edge/indirect effects) by the proposed development. There are no records from any previous flora surveys or Bionet over the site of any threatened flora species.

A flora survey was undertaken for the selected threatened flora listed within Table 5& 6 with suitable habitat requirements and geographic location, and no other constraints. They were undertaken in accordance with the NSW Guide to surveying Threatened Plants (NSW DPIE, 2020). Meander transects, transects 10-20m apart, plots and targeted surveys were

employed over areas to be impacted within their habitat. Those species are assessed within Table 5 & 6.

No species were assessed in addition to the BAM Calculator from BioNet records, as habitat not present, and not recorded in any surveys. There are no existing Bionet records over this site of any threatened flora species

A flora species list of all plants recorded during survey and over the BAM plot is shown in Appendix 3. Raw BAM Plot field sheet data is shown in Appendix 2.

The site was of moderate diversity, but heavily disturbed and modified due to underscrubbing clearing & grazing, but some regrowth of native understorey present. Plot 2 was located over a heavily grazed paddock, with part natural canopy, and groundstorey. The plot was located here to gauge VI over these heavily disturbed areas/whether a separate zone required. In this case was same or even higher VI, so same zone.

There are very few/one only older larger remnant trees around the development site.

Most species listed within the BAM Calculator do not have habitat presence, or can be discounted due to lack of Bionet records within the region, or other factors. These include:

- Soil type is clay, not sandy, over sandstone;
- Dry sclerophyll forest;
- Topographic location over a hill side, not over a floodplain;
- Geographical location;
- Level of disturbance/weed cover/grazing, etc
- Not detected in surveys.

These species were mostly surveyed in their stated flowering times as stated within the BAM calculator, or are readily recognisable by leaf given good visibility conditions. No threatened species recorded. The author is familiar with all listed threatened species as shown in the Bionet and BAM Calculator results, and their leaves, and visibility was good over this site, and all areas of proposed impact were surveyed.

No threatened flora species were recorded over the site. All potential predicted candidate threated flora species and are either assumed present, unless they are discounted due to incorrect habitat requirements, or survey found no presence occurred (during correct seasonal time of survey, as per BAM calculator occurred.

4.6.4 Threatened flora & fauna species polygons

No threatened flora species were recorded over the development site. Habitat is not present for those candidate species that are outside of the BAM calculator survey periods (see Table 6).

A species polygon has been mapped for Swift Parrot & Regent Honeyeater, being the only candidate threatened species considered present.

The maximum site impact area over their potential habitat area which includes the mapped Important Areas mapped area (0.42Ha), is taken as the polygon for both threatened fauna species.

4.7 Aquatic Habitats

No aquatic habitats is present. Wetland and creek off site are not considered to be directly affected, but may have an indirect impact.

No dams or wetlands present over the development site.

4.8 Groundwater Dependent Ecosystems

The study area sits within the Hunter River region as defined in the Groundwater Dependent Ecosystem (GDE) Atlas (Bureau of Meteorology 2018). Vegetation over the site is not identified in the GDE Atlas as a terrestrial GDE based on regional studies. Vegetation over the mapped creek line off site is not identified as a terrestrial GDE.

No PCTs mapped within the subject land and broader study area have potential of being GDE.

Table 7: Candidate species excluded or added from assessment after site fauna & flora survey and rationale

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
Amphibians - Green and Golden Bell Frog	Within 1km of a waterbody.	*A frog that preys upon other frogs, actively locating them by their advertisement calls. It is also one of the few frogs known to be active by day and actually bask in the sunlight. Adults are usually found close to, or in water or very wet areas in forests, woodlands, shrublands and open or disturbed areas, particularly where there are reeds or bulrushes. The eggs and tadpoles can be found in permanent lakes, swamps and dams with still water*. Not heard or sighted in this area and no dams or larger still ponds present (only ephemeral creek). They are also vulnerable to poor water quality, predation of eggs by mosquito fish, and use of herbicides etc near waterways. Unlikely to be present. No records locally in this immediate area.				Majority of site is cleared and over 50m from any creek line. One section of boundary fence is within 50m, however the area is denuded by grazing, and no water or leaf litter present, and not considered suitable habitat. Green and Golden Bell Frog was generated on the BAM Calculator, however Wallis Creek wetland has no Bionet records within 10km of site. Wallis Creek is grazed and denuded of fringing and wetland vegetation. Catchment/water quality are poor being grazed/part cleared and disturbed. Therefore all amphibians are discounted and not further assessed.

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
Green – thighed frog (*Litoria brevipalmata)*	Within 50m of a stream	Department of Environment and Climate Change (2009) state" *Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. Breeding occurs following heavy rainfall in late spring and summer, with frogs aggregating around grassy semi-permanent ponds and flood-prone grassy areas. The frogs are thought to forage in leaf-litter.*	V	-	No	Majority of site is cleared and over 50m from any creek line. One section of boundary fence is within 50m, however the area is denuded by grazing, and no water or leaf litter present, and not considered suitable habitat. Green Thighed Frog was generated on the BAM Calculator, however Wallis Creek wetland has no Bionet records within 10km of site, and only one record of Green thighed Frog, not located near this site. Wallis Creek is grazed and denuded of fringing and wetland vegetation. Catchment/water quality are poor being grazed/part cleared and disturbed. Therefore all amphibians are discounted and not further assessed.

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
Reptiles						No reptiles have been generated on the BAM Calculator, and no Bionet records in this area. Therefore all reptiles are discounted and not further assessed.
Ninox connivens Barking Owl (Breeding)		Office of Environment and Heritage state: *The Barking Owl is found throughout Australia except for the central arid regions and Tasmania. It is quite common in parts of northern Australia, but is generally considered uncommon in southern Australia. It has declined across much of its distribution across NSW and now occurs only sparsely. It is most frequently recorded on the western slopes and plains. It is rarely recorded in the far west or in coastal and escarpment forests. Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as Acacia and Casuarina species, or the dense clumps of canopy leaves in large Eucalypts. Feeds on a variety of prey, with invertebrates predominant for most of the year, and birds and mammals such as smaller gliders, possums, rodents and rabbits becoming important during breeding. Live alone or in pairs. Territories range from 30 to 200 hectares and*				Breeding habitat not present over development site, no hollow, therefore not included as a candidate species.

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
		birds are present all year. Three eggs are laid in nests in hollows of large, old eucalypts.				
Haliaeetus leucogaster White-bellied Sea-Eagle (Breeding)	Within 1km of waterway.	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	V	-	No	Potential breeding habitat not present within the development land as no taller old growth trees present. . Foraging habitat present off site. A recorded sighting of White Bellied Sea Eagle. No stick nest present.
Miniopterus australis Little Bentwing-bat (Breeding)	Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	V	-	No	No breeding resources with no caves present over the development site. Therefore species is discounted.
Miniopterus orianae oceanensis	Cave, tunnel, mine, culvert or other structure	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-	V	-	No	No breeding resources with no caves present over the

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
Large Bent-winged Bat (Breeding)	known or suspected to be used for breeding	made structures. Populations disperse within about 300 km range of maternity caves. Hunt in forested areas, catching moths and other flying insects above the treetops.				development site. Therefore species is discounted.
Phascolarctos cinereus Koala (Breeding)	-	*Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.* *Females breed at two years of age and produce one young per year.*	V	V	No	Feed trees are present over the site. The site is considered potential foraging habitat. It is not considered breeding habitat however due to no recorded occurrences of any Koala in any fauna surveys, and no scat present from surveys, and no Bionet records in this area. It is not considered important habitat, due to no recorded breeding/sparse records of Koala in this area. Species has therefore been discounted. .
Squirrel glider (*Petaurus norfolcensis)*		*The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more*	V	-	No	Not recorded in this local area on Bionet. Habitat considered marginal, with understorey primarily missing over the majority of development site.

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
		adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. Note: Research from Lake Macquarie City Council Squirrel Glider Guidelines 2015 stated that: *The minimum habitat patch size that will be occupied by squirrel gliders is strongly influenced by habitat quality. Squirrel gliders occupy very small patches if habitat quality is high, and much larger habitat patch sizes in lower quality habitat.* *However, the probability of a patch being occupied by squirrel gliders decreases with remnant size. Modelling predicts that density and occurrence begins to decline when patch size falls below 100 ha depending on time since isolation, remnant shape, and distance to nearby habitat. In Wyong, the largest known remnant of suitable habitat without squirrel gliders is 30 ha. Habitat patches of less than 4 ha are considered unsuitable for permanent occupancy. Small habitat patches of 4 ha to 30ha, are considered at high risk of local extinction. Minor habitat patches of 30 ha to 100 ha, are considered at moderate to low risk in the short-term, and high risk in the long-term; and major habitat patches, 100 ha to 1,000 ha are considered at no risk in the short-term, (50 yrs to 100 yrs), and low to moderate risk in the long term (Smith 2002).*				No hollow bearing trees to be removed. Breeding habitat is not considered affected, and species discounted.

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
		Squirrel gliders are reluctant to come to the ground to cross gaps and crossing width depends on tree height on either side of the gap (van der Ree 2000).				
Grey headed flying fox (*Pteropus poliocephalus*)		Forages over a large area for nectar/fruits etc. Roosts in communal base camps, which are typically found in gullies, close to water and in vegetation with a thick canopy. As there are fruit trees (ie figs & other rainforest fruits) present over the site, and flowering trees and plants, they would occur from time to time. They are a reasonably common species, and impacts from this development would make a low impact on them due to loss of some foraging resources. No camp was observed over the site.	V	V	No - surveyed	Discounted. No breeding camp present over the site.
Eucalyptus glaucina Slaty Red Gum	-	• A medium-sized tree to 30 m tall. • Found only on the north coast of NSW and in separate districts: near Casino where it can be locally common, and farther south, from Taree to Broke, west of Maitland. • Grows in grassy woodland and dry eucalypt forest. • Grows on deep, moderately fertile and well-watered soils.	V	V	No	Not recorded over development site, habitat/soils not present, not considered suitable habitat.
Persoonia pauciflora (Rothbury Geebung)	Within a 2.5 km radius of North Rothbury	*Persoonia pauciflora* is able to be identified out of flowering season, with distinctive light green foliage. A small spreading shrub, 0.1 - 1.4 m high and 0.4 - 2.0 m wide, with bright green needle-like leaves Extremely restricted distribution; all but one of the plants which make up the only known population occur within a 2.5 km radius of the original specimen at North Rothbury in the Cessnock local			No	Not recorded over development site, and outside of range. .

Candidate credit species	Habitat constraints and / or geographic restrictions	Threatened Biodiversity data Collection habitat (NSW DPIE,2019)	BC Act Listing	EPBC Act Listing	Candidate credit species assessed presence	Rationale
		government area. Within this range, there are three main sub-populations which comprise approximately 90% of the total population. The other 10% of the population occurs as scattered individuals in what is a relatively disturbed landscape. It is found in dry open forest or woodland dominated by Spotted Gum (*Corymbia maculata*), Broad-leaved Ironbark (*Eucalyptus fibrosa*) and/or Narrow-leaved Ironbark (*E. crebra*) and supporting a moderate to sparse shrub layer and grassy groundcover. The majority of the population is known to occur on silty sandstone soils derived from the Farley Formation.				
Pterostylis chaetophora		Recorded in Queensland and NSW. In NSW it is currently known from 18 scattered locations in a relatively small area between Taree and Kurri Kurri, extending to the south-east towards Tea Gardens and west into the Upper Hunter, with additional records near Denman and Wingen. The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey.	V	-	No	Habitat degraded due to long term slashing/heavy grazing and weed cover and this species is discounted. Nearest record is near North Rothbury. All records are over coastal valley floors/lowlands. Not recorded during surveys.

STAGE 2- IMPACT ASSESSMENT

5.0 IMPACT ASSESSMENT

Only relevant sections within Stage 2 of this BCAR are documented.

5.1 Avoid and minimise

Note that the NSW DPE recommended conservation zoned land off site to east (but over land owned by the proponent) can be retained as native vegetation/riparian zone/wildlife corridor, and not developed.

5.1.1 Avoidance measures (pre-construction)
5.1.2 Avoidance measures (construction and operation phases)
5.1.3 Operation

5.2 Assessment of unavoidable impacts

Assessment of direct and indirect impacts unable to be avoided has been undertaken in accordance with the BAM (OEH 2020). The following direct and indirect impacts are unable to be avoided in progressing the proposed development.

The project would affect biodiversity, including threatened biodiversity through both direct and indirect impacts during construction and operation.

The direct and indirect impacts associated with the project and measures to offset and manage biodiversity in the long term are outlined the following sections.

5.3 Direct Impacts

Direct impacts arising from the project include:

- Clearing of vegetation to the extent specified in Table 1. The extent of clearing of native vegetation communities is estimated to be 0.7Ha, with the entire development site already grazed/slashed regularly.

5.4 Indirect impacts

Potential indirect impacts arising from the project are outlined and addressed in Table 7 below. Consideration of indirect impacts was undertaken across an area encompassed by a 1500 metre buffer around the subject land.

Table 8: Assessment of indirect impacts

Indirect Impact	Assessment / likelihood of occurrence

Inadvertent impacts on adjacent habitat or vegetation including trampling	The proposed development may result in increased weeds and potential vegetation disturbance /inadvertent impacts on adjacent retained habitat or vegetation. The following measures will assist in mitigating these impacts: • Implementation of CEMP. • No go fencing during construction and delineation of all remnant vegetation areas & hollow bearing trees within 20m of the development site signage "Conservation Area-please keep out" or the like. • Tool Box all workers, about no go areas. Mitigation measures implemented during the construction and operations phases of the project will assist in ensuring no encroachment to adjacent vegetation and habitat by construction workers or permanent residents, etc during operation of the development.
Reduced viability of adjacent habitat due to edge effects.	The proposed development will result in an increase in edge effects impacting upon the retained vegetation. The CEMP should include measures to minimise weed encroachment within APZs bordering adjacent habitat.
Reduced viability of adjacent habitat due to noise, dust or light spill.	Mitigation measures outlined above and standard construction environmental controls will ensure potential impacts are minimised.
Transport of weeds and pathogens from the site to adjacent vegetation.	The potential introduction and spread of weeds and pathogens will be managed through implementation of weed hygiene controls as part of a CEMP during construction.
Loss of breeding habitats.	The proposed development will remove no hollow-bearing trees. Therefore there is no impact over breeding habitat for hollow dependant fauna. There is a loss of other breeding habitat such as trees.
Rubbish dumping.	The CEMP will clearly set out waste management areas and procedures during construction of the development. During the operational phase, the CEMP will include measures to monitor and respond to rubbish dumping within the development site and interface with adjacent vegetation.
Wood collection.	The CEMP will include measures to monitor and respond to illegal wood collection within the subject land and interface with adjacent vegetation (such as locked gates).
Increase in predatory & pest fauna species populations.	Waste management measures implemented as part of the CEMP will mitigate the potential increase in predator species populations.
Change in fire regime of native vegetation and associated habitats	The construction and operation of the development site is unlikely to lead to a substantial change in the fire regime of adjacent vegetation and habitats.
Disturbance to specialist breeding and foraging habitat.	There will be some indirect disturbance to retained hollow bearing trees (HBT) providing breeding & foraging habitat, as well as direct removal of around 1.6 hectares of forest habitat, most being already cleared/regrowth.
Fragmentation of movement corridors.	No fragmentation proposed. It is considered this is not likely to result in substantial or significant adverse impedance to fauna species mobility.

5.5 Prescribed impacts

Assessment of prescribed biodiversity impacts are outlined and addressed in Table 6 below.

Table 9: Assessment of prescribed impacts

Prescribed Impact	Assessment / likelihood of occurrence
Impacts of development on the habitat of threatened species or ecological communities associated with karst, caves, rocks, crevices, cliffs and other features of geological significance.	No karst, caves, crevices, cliffs and other features of geological significance will be impacted by the proposed works and no threatened species associated with these features were recorded during the assessment. No bush rock will be impacted by the proposed works (not present over site) and no threatened species associated with this habitat feature were recorded during the assessment.
Impacts of development on the habitat of threatened species or ecological communities associated with human made structures.	No human made structures will be impacted by the proposed works (house & sheds to stay at this stage) and no threatened species associated with this habitat feature were recorded during the assessment.
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation.	0.7Ha hectares of Forest affected directly, being an Endangered Ecological Community. Threatened species including microbats, birds, & mammals and possibly amphibians and reptiles may forage in areas of undisturbed/scattered trees/native vegetation affected over the development site from time to time. However similar habitat is extensive in the locality and subregion. The loss of this vegetation is expected to result in a low impact to threatened species. The impact is not considered a SAII to any species.
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The proposed development will not sever any connectivity in the broader locality and as such, impacts to species using the site is considered low (Fig 8). The proposed conservation land/riparian zone offsite adjoin site to east will maintain connectivity around the site.
Impacts of the development on movement of threatened species that maintains their life cycle	The proposed development is not considered to impact on the movement of threatened species that maintains their survival. Species considered likely to utilize the subject land are highly mobile and connectivity will be maintained within remnant vegetation over the subject land and surrounding extensive native forests.
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including subsidence or subsidence resulting from underground mining or other development)	The subject land includes no mapped Coastal management SEPP Coastal Wetland, and no streams or wetlands, although they are located close by to the east. Based on the results of field survey, it provides: • No known foraging potential foraging and breeding habitat for any threatened frog species due to its location/habitat/known Bionet records/water quality disturbance/grazing/lack of vegetation. • Limited potential habitat for any other threatened ecosystem credit fauna species.

	Construction of the development and associated infrastructure will employ industry standard erosion and sedimentation control measures to mitigate potential for polluted or sediment-laden water to flow beyond the construction area and into any stream or overland flow. Minimal clearing through the creek line for boundary is recommended. The construction and operation of the proposed development is not expected to substantially alter the groundwater or surface hydrology that sustains potential threatened species off site such as amphibians, wetland birds and threatened ecological communities.
Impacts of wind turbine strikes on protected animals	The proposed development does not include operation of wind turbines.
Impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	Native vegetation adjacent to the subject land supports foraging habitat for a variety of threatened species such as birds, microbats and potentially other species. Habitat connectivity is to be retained. The proposed development will increase vehicle movements along the access road (Avery Lane). Therefore there is a potential increase in the risk of vehicle strikes to threatened species over this road, however the access road is of low speed, minor road with low vehicle usage at present, thereby low overall low risk to fauna from vehicle strike along the access road anticipated.

5.6 Adaptive Management Strategy

The proposed development will have some direct impacts to biodiversity in the locality and may have some indirect impacts to adjacent habitats. The severity and consequence of direct and indirect impacts are sufficiently well understood that a detailed adaptive management strategy which includes measures to monitor impacts, is not considered necessary. The CEMP should include actions to monitor, assess and adaptively manage the effectiveness of planned mitigation measures.

5.7 Use of Biodiversity Credits to Mitigate or Offset Indirect or prescribed impacts

The total number and classes of biodiversity credits required to be retired for the project are summarised in the BAM Calculator, and a report showing these is shown Appendix 8.

Although not required at this stage it shows the type and amount of likely credits generated.

The proponent would if deciding to further develop this land at DA stage discharge the biodiversity offset obligations of the project through the retirement of the full number of like-for-like credits and/or payment in to the Biodiversity Conservation Fund, or through a private broker (if credits available) of an equivalent amount of credits as calculated using the BAM Offsets Payment Calculator.

6.0 IMPACT ON BIODIVERSITY VALUES

6.1 Impact thresholds for assessment and offsetting impacts

This section outlines the thresholds for assessment and offsetting impacts in accordance with the BAM.

6.2 Serious and irreversible impacts

Under the BC Act 2016, a determination of whether an impact is serious and irreversible (SAII) must be made in accordance with the principles prescribed in section 6.7 of the BC Regulation.

The "*Guidance to assist a decision maker to determine a serious and irreversible impact*, 2019, sets out those potential SAII species and ecological communities (known as "potential SAII entities".

The principles for determining serious and irreversible impacts in the Biodiversity Conservation Regulation, 2017 are:

- *will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or*
- *will further reduce the population of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or*
- *are impacts on the habitat of a species or area of ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or*
- *are impacts on a species or ecological community is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.*

6.3: Potential SAII entities

Threatened species which have either been recorded within the subject land or are expected to inhabit the development site and which the proposed development may impact upon any candidate SAII entity as listed in Appendix 2 or ecological communities listed in Appendix 3 of the '*Guidance to assist a decision-maker to determine a serious and irreversible impact*' (OEH 2017e) have been addressed in Table 8.

Table 10: SAII impact evaluation

Potential SAII entities	Impact evaluation	Impact thresholds	Serious and irreversible impact?
Regent Honeyeater	Habitat present, and not associated with this vegetation type (from NSW DPIE threatened species profile	Within a NSW DPIE mapped important area (Fig 23-24).	No.

	database), is over a key mapped threshold area. Low impact anticipated.	Area impacted is considered low (0.42Ha) with surrounding extensive habitat present. Regent Honeyeater over the region where they have known habitat occurs over 1000's of hectares of Lower Hunter Spotted Gum Ironbark Forest and some other vegetation types. Werakata NP also has large areas preserved. This site offers habitat, however it is marginal as discussed below.	
Swift Parrot	Habitat present, not associated with this vegetation type (from NSW DPIE threatened species profile database), is over a key mapped threshold area. Low impact anticipated.	Within a NSW DPIE mapped important area (Fig 23-24). Area impacted is considered low (0.42ha) with surrounding extensive habitat present. Swift Parrot over the region where they have known habitat occurs over 1000's of hectares of Lower Hunter Spotted Gum Ironbark Forest and some other vegetation types. Werakata NP also has large areas preserved. This site offers habitat, however it is marginal as discussed below.	No
Large eared Pied Bat (*Chalinolobus dwyeri*)	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies.	Species roosting or breeding habitat is not present within the development site.	No
Eastern Cave Bat (*Vespadelus troughtoni)*	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals.	Species roosting or breeding habitat is not present within the development site.	No
Miniopterus australis	Little Bentwing-bats breed in caves, tunnels, abandoned	Species breeding habitat not present within the development site.	No

Little Bentwing-bat (Breeding)	mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.		

6.3.1: Potential SAII entities - Swift Parrot & Regent Honeyeater SAII Assessment

The subject site lies within a Mapped Important Area for Swift Parrot & Regent Honeyeater (Fig 23-24). Therefore an assessment is carried out below in accordance with the BC Act, to determine if a potential SAII. Information also added here to address NSW DPE & Cessnock City Council comments:

1. *SAII assessment is required for regent honeyeater and swift parrot. The SAII assessment for regent honeyeater and swift parrot 'important areas' should consider the following matters:*

a. *Condition/age of feed trees including occurrence and quality of the favoured blossom feed trees outlined in the Swift Parrot and Regent Honeyeater Recovery Plans*

The National Recovery Plan for the Regent Honeyeater, Department of Environment, 2016, states:

"Key tree and mistletoe species for the regent honeyeater include:

- Mugga (or Red) Ironbark, *Eucalyptus sideroxylon*
- Yellow Box, *E. melliodora*
- White Box, *E. albens*
- Yellow Gum, *E. leucoxylon*
- Spotted Gum, *Corymbia maculata*
- Swamp Mahogany, *E. robusta*
- Needle-leaf Mistletoe, *Amyema cambagei* on River Sheoak, *Casuarina cunninghamiana*
- Box Mistletoe, *A. miquelii*
- Long-flower Mistletoe*, Dendropthoe vitellina"*

None of these species was recorded over the site. The site is dominated by *Eucalyptus tereticornis*, of ages from 1 year to 30 years, although a few are older than this around approximately 50 years old (from looking at tree height, girth, lack of hollows, historic aerial photography, etc).

b. *Diversity of Eucalypt species present*

Almost predominately *Eucalyptus tereticornis,* some minor planted Spotted Gum (only one or two), and a few *Angophora floribunda*.

c. *Occurrence and quality of favoured lerp trees and mistletoe*

No lerp trees or mistletoe trees seen over site.

d. *Occurrence of competitor species (e.g. rainbow lorikeets, noisy miners, red wattlebirds, noisy friarbirds etc.)*

Rainbow Lorikeets were recorded over the site. It is likely all of these competitor species would frequent this site as fragmented, small patch size, and part fragmented from more extensive vegetation patches to west by new cleared subdivision/agricultural land, and by Hunter Expressway to south.

The National Recovery Plan for the Regent Honeyeater, Department of Environment, 2016, states "The species also faces increased competition from larger, more aggressive nectivores, such as the noisy friarbird (*Philemon corniculatus*), red wattlebird (*Anthochaera carunculata*) and the noisy miner (*Manorina melanocephala*). Recent research also suggests nest predation is impacting the species' ability to recruit sufficiently in favourable years".

This increased competition is likely to occur over this site.

e. *Connection to other habitat areas and fragmentation*

Limited connectivity- see Fig 8.

f. *Availability of water to the site*

Yes, nearby Wallis Creek.

g. *Landscape productivity (soil types/fertility, slope)*

Soils are shallow, with sandstone outcropping in flat sheets over some parts of the site. Fertility is likely low, being red or yellow podzolics (see Section 2.7). Low slope around existing dwelling, then steep downslope dropping down to Wallis Creek.

h. *Any evidence of site fidelity (i.e. preference to use the site)*

Regent Honeyeater

No. No Bionet records over or within 4kms of this site, and no evidence to show any use of this site (see Bionet records map- Appendix 5). The closest records of Regent Honeyeater are over 4 kilometres away at Weston. The main recorded locations of Regent Honeyeater in the region are over the Tomalpin Forests (around 6kms from this site). This area is a known key breeding area in the Hunter Valley (Figure 1 of the National Recovery Plan for the Regent Honeyeater, Department of Environment, 2016). It is not located over or near the subject site. It is part located over Werakata National

Park, although the majority is outside of that area over private lands/Lower Hunter Economic Zone.

This site is close to a public road and freeway. If these birds were present it is likely there would be Bionet records as easily seen/accessed in this semi urban area.

Swift Parrot

No. No Bionet records over or within 3kms of this site, and no evidence to show any use of this site (see Bionet records map- Appendix 5). The closest records of Swift Parrot are over 4 kilometres away at Stanford Merthyr. The main recorded locations of Swift Parrot in the region are over the Tomalpin Forests (around 6kms from this site).

This site is close to a public road and freeway. If these birds were present it is likely there would be Bionet records as easily seen/accessed in this semi urban area.

i. Cumulative impacts where known.

Clearing recently for subdivision to west of this site, including trees nearby. Clearing for Averys Lane upgrade, with some large trees removed. Clearing further north-west over residential subdivisions around Heddon Greta. Clearing for Hunter Expressway. Former extensive agricultural clearing over this site and surrounds, continuing agriculture and clearing over floodplain.

The proposed rezoning, and potential intensification of land use may have long term edge effects and an indirect impact on retained foraging habitat. This is through weeds, light, human disturbance through trampling, light spill at night, noise, dogs, illegal clearing, etc.

Access to the water source will be retained for wildlife, as connectivity retained north-south through the eastern retained riparian zone part of the site.

A VMP & covenant protecting this land is perpetuity is recommended and would assist in managing some of these issues, such as weeds, and potentially human disturbance.

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

In this case the development footprint was primarily cleared as of 1990, and has since part regrown/some vegetation planted. It is a mapped important Swift Parrot & Regent Honeyeater area. The proponent would like to retain all vegetation over the proposed R2 zoned land. NSW DPE has recommended "*The proponent has suggested that conservation areas could be provided to the east of the development site along the waterfront adjoining Wallis Creek to compensate for the impacts on biodiversity. It is recommended that the C2 (Environmental Conservation) zone is extended as presented in the Council's planning proposal and that some further mechanism is put in place to ensure management of the remnant vegetation in this area*".

This recommendation is likely to be adopted, and a draft plan is presented in Figure 3e & 3f. This rezoning plan was presented to Council prior to the Planning proposal being submitted to Council. Council recommended removal of the E2 (now C2) zone. It is what the proponent originally wanted for this site, until Council advised this could not occur.

The recommended NSW DPE conservation C2 land/riparian zone and all vegetation over it being around 0.5Ha of Hunter Lowland Redgum Forest Endangered Ecological Community extending upslope from Wallis Creek to the eastern border of the proposed R2 zone would be retained (Fig 3e & 3f), and impact avoided over that area, which is also mapped important Swift Parrot & Regent Honeyeater area. This would conserve most remnant vegetation over the site. A VMP & covenant is recommended to be placed over this vegetation as a condition of consent by Council to avoid any future removal, disturbance, etc.

(b) the size of the local population directly and indirectly impacted by the development, clearing or biodiversity Development

There is a proposed removal of 0.42Ha of mapped Swift Parrot & Regent Honeyeater habitat.

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

No threshold is noted by NSW DPIE from the threatened species database description for either species.

(d) the likely impact (including direct and indirect impacts) that the development, clearing or biodiversity Development will have on the habitat of the local population, including but not limited to:
(i) an estimate of the change in habitat available to the local population as a result of the proposed development

NSW DPIE state:

- Draft swift parrot important areas within NPWS estate 28,700ha;
- Draft swift parrot important areas within Hunter IBRA subregion 18,000ha.

These areas of habitat are similar to Regent Honeyeater important areas habitat as both birds have similar foraging requirements, and can be inferred that Regent Honeyeater has at least 18 000Ha of habitat in the Hunter.

Therefore the loss of 0.42Ha will have a very low impact. This is particularly evident over this site where no known Regent Honeyeater records exist, no listed feed trees /mistletoe exist, and soils are poor/low nutrient, and not preferred habitat of Regent Honeyeater.

(ii) the proposed loss, modification, destruction or isolation of the available habitat used by the local population, and

Low. Extensive habitat is present further south and west of this site, although it has reduced in extent due to ongoing clearing for residential subdivisions locally. The main local populations of both species are over the Tomalpin Forests, which are unaffected by this proposal.

(iii) modification of habitat required for the maintenance of processes important to the species life cycle (such as in the case of a plant "pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.

Negligible, as stated above.

(e) the likely impact on the ecology of the local population. At a minimum, address the following:
(i) for fauna:
– **breeding** – no impact, as breeds in Tasmania only for Swift Parrot, and over the Tomalpin Woodlands at Stanford Merthyr and Mudgee for Regent Honeyeater.
– **foraging** – very low, limited to loss of 0.42Ha, as feed trees affected over the site.
– **roosting, and** – negligible.
– **dispersal or movement pathways** – no impact.

(ii) for flora, address how the proposal is likely to affect the ecology and biology of any residual plant population that will remain post development including where information is available:
– **pollination cycle**
– **seedbanks**
– **recruitment, and**
– **interactions with other species (e.g. pollinators, host species, mycorrhizal associations)**

N/A

(f) a description of the extent to which the local population will become fragmented or isolated as a result of the proposed development:

The local population (read Tasmanian population for Swift parrot), and Regent Honeyeater will not become fragmented or isolated as a result of the proposed development.

(g) the relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range

The local Swift Parrot population (Tasmanian whole population) occurs across NSW in winter, dependant on availability of flowering trees, according to the Swift Parrot Threatened Species Profile. This development will have low impact on the supply of foraging trees, or other individuals within the Tasmanian population.

Regent Honeyeater (from NSW DPIE) "*mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.*

The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.

(h) the extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population

Loss of feed trees /foraging resources & hollow bearing habitat trees of 0.42ha directly.

(i) an estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion

NSW DPIE threatened species profile state around 2000 Swift Parrot are left, and around 300 Regent Honeyeater remain in the world.

(j) the measure/s proposed to contribute to the recovery of the species in the IBRA subregion.

It is recommended that all habitat /feed trees outside of the development footprint are retained, and cleared areas rehabilitated and allowed to regenerate. The proposed NSW DPE conservation land/riparian zone adjoining site to east should be conserved, and not developed (or allowed to be developed in zoning). A VMP & covenant protecting remnant vegetation over that area in perpetuity (around 0.5Ha of habitat) should be a condition of consent.

The principles for determining serious and irreversible impacts in the Biodiversity Conservation Regulation, 2017 are:

- *will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or*
- *will further reduce the population of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or*

- *are impacts on the habitat of a species or area of ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or*
- *are impacts on a species or ecological community is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.*

This site adjoins fragmented forested lands, being predominantly cleared in this area. There are thousands of hectares of suitable habitat being part of Werakata National Park, and other reserves nearby and other private forested lands, which contain suitable winter flowering feed trees including many hundreds of thousands of Spotted Gum/Swamp Mahogany/Eucalyptus tereticornis trees providing winter flowering foraging habitat.

The proposal is in the authors professional opinion will:

- not likely to cause a further decline of the species, or;
- not further reduce the population of the species, or;
- species foraging range is very broad (half of NSW according to Swift Parrot & Regent Honeyeater NSW DPIE profile map/ Figure 1 of the National Recovery Plan for the Regent Honeyeater, Department of Environment, 2016 N), and it does not have a very limited geographic distribution;
- Therefore the development is not considered to impact on Swift Parrot or Regent Honeyeater such that it places them at risk of extinction.

7.0 APPLYING THE NO NET LOSS STANDARD

7.1 Quantifying offset requirements for direct impacts

The BAM identifies the BAM Calculator as the appropriate tool for quantifying the offsets required in both Ecosystem Credit and Species Credit terms. A calculation of the nature and extent of offset credits required due to biodiversity impacts associated with the project has been undertaken using the BAM Calculator.

As outlined in Section 10.3.1 of the BAM, an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥15 where the PCT is representative of an endangered or critically endangered ecological community.
- ≥17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community.
- ≥20 where the PCT is not representative of a TEC or associated with threatened species habitat.

7.2 Impacts over native vegetation and threatened flora species

The proposed development site will result in impacts to:

- 0.3 hectares of PCT 1598 (Category 2 land), which includes Swift Parrot & Regent Honeyeater mapped important area.

The vegetation integrity score for this PCT/vegetation zone (as all in the same condition and considered one vegetation zone) within the development site is greater than 15, therefore impacts on this PCT will require offsetting (in the future if developed).

The vegetation integrity score for the future is taken as 0 for the development site, as shown in the BAM Calculator.

7.3 Areas not requiring assessment

Areas of land not containing native vegetation or threatened species habitat or already approved for clearing and therefore not requiring offsetting are all those areas outside of the development area/Category 1 exempt lands under LLS Act. They are still assessed however for potential prescribed impacts.

7.4 Biodiversity credits

This section provides a summary of biodiversity credits required for impacts on the biodiversity values within the development site ((in the future if developed), following consideration of measures to avoid, minimise and mitigate impacts.

Table 11 and Table 12 provide a summary of ecosystem credit and species credit requirements respectively resulting from the proposed development. The full credit profile is provided in Appendix 8.

Table 11: Summary of ecosystem credits for all vegetation zones.

Vegetation mapping	PCT-best fit	Cleared area (Ha)	Required credits
PCT 1598- F*orest Red Gum grassy open forest on floodplains of the lower Hunter*	PCT 1598-	0.3Ha	6
TOTAL			**6**

Table 12: Summary of species/candidate credits for all vegetation zones.

Species Credit Species	PCT-best fit	Area (Ha)/number	Required credits
Lathamus discolor (Swift Parrot)	PCT 1598	0.3Ha	9
Anthochaera phrygia (Regent Honeyeater)	PCT 1598	0.3Ha	9

7.5 Strategy to meet biodiversity offset requirements

The total number and classes of biodiversity credits required to be retired for the project are summarised in the BAM Calculator, and a report shown in Appendix 7.

The proponent proposes to discharge the biodiversity offset obligations of the project through the retirement of the full number of like-for-like credits and/or payment in to the Biodiversity Conservation Fund, or through a private broker (if credits available) of an equivalent amount of credits as calculated using the BAM Offsets Payment Calculator when/if required at DA stage.

8.0 ASSESSMENT AGAINST BIODIVERSITY LEGISLATION AND POLICIES

8.1 *Environment Protection and Biodiversity Conservation Act 1999*

This Act is related to actions which may have a detrimental impact on matters of National Environmental Significance (NES). This includes:

- Nationally Threatened Species (including koala) and Ecological Communities,
- Listed Migratory Species which may be relevant to this site
- Declared world heritage sites
- Ramsar Wetlands
- Nuclear actions
- Actions in a Commonwealth marine area.

For the purposes of this Act this report should be used by the determining authority to allow an Assessment of whether the site requires approval from Department of Environment. It is an offence to carry out an action that will or is likely to have a significant impact on one of the above NES matters without first obtaining an approval from the Commonwealth Environment Minister except where an exemption in the EPBC Act applies. A Bionet database search which includes listed locally recorded federal threatened species has been produced (Appendix 5), and BAM calculator generated species are shown in Tables 4 & 6.

The site is not a Declared World Heritage Site, Ramsar Wetland, has no Federal listed Endangered Ecological Communities present, and Nuclear Actions/Actions in a Commonwealth marine area are not relevant. There is habitat present for some listed EPBC threatened species, which are addressed within this BCAR stage 1 (Table 5), particularly Grey Headed Flying Fox and Koala. There is no significant impact anticipated to any species, primarily due to the very low impact (0.7Ha/ 0.3Ha over LLS Cat 2 lands). The project in the consultant's opinion conforms to the *EP&BC Act 1999* and does not need referring to Federal Department of Environment.

Biodiversity Conservation Act 2016.

The *BC Act 2016* repeals the *Threatened Species Conservation Act 1995* (NSW), the *Native Vegetation Conservation Act, Nature Conservation Trust Act 2001* (NSW) and parts of the *National Parks and Wildlife Act 1974* (NSW).

The BC Act establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments. Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the new Biodiversity Assessment Method (**BAM**).

The purpose of the Act (from Austlii, Aug,2017) relevant to this Biodiversity Assessment Report is:

The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development.

OEH state: - *"The test of significance detailed in section 7.3 of the Biodiversity Conservation Act 2016 must be used to determine whether a local development is likely to significantly affect threatened species.*

Proponents will need to supply evidence relating to the triggers for the Biodiversity Offsets Scheme (BOS) *Threshold and the test of significance when submitting their application to the consent authority.*

Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

The area threshold applies to all proposed native vegetation clearing associated with a development proposal – for example in the case of a subdivision; all future clearing across the lots subject to the subdivision, must be considered". Table 2 shows the proposed clearing amount, and other details.

Table 1: Area clearing thresholds (from *Biodiversity Conservation Regulation 2017 cl. 7.2 (4)*)

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

Biodiversity Values Map (BV Map)

OEH 2018 (www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap) state: - "*The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the Biodiversity Conservation Regulation 2017. The Biodiversity Offsets Scheme applies to all local developments, major projects or the clearing of native vegetation where the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 applies. Any of these will require entry into the Biodiversity Offsets Scheme if they occur on land mapped on the Biodiversity Values Map. Exempt and complying development or private native forestry are not subject to the Biodiversity Offsets Scheme".*

The subject development site is mapped on the Biodiversity Values Map (Fig. 7).

An assessment of prescribed and indirect impacts is undertaken within Section 9 of this report which found no prescribed or indirect impacts are applicable.

Therefore this proposal does trigger the BC Act Stage 1 BCAR assessment requirements (Table 2) under this criteria.

5 Part Test

Under the *Biodiversity Conservation Act 2016 (Sect 7.3)*, a 5 Part Test is undertaken to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

Under the *Biodiversity Conservation Act 2016* Part 4 development work will require a 5 Part Test for any clearing of native vegetation, impacts over threatened flora/fauna species and Endangered Ecological Communities.

The "Five Part Test of Significance" was not required in this instance as a Part 3 rezoning, and a BCAR has been prepared.

This report has also addressed other relevant ecological factors (over the site such as threatened species observations, Endangered Ecological Communities, hollow bearing habitat trees, other habitat features such as caves, hollow logs, connectivity, water bodies/creeks, and details amount of native vegetation clearing proposed for the development.

Table 2: Summary of BC Act triggers applicable to the subject site

Land zone & Development type (under EP& A Act) & land type under LLS Act	Minimum lot size associated with the property	Applicable threshold for clearing, above which the BAM and offsets scheme apply	Biodiversity Values mapped over site?	Proposed clearing (Ha) over LLS Cat 2 land	5 Part Test Assessment of significance required?	Full BCAR required
RU2, Part 3, Cat 1 & Cat 2 lands	40Ha	1ha or more	No	0.3Ha	No	Yes (Stage 1 streamlined BCAR)

*See 5 Part Test results, no significant impact on any threatened species, Endangered Ecological Community or critical habitat was found.

Planning data obtained from www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/lot, and Native Vegetation Regulatory map, 2nd March, 2022.

Local Land Services Act, 2013

Rural land is defined as land zoned as RU1, RU2, RU3, RU4, RU6 and deferred matters. RU5 is considered not to be rural land.

If your proposed activity is on an area zoned as non-rural (e.g. urban, peri-urban, environmental zones) under a local council's Local Environmental Plan) then the Biodiversity Conservation Act will need addressing.

Rural land in NSW is categorised into:

- *Exempt land (Category 1) - category 1 is land cleared of native vegetation as at 1 January 1990 or lawfully cleared after 1 January 1990, Low conservation grasslands, Land containing only low conservation groundcover (not being grasslands).*
- *Regulated land (Category 2) – Land not cleared as at 1 January 1990 or unlawfully cleared after 1 January 1990, grasslands that are neither low nor high conservation grasslands* (includes all native groundcover >50% canopy cover)*, protected riparian areas, land susceptible to erosion, or land that is otherwise environmentally sensitive, coastal wetlands and littoral rainforests (Coastal Management Act 2016), high conservation grasslands, core Koala habitat identified in a plan of management (Koala Habitat Protection State Environmental Planning Policy), critically endangered plants and critically endangered ecological communities, land subject to a condition of development consent requiring the land to be set aside for conservation purposes under the Environmental Planning and Assessment Act 1979, rainforest and old-growth forest.*
- *Excluded land (Category 3).*

NSW Local land Services state for land/activities not requiring a DA:

If your land is 'exempt' (Category 1), and therefore unregulated, you can remove native vegetation so long as you do not knowingly harm an animal or damage the habitat of an animal that is a threatened species or part of a threatened ecological community.

If your land is regulated (Category 2) you can undertake a range of allowable activities which are routine land management activities associated with agriculture and other common practices in rural zoned areas. All other required statutory approvals must be obtained before clearing for a work, building or structure.

There are three (3) Allowable Activity Zones in NSW: the Western, Central and Coastal Zones. The maximum clearing distances for allowable activities are different for each zone. Clearing for allowable activities does not require approval under the Local Land Services Act 2013.

The 'Allowable activities for landholders' covers:

- *imminent risk*
- *firewood collection*
- *construction timber*
- *planted native vegetation*
- *private power lines*
- *airstrips*
- *traditional Aboriginal cultural activities*
- *environmental protection works*
- *sustainable grazing*
- *firebreaks*
- *mulga species for stock fodder on a landholding*
- *maximum clearing distances for rural infrastructure.*

Rural infrastructure is defined as a building, structure or work that is used for the purposes of, or in connection with, an activity that is being carried out in a regulated rural area of the State but only if the activity does not require development consent under the Environmental Planning and Assessment Act 1979.

Where land is classed as Category 2 – vulnerable regulated land or Category 2 – regulated sensitive land, allowable activities are limited, and reduced maximum clearing distance applies. On Category 2 - vulnerable regulated land and Category 2 - sensitive regulated land, clearing for rural infrastructure is allowed for:

- *permanent boundary fences*
- *permanent internal or temporary fences*
- *farm track, if the track is necessary for access and the route of the track minimises clearing.*

Clearing for rural infrastructure must be undertaken to the minimum extent necessary to build and maintain rural infrastructure. The maximum distance of clearing for rural infrastructure in each zone and on small landholding is:

- *Central zone* (includes Cessnock) – *30m*
- *Coastal zone- 15 metres*

NSW DPIE state in regard to assessing development impacts on Category 1 - exempt land and the Biodiversity Offset Scheme:

The Biodiversity Assessment Method (BAM) applies to clearing and development proposals on Category 1 - exempt land (as per Part 5A Local Land Services Act 2013*) in some circumstances. Clearing of native vegetation on Category 1 - exempt land does not require assessment or offsetting under the BAM (in accordance with section 6.8 of the Biodiversity Conservation Act 2016). In practice, this means that native vegetation on Category 1 - exempt land is not included in any area clearing calculations when determining whether the Biodiversity Offset Scheme (BOS) applies to a proposal.*

Assessment of prescribed biodiversity impacts on Category 1 - exempt land is required for a clearing proposal or development where the BOS applies. This includes:

- *local development assessed under Part 4 of the Environmental Planning and Assessment Act 1979*
- *activities assessed and determined under Part 5 of the Environmental Planning and Assessment Act 1979*
- *clearing of native vegetation that requires approval by the Native Vegetation Panel under the Local Land Services Act 2013.*

Prescribed impacts are listed in Clause 6.1 of the Biodiversity Conservation Regulation 2017 and requirements for the assessment of these impacts are set out in the BAM.

In this case the development site is part mapped. The land category where not mapped on the Native Vegetation regulatory map is determined on site by the consultant/Council.

Rural land classes for the subject site are shown on the Transitional Native Vegetation regulatory Map (Fig 15). A more accurate map (as mapped by PEAK LAND MANAGEMENT after site inspection) is shown in Figure 17. This takes into account the following:

- Parts of the site have trees considered to predate 1990, and therefore these parts of the site are considered Category 2 land (see old aerial photo from 1991- Fig 16).
- Other cleared or regrowth areas post 1990, which retain >50% native groundcover, are classed as Category 2 land (ie riparian zone).
- Cleared land with <50% native groundcover is classed as Category 1 land.
- Assumes land over the development site where cleared now for the dwelling, sheds, driveway etc was authorised clearing;
- Land mapped on the Biodiversity Values Map is mapped due to Regent Honeyeater & Swift Parrot Critically endangered bird habitat/NSW DPIE mapped important area. It is *environmentally sensitive* land. It is therefore classed as Category 2 vegetation over those areas.
- Fence lines will presumably be constructed over the new subdivision property boundary. Fence lines are already in place, and no further clearing proposed or required. A restrictive covenant under *Section 88B of the Conveyancing Act 1919* that restricts clearing to a maximum of 4m wide for the boundary fence construction over the proposed R lot (ie where already cleared) and ongoing fence maintenance can be put in place if required at DA stage. This therefore demonstrates that the LLS Act allowable boundary clearing activity of 30m wide, or Rural Fire Service boundary clearing of 25m, cannot be used. It therefore protects remnant riparian zone vegetation.

All clearing impact based upon Fig 20.

Therefore the BC Act will need addressing for those parts of the site mapped as Category 2 land, and any other unmapped parts of the site which are treed and classed as Category 2 lands where impact proposed.

Note- all areas impacted (incld Category 1 mapped areas) are assessed in this report for the purposes of Councils Flora & Fauna Survey Guidelines.

8.2 *Water Management Act, 2000 – Riparian Management Water Management (General) Regulation 2018*

This Act is administered by the Natural Resources Regulator (NRAR) and controls works along rivers and foreshore areas of streams or drainage lines, termed waterfront land where within 40m of a mapped (as shown on a topographic map) lake or creek.

The WM Act provides for the sustainable and integrated management of the state's water for the benefit of both present and future generations based on the concept of ecologically sustainable development. Under the WM Act an approval is required to undertake controlled activities on waterfront land, unless that activity is otherwise exempt under Section 91E.

Waterfront land is defined within the Act as the bed of any river, lake or estuary and any land within 40 metres of the river banks, lake shore or estuary mean high water mark.

There will be riparian vegetation clearing proposed over the 40m wide riparian zone for the boundary line only between the R zoned lot and NSW DPE conservation land/riparian zone adjoining site to east & Asset Protection Zone (Fig 21). This is primarily over previously cleared land which now has some native tree, shrub & lantana regrowth. The proposed rezoning developable R2 land is within 40m of a water body/waterfront land, which is a fourth order stream with 40m riparian zone applicable (Wallis Creek).

It is Councils/NSW DPIE prerogative whether the proposal should be referred to NRAR.

The waterway is mapped on the 1:25,000 topographic map for the region. A controlled activity permit may be required. Referral to NRAR is at the discretion of NSW DPE/Cessnock City Council.

Appropriate erosion and sedimentation control principles, should be followed nevertheless for any works to prevent sedimentation/water quality runoff & indirect impacts on local creeks.

8.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

NSW Government, 2021 Fact Sheet states: *"No policy changes have been made. The SEPP consolidation does not change the legal effect of the existing SEPPs, with section 30A of the Interpretation Act 1987 applying to the transferred provisions. The SEPP consolidation is administrative. It has been undertaken in accordance with section 3.22 of the Environmental Planning and Assessment Act 1979.*
The Biodiversity and Conservation SEPP:

- *transfers most existing provisions from the 11 SEPPs being consolidated into chapters 2 to 12. Chapter 1 contains preliminary information and commencement details*
- *repeals the 11 SEPPs being consolidated.*

The Biodiversity and Conservation SEPP incorporates provisions from the SEPPs being consolidated as follows:

- *'Chapter 2 – Vegetation in non-rural areas' contains planning rules and controls from the Vegetation SEPP relating to the clearing of native vegetation in NSW on land zoned for urban and environmental purposes that is not linked to a development application.*
- *'Chapter 3 – Koala habitat protection 2020' contains provisions from the Koala SEPP 2020 and, as an interim measure, applies in the NSW core rural zones of RU1, RU2 and RU3, except within the Greater Sydney and Central Coast areas.*
- *'Chapter 4 – Koala habitat protection 2021' contains the land-use planning and assessment framework from the Koala SEPP 2021 for koala habitat within Metropolitan Sydney and the Central Coast and applies to all zones except RU1, RU2 and RU3 in the short term – it will apply to all zones once the Koala SEPP 2020 is repealed.*
- *'Chapter 5 – River Murray lands' contains the provisions from the Murray REP, which establishes a consistent and co-ordinated approach to environmental planning and assessment along the River Murray.*
- *'Chapter 6 – Bushland in urban areas' contains the provisions from SEPP 19, which seeks to protect and preserve bushland within public open space zones and reservations.*

- *'Chapter 7 – Canal estate development' contains the provisions from SEPP 50, which aims to prohibit canal estate development".*

State Environmental Planning Policy (Koala Habitat Protection) 2021.

The Koala SEPP 2021 reinstates the policy framework of SEPP Koala Habitat Protection 2019 to 83 Local Government Areas (LGA) in NSW. At this stage:

- *In nine of these LGAs – Metropolitan Sydney (Blue Mountains, Campbelltown, Hawkesbury, Ku-Ring-Gai, Liverpool, Northern Beaches, Hornsby, Wollondilly) and the Central Coast LGA – Koala SEPP 2021 applies to **all zones**.*
- *In all other identified LGAs, Koala SEPP 2021 **does not apply** to land zoned RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry.*

For all RU1, RU2 and RU3 zoned land outside of the Sydney Metropolitan Area and the Central Coast, Koala SEPP 2020 continues to apply. This is an interim measure while new land management and private native forestry codes are developed in line with the NSW Government's announcement on 8 March 2021.

The principles of the Koala SEPP 2021 are to:

- *Help reverse the decline of koala populations by ensuring koala habitat is properly considered during the development assessment process.*
- *Provide a process for councils to strategically manage koala habitat through the development of koala plans of management.*

To see where Koala SEPP 2020 and Koala SEPP 2021 apply, visit the Koala SEPP LGA list webpage.

This land is zoned RU2. Therefore SEPP 2020 applies.

The KOALA SEPP 2020 states:

- *Provides a framework for councils to prepare a strategic koala plan of management that would apply to the whole or part of a local government area.*
- *Applies to development applications on land over one hectare in a relevant LGA.*
- *Requires development applications to be consistent with a council strategic koala plan of management that applies to the land, or, if there is no strategic plan, sets out a two-step process to determine if the land is core koala habitat and if it is, produce an Individual Koala Plan of Management before council can grant consent to a development application.*
- *Exempts clearing of vegetation from the application of the SEPP if the purpose of the clearing is to maintain an Asset Protection Zone as part of rebuilding a dwelling destroyed or damaged by bushfire and allows the dwelling to be sited anywhere on the lot.*
- *Saves all Koala Plans of Management approved under SEPP 44 and 2019 Koala SEPP.*

In this Policy:

"core koala habitat" means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

"guidelines" means the guidelines, as in force from time to time, made for the purposes of this Policy by the Director.

"potential koala habitat" means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component".

This SEPP applies across NSW to land which is greater than 1 hectare in extent, including adjoining land in the same ownership whether or not the proposal applies to the whole or only part of the land, and is not a National Park or Forestry Reserve. Therefore this SEPP applies, and will be addressed here.

No scats, tree use marks or visual sightings of koalas were seen on or around the site, including over the development area. Feed trees as listed under this SEPP within Schedule 2 do occur over the subject development site, being Forest Redgum- *Eucalyptus tereticornis*. There is no Koala Plan of Management (KPoM) known to exist over this site. These trees however are >15% cover. There are no Bionet records of Koala in this locality, and insufficient habitat remaining to sustain a breeding colony.

Therefore the subject development site is considered potential Koala habitat, but not core Koala habitat.

It is considered that the proposed works conform to this SEPP, and that no further koala SEPP studies are considered warranted or required under this SEPP.

NSW Rural Fire Service 10/50 Vegetation Clearing Code of Practice for NSW.

NSW Rural Fire Service state:
"The 10/50 Vegetation Clearing Scheme was introduced following the devastating 2013 bush fires in which more than 200 properties were destroyed. If you live in an area close to the bush, you need to prepare your home. The 10/50 Vegetation Clearing Scheme gives people living near the bush an additional way of being better prepared for bush fires.
The scheme allows people in a designated area to:

- *Clear trees on their property within 10 metres of a home, without seeking approval; and*
- *Clear underlying vegetation such as shrubs (but not trees) on their property within 50 metres of a home, without seeking approval.*

This site is within a designated 10/50 Vegetation Clearing Entitlement Area as it is mapped as Bush Fire Prone Land. This Code of Practice has been taken into account, with survey extending 50m from proposed development footprint over the subject site.

NSW Rural Fire Service Rural Boundary Clearing Code, 2021

This code has been abbreviated below, and only sections related to the Hunter and Central Coast are shown here. No all items are shown.

The objective of the Rural Boundary Clearing Code is to simplify vegetation management for owners or occupiers of land for the purpose of bush fire hazard mitigation by allowing them to clear vegetation on their property within 25 metres of their property boundary. This should be undertaken with consideration of environmental impacts.

The Code will apply to any holding within a rural zone within the Boundary Clearing Code Vegetation Map (derived from bush fire prone land 2015 Guide for Bush Fire Prone Land Mapping). Vegetation clearing under this Rural Boundary Clearing Code may only be undertaken on parcels of land (cadastre lots) that are in the rural boundary clearing area as identified on the Rural Boundary Clearing online tool on the day of clearing. Vegetation clearing that is carried out in accordance with this Rural Boundary Clearing Code is considered to be authorised clearing under NSW legislation.

State laws cannot override Commonwealth laws. Clearing in accordance with the Rural Boundary Clearing Code does not constitute an approval (or exemption) under Commonwealth laws, such as the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and the Aboriginal and Torres Strait Islander Heritage Protection Act 1984. The clearing of vegetation under this Rural Boundary Clearing Code can only be conducted with the consent of the landowner.

The types of vegetation that cannot be removed under Sect 6.2 of the Code include:

a. SEPP Coastal Management - Coastal Wetlands (not including the proximity area) as mapped and provided to the NSW RFS by the Department of Planning, Industry and Environment;
b. N/A;
c. N/A;
d. SEPP Coastal Management – Littoral Rainforests (not including the proximity area) as mapped and provided to the NSW RFS by the Department of Planning, Industry and Environment,
e. Core Koala habitat identified at Attachment 'A' as mapped and provided to the NSW RFS by the Department of Planning, Industry and Environment;
f. Ramsar Wetlands;
g. vegetation within 100 metres of the coastline or estuaries of NSW;
h. N/A;
i. N/A;
j. Critically Endangered Ecological Communities (as listed in Attachment A – Vegetation Types) as mapped and provided to the NSW RFS by the Department of Planning, Industry and Environment;
k. N/A;
3. Mangroves and saltmarsh may not be cleared. Mangroves and coastal saltmarsh are as described in NSW Department of Primary Industries Primefact 746 May 2008 – Mangroves, and Primefact 1256 March 2013 – Coastal saltmarsh.

Other items that can not be cleared/disturbed under Sections 6.5, 6.6, 6.7, 6.8, & 6.9 include:

1. *Tree removal is not permitted on slopes greater than 18 degrees except in accordance with conditions identified in a geotechnical engineer assessment report undertaken for that purpose.*
2. *Pruning of trees is only permitted on slopes greater than 18 degrees provided at least 75 per cent of the original canopy cover is retained, except in accordance with conditions identified in a geotechnical engineer assessment report undertaken for that purpose.*
3. *Any areas mapped as protected riparian land in the Biodiversity Values Map are excluded from the Rural Boundary Clearing Code.*
4. *The clearing must not cause stream bank instability and any process that results in declining water quality for any lakes or rivers.*
5. *An Aboriginal Place as mapped and provided to the NSW RFS by Heritage NSW.*
6. *Landowners have a duty of care to avoid harm to Aboriginal heritage when clearing vegetation*
7. *Aboriginal heritage: culturally modified trees (also known as 'Aboriginal scarred trees'), as mapped and provided to the NSW RFS by the Department of Planning, Industry and Environment.*
8. *No clearing may be undertaken of vegetation that is protected by the relevant heritage listing being NSW State heritage as mapped and provided to the NSW RFS by the Department of Planning, Industry and Environment; and local heritage as mapped by councils and provided to the NSW RFS by the Department of Planning, Industry and Environment.*
9. *Protection of vegetation to which a legal obligation exists. Clearing under this Code cannot be inconsistent with any of the following:*
    a. *a condition of development consent or approval under the Environmental Planning and Assessment Act 1979 that identifies and requires the retention and management of vegetation for conservation purposes.*
    b. *an instrument under Section 88B of the Conveyancing Act 1919 that identifies and requires the retention and management of vegetation for conservation purposes.*
    c. *Landowners have a duty of care to avoid cruelty and harm to native, introduced or domestic animals when clearing trees and vegetation.*

A restrictive covenant under *Section 88B of the Conveyancing Act 1919* that identifies restricts clearing to a maximum of 4m wide, or lesser for the boundary fence construction and maintenance can be put in place at DA assessment time, to prevent any unauthorised boundary clearing. This therefore demonstrates that the Rural Boundary Clearing Code, 2021 can not be used to clear more than a 4m wide boundary, over the proposed R zoned lot only. It therefore protects remnant riparian zone vegetation.

8.4 Biosecurity Act 2015

The Biosecurity Act was enacted to provide for the identification, classification and control of Priority Weeds with the purpose of determining if a biosecurity risk is likely to occur, i.e.:

- The introduction, presence, spread or increase of a pest into or within the state or any part of the state.
- A pest plant has the potential to; harm or reduce biodiversity or out-compete other organisms for resources, including food, water, nutrients, habitat and sunlight.

Priority Weeds recorded over the site are shown in Appendix 3 for Hunter Region. They should be controlled by the landowner in accordance with this Act.

8.5 Cessnock City Council Local Environmental Plan (2011)

The development site has minimised impacts to native vegetation and flora and fauna habitats and is therefore consistent with the environmental (biodiversity) related objectives of this zoning being sought within this application.

It addresses all requirements under the Biodiversity Act. It has also addressed the requirements under the Cessnock City Council Flora & Fauna Survey Guidelines.

No other draft planning instruments have been identified.

9.0 CONCLUSION

This assessment has been completed in accordance with Stage 1 BAM methodology.

The proposed development site will result in impacts to:

- 0.7 hectares of PCT 1598- Forest Red Gum grassy open forest on floodplains of the lower Hunter.
- Impacts over 0.3Ha of LLS Category 2 land, requiring offsetting credits if developed.

Indirect & direct impacts to flora & fauna, both common and threatened species.

The vegetation integrity score for all vegetation zones within the development site is greater than 15, therefore impacts on this PCT will require offsetting if developed.

No threatened flora species were recorded within the subject land during field investigation undertaken in accordance with the BAM.

There is suitable habitat for some threatened fauna species to forage over, breed, and reside over the development site, and subject land, from time to time, with potential to be present occasionally as part of their foraging range, including Swift Parrot, and Regent Honeyeater, with species potentially to be offset as either ecosystem credit species, or as a candidate species if developed. These species are shown in Appendix 7.

Measures to avoid and minimise impacts to biodiversity values over the development site were considered during the design and planning stage of the proposed development, however as a rezoning these are yet to be determined.

The proponent has considered NSW DPE comments regarding conservation land zoning to east of development site (ie waterfront land adjoining Wallis Creek). They are happy to adopt this recommendation and include this land within rezoning proposal. There is scope to consider this environmental land to be utilised as an offset or protected land in the future. This would however require further BAM assessment if to be used to generate credits at DA stage for any proposal.

Measures to mitigate potential indirect impacts to biodiversity values are detailed in Section 5. The proposed development will impact candidate species at risk of Serious and Irreversible Impact as outlined in the BAM. The SAII assessment found impact was very low, and unlikely to be considered an SAII, however this is the consent authorities decision.

Accordingly the development site may be permitted to be considered for rezoning without risk of serious environmental impact, subject to NSW DPE & Council approval as the consent authorities.

Impacts to native vegetation, and threatened species will require retirement of ecosystem & species credits in accordance with the Biodiversity Offsets Scheme (Appendix 7) if required at development stage (not at rezoning stage).

Recommendations

- The recommended NSW DPE conservation C2 land/riparian zone and all vegetation over it being around 0.5Ha of Hunter Lowland Redgum Forest Endangered Ecological Community extending upslope from Wallis Creek to the eastern border of the proposed R2 zone (Figs3e & f) be adopted.
- A VMP & covenant to protect this area of vegetation in perpetuity, which is also mapped important Swift Parrot & Regent Honeyeater habitat, is recommended to be a condition of consent by Council to avoid any future removal, disturbance, etc.

Report prepared by:

Ted Smith BSc (Hons), Grad Dip (Bush Fire), BAM Accredited Assessor, Certified Practicing Ecologist
PEAK LAND MANAGEMENT

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Websites

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Environment Protection and Biodiversity Conservation Act 1999
Biodiversity Conservation Act 2016
Biodiversity Conservation Act Regulations 2017
National Parks and Wildlife Act 1974
Environmental Planning and Assessment Act (1979)
Water Management Act, 2000
State Environmental Planning Policy - Coastal Management
State Environmental Planning Policy - Vegetation in Non-Rural Areas
State Environmental Planning Policy (Koala Habitat Protection) 2021

Other Websites

The following websites have been viewed throughout the development of this report:

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http://imagery.maps.nsw.gov.au/
Nearmap
http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10604
http://www.bom.gov.au/water/groundwater/gde/map.shtml
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www.deh.gov.au
http://www.environment.gov.au/epbc/pmst/index.html- & Protected Matters Search
http:www.frogsaustralia.net.au/frogs/
http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed/noxious
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http://weeds.dpi.nsw.gov.au/WeedDeclarations/Results
http://www.environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice

https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap
https://www.landmanagement.nsw.gov.au/biodiversity-offsets-scheme/
https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap
http://www.olg.nsw.gov.au/biodiversity-assessment-and-approvals-navigator
https://www.planningportal.nsw.gov.au/find-a-property
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Applications – iphone

- The Michael Morcombe eGuide to the Birds of Australia, 2020 v1.5. Mydigitalearth.com
- Frogs of Australia. Hoskin, C.J, Grigg, G.C., Stewart, D.A. & Macdonald, S.L. 2015. Frogs of Australia (1.0.1/4139). (Mobile application software). Retrieved from http:www.ugmedia.com.au.

APPENDIX 1 AUTHOR DETAILS

PEAK LAND MANAGEMENT is an independent company specialising in providing quality consulting services in natural resource/land management including bush fire assessment. The company is a consultant member of the NSW Ecological Association, and accredited BAM Assessor and abides by both the NSW Ecological Association & NSW DPIE professional code of conduct and ethics. PEAK LAND MANAGEMENT is licenced with NSW DPIE for survey and collection of threatened flora (SL 100640).

Some examples of the type of work PEAK LAND MANAGEMENT PTY LTD undertakes includes Review of Environmental Factors, Flora & Fauna Surveys/ Ecological/Biodiversity Assessments, Bushland/Vegetation Management Plans, and Bush Fire Assessment Reports.

Mr Ted Smith is the Director of **PEAK LAND MANAGEMENT PTY LTD**. Ted has a Bachelor of Science Degree with Honours majoring in Physical Geography from the University of New South Wales, and a Graduate Diploma in Design for Bushfire Prone Areas from the University of Western Sydney. He is a qualified & experienced Ecologist being a Certified Practicing Ecological Consultant Ecologist (under the NSW Ecological Association -006); certified BPAD Bushfire Practitioner (FPA Aust-17671), and accredited Biodiversity Assessment Method (BAM) Assessor with NSW DPIE (BAAS 17076).

Ted Smith was the author of this work, and conducted all flora and some fauna fieldwork.

A1.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW (Harden 1992, Harden 1993, Harden 2002). All doubtful species names were verified with the on-line Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 2.

A1.1 Permits and licences

The flora and fauna assessment was conducted under the terms of PEAK LAND MANAGEMENT Scientific Licence issued by the NSW DPIE under the National Parks and Wildlife Act 1974 (PEAK LAND MANAGEMENT- SL 100640). The BAM Assessment was carried out by Accredited Assessor Ted Smith (BAAS 17076).

A1.2 Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. Factors influencing detectability of species during survey include species dormancy, seasonal conditions, ephemeral status of waterbodies, and migration and breeding behaviours of some fauna. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The field survey was conducted in warmer Summer/spring weather, which is a suitable time to determine the presence of most threatened flora & fauna species, (including most cryptic species such as most orchids).

Surveys undertaken, combined with habitat assessments and desktop analysis are considered sufficient to reach the conclusions herein in regards to this and all other species' likelihood of occurrence within the study area. Further targeted surveys may be required dependant on consent authority.

Database searches, and associated conclusions on the likelihood of species to occur within the subject land, are reliant upon external data sources and information managed by third parties.

APPENDIX 2: BAM FLORA PLOT FIELD SURVEY SHEETS

BAM Site – Field Survey Form | Site Sheet no: 1 of 2

Survey Name	Zone ID	Recorders TS

Date	25-4-22			Plot dimensions	20 x 50m	Photo #	✓
Zone 56	Datum MGA 94	Plot ID	1				
Easting 0361049	Northing 6367351	IBRA region	540 BASIN	Midline bearing from 0 m	(20x2om)	Magnetic °	

Vegetation Class	Coastal Floodplain Wetlands	Confidence: H M L
Plant Community Type	1598	EEC: ✓ Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	1
	Shrubs	1
	Grasses etc.	4
	Forbs	5
	Ferns	–
	Other	–
Sum of Cover of native vascular plants by growth form group	Trees	70
	Shrubs	0.1
	Grasses etc.	60.4
	Forbs	12.1
	Ferns	–
	Other	–
High Threat Weed cover		5.2

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		–
50 – 79 cm		
30 – 49 cm	1 1 1	
20 – 29 cm	25 IIII II	
10 – 19 cm	IIII III IIII	
5 – 9 cm		
< 5 cm	–	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	– Tally space	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	5 7 13 23 15	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	8	3	–	–

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			slashed, understorey, weedy, remnant tree cover,
Cultivation (inc. pasture)			part native u/s.
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			+ grazed by horses
Fire damage			
Storm damage			trees to 20m, mainly regrowth.
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2	Survey Name	Plot Identifier	Recorders
Date		1	TS

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
T	Eucalyptus tereticornis	N	70%	19		
F	Creeping speedwell - Veronica plebeia		2	10		
S	Acacia longifolia		0.1	1		
G	Lomandra filiformis		0.1	1		
G	Cyperus sp.		0.2	10		
F	Dichondra repens		0.1	10		
F	Einadia nutans		5	100		
S	Pleurathera persicifolia		0.1	1		
F	Parathera microphylla		2	10		
F	Dysphania pumilio		3	10		
	Paspalum	E	0.1	10		
	oxalis	E	0.2	50		
G	Cynodon dactylon	N	60	Lots+		
	Cyperus brevifolius	E	0.7	50		
G	Common rush - Cyperus gracilis	N	0.1	1		
	Rhodes grass	HTE	0.1	10		
	Pennisetum macrourum		0.3	10		
	setaria	↓	1	100		
	Scurvy weed	N	0.3	10		
	Peperomia	E	0.2	20		
	Scarlet pimpernel	↓	0.1	10		
	Paspalum lucens		1	50		
	Clover		2	50		
	African Veldt Grass	HTE	0.5	10		
	Kikuyu	HTE	1	10		
	Paraneurachne muelleri		0.5	10		
	Digitaria sanguinalis - Summer Gr		0.2	5		
	Prickly Nightshade		0.1	1		
	Richardia		2	50		
	Fleabane		0.1	10		
	Annual Ragweed		0.1	50		
	Cyperus eragrostis	HTE	0.1	10		
	Fireweed	HTE	3	30		
	African olive	HTE	0.1	1		
	B. diversifolia	HTE	0.1	10		
	Common Sowthistle		0.1	10		
	B. diversifolia	HTE	0.2	10		
	Lantana	HTE	0.1	1		

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

BAM Site – Field Survey Form

Site Sheet no: 1 of 2

		Survey Name	Zone ID	Recorders
Date	25.4.22			TS
Zone 56	Datum MGA 94	Plot ID 2		Plot dimensions 20m x 50m	Photo # ✓
Easting 0367411	Northing 6367411	IBRA region SYD BASIN		Midline bearing from 0 m Magnetic °
Vegetation Class	Coastal Floodplain Wetland			Confidence: H M L
Plant Community Type	1598		EEC: ✓	Confidence: H M L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	2
	Shrubs	–
	Grasses etc.	3
	Forbs	4
	Ferns	–
	Other	–
Sum of Cover of native vascular plants by growth form group	Trees	25
	Shrubs	–
	Grasses etc.	95.1
	Forbs	0.5
	Ferns	–
	Other	–
High Threat Weed cover		1.7

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm	1	
20 – 29 cm	1	
10 – 19 cm		
5 – 9 cm	𝍸 III	
< 5 cm	𝍸 𝍸 III	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	– Tally space	

Counts apply when the **number of tree stems** within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30…., 100, 200, 300…). For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. **Tree stems must be living.**

For **hollows**, count only the presence of a stem containing hollows. For a **multi-stemmed tree**, only the largest stem is included in the count/estimate. **Stems may be dead and may be shrubs.**

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	5 10 15 20 5	a b c d e	a b c d e	a b c d e
Average of the 5 subplots	~~50~~ 15	10	–	–

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			Stm: cleared, large regrd, no large trees,
Cultivation (inc. pasture)			saplgs, no shrub/mid story
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			NO HBT's
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet 2 of 2	Survey Name	Plot Identifier	Recorders
Date		2	TS

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
T	Eucalyptus tereticornis	N	20	10		
T	Angophora floribunda		5	1		
		↓				
F	Solanum prinophyllum		0.1	1		
#G	Einadia hastata		2	10		
G	Cynodon dactylon		93	500+		
F	Dysphania		0.2	5		
F	Dichondra repens		0.1	10		
F	Cotula australis		0.1	1		
G	Microlaena stipoides	N	0.1	10		
	Mistflower	HTR	0.1	10		
	Paraquilegia Grey	E	0.2	10		
	Tomato		0.1	5		
	Pumpkin	↓	0.2	1		
	Deadly Nightshade		0.1	10		
	Summer grass		0.1	1		
	Dandelion		0.1	10		
	Cyperus tenellus	HTR	0.3	50		
	Oxalis		2	50		
	B. diandrus	HTR	0.1	10		
	Fleabane		0.1	10		
	Richardia		1	20		
	Paddys Lucerne		1	10		
	Fireweed		0.2	5		
	Fireweed	HTR	1	30		
	Annual transparent		0.1	10		
	Lantana	HTR	0.1	10		
	purpletop	HTR	0.1	5		
	Urochloa		0.1	10		
	Onion grass	↓	0.1	10		
	Dock		0.1	1		
	Rye Grass		0.1	10		

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

APPENDIX 3: FLORA SURVEY RESULTS –27th July, 2021 & 25th April, 2022

Scientific Name	Common Name	Plot 1	Plot 2	Transect
Trees:				
Angophora floribunda	Rough Barked Apple		x	x
Casuarina glauca	Swamp Oak			x
Corymbia maculata	Spotted Gum			x
^ Eucalyptus crebra	Narrow leafed Ironbark			x
Eucalyptus fergusonii	An Ironbark			x
^ Eucalyptus punctata	Grey Gum			x
^ Eucalyptus siderophloia	Grey Ironbark			x
Eucalyptus tereticornis	Forest Red Gum	x	x	x
Midstorey:				
Melaleuca linariifolia	Flax-leaved Paperbark			x
Melaleuca styphelioides	Prickly-leaved Tea Tree			x
Midstorey, shrubs and understorey:				
^ Acacia fimbriata	Fringed Wattle			x
^ Acacia longifolia	Coastal Wattle	x		x
^ Acacia parramattensis	Parramatta wattle			x
Breynia oblongifolia	Coffee Bush			x
^ Callistemon viminalis	Weeping Bottlebrush			x
Cassinia spps				x
Crassula sieberiana	Australian Stonecrop			x
Cotula australis	Carrot Weed		x	x
Denhamia silvestris	Narrow-leaved Orange bark,			x
Dichondra repens	Kidney weed	x		x
Dysphania pumilio	Small Crumbweed	x	x	x
Einadia nutans	Climbing Saltbush	x		x
Euchiton involucratus	Star Cudweed			
^ Grevillea hybrid	Grevillea			
Leptospermum polygafolium	Lemon scented tea tree			x
Leucopogon appressus				x
Lobelia purpurascens	Pratia, White Root			x
Lomandra filiformis subsp filiformis	A Mat Rush	x		x
Lomandra multiflora subsp multiflora	Mat Rush			x
Melichrus procumbens	Jam Tarts			x
Melaleuca nodosa	Ball paperbark			x
Notelaea longifolia	Large Mock-Olive			x
Ozothamnus diosmifolius	Pill flower			x
Persoonia linearis	Narrow leafed Geebung			x
Poranthera microphylla		x		x
Solanum cinereum	A Nightshade			x

Solanum prinophyllum	Forest Nightshade		x	x
Veronica plebeia	Creeping Speedwell			x
Wahlenbergia gracilis	Australian Bluebell			x
Grasses				
Aristida vagans	Three Awn Grass			x
Cymbopogon refractus	Barb Wire Grass			x
Cynodon dactyldon	Couch	x	x	x
Digitaria parviflora	Small-flowered Finger Grass	x		x
Eragrostis brownii	Love grass			x
Eragrostis leptostachya	Paddock Lovegrass			x
Imperata cylindrica	Blady Grass			x
Microlaena stipoides	Weeping grass		x	x
Panicum effusum	Hairy Panic			x
Themeda triandra	Kangaroo grass			x
Ferns:				
Chielanthes sieberi	Poison rock fern			x
Sedges and water plants:				
Carex appressa	A Sedge			x
Cyperus gracilis		x		x
Fimbristylis dichotoma	Common Sedge		x	x
Juncus ustitatus	Common reed			x
Typha orientalis	Cumbungi			x
Vines and scramblers:				
Commelina cyanea	Scurvy weed	x		x
Glycine clandestina	Purple twining Pea			x
Orchids/epiphytes:	Nil			
Weeds				
Ageratina riparia	Mistflower, Creeping Crofton Weed		x	
Anagallis arvensis	Scarlet pimpernel	x		x
Araujia sericifera	Moth Vine, Milk Vine			x
Bidens pilosa	Cobblers Pegs	x	x	x
Bidens subalternans	Greater Beggar's Ticks	x		x
Cenchrus clandestinus	Kikuyu	x		
Cestrum parqui	Green Cestrum			x
Chloris gayana	Rhodes Grass	x		x
Cirsium vulgare	Spear thistle			x
Conyza bonariensis	Flax leaved fleabane	x	x	x
Cotoneaster spps	Cotoneaster			
Cucurbita maxima	Ironbark Pumpkin		x	x
Cyclospermum leptophyllum	Slender Celery			x
Cyperus brevifolius		x	x	x

Cyperus eragrostis		x		x
Digitaria sanguinalis	Summer Grass	x	x	x
Ehrharta erecta	Panic Veldt grass	x		x
Eragrostis pilosa	Soft Lovegrass			x
Eragrostis tenuifolia	Elastic Grass			x
Facelis retusa	Annual Trampweed	x	x	x
Gnaphalium sphaericum	Common cudweed			x
Hypochoeris radicata	Flatweed			x
(P) Lantana camara	Lantana	x	x	x
Lepidium spps		x		x
Lolium rigidum	Annual rye grass		x	x
Malva parviflora	Small-flowered Mallow			x
Melinis repens	Red Natal Grass			x
Modiola caroliniana	Red Flowered Mallow			x
Nothoscordum gracile	Onion Weed		x	x
(P) Olea europaea subsp. cuspidata	African Olive	x		x
(P) Opuntia stricta	Prickly Pear			x
(P) Opuntia aurantiaca	Tiger Pear			x
Oxalis spps	Oxalis	x	x	x
Panicum maximum	Guinea Grass	x		x
Paspalum dilatum	Paspalum		x	x
Phytolacca octandra	Inkweed		x	x
Plantago lanceolata	Lambs tongue			x
Poa annua	Winter Grass			x
(P) Rubus anglocandicans	Blackberry			
Rumex spps	Dock		x	x
Richardia humistrata		x	x	x
(P) Senecio madagascariensis	Fireweed	x	x	x
Setaria spps	Setaria	x		x
Sida rhombifolia	Paddy's lucerne	x		x
Sonchus oleraceus	Common sowthistle	x		x
Solanum mauritianum	Tobacco Bush			x
Solanum nigrum	Deadly/Blackberry nightshade	*x*	x	
Solanum spps	Tomato		x	x
Sporobolus africanus	Parramatta Grass	x		x
Stellaria media	Chickweed			x
Tagetes minor	Stinking Roger			x
Taraxacum officinale	Dandelion	x	x	x
Trifolium repens	White clover	x		x
Urochloa panicoides	Liverseed Grass		x	
Native species total:	**59**			
Weed species total:	**54**			
TOTAL PLANTS:	**113**			
# Threatened species	0			
(P) Priority weed	6			
^ Planted Non endemic native				

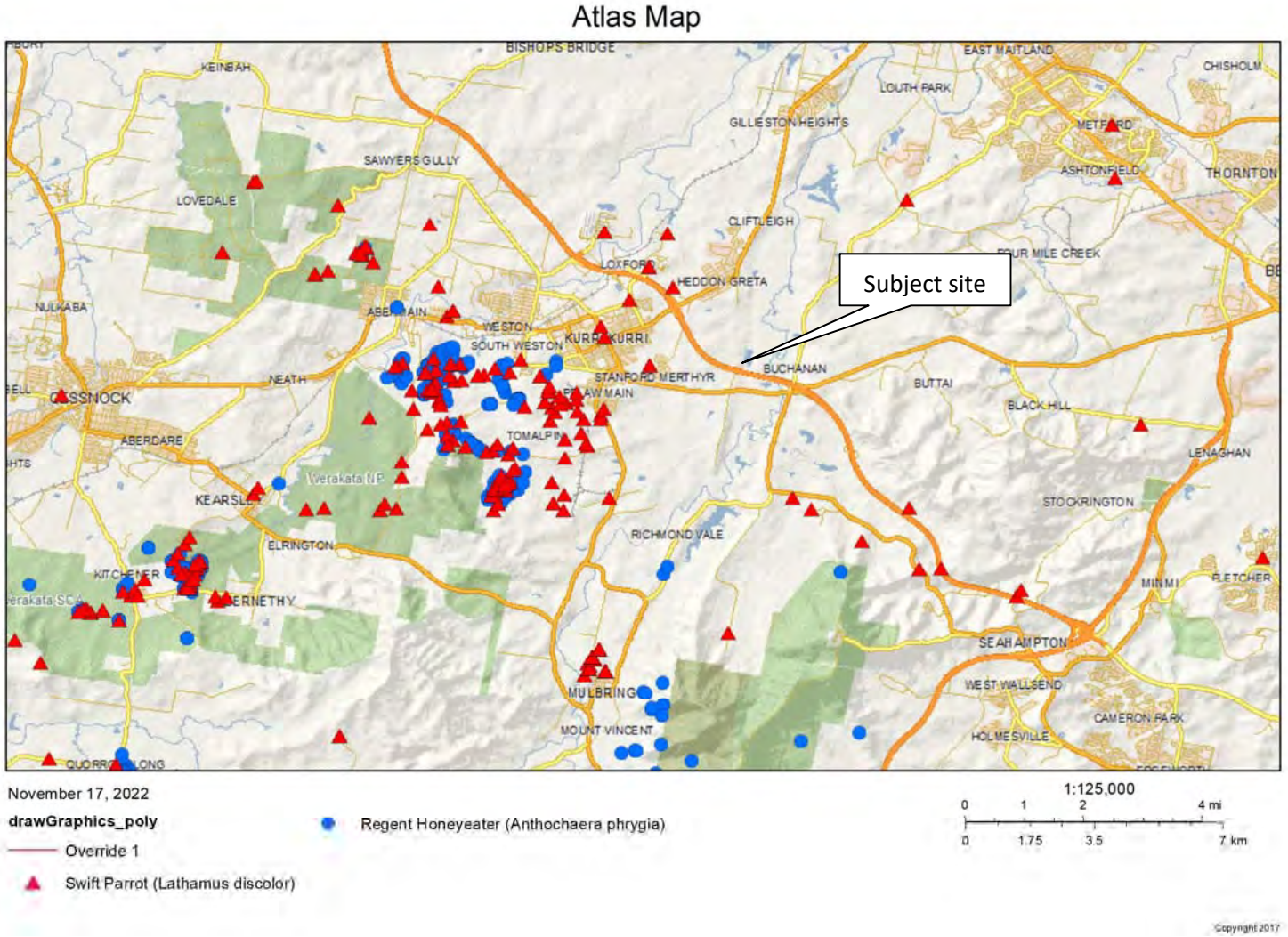
APPENDIX 4: FAUNA SURVEY RESULTS, PEAK LAND MANAGEMENT (MARCH, 2021 & APRIL, 2022)

COMMON NAME	
The following birds were observed, or heard either on or near the development site, including flying overhead (common bird names from Pizzey & Knight, 1997):	
Kookaburra	Masked Lapwing
Willie Wagtail	Yellow-faced Honeyeater
Black Cormorant	Blue Wren
Rainbow Lorikeet	Eastern Yellow Robin
Brown Thornbill	# Grey Crowned Babbler
Pee Wee	# White Breasted Sea Eagle
+Rufous Fantail	Wood Duck
Masked Lapwing	Corella
Black Faced cuckoo Shrike	Galah
Other fauna observed, or heard from calls/scats/footprints/scratch marks were:	
Crinea signifera- Common Eastern Toadlet	*Domesticated cat
*Domesticated dogs	*Chickens
*Horses	
+ Threatened spps listed under EPBC Act	
# Threatened spps listed under BC Act	
*Exotic species	

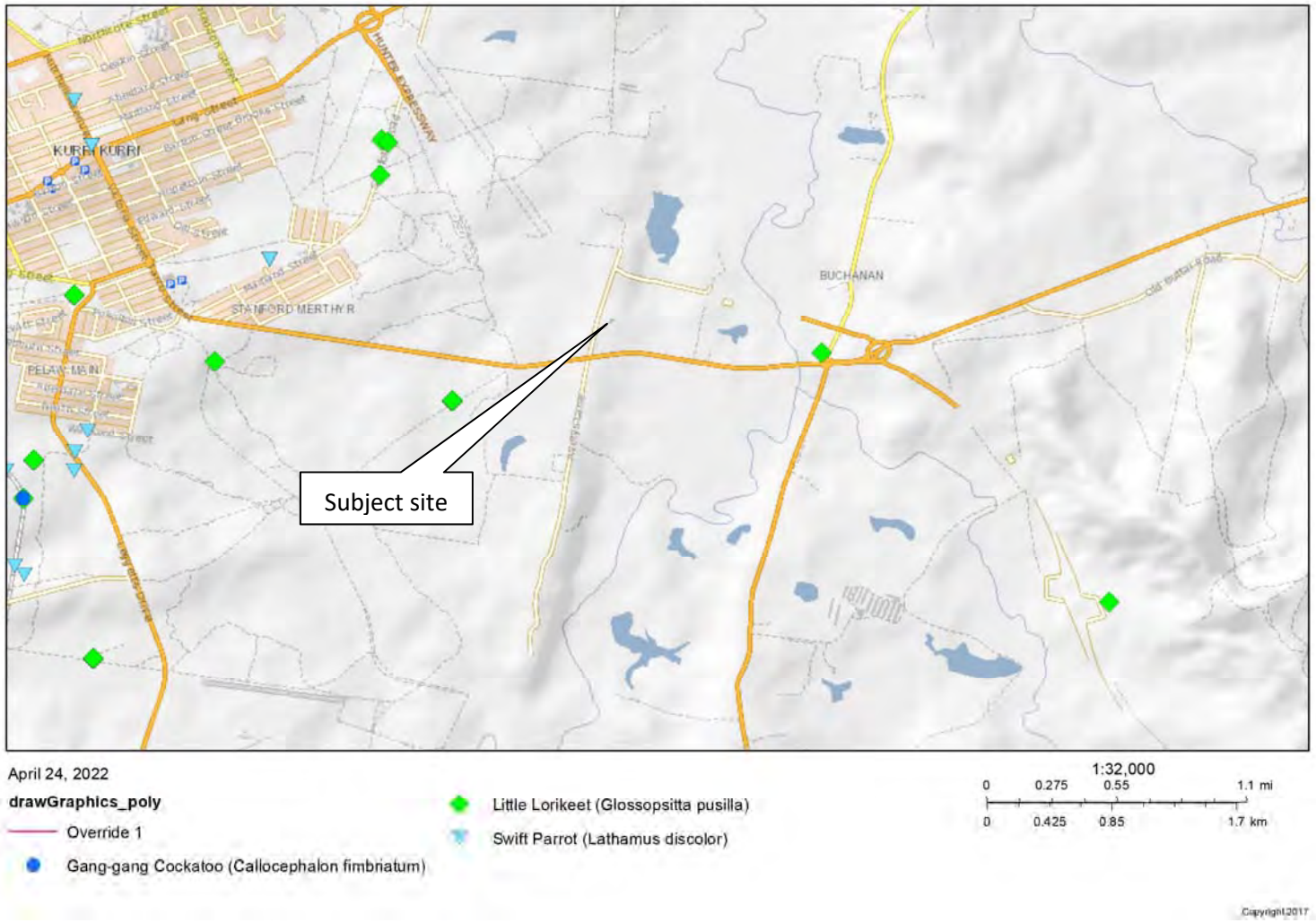
APPENDIX 5: THREATENED FLORA & FAUNA SPECIES SEARCH RESULT (Over a 100 square kilometre area – NSW & National EPBC Species – from Bionet).

Note: this does not mean these species are found on the site. Maps are shown of some indicative species only.

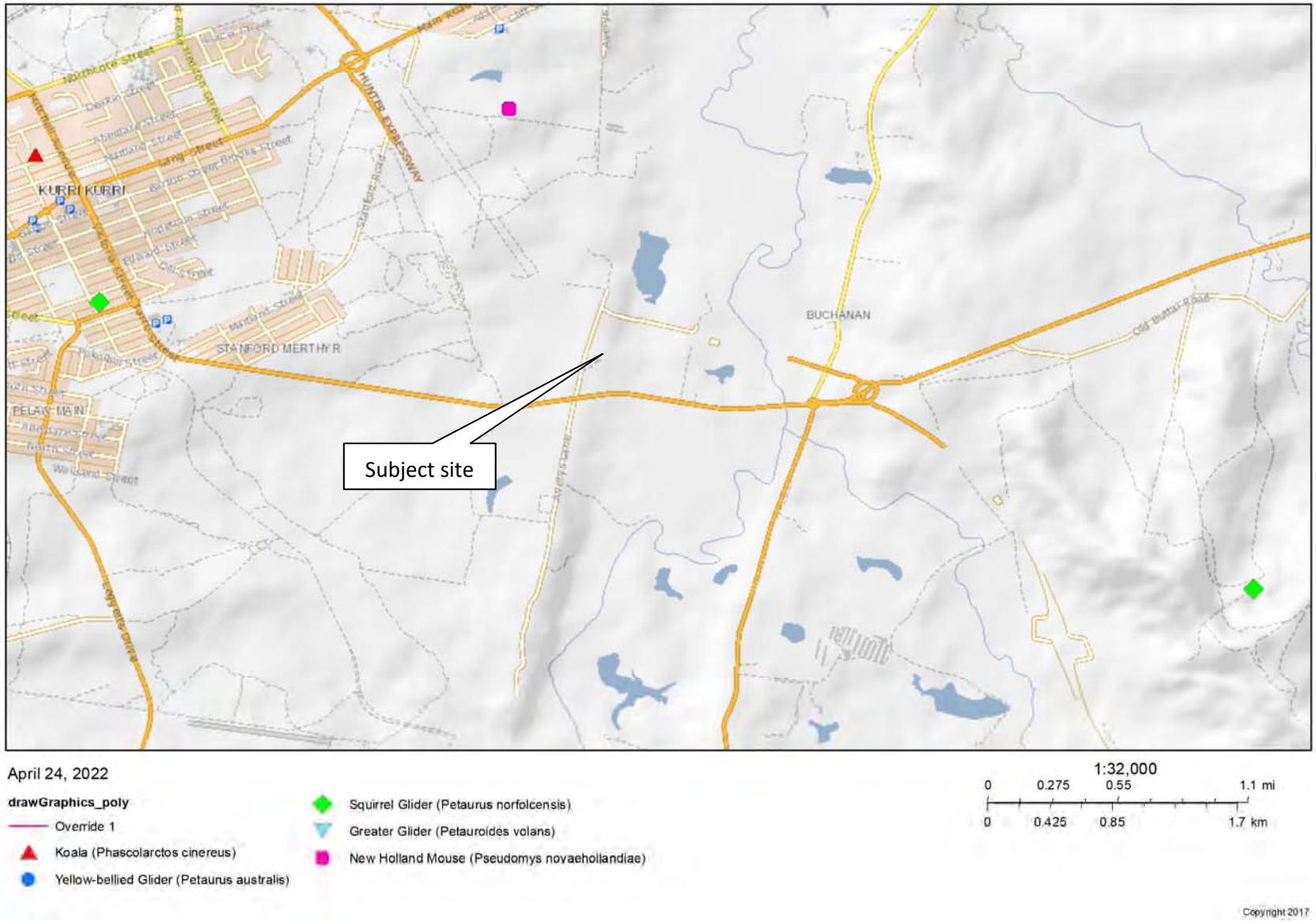
Regent Honeyeater & Swift Parrot records within 10kms of site



Atlas Map


KURRI KURRI
STANFORD MERTHYR
BUCHANAN
Subject site
April 24, 2022
drawGraphics_poly
Override 1
Gang-gang Cockatoo (Callocephalon fimbriatum)
Little Lorikeet (Glossopsitta pusilla)
Swift Parrot (Lathamus discolor)
1:32,000
0 0.275 0.55 1.1 mi
0 0.425 0.85 1.7 km

Atlas Map


KURRI KURRI
STANFORD MERTHYR
BUCHANAN
PELAW MAIN
HUNTER EXPRESSWAY
Subject site
April 24, 2022
drawGraphics_poly
Override 1
Koala (Phascolarctos cinereus)
Yellow-bellied Glider (Petaurus australis)
Squirrel Glider (Petaurus norfolcensis)
Greater Glider (Petauroides volans)
New Holland Mouse (Pseudomys novaehollandiae)
1:32,000
0 0.275 0.55 1.1 mi
0 0.425 0.85 1.7 km
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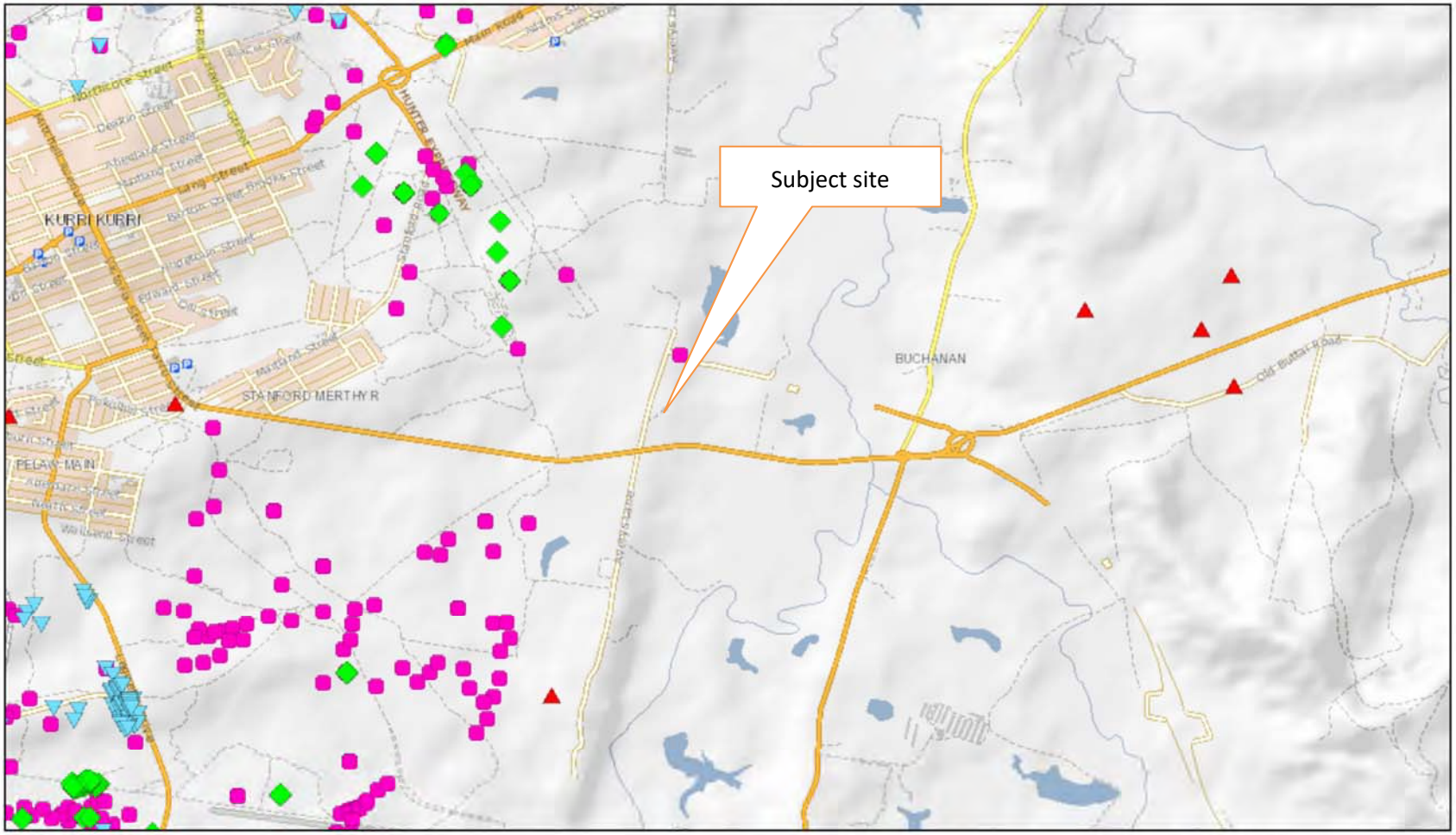
Atlas Map


Subject site
KURRI KURRI
STANFORD MERTHYR
BUCHANAN
PELAW MAIN
April 24, 2022
drawGraphics_poly
Override 1
Heath Wrinklewort (Rutidosis heterogama)
Bynoe's Wattle (Acacia bynoeana)
Netted Bottle Brush (Callistemon linearifolius)
Small-flower Grevillea (Grevillea parviflora subsp. parviflora)
1:32,000
0 0.275 0.55 1.1 mi
0 0.425 0.85 1.7 km
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Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -32.78 West: 151.46 East: 151.56 South: -32.88] recorded since 23 Apr 1990 until 24 Apr 2022 returned a total of 2,536 records of 52 species.
Report generated on 24/04/2022 8:23 AM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Hylidae	3169	*Litoria brevipalmata*		Green-thighed Frog	V,P		1	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	9	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		5	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		1	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		1	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		23	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		6	

Animalia	Aves	Accipitridae	0230	*Lophoictinia isura*	Square-tailed Kite	V,P,3		6
Animalia	Aves	Accipitridae	8739	*Pandion cristatus*	Eastern Osprey	V,P,3		1
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*	Comb-crested Jacana	V,P		27
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	1
Animalia	Aves	Scolopacidae	0152	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K	1
Animalia	Aves	Cacatuidae	0268	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3	E	7
Animalia	Aves	Cacatuidae	0265	*^^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		1
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	Little Lorikeet	V,P		116
Animalia	Aves	Psittacidae	0309	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	51
Animalia	Aves	Psittacidae	0302	*Neophema pulchella*	Turquoise Parrot	V,P,3		2

Animalia	Aves	Strigidae	0248	*Ninox strenua*	Powerful Owl	V,P,3		11
Animalia	Aves	Tytonidae	0250	*Tyto novaehollandiae*	Masked Owl	V,P,3		3
Animalia	Aves	Tytonidae	9924	*Tyto tenebricosa*	Sooty Owl	V,P,3		1
Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		53
Animalia	Aves	Acanthizidae	0504	*Chthonicola sagittata*	Speckled Warbler	V,P		7
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	23
Animalia	Aves	Meliphagidae	8303	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)	V,P		39
Animalia	Aves	Pomatostomidae	8388	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		86
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*	Varied Sittella	V,P		26
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		29

Animalia	Aves	Petroicidae	0380	*Petroica boodang*	Scarlet Robin	V,P		6
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	V,P	E	4
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*	Yellow-bellied Glider	V,P		18
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		25
Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*	Greater Glider	P	V	1
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	22
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		1
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P		18
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	8
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		1

Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		5	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		6	
Animalia	Mammalia	Vespertilionidae	1025	*Vespadelus troughtoni*	Eastern Cave Bat	V,P		6	
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		32	
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		17	
Animalia	Mammalia	Muridae	1455	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	5	
Plantae	Flora	Asteraceae	1643	*Rutidosis heterogama*	Heath Wrinklewort	V	V	559	
Plantae	Flora	Elaeocarpaceae	6206	*Tetratheca juncea*	Black-eyed Susan	V	V	41	
Plantae	Flora	Fabaceae (Mimosoideae)	3728	*Acacia bynoeana*	Bynoe's Wattle	E1	V	88	
Plantae	Flora	Myrtaceae	4007	*Callistemon linearifolius*	Netted Bottle Brush	V,3		290	

Plantae	Flora	Myrtaceae	4096	*Eucalyptus glaucina*	Slaty Red Gum	V	V	3	
Plantae	Flora	Myrtaceae	9163	*Eucalyptus parramattensis subsp. decadens*		V	V	568	
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE	1	
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	1	
Plantae	Flora	Proteaceae	10009	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V	273	

APPENDIX 6: SELECTED PHOTOS OF SITE

Property access driveway looking south. Hunter Lowland Redgum Forest Endangered Ecological Community to right of frame mapped on BV map area.

Existing dwelling looking east

Looking north over proposed R zoned lot.

Looking east from north of existing dwelling.

Looking north showing local wetland off the development/rezoning site.

Looking south showing mapped Biodiversity Values area (Hunter Lowland Redgum Forest Endangered Ecological Community).

Lantana understorey over much of the BV mapped Hunter Lowland Redgum Forest Endangered Ecological Community (over east of site)

Looking west showing mapped Biodiversity Values area (Hunter Lowland Redgum Forest Endangered Ecological Community).

Looking south over proposed rezoning boundary.

Looking east over proposed rezoning boundary.

Grey Crowned Babbler over site

Marginal connectivity to north (mainly cleared, but a few large HBT's present). Possible future riparian zone.

APPENDIX 7: BIODIVERSITY CREDIT REPORT

Not finalised as only Stage 1 assessment.

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00032651/BAAS17076/22/00032652	Proposal Name BCAR- Stage 1 - 259 Averys Lane Buchanan	BAM data last updated * 24/11/2021
Assessor Name Ted Smith	Assessor Number BAAS17076	BAM Data version * 50
Proponent Names	Report Created 27/04/2022	BAM Case Status Open
Assessment Revision 0	Assessment Type Biocertification	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
Nil		
Species		
Anthochaera phrygia / Regent Honeyeater		
Lathamus discolor / Swift Parrot		

Additional Information for Approval

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

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
1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	0.3	0	6	6

PEAK LAND MANAGEMENT

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions This includes PCT's: 1591, 1598, 1603, 1605, 1691, 1692, 1749	-	1598_Good	No	5	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions This includes PCT's: 1591, 1598, 1603, 1605, 1691, 1692, 1749	-	1598_Good01	No	1	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

NSW GOVERNMENT

BAM Biodiversity Credit Report (Like for like)

Species	Vegetation Zone/s	Area / Count	Credits
Anthochaera phrygia / Regent Honeyeater	**1598_Good, 1598_Good01**	0.3	9.00
Lathamus discolor / Swift Parrot	**1598_Good, 1598_Good01**	0.3	9.00

Credit Retirement Options

Like-for-like credit retirement options

	Spp	IBRA subregion
Anthochaera phrygia / Regent Honeyeater	**Anthochaera phrygia /** Regent Honeyeater	Any in NSW
Lathamus discolor / Swift Parrot	**Lathamus discolor /** Swift Parrot	Any in NSW