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BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

for an

Commercial/Industrial

Development

at

252 Coal Road

(Lot 1 DP819014)

MUSWELLBROOK

17th of December 2024

CERTIFICATION

I, Bart Schiebaan of Hunter Ecology, hereby state that this Biodiversity Development Assessment Report (BDAR) for an industrial development at 252 Coal Road, (Lot 1 DP819014), Muswellbrook 2333, has been prepared in accordance with the Biodiversity Assessment Method (BAM) 2020 established under the NSW *Biodiversity Conservation Act 2016.* Fieldwork and report writing for this project was undertaken by Bart Schiebaan and Lucinda Casey. Qualifications are provided below.

Bart Schiebaan	**Principal Ecologist / Co-Director** B.Ap.Sc. BAM Accredited Assessor (BAAS 18033) Member of the Ecological Consultants Association of NSW
Lucinda Casey	**Ecologist** Bachelor of Biodiversity & Conservation BAM Accredited Assessor (BAAS 24054)

Conflicts of Interest

The Accredited Assessors have signed an agreement to abide by the Accredited BAM Assessor Code of Conduct. The authors declare in accordance with the Assessors Code of Conduct that no actual, perceived, or potential conflicts of interest exist.

Disclaimer

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Bart Schiebaan

B.Ap.Sc.

BAAS18033 Accredited Assessor
Principal Ecologist / Co-Director, Hunter Ecology

TERMS & ABBREVIATIONS

Assessment area – the area that includes the Site and a 1.5 km buffer surrounding the Site.

BAM – Biodiversity Assessment Method 2020

BAM-C – BAM Calculator

BC Act – NSW *Biodiversity Conservation Act 2016*

BC Regulation – *Biodiversity Conservation Regulation 2017*

BDAR – Biodiversity Development Assessment Report

BioNet – NSW Atlas of NSW Wildlife.

BioNet VIS – NSW BioNet Vegetation Information System

BOS – Biodiversity Offset Scheme

Canopy – The tallest woody stratum present.

Connectivity – The measure of the degree to which an area of native vegetation is linked with other areas of native vegetation.

Cumulative impacts – the combined incremental effects of past, present and anticipated future actions within a regional setting.

DCCEEW – Department of Climate Change, Energy, the Environment and Water (NSW or Commonwealth).

DCP – Development Control Plan

DEC – Department of Environment & Conservation (NSW).

Direct impacts – Impacts that directly affect the habitat of species and ecological communities and of individuals using the study area.

DPIE – Department of Primary Industries and Environment (NSW).

EP&A Act – NSW *Environmental Planning and Assessment Act 1979*

EPBC Act – Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Ground Cover – Vegetation generally below 1 m in height.

Ha – Hectare.

Habitat – An area or areas occupied, or periodically or occasionally occupied, by a species or ecological community, including any biotic or abiotic component.

HBT – Hollow-bearing tree

IBRA – Interim Biogeographic Regionalisation for Australia.

Indirect impacts – Impacts which occur when project-related activities affect species or ecological communities in a manner other than direct loss within the study area. Indirect impacts may sterilise or reduce the habitability of adjacent or connected habitats. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, reduction in viability of adjacent habitat due to edge effects,

deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, noise, light spill, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas.

Intact vegetation – Vegetation where all tree, shrub, grass and/or forb structural growth form groups expected for a plant community type are present.

LEP – Local Environment Plan

LGA – Local Government Area

Locality – the database search area encompassing a 10 km radius from the study area.

Mid-storey – All vegetation between the over-storey stratum and a height of 1 m (typically tall shrubs, under-storey trees and tree regeneration), as opposed to over-storey and under-storey.

Mitchell Landscape – Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

MU – Map unit

PCT – Plant community type, identified using the PCT classification system described in the BioNet Vegetation Classification.

Project or **Proposal** – the proposed industrial development to be undertaken at 252 Coal Road (Lot 1 DP819014) Muswellbrook, 2333.

SEPP – State Environmental Planning Policy

Study area – the surveyed area of the site.

Site – the area directly affected by the proposal, as shown in Figure 1-1 of this report. The Site includes the footprint of the development and any ancillary works, facilities, accesses, or hazard reduction zones that support the construction or operation of the development or activity.

TBPDC – The NSW BioNet Threatened Biodiversity Profile Data Collection.

TEC – Threatened ecological community, listed as critically endangered, endangered or vulnerable in Schedule 2 of the BC Act, or any such listed communities under the EPBC Act.

Threatened species – Critically endangered, endangered or vulnerable species as defined by Schedule 1 of the BC Act, or any such listed species under the EPBC Act.

VI – Vegetation integrity.

VZ – Vegetation Zone

WM Act – NSW *Water Management Act 2000*

EXECUTIVE SUMMARY

Hunter Ecology has been contracted to prepare a Biodiversity Development Assessment Report (BDAR) industrial/commercial development ('the Proposal' or 'the Project') at 252 Coal Road, (Lot 1 DP819014), Muswellbrook 2333, in the Muswellbrook Shire Local Government Area (LGA). This BDAR has been prepared in accordance with the Office of Environment and Heritage (OEH) (2020) The Biodiversity Offset Scheme (BOS) applies to the Proposal, as the proposed development would exceed the Area Clearing Threshold (0.25ha) for the minimum lot size (0.06ha) associated with the lot. **Note**, this is a 'streamlined assessment', in accordance with Appendix C of the BAM ('Streamlined assessment module – Small area').

The proposed development involves the construction of a new community infrastructure depot for Council's operational staff at the Waste Management Facility. The depot would accommodate operational staff and cater to day-to day operations including light and heavy vehicle parking, office space, equipment storage and a mechanical workshop for repairs and servicing.

The native vegetation within the proposed impact area was determined to be Plant Community Type (PCT) 3431 - Central Hunter Ironbark Grassy Woodland and was found to be commensurate with the Biodiversity Conservation (BC) Act Listed Endangered Ecological Community (EEC) - *Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions.* The proposed development will require the removal of approximately 0.51ha of this community. The proposed development will additionally require the removal of 0.12ha of planted native and non-native vegetation. The vegetation was planted abreast a soil bund running parallel to Coal Road for the purpose of soil stabilisation and screening of the waste facility. In accordance with Appendix D: Streamlined assessment module –Planted native vegetation of the BAM (2020) this vegetation does not require offsetting, however, has been assessed in Section 6 of this report.

Although highly degraded, the Site is likely to contribute to available habitat for several Ecosystem Credit Species identified by the Biodiversity Assessment Method Calculator (BAM-C), in addition to the more widespread and abundant species not listed by the BC Act or Environmental Protection Biodiversity Conservation (EPBC) Act. The BAM-C additionally identified one Species Credit Species with the potential to occur at the Site: *Acacia pendula* (Endangered population in the Hunter catchment). A targeted flora survey was undertaken confirming the species does not occur on site or within the impact area.

The proposed development has been designed to comply with avoidance and minimisation requirements under the BOS. This has been achieved through the strategic placement of the proposed development footprint within an area that is significantly degraded and primarily dominated by exotic vegetation, consisting of exotic ground covers and the occasional ornamental shrub. Due to the strategic placement of the proposed development footprint, minimal native vegetation clearing will be required to facilitate the proposal (0.51ha).

The proposed development would result in the removal of 0.51ha of the BC Act listed *EEC Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions*, resulting in a loss of 0.0034% of the remaining EEC. While the clearance of such a portion of the EEC, might have regional-scale implications, taking into consideration the sites poor condition, limited

connectivity, and overall low potential for regeneration suggests that the overall impact would be relatively minor.

An assessment of direct, indirect and prescribed impacts was undertaken, and several mitigation measures have been proposed to address any unavoidable impacts.

It is concluded that the Project will generate the following offset obligation:

- **Ecosystem Credits:**
  - 8 Credits - *Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions*.

The Project was assessed under the requirements of the EPBC Act; assessments of significance for several potentially occurring threatened and migratory species were undertaken. It was concluded that the Project is unlikely to significantly impact on any MNES and thus referral to the Commonwealth DCCEEW is not required.

It is recommended that the following measures are conditioned as part of any Project consent:
implemented

- The following vegetation clearing protocols will be:
  - The boundaries of vegetation removal are to be clearly defined (signposted and fenced) to prevent unauthorised clearing and vehicular and/or foot traffic. 'No go' zones should include areas of retained vegetation and any retained trees within the footprint.
  - Relocate fallen timber and bushrock from areas of vegetation clearing into retained vegetation

- Vegetation Management
  - Vegetation management is to be undertaken in accordance with the landscape plan prepared by RFA Landscape Architects, to provide replacement vegetation consistent with PCT 3431 - Central Hunter Ironbark Grassy Woodland.

- Installation of replacement habitat:
  - A total of ten artificial nest boxes will be selected and installed (by a suitably qualified ecologist) within the bushland beyond the development footprint.
  - The nest box types installed must target the species impacted by the proposal (such as microbats, arboreal mammals and birds).
  - Maintenance of monitoring of nest boxes will be undertaken for a period of at least 10 years.

- Implementation of a weed management protocol:
  - All equipment, vehicles and machinery wheels and tracks of excavators and other tracked machinery should be cleaned so that they are completely free of soil, seeds and plant material before entering the site to prevent the introduction of further exotic plant species and pathogens.

- Implementation of sediment and erosion controls:
  - No excavated material or fill to be placed in flood prone areas.
  - All stockpiles and material to be secure from a one in ten-year flood level and have effective sediment control works to contain run-off.

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1. INTRODUCTION

1.1 Purpose

Hunter Ecology has been contracted to prepare a Biodiversity Development Assessment Report (BDAR) for a commercial/industrial development, ('the Proposal' or 'the Project') at 252 Coal Road (Lot 1 DP819014), Muswellbrook, in the Muswellbrook Shire Council local government area (LGA). This BDAR has been prepared in accordance with the Office of Environment and Heritage (OEH) (2020) Biodiversity Assessment Method (BAM). The Biodiversity Offset Scheme (BOS) applies to the Proposal, as the proposed development would exceed the Area Clearing Threshold (0.25ha) for the minimum lot size (0.06ha) associated with the lot.

Note, this is a 'streamlined assessment', in accordance with Appendix C of the BAM ('Streamlined assessment module – Small area'). The development meets the streamlined assessment clearing threshold for its zoned minimum lot size, which is ≤1 ha.

1.2 Scope

Section 1 of this BDAR identifies and describes the Site and Project (including the construction and operational footprint) and lists the sources of information used for the assessment.

Sections 2, 3 & 4 of this BDAR address Stage 1 of the BAM and provides an assessment of the biodiversity values of the site by identifying:

- Landscape features and site context of the Site in accordance with Chapter 4 of the BAM;
- Presence of threatened ecological communities (TECs), plant community types (PCTs), and the condition (vegetation integrity) of native vegetation in the Site in accordance with Chapter 5 of the BAM;
- Habitat suitability for threatened species on the Site in accordance with Chapter 6 of the BAM; and
- Potential prescribed biodiversity impacts on threatened entities.

Sections 5, 6, 7 & 8 of this BDAR address Stage 2 of the BAM and provide an assessment of the impacts on biodiversity values, as follows:

- Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the project location in accordance with Chapter 7 of the BAM;
- Determination of the impacts on native vegetation and threatened species habitat, including a description of direct, indirect and prescribed impacts on native vegetation, threatened ecological communities and threatened species habitat;
- Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5;
- Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5);
- Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAII, in accordance with BAM Section 9.1);

- Identification of impacts requiring offset in accordance with BAM Section 9.2;
- Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.);
- Identification of areas not requiring assessment in accordance with BAM Section 9.3;
- Identification of the ecosystem credits and species credits that measure the impact of the development on biodiversity values; and
- Description of credit classes for ecosystem credits and species credits at the development or clearing site.

1.3 Project Background

The Project would involve the construction of a new community infrastructure depot for Council's operational staff at the Waste Management Facility located at 252, Coal Road (Lot 1 DP819014), Muswellbrook. The proposed facility is intended to accommodate operational staff and cater to day-to day operations including light and heavy vehicle parking, office space, equipment storage and a mechanical workshop for repairs and servicing. The proposal will require the removal of approximately 0.51ha of native vegetation, and 0.12ha of mixed native and non-native plantings.

1.4 Site Overview

Table 1-1: Overview of the Site

Locality:	252, Coal Road, Muswellbrook 2333
Lot / DP:	Lot 1 DP819014
Land size	19ha
LGA:	Muswellbrook Shire Council
Site zoning:	SP2 - Infrastructure:
Topography:	The development area includes a steep manmade bund located along the southern boundary. Beyond this bund the site is relatively flat with some undulations. A constructed drainage line is located along the northern boundary.
Vegetation:	Hunter-Macleay Dry Sclerophyll Forests, planted native vegetation and non-native ground covers.
Existing development/ land uses:	The development area forms part of the Muswellbrook Waste Management Facility. The development footprint contains a mixture of remnant trees and planted native trees.
Historical development/ land uses:	The waste Management Facility has been operational since 1993, before which the site formed part of an operational coal mine, with the extraction area located to the north of the proposed development footprint.

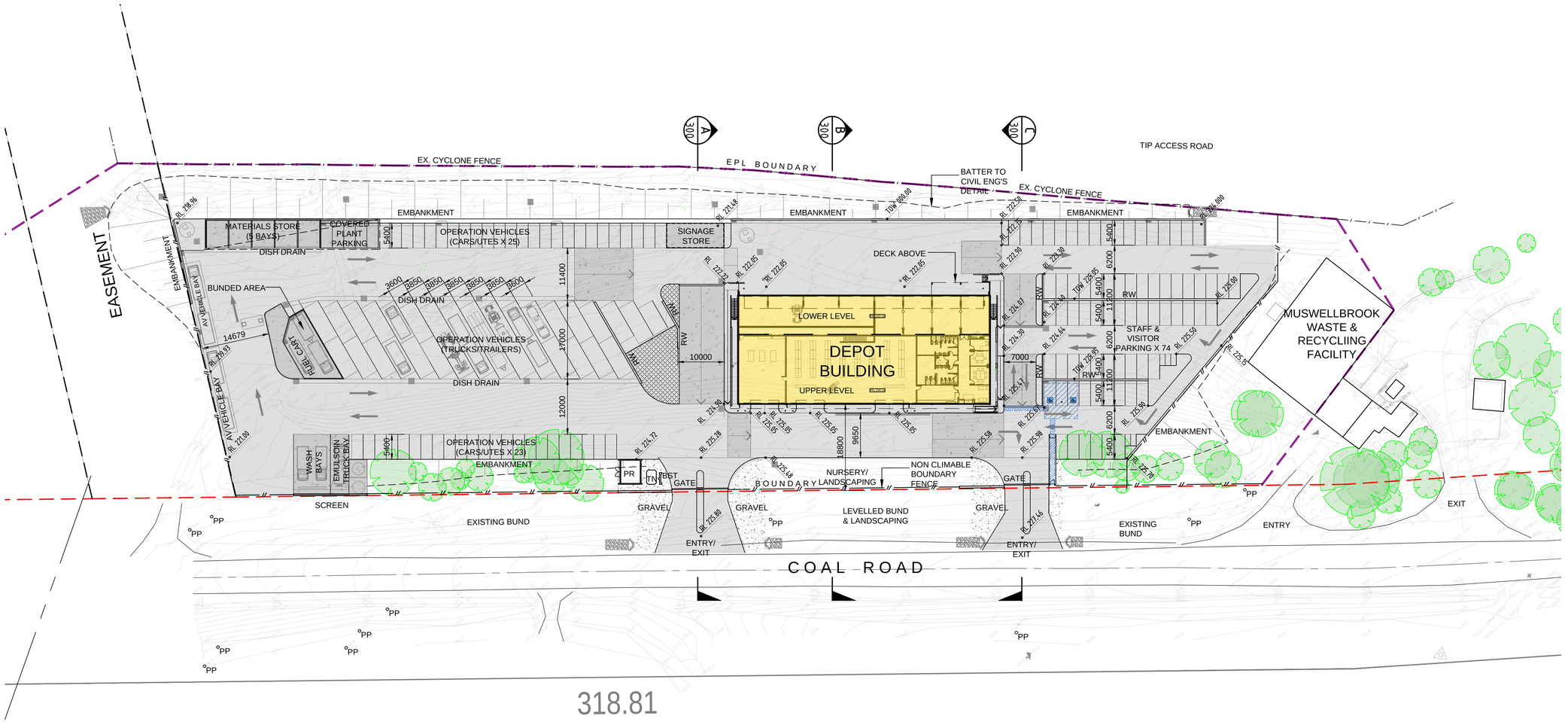
1.5 Development Footprint

1.5.1 Construction Footprint

The construction footprint encompasses the building footprint, carpark and the ancillary roadways. This includes approximately 0.51ha of native vegetation, and 0.12 ha of mixed native and non-native plantings not requiring offsetting (See **Figure 1-1**).

1.5.2 Operational Footprint

The operational footprint includes the construction footprint indicated in **Figure 1-1**. It also includes any areas within 100 m of the commercial/industrial dwelling, as these areas would be indirectly impacted during the operational phase, (for instance by anthropogenic noise and light). The operational footprint covers a land area of approximately 0.51 ha, including approximately 0.12 ha of mixed native and non-native plantings.



SITE PLAN
SCALE 1:500

BCA AREA/VOLUME CALCS

	FLOOR AREA	HEIGHT	VOLUME
UPPER LEVEL			
Workshop/Store	575m2	5.2m	2,990 m3
Admin/Amenities	700m2	2.7m	1,890 m3
LOWER LEVEL			
Garage/Store	460m2	2.7m	1,250 m3
TOTAL	1,735m2		6,130 m3

SITE LEGEND

AR	ARCHITECTURAL
BDY	BOUNDARY
BLK	BLOCKWORK
BOL	BOLLARD
BST	HYDRANT BOOSTER
CONC	CONCRETE
DP	DOWN PIPE
DS	EMERGENCY DELUGE SHOWER
EW	EMERGENCY EYE WASH
EX	EXISTING
FEN	FENCE
FH	FIRE HYDRANT
HT	HOSE TAP
LP	LIGHT POLE
PR	PUMP ROOM
RL	REDUCED LEVEL
RW	RETAINING WALL
SWP	STORM WATER PIT
TN	HYDRANT BREAK TANK

BOUNDARY
FENCE LINE
TO BE REMOVED OR RELOCATED
PROPOSED DEPOT BUILDING
PROPOSED CARPARK PAVEMENT
RL 123.45 FINISHED LEVEL

QUALITY CHECK

Drawings Approval for:

Item	Drawn	Project Architect	Director	Date

AMENDMENTS

No.	Description	Drawn	Appd.	Date
1	CONCEPT DESIGN	GC		8.4.24
2	CONCEPT DESIGN	GC		15.4.24
3	DEVELOPED DESIGN	GC		24.4.24
4	DEVELOPED DESIGN	GC	HN	07.05.24
5	DEVELOPED DESIGN	GC		22.05.24
6	DEVELOPED DESIGN	AB		15.10.24
7	DEVELOPED DESIGN	AB		2.12.24

Director Approval:

LEGEND

NOTES

Verify all dimensions and levels on site and report any discrepancies prior to the commencement of work.

Drawings are to be read in conjunction with all contract documents.

Use figured dimensions only. Do not scale from drawings.

CCG Architects Pty. Ltd. cannot guarantee the accuracy of content and format for copies of drawings issued electronically.

The completion of the issue details checked and authorised section is confirmation of the status of the drawing. The drawing shall not be used for construction unless endorsed 'For Construction' and authorised for issue.

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CLIENT

muswellbrook shire council

PROJECT

COMMUNITY INFRASTRUCTURE DEPOT AT 252 COAL ROAD, MUSWELLBROOK NSW 2333

DRAWING

SITE PLAN

PROJECT No.	DWG.No. DA 002
23-149	SCALE: 1:500

CCG Info: Plotted by Contractor Two on Monday, 2 December 2024
P:\23-149 MUSWELLBROOK SC_ COMMUNITY INFRASTRUCTURE DEPOT\AUTOCAD\AR002_004 MSC DEPOT PROPOSED SITE PLAN.DWG

1.6 Information Sources

The Bibliography in Section 12 contains a full list of information sources referred to for this report. Information sources included (but were not necessarily limited to) the following:

- Database searches included:
    - Review of the threatened species ecological data contained in NSW Department of Climate Change, Energy, Environment and Water's (DCCEEW) Threatened Biodiversity Profile Data Collection (TBPDC).
    - Review of the NSW DCCEEW BioNet Vegetation Classification database.
    - Review of threatened fauna and flora records within a 10 km radius of the site, contained in the NSW DCCEEW Atlas of NSW Wildlife (BioNet).
    - Review of the Matters of National Environmental Significance (MNES) records within a 10 km radius of the site, using the EPBC Act Protected Matters Search Tool.
    - A review of existing regional vegetation mapping (including - Map Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855 and NSW State Vegetation Type Map) was undertaken.
- Aerial Photograph Interpretation (API) included use of the following:
    - Nearmap.
    - SIX maps.
- The following guidelines were reviewed and referred to in the development of biodiversity assessment and field survey methods:
    - Biodiversity Assessment Method (BAM) 2020
    - Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method (EES, 2016).
    - Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Department of Environment and Conservation (DEC), 2004).
- The following reports were reviewed:
    - Kingfisher, Urban Ecology and Wetlands, *Ecological Impact Assessment, Muswellbrook Waste Management Facility* May 2022
- The following legislation and policy guidelines relevant to the Site were reviewed:
    - Muswellbrook Local Environmental Plan (LEP) 2009
    - The Development Control Plan (DCP) 2009

2. LANDSCAPE FEATURES

2.1 Site and Landscape Context

This section details the site and landscape features occurring on the Site and within the assessment area (i.e., a 1.5 km buffer surrounding the Site). See **Figure 2-1** for a Site Map and **Figure 2-2** for a Location Map.

Table 2.1: Site and Landscape Features

IBRA Bioregions and Subregions	The Site falls within the Sydney Basin IBRA bioregion and the Hunter IBRA subregion. No other regions/subregions occur within the assessment area.
NSW Landscape Regions (Mitchell Landscapes)	The Site occurs in the Central Foothills landscape. The Upper Hunter Channels and Floodplain landscape also occur within the assessment area. See **Figure 2-2** for the landscape regions within the assessment area.
Native Vegetation Extent	Native vegetation extent is calculated as a percentage cover on the Site and the surrounding assessment area. Cover estimates are based on the cover of native woody and non-woody vegetation relative to the approximate benchmarks for the PCT, considering vegetation condition and extent. The native vegetation cover within the 795ha assessment area is estimated at 352.6ha or 44% (see **Figure 2-2**).
Patch Size	Patch size is used to describe an area of intact native vegetation, that includes native vegetation with a gap of less than 100 m from the next area of moderate to good condition native vegetation. This gap is less than or equal to 30 m for non-woody ecosystems. The patch size of the native vegetation on the site has been calculated as >25 - ≤100 ha.
Watercourses	The Site contains a small, constructed drainage channel. See **Figure 2-2** for the watercourses / wetlands within the assessment area.
Important Wetlands	There are no Wetlands of International Importance within 10 km of the Site.
Habitat Connectivity	The dominant land use within the area is agricultural cropping and livestock grazing. Native vegetation cover is limited and highly fragmented, however, the site would act as a steppingstone between fragmented patches of bushland within the broader area. (See **Figure 2-2**)
Karst, caves, crevices, cliffs and areas of geological significance	No such geological features occur at the Site.
Areas of Outstanding Biodiversity Value (AOBV)	No AOBV declared by the BC Act occur within the Site or assessment area.

Hunter Ecology

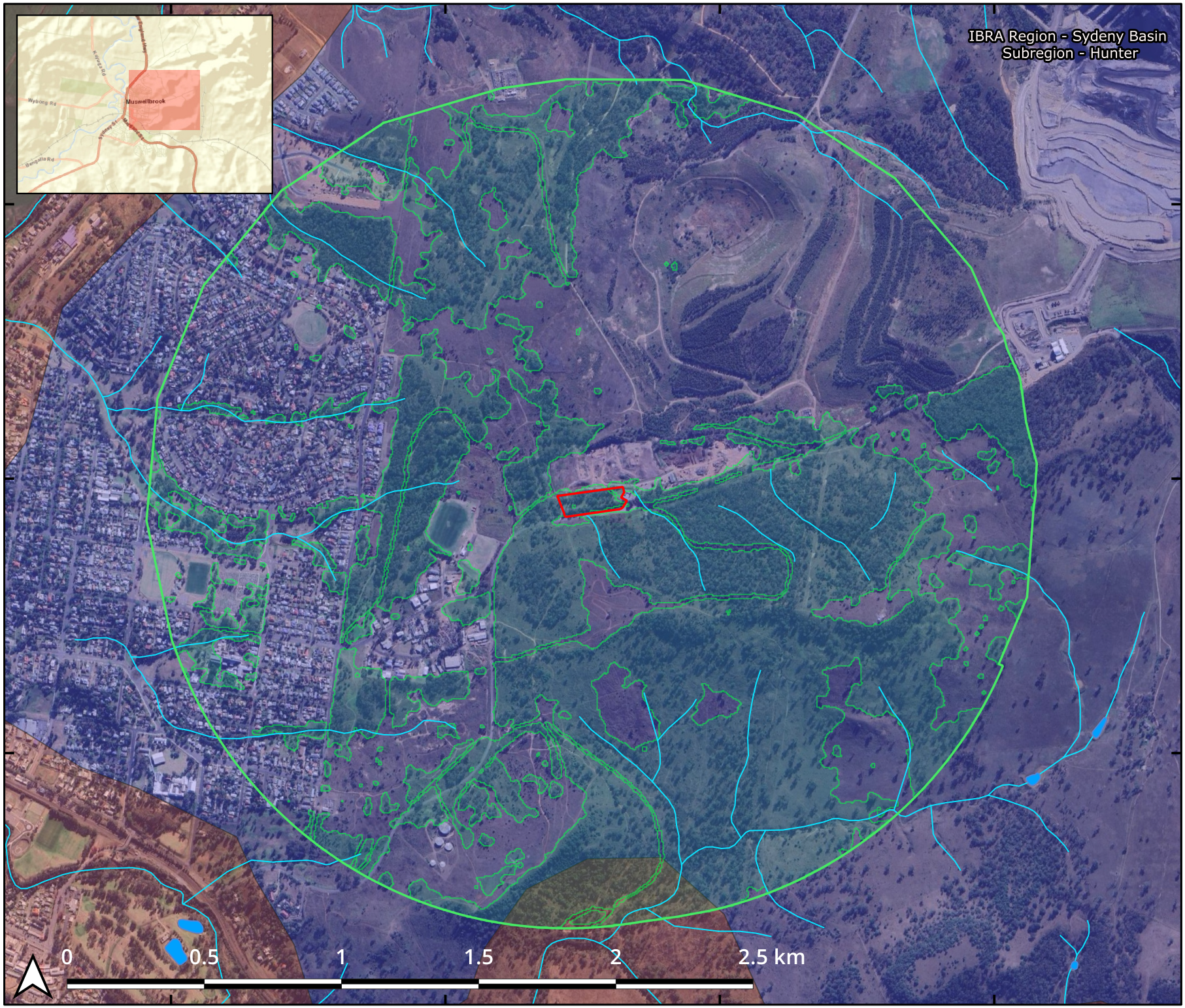
Figure 2-1: Site Map

Community Infrastructure Depot
252 Coal Road, Muswellbrook, 2333

Legend

- Drainage Lines
- Cadastre
- Development footprint

Date: 05/12/2024
Map Version: 1.5
CRS: GDA 2020 Zone 56
Imagery: NearMap



Hunter Ecology

Figure 2-2: Location Map

Community Infrastructure Depot
252 Coal Road, Muswellbrook, 2333

Legend

- Assessment Area
- Study Area
- Native Vegetation
- Hydoareas
- Drainage lines

NSW Mitchell Landscapes

- Central Hunter Foothills
- Upper Hunter Channels and Floodplain

Date: 04/03/2024
Map Version: 1.0
CRS: GDA 2020 Zone 56
Imagery: NearMap

3. NATIVE VEGETATION

3.1 Native Vegetation Extent within the Site

The native vegetation extent within the Site was assessed and groundtruthed by principal ecologist Bart Schiebaan and ecologist Lucinda Casey, during a site visit on 9 February 2024. The vegetation on site is comprised of native vegetation, planted native and non-native vegetation, and areas dominated by exotic grasses and herbaceous weeds (See **Figure 3-1**). The planted native vegetation is located along the soil bund running parallel to Coal Road, which has been planted for the purpose of bund stabilisation and screening of the waste facility (confirmed by Muswellbrook Council Works Engineer-Joseph Thurairatnam, via email 20/02/2024). In accordance with *Appendix D: Streamlined assessment module –Planted native vegetation* of the BAM (2020) this vegetation does not require offsetting.

An assessment of ground covers beyond the dripline of the canopy was undertaken to determine the ratio of native and non-native vegetation cover. The systematic approach involved assessing 10 randomly dispersed 1x1m quadrats for percent total cover, and percent native cover. Average percent cover across quadrats was 58.1%, of which just 2.5% consisted of native vegetation. Due to the low composition of native ground covers, this area is considered to be non-native vegetation and does not require offsetting under the BOS. Refer to **Figure 3-1** for the location of non-native vegetation. A complete account of quadrate data is detailed in **Appendix A,** with photos provided in **Appendix B.**

The extent of native vegetation, on site is therefore limited to the dripline of the canopy trees. This accounts for a total area of 0.51ha of native vegetation.

Figure 3-1 for an indication of the native vegetation extent within the Site.

3.2 Identifying Plant Community Types

3.2.1 Review of Existing Vegetation Mapping

A review of existing regional vegetation mapping was undertaken. See **Table 3-1** for an indication of the vegetation communities mapped in or near the site.

Table 3-1: Review of Existing Vegetation Mapping of the Site and Surrounding Area

Dataset	Vegetation Community/ies Mapped Within or Near Site
NSW State Vegetation Type	PCT 3431 - Central Hunter Ironbark Grassy Woodland PCT 3525 - Upper Hunter Box-Blakelys Red Gum Grassy Forest PCT 3120 - Hunter-Peel Ranges Dry Rainforest PCT 3397 - Northwest Yellow Box Grassy Woodland PCT 4089- Namoi-Upper Hunter River Red Gum Forest
Map Greater Hunter Native Vegetation Mapping v4.0. VIS ID 3855	• White Box/ Sticky Daisy Bush/ Bead Bush shrubby woodland with semi-evergreen vine thicket elements of the Central Hunter Valley

Vegetation communities described in Sivertsen, et al. (2011)	• Narrow-leaved Ironbark/ Grey Box/ Spotted Gum shrub/ grass open forest of the central and lower Hunter • Narrow-leaved Ironbark/ Grey Box grassy woodland of the central and upper Hunter • Narrow-leaved Ironbark/ Native Olive shrubby open forest of the central and upper Hunter

3.2.2 Plot-based Floristic Vegetation Surveys

A plot-based floristic survey was conducted in the study area, in accordance with s.5.2.1.9 of the BAM, on 9 February 2024, by principal ecologist Bart Schiebaan and ecologist Lucinda Casey. Due to the small size of the vegetation community observed on Site, and areas cleared for vehicle access, plots were modified to fit within the available space.

Plot 1 was established around a 25m transect and included:

- 1 x Composition and structure plot - 25m x 10m (250 m²)
- 1 x Structure and function plots - 25m x 10m (250 m²)
- 5 x Average litter cover plots – 1m x 1m (1m²)

Plot 2 was established around a 50m transect and included:

- 1x Composition and structure plot - 40m x 10m (400m²)
- 1 x Structure and function plots - 50m x 10m (500 m²)
- 5 x Average litter cover plots – 1m x 1m (1m²)

Each composition and structure plot was carefully examined to identify all flora species present. This search continued until confident that all flora species within the plots were detected. Data collected for each species included:

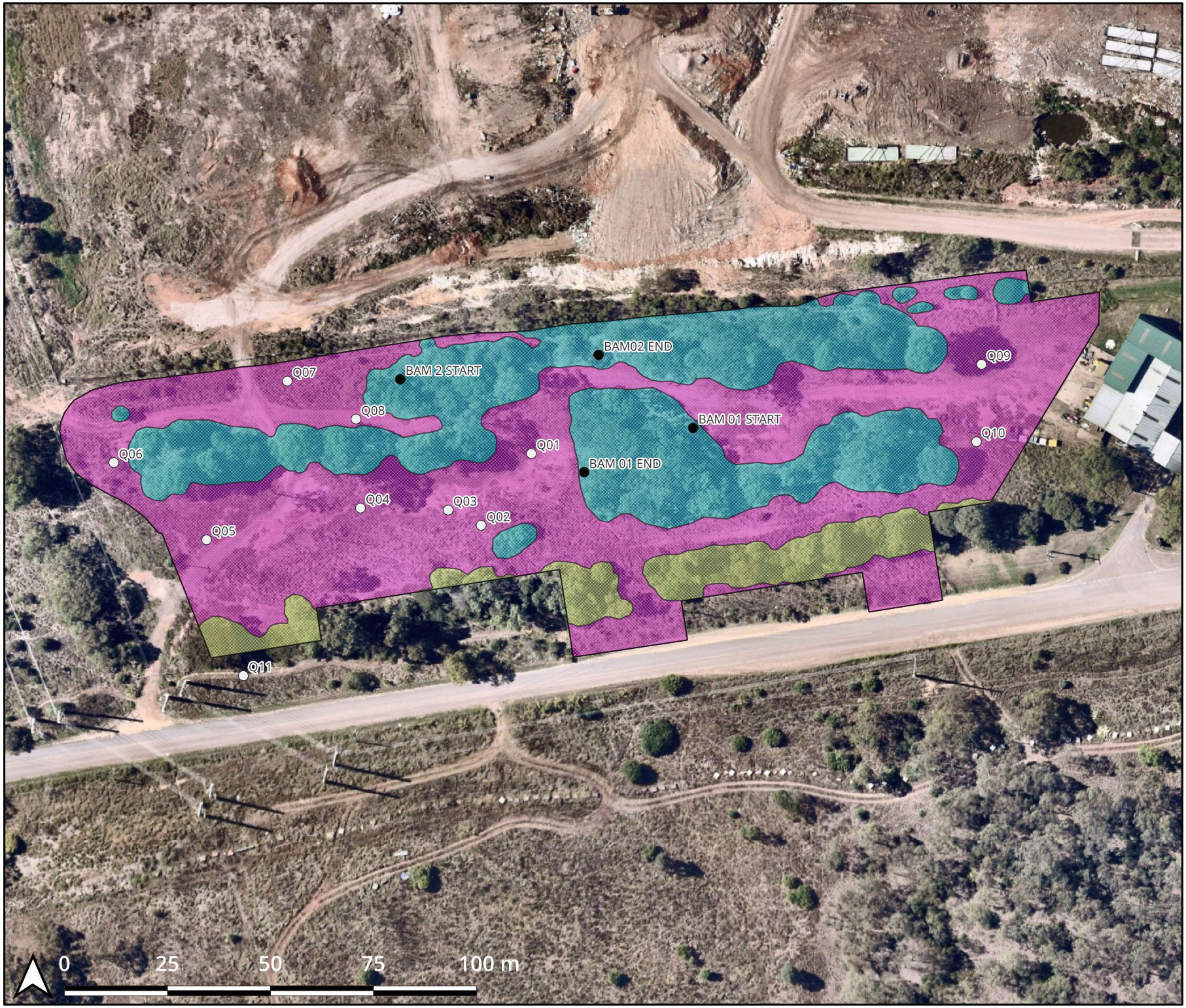
- Stratum and layers in which each species occurs.
- Growth form for each species.
- Scientific and common name for each species.
- Percentage foliage cover across the plot, of each species rooted in or overhanging the plot.
- Abundance rating for each species.

Structure and function plots assess the function attributes: number of large trees, stem size class, tree regeneration and length of logs. Each 1 m² sub-plot is used to assess average litter cover (and other groundcover components).

See **Figure 3-1** for the plot location. Plot location data is provided in **Table 3-2.** Plot data is provided in **Appendix A.** Plot photos are provided in **Appendix B**. A full recorded flora species list is provided in **Appendix C.**

Table 3-2: Plot Location Data

Plot ID	VZ	MGA Zone	Easting 0 m	Northing 0 m	Easting 50 m	Northing 50 m	Bearing 0 m
			Start		End		
Plot 1	3431_1	56	303553	6428925	303527	6428914	110.7
Plot 2	3431_1	56	303483	6428937	303530	6428943	83.7



Hunter Ecology

Figure 3-1: Vegetation Survey Plot Locations

Community Infrastructure Depot
252 Coal Road, Muswellbrook, 2333

Legend

- Development Footprint
- BAM Plot Start/End
- Quadrat

Vegetation

- PCT 3431
- Planted
- Non-native

Date: 10/12/2024
Map Version: 1.3
CRS: GDA 2020 Zone 56
Imagery: NearMap

3.2.3 Plant Community Types

As part of the BAM, an assessor must identify the distribution of Plant Community Types (PCTs) according to the NSW PCT classification described in the NSW BioNet Vegetation Information System (BioNet VIS). One vegetation community was observed on the Site; this community was matched with its 'best-fit' equivalent PCT (based on observations made during the flora surveys as well as a comparison of the PCT descriptions in BioNet VIS).

One PCT was identified within the proposed development impact area. **Table 3-3** provides a summary of the identified PCT, and the distribution of the PCT is indicated in **Figure 3-1**. Note that non-native vegetation communities and mixed planted natives and non-natives were also observed in areas of the Site. The non-native vegetation and planted vegetation is not included in the assessment of native PCTs; rather, they are discussed later in this BDAR in the fauna habitat, prescribed impacts and impact assessment sections of this BDAR.

Table 3-3: PCT 3431 – Central Hunter Ironbark Grassy Woodlands

Attribute	Description
Photo	
Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation Class	Hunter-Macleay Dry Sclerophyll Forests
PCT Name	3431 – Central Hunter Ironbark Grassy Woodlands
TEC status	PCT 3431 Central Hunter Ironbark Grassy Woodlands is associated with the following Threatened Ecological Communities (TEC): BC Act Listed Endangered: Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions. The vegetation on site is commensurate with the described TEC. EPBC Act listed Critically Endangered: Central Hunter Valley eucalypt forest and woodland.

	The vegetation on site is not commensurate with this TEC as it does not satisfy the condition thresholds as per Section 1.5.3 of the Conservation Advice.
PCT Percent Cleared	86.47%
Description	This vegetation community is highly fragmented by cleared pathways to accommodate vehicle access through the site. Apart from a few more mature outliers, the canopy is of a relatively young age class. The canopy stratum is heavily dominated by *Eucalyptus crebra,* with a highly disturbed ground stratum, dominated by exotic grasses and herbaceous weeds. **Upper Stratum** – 8 m to 15 m high with a projected foliage cover (PFC) of 35-70%. The canopy stratum is heavily dominated by *Eucalyptus crebra* with scattered occurrences of *Eucalyptus moluccana* and *Corymbia maculata.* **Mid Stratum** – 1 m to 3 m high with a PFC of 5-15% The mid-stratum was largely absent excepting a small number of scattered shrubs and small trees. The mid-stratum was dominated by *Notelaea macrocarpa*, and Allo*casuarina luehumnnii,* with scattered occurrences of *Pittosporum undulatum, Olearia elliptica subsp. elliptica* and *Breynia oblongifolia.* **Lower Stratum** – <1 m high with a PFC of 80% to 90%. The ground stratum is heavily dominated by exotic grasses and herbaceous weeds, most notably by high threat weeds (HTW) *Megathyrsus maximus, Galenia pubescens* and *Opuntia aurantiaca.* Scattered natives were also present amongst the exotics, these included *Austrostipa scabra, Bothriochloa macra, Sida corrugata, Desmodium varians, Commelina cyanea, Chrysocephalum apiculatum,* and *Einadia nutans, Geitonoplesium cymosum.*
Vegetation Zones / Condition States	PCT 3431 – Central Hunter Ironbark Grassy Woodlands was found to be in one broad condition state across the Site and was concluded to have one VZ (3431_1). The vegetation community is highly degraded due to fragmentation and ongoing disturbance through human activity within the area (vehicles transgressing the site). The understory is highly dominated by exotic grasses and herbaceous weeds. most notably by high threat weeds (HTW) *Megathyrsus maximus, Galenia pubescens* and *Opuntia aurantiaca.*
Justification for PCT Selection	PCT 3431 is most extensively distributed on low-gradient Permian sediments across the central Hunter valley between the Rothbury, Muswellbrook and Wybong districts, where it primarily occurs in small, often disturbed patches in a landscape dominated by agriculture and coal mining. This described distribution is consistent with the context of the site. The floristics of the described community are consistent with PCT 3431, with a canopy almost exclusively dominated by *Eucalyptus crebra* with occasional occurrences of *Eucalyptus moluccana.* The occurrence of scattered *Corymbia maculata* appears to be an outlier, however, the arrangement of the trees with the landscape (in a straight line) suggests they may have been planted. Although highly disturbed and degraded, the mid and ground stratums contained native vegetation consistent with PCT 3431, including *Allocasuarina luehmannii, Acacia falcata, Notelaea macrocarpa, Austrostipa scabra, Dichondra repens,* and *Eremophila debilis.* PCT 3431 is mapped on site by the SVTM

3.3 Vegetation Integrity Assessment

3.3.1 Vegetation Zones

For the purposes of the BAM, a vegetation zone (VZ) is an area of native vegetation on the Site that is the same PCT and has a similar broad condition state. PCT 3431 was found to be in one broad condition state across the Site and was concluded to have one VZ (3431_1). The vegetation community is highly degraded due to fragmentation and ongoing disturbance through human activity within the area (vehicles transgressing the site), as the site forms part of an operational Waste Management Facility. The understory is highly dominated by exotic grasses and herbaceous weeds. most notably by HTW *Megathyrsus maximus, Galenia pubescens* and *Opuntia aurantiaca*.

The distribution of VZ 3431_1 is indicated in previous **Figure 3-2**.

Table 3-4: Vegetation Zone

PCT	VZ	Area
PCT 3431 – Central Hunter Ironbark Grassy Woodlands	3431_1	0.51

3.3.2 Vegetation Integrity Scores

VZs 3431_1 was surveyed on 9th February 2024 to obtain a quantitative measure of the composition, structure and function attributes listed in Table 3 of the BAM. These attributes are listed below:

- Growth form groups used to assess composition and structure:
    - Tree
    - Shrub
    - Grass and grass like
    - Forb
    - Fern
    - Other
- Attributes used to assess function:
    - Number of large trees
    - Tree regeneration
    - Tree stem size class
    - Total length of fallen logs
    - Litter cover
    - High threat exotic vegetation cover
    - Hollow-bearing trees

As outlined previously in this report, a plot-based survey was conducted, in accordance with the BAM. Due to the small size of the vegetation community observed on Site, and areas cleared for vehicle access, plots were modified to fit within the available space.

Plot 1 was established around a 25m transect and included:

- 1 x Composition and structure plot - 25m x 10m (250 m²)
- 1 x Structure and function plots - 25m x 10m (250 m²)
- 5 x Average litter cover plots – 1m x 1m (1m²)

Plot 2 was established around a 50m transect and included:

- 1x Composition and structure plot - 40m x 10m (400m²)
- 1 x Structure and function plots - 50m x 10m (500 m²)
- 5 x Average litter cover plots – 1m x 1m (1m²)

Table 3-5 details the vegetation integrity (VI) scores.

Table 3-5: Vegetation Integrity Scores

VZ	Composition Score	Structure Condition Score	Function Condition Score	VI Score
3431_1	27.6	33	38	**32.6**

4. THREATENED SPECIES

4.1 Habitat Assessment

4.1.1 Desktop Review

A desktop review of previous reports and existing databases was undertaken. Databases searches included:

- Review of the threatened species ecological data and information contained in NSW DCCEEW's TBPDC.
- Review of threatened fauna and flora records within a 10 km radius of the site, contained in the NSW DCCEEW Atlas of NSW Wildlife (BioNet Atlas).
- Review of the MNES records within a 10 km radius of the subject site, using the Commonwealth DCCEEW EPBC Act Protected Matters Search Tool.
- Review of the Commonwealth DCCEEW Species Profile and Threats Database.

Table 4-1 lists the threatened species that have been recorded within 10 km of the Site (in the BioNet Atlas) or are predicted to occur within 10 km of the site (by the EPBC Protected Matters Search Tool).

Table 4-1: Threatened Species Recorded or Predicted to Occur within 10 km of the Site by a Search of the NSW BioNet Atlas and EPBC Protected Matters Search Tool

Scientific Name	NSW status	Comm. status	BioNet Records (<10km of the site)
Flora			
Acacia pendula Acacia pendula population in the Hunter catchment	E2	-	29
Androcalva procumbens	-	V	0
Cymbidium canaliculatum Cymbidium canaliculatum population in the Hunter Catchment	E2	-	11
Cynanchum elegans White-flowered Wax Plant	E	E	0
Dichanthium setosum Bluegrass	V	V	0
Diuris tricolor Pine Donkey Orchid	V	-	170
Diuris tricolor Pine Donkey Orchid population in the Muswellbrook local government area	E2	-	170
Eucalyptus camaldulensis Eucalyptus camaldulensis population in the Hunter catchment	E2	-	58
Eucalyptus glaucina Slaty Red Gum	V	V	8
Euphrasia arguta	CE	CE	0
Lepidium aschersonii Spiny Peppercress	V	V	0
Ozothamnus tesselatus	V	V	0

Picris evae Hawkweed	V	V	0
Pomaderris brunnea Brown Pomaderris	E	V	0
Prasophyllum petilum Musky leek-orchid	V	CE	0
Pterostylis gibbosa Illawarra Greenhood	E	E	0
Swainsona murrayana Murray Swainson-pea	V	V	0
Thesium australe Austral Toadflax	V	V	0
Vincetoxicum forsteri	-	E	0
AVES			
Actitis hypoleucos Common Sandpiper	-	M	0
Anseranas semipalmata Magpie Goose	V	-	1
Anthochaera phrygia Regent Honeyeater	CE	CE	1
Aphelocephala leucopsis Southern Whiteface	V	V	0
Apus pacificus Fork-tailed Swift	-	M	0
Artamus cyanopterus cyanopterus Dusky Woodswallow	V	-	4
Botaurus poiciloptilus Australasian Bittern	E	E	0
Calidris acuminata Sharp-tailed Sandpiper	-	V, M	0
Calidris ferruginea Curlew Sandpipe	E	CE, M	0
Calidris melanotos Pectoral Sandpiper	-	M	0
Callocephalon fimbriatum Gang-gang Cockatoo	V	E	0
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	V	V	0
Chthonicola sagittata Speckled Warbler	V	-	20
Circus assimilis Spotted Harrier	V	-	1
Climacteris picumnus victoriae Brown Treecreeper (south-eastern)	V	V	3
Daphoenositta chrysoptera Varied Sittella	V	-	5
Ephippiorhynchus asiaticus Black-necked Stork	E	-	2
Erythrotriorchis radiatus Red Goshawk	E	E	0
Falco hypoleucos Grey Falcon	V	V	0
Falco subniger Black Falcon	V	-	1

Gallinago hardwickii Japanese Snipe	-	V, M	0
Glossopsitta pusilla Little Lorikeet	V	-	8
Grantiella picta Painted Honeyeater	V	V	0
Haliaeetus leucogaster White-bellied Sea-Eagle	V	-	5
Hieraaetus morphnoides Little Eagle	V	-	4
Hirundapus caudacutus White-throated Needletail	-	V, M	4
Lathamus discolor Swift Parrot	E	CE	0
Melanodryas cucullata cucullata South-eastern Hooded	E	E	0
Monarcha melanopsis Black-faced Monarch	-	M	0
Motacilla flava Yellow Wagtail	-	M	0
Myiagra cyanoleuca Satin Flycatcher	-	M	0
Neophema chrysostoma Blue-winged Parrot	V	V	0
Ninox strenua Powerful Owl	V	-	1
Pandion haliaetus Osprey	-	M	0
Polytelis swainsonii Superb Parrot	V	V	0
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	V	-	5
Rhipidura rufifrons Rufous Fantail	-	M	0
Rostratula australis Australian Painted Snipe	E	E	0
Stagonopleura guttata Diamond Firetail	V	V	3
Tringa nebularia Common Greenshank	-	E, M	0
MAMMALS			
Chalinolobus dwyeri Large-eared Pied Bat	V	E	7
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll	V	E	6
Falsistrellus tasmaniensis Eastern False Pipistrelle	V	-	5
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	V	-	4
Miniopterus australis Little Bent-winged Bat	V	-	2
Miniopterus orianae oceanensis Large Bent-winged Bat	V	-	32

Myotis macropus Southern Myotis	V	-	15
Notamacropus parma Parma Wallaby	V	V	0
Nyctophilus corbeni Corben's Long-eared Bat	V	V	2
Nyctophilus corbeni South-eastern Long-eared Bat	V	V	0
Petauroides volans Greater Glider (southern and central)	E	E	0
Petaurus australis australis Yellow-bellied Glider (south-eastern)	V	V	0
Petaurus norfolcensis Squirrel Glider	V	-	22
Petrogale penicillata Brush-tailed Rock-wallaby	E	V	0
Phascogale tapoatafa Brush-tailed Phascogale	V	-	14
Phascolarctos cinereus Koala	E	E	11
Pseudomys novaehollandiae New Holland Mouse	-	V	0
Pteropus poliocephalus Grey-headed Flying-fox	V	V	29
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	V	-	5
Scoteanax rueppellii Greater Broad-nosed Bat	V	-	5
Vespadelus troughtoni Eastern Cave Bat	V	-	13
HERPETOFAUNA			
Aprasia parapulchella Pink-tailed Legless Lizard	V	V	0
Delma impar Striped Legless Lizard	V	V	11
Litoria aurea Green and Golden Bell Frog	E	V	0
Litoria booroolongensis Booroolong Frog	E	E	0

E= Endangered, V= Vulnerable, CE = Critically Endangered

4.1.2 Field Investigations

An assessment of the relative habitat values of the Site was undertaken by ecologists, Bart Schiebaan and Lucinda Casey on 9th February 2024. The habitat assessment focused on the identification of habitat types and resources favoured by all major guilds of native flora and fauna, including threatened species known from the region. The assessment was based on specific habitat requirements regarding home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology. Any opportunistic observations of fauna utilising the Site were recorded. This included sightings, calls or signs of fauna presence, such as scats, scratches, sap-feeding scars, diggings, nests,

dreys, bones, hair, shed skins, tracks, burrows, chewed cones and feeding pellets. Signs were verified with reference to Triggs (2004).

4.1.3 Habitat Features

Table 4-2 provides details on the habitat features that were recorded. See **Figure 4-1** for locations of important habitat features.

Table 4-2: Assessment of Habitat Features

Habitat Feature	Details
	VZ 3431_1
Vegetation condition	3431_1 is highly degraded due to fragmentation and ongoing disturbance through human activity within the area (vehicles transgressing the site). The site has a high cover of exotic vegetation with ground cover vegetation dominated by exotic grasses and herbaceous annuals. Most notably there is a high cover of HTWs including but not limited to *Megathyrsus maximus, Galenia pubescens* and *Opuntia aurantiaca.*
Vegetation Type	Dry sclerophyll open forest, dominated by *Eucalyptus crebra* and *Allocasuarina luehmannii*
Vegetation structure	A closed canopy with a sparse shrub layer and grassy groundcover.
Presence of stock	No livestock have access to the site.
Evidence of feral animals	*Felis catus* (Cat) was observed during the site assessment, and species such as *Vulpes vulpes* (Red Fox), *Rattus rattus* (Black rat), and *Oryctolagus cuniculus* (European Rabbit) are also likely to occur in the general area.
Evidence of human disturbance	The Site contains fragmented vegetation, exposed to human disturbance and edge effects. Impacts include weed infestation, vegetation trampling and an accumulation of waste blown or carried in (birds / rats) from the landfill.
Nectar or fruit resources and perch sites	The canopy would provide nectar or fruit resources and perch sites.
Winter flowering eucalypt species	Yes - *Corymbia maculata* is known to flower in winter.
Allocasuarina and Casuarina trees	Yes - *Allocasuarina luehmannii* is present.
Proximity to water	No bodies of water or streams occur within the site or in proximity to the site. However, the site contains a manmade drainage line which would experience flows during and following rainfall. See **Figure 2-2** for the watercourses / wetlands within the assessment area.
Evidence of fauna occupation	One hollow bearing tree was recorded on Site.
Flying fox camp	The closes flying fox camp (grey-headed flying fox) is located along the Hunter River >2.5km to the West of the Site.
Evidence of seedling recruitment	No – No seedlings were observed.
Presence of sap feed trees for glider species	Yes - *Corymbia maculata.*

Presence of preferred Koala feed trees	*Corymbia maculata*, *Eucalyptus crebra,* and *Eucalyptus moluccana* are listed as 'Koala use tree species', for the Central Coast Koala management area in the *State Environmental Planning Policy (SEPP) (Koala Habitat Protection) 2021*.
Hollow resources or other tree habitat features or large trees with basal cavities	One small hollow as recorded on site.
Wetlands, streams, rivers, dams or waterbodies with emergent vegetation	No Wetlands, streams, rivers, dams or waterbodies occur on site.
Cliffs or caves, tunnels or disused mine shafts	No cliffs or caves, tunnels or disused mine shafts occur at the site.
Bush rocks and rocky outcrops or logs	Minimal ground timber was recorded. No functional bush rock was observed.
Human made structures that may provide habitat	No.
Areas that can act as corridors/ connectivity to other areas	The dominant land use within the area is livestock grazing. Native vegetation cover is limited and highly fragmented. The site may act as a steppingstone between fragmented patches of bushland within the broader area. (See **Figure 2-2**)

4.1.4 Site photos

Proposed building footprint

Soil bund located along Coal Road

Introduced natives planted ontop of soil bund

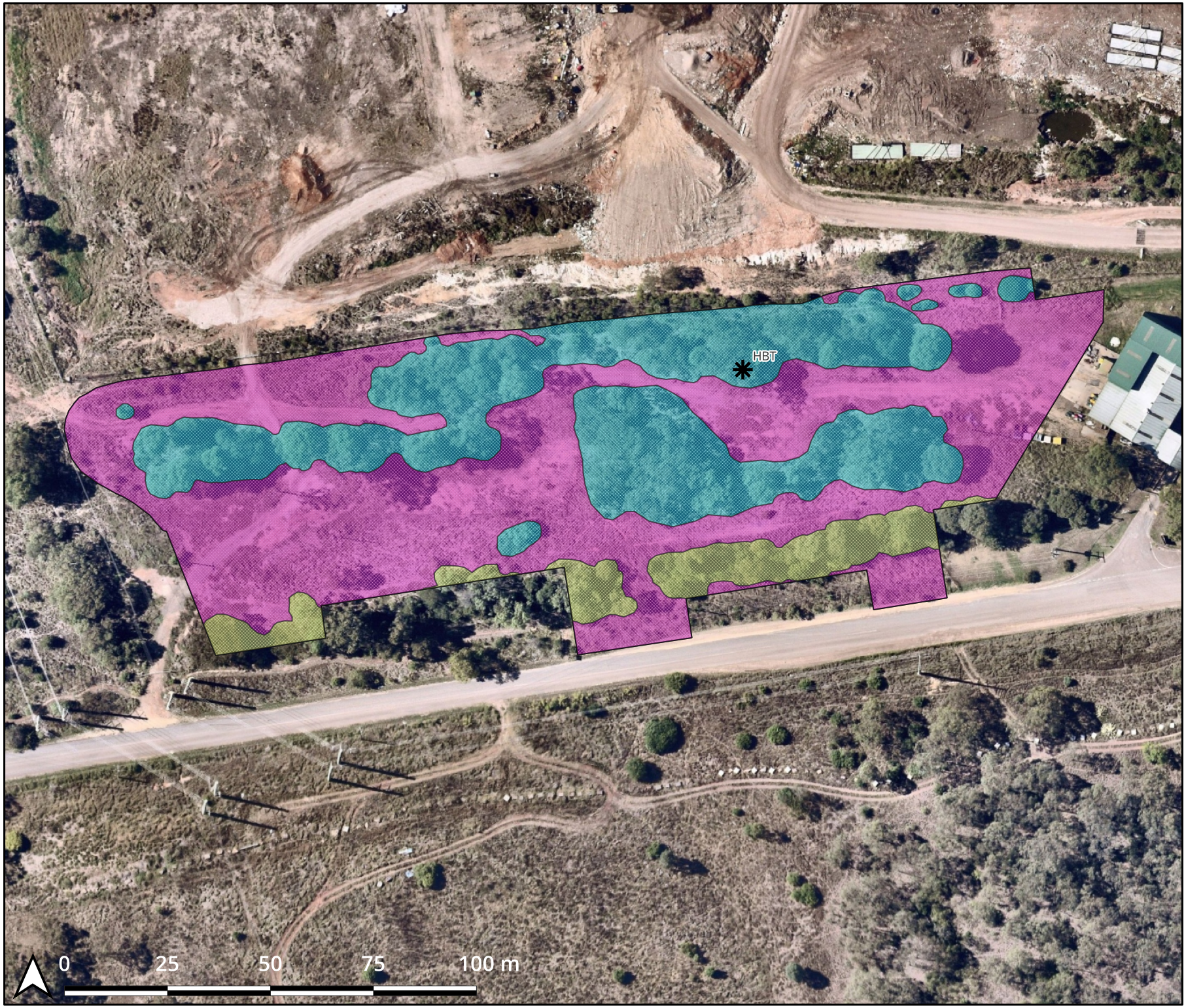
Exotic ground covers

Northeast view from the site.

View of the site from the bund

Mature spotted gum (*Corymbia maculata*)

Mature hollow bearing *Eucalyptus crebra*



Hunter Ecology

Figure 4-1: Habitat Features

Community Infrastructure Depot
252 Coal Road, Muswellbrook, 2333

Legend

- Development Footprint
- Hollow bearing tree

Vegetation

- PCT 3431
- Planted
- Non-native

Date: 05/12/2024
Map Version: 1.3
CRS: GDA 2020 Zone 56
Imagery: NearMap

4.2 Ecosystem Credit Species

Ecosystem credit species are those where the likelihood of occurrence of the species or elements of the species' habitat, can be predicted by vegetation surrogates and landscape features, or for which targeted survey has a low probability of detection. Targeted survey is not required for ecosystem credit species. The Threatened Biodiversity Data Collection (TBCD) has identified several ecosystem credit species as requiring assessment, for the Project; these are listed in **Table 4-3**.

Table 4-3: Habitat Suitability for Ecosystem Credit Species

Ecosystem Credit Species	Habitat Constraints / Geographic Limitations	Confirmed predicted species
Anthochaera phrygia Regent Honeyeater (Foraging)	Nil	**Yes**
Artamus cyanopterus cyanopterus Dusky Woodswallow	Nil	**Yes**
Callocephalon fimbriatum Gang-gang Cockatoo (Foraging)	Nil	**Yes**
Calyptorhynchus lathami Glossy Black-Cockatoo (Foraging)	Presence of *Allocasuarina* and *Casuarina* species✓	**Yes**
Chthonicola sagittata Speckled Warbler	Nil	**Yes**
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	Nil	**Yes**
Daphoenositta chrysoptera Varied Sittella	Nil	**Yes**
Dasyurus maculatus Spotted-tailed Quoll	Nil	**Yes**
Ephippiorhynchus asiaticus Black-necked Stork	Swamps -Shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 300m of these swamps **×** Waterbodies - Shallow lakes, lake margins and estuaries within 300m of these waterbodies **×**	**No – Habitat constraints not present**
Falco subniger Black Falcon	Nil	**Yes**
Glossopsitta pusilla Little Lorikeet	Nil	**Yes**
Haliaeetus leucogaster White-bellied Sea-Eagle (Foraging)	Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastline **×**	**No – Habitat constraints not present**
Hieraaetus morphnoides Little Eagle	Nil	**Yes**

Ecosystem Credit Species	Habitat Constraints / Geographic Limitations	Confirmed predicted species
(Foraging)		
Hirundapus caudacutus White-throated Needletail	Nil	**Yes**
Ixobrychus flavicollis Black Bittern	Waterbodies **×** Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation **x**	**No - Habitat constraints not present**
Lathamus discolor Swift Parrot (Foraging)	Nil	**Yes**
Limicola falcinellus Broad-billed Sandpiper (Foraging)	Nil	**No - Habitat constraints not present**
Lophoictinia isura Square-tailed Kite (Foraging)	Nil	**Yes**
Melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	Nil	**Yes**
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	Nil	**Yes**
Miniopterus australis Little Bent-winged Bat (Foraging)	Nil	**Yes**
Miniopterus orianae oceanensis Large Bent-winged Bat (Foraging)	Nil	**Yes**
Neophema pulchella Turquoise Parrot	Nil	**Yes**
Ninox connivens Barking Owl (Foraging)	Nil	**Yes**
Ninox strenua Powerful Owl (Foraging)	Nil	**Yes**
Pandion cristatus Eastern Osprey (Foraging)	Nil	**No - Habitat constraints not present**
Petroica boodang Scarlet Robin	Nil	**Yes**
Petroica phoenicea Flame Robin	Nil	**Yes**

Ecosystem Credit Species	Habitat Constraints / Geographic Limitations	Confirmed predicted species
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	Nil	**Yes**
Pteropus poliocephalus Grey-headed Flying-fox (Foraging)	Nil	**Yes**
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	Nil	**Yes**
Stagonopleura guttata Diamond Firetail	Nil	**Yes**
Tyto novaehollandiae Masked Owl (Foraging)	Nil	**Yes**

4.3 Species Credit Species

Species credit species are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence or components of their habitat. These species are identified in the TBDC. A targeted survey or an expert report is required to confirm the presence of these species on the Site. Alternatively, for a development activity, clearing or biodiversity certification proposal, the proponent may elect to assume the species is present. The assessor must identify the species assessed for species credits in conjunction with information about the site context of the subject land, information about PCTs and attributes and data from the TBDC. **Table 4-4** lists the species credit species identified as requiring assessment and also includes an assessment of the habitat suitability for each species credit species, in accordance with the BAM.

Note: for streamlined assessments such as this (i.e., under 'Appendix C: Streamlined assessment module – Small area'), only candidate species credit species that are potential serious and irreversible impact (SAII) entities (i.e., those with a 'very high' biodiversity risk weighting) require assessment. Candidate species credit species that are not SAII entities and are not incidentally recorded on the Site do not require assessment.

Table 4-4: Habitat Suitability for Species Credit Species

Species Credit Species	Habitat Constraints / Geographic Limitations	SAII	Confirmed Candidate Species	Justification
***Acacia pendula* - endangered population** *Acacia pendula* population in the Hunter catchment	1. Within the Hunter River Catchment ✓	Yes	Yes	**NA**
Anthochaera phrygia Regent Honeyeater (Breeding)	1. Other × 2. As per Important Habitat Map ×	Yes	No	**Habitat constraints not present:** The Site does not occur within a 'mapped important area'.
Chalinolobus dwyeri Large-eared Pied Bat	1. Cliffs × 2. Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels ×	Yes	No	**Habitat constraints not present:** The species is considered rare with a patchy distribution within NSW. The species typically only occurs in areas with extensive cliffs and caves.
Lathamus discolor Swift Parrot (Breeding)	1. Other × 2. As per Important Habitat Map ×	Yes	No	**Habitat constraints not present:** The Site does not occur within a 'mapped important area'.
Miniopterus australis Little Bent-winged Bat (Breeding)	1. Caves × 2. Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' × 3. observation type code 'E nest-roost'×	Yes	No	**Habitat constraints not present:** The Site does not contain the breeding habitat constraints for this species.

Species Credit Species	Habitat Constraints / Geographic Limitations	SAII	Confirmed Candidate Species	Justification
	4. with numbers of individuals >500 × 5. or from the scientific literature ×			
Miniopterus orianae oceanensis Large Bent-winged Bat (Breeding)	1. Caves × 2. Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' × 3. observation type code 'E nest-roost'× 4. with numbers of individuals >500 ×	Yes		**Habitat constraints not present:** The Site does not contain the breeding habitat constraints for this species.
Persoonia pauciflora North Rothbury Persoonia	1. Within 10km of North Rothbury ×	Yes	No	**Geographic limitation:** the Site is located 75km northwest of the North Rothbury
Petrogale penicillata Brush-tailed Rock-wallaby	1. NA / Other × 2. Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines ×	Yes	No	**Habitat constraints not present:** Believed to be limited to a reduced number of populations within NSW. The species typically occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. BioNet displays no records of the species within 10km of the site. The species is therefore considered unlikely to occur within the Site
Prasophyllum sp. Wybong	Nil	No	No	**Species is not SAII**
Vespadelus troughtoni Eastern Cave Bat	1. Caves × 2. Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometres of old mines, tunnels, old buildings or sheds. ✓	Yes	No	**Habitat constraints not present:** A cave roosting species, that typically occurs in dry open forest and woodland, near cliffs or rocky overhangs.

4.3.1 Determining the Presence or Absence of Confirmed Candidate Species Credit Species

Targeted surveys have been undertaken for the confirmed candidate species credit species identified in previous **Table 4-4**. Requirements for targeted surveys include the survey months specified in the BAM Calculator, as well as the survey effort and methods described in the TBDC and relevant survey guidelines published by the Commonwealth and NSW governments. Where no relevant published guidelines exist, the species survey requirements are based on best practice methods that can be replicated for repeat surveys.

Targeted surveys for candidate species credit species were undertaken within any areas of suitable habitat in and near the Site.

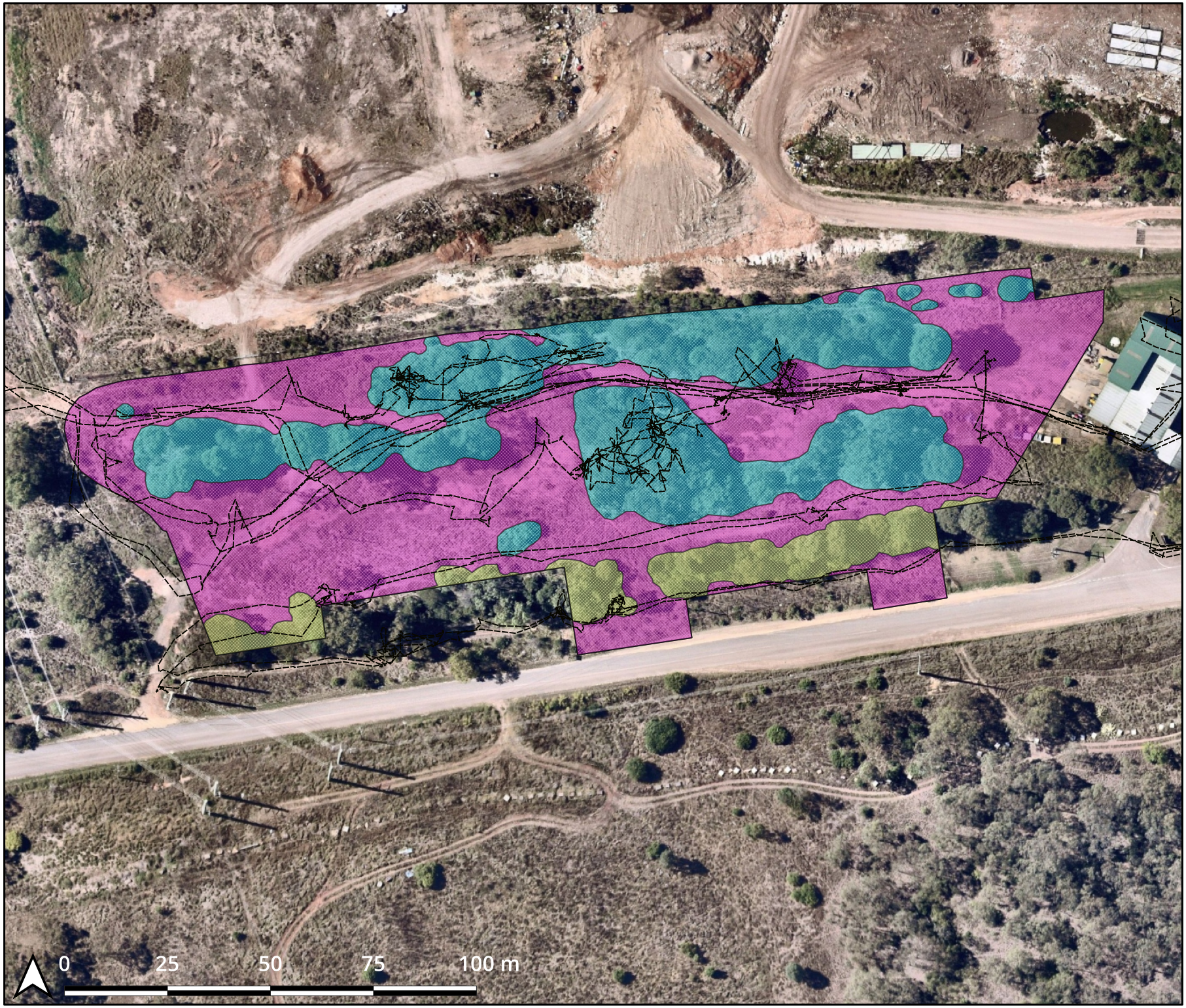
Table 4-5 provides the survey dates and weather conditions. **Table 4-6** provides a summary of survey details, methods and results for each candidate species credit species. **Figure 4-2** depicts the survey effort.

Table 4-5: Field Survey Dates and Weather Conditions

Date	Survey	Temp.	Wind Speed	Cloud Cover	Rain
09/02/2024	BAM plot survey and targeted flora survey.	28°C	Light	Nil	Nil

Table 4-6: Survey Details and Results for Candidate Species Credit Species

Species Credit Species	Survey Months Specified in the BAM Calculator	Survey Dates	Survey Methods and Effort	Relevant Survey Guidelines	Survey Result
Acacia pendula **Endangered population** *Acacia pendula* population in the Hunter catchment	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec	09/02/2024	Parallel field traverse (max. 5-10 m between transects), in all areas of suitable habitat.	*Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method* (EES, 2020).	Species not recorded. Presence ruled out. **EXCLUDED**



Hunter Ecology

Figure 4-2: Targeted Survey Effort

Community Infrastructure Depot
252 Coal Road, Muswellbrook, 2333

Legend

Development Footprint

- Development Footprint
- Survey Tracks

Vegetation

- PCT 3431
- Planted
- Non-native

Date: 05/12/2024
Map Version: 1.3
CRS: GDA 2020 Zone 56
Imagery: NearMap

4.3.2 Survey Results

As previous **Table 4-6** indicates, no species credit species were confirmed to be present at the site.

4.3.3 Prescribed Impacts

Prescribed impacts are the impacts on biodiversity values that which are not related to, or are in addition to, native vegetation clearing and habitat loss. As detailed in Section 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation), prescribed impacts include the following:

- The impacts of development on the following habitat of threatened species or ecological communities
    - karst, caves, crevices, cliffs and other geological features of significance,
    - rocks,
    - human made structures,
    - non-native vegetation,
- The impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,
- The impacts of development on movement of threatened species that maintains their lifecycle,
- The impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),
- The impacts of wind turbine strikes on protected animals,
- The impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.

These types of impacts are used by the decision-maker to inform the determination and conditions of consent for developments. The BAM does not provide an approach to determine the number and class of biodiversity credits that are required for a prescribed impact. However, the additional prescribed impacts on biodiversity may be considered by a consent authority when they determine the biodiversity credits required to be retired (or other conservation measures required to be taken) under a planning approval.

Table 4-9 identifies the prescribed impacts associated with the Site / Project.

Table 4-7: Prescribed Impacts

Feature	Present?	Location	Characteristics and Potential Impact	Threatened Entities Potentially Using Feature	Section in Which Prescribed Impact is Addressed
Karst, caves, crevices, cliffs and other geological features of significance	X	NA	NA – No Karst, caves, crevices, cliffs and other geological features of significance occur on the site.	NA	NA
Rocks	X	NA	NA – No functional bush rock was observed during the site assessment.	NA	NA
Human made structures	X	NA	NA – The proposed development will not require the removal of any manmade structures.	NA	NA
Non-native vegetation	X	See **Figure 3-1**	The site contains a cover of exotic ground covers, largely consisting of exotic grasses and herbaceous weeds, as well as a small number of ornamental exotic trees/shrubs.	The avian species listed in **Table 4-3,** and *Dasyurus maculatus* (Spotted-tailed Quoll).	**Section 6.3**
Hydrological processes	✓	See **Figure 2-1** and **Figure 2-2** for the watercourses and wetlands within the assessment area.	Th site contains a manmade drainage line to divert stormwater flows. Although dry during the time of the site assessment is likely to experience flows during and following rainfall events. The drainage line is to be retained, however will likely experience disturbance during the construction phase of the proposal. No additional, waterways occur on site.	The drainage line may act as a water resource for all Ecosystem species listed in **Table 4-3.**	**Section 6.3**.
Wind turbine strike	X	NA	NA – The proposal will not involve the installation of any wind turbines.	NA	NA
Vehicle strike	✓	**See Figure 1-1**. For proposed car parks and roadways.	The Project includes the installation of parking spaces for light and heavy vehicles and ancillary access roadways. All access roads and carparks would be restricted to a very low speed limit (<20km/h) and are unlikely to be used passed the operational hours of the Water Management facility (8am-4pm).	All entities potentially affected.	**Section 6.3.**

5. AVOID AND MINIMISE IMPACTS

5.1 Avoidance and Minimisation of Impacts through Location and Design

The Site has experienced significant anthropogenic disturbance in it its history including a history of past clearing, urban development, and the proliferation of high threat weeds. The development forms part of the operational Muswellbrook Waste Management Facility and experiences ongoing disturbance by human and vehicle traffic, and contains general waste brought in through wind and animal activity, likely from rats, foxes, and birds which forage within the landfill located to the north of the development footprint. The proposed development will require the removal of approximately 0.51ha of native vegetation and 0.12 ha of mixed native and non-native plantings, and 0.84 of exotic vegetation. This area is considered to have low ecological value due to its fragmented and degraded state with ongoing disturbance from the operational waste management facility.

The native vegetation onsite is consistent with the BC Act listed Endangered Ecological Community (EEC) *Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions.* In 2006 the remaining community was estimated to span approximately 18,300ha, having reduced by approximately 29% since European settlement. Mapped occurrences of the EEC included 34 remnant patches greater then 100ha and over 1000 occurrences spanning less then 10ha, indicating a high level of fragmentation (Peake 2006). According to the Threatened Biodiversity Database Collection (TBDC) more recent estimates suggest the remaining area of the EEC is now just 14,818 ha. The area proposed to be cleared to facilitate the proposed development accounts for approximately 0.0034% of the remaining EEC. While the clearance of such a portion of the Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions, might have regional-scale implications, taking into consideration the sites poor condition, limited connectivity, and overall low potential for regeneration suggests that the overall impact would be relatively minor. Owing to its limited connectivity, degraded state, and consequent limitations in supporting diversity, the EEC on the Site does not make a substantial ecological contribution within the region. Due to the low potential for regeneration the community has limited potential to persist long-term unless efforts were made to conserve it.

It is therefore considered that the proposal addresses the avoid and minimise principals through strategic placement of the development footprint within an area of low ecological value dominated by non-native groundcovers.

5.2 Further Measures to Avoid and Minimise Impacts

Impacts will be further avoided and minimised through several measures, designed to protect retained vegetation and habitat before, during and after construction. These measures are detailed in **Section 7** of this BDAR.

6. ASSESSMENT OF IMPACT

6.1 Direct Impacts

Direct impacts are described below. See **Table 6-1** for information on nature, extent, frequency, duration, timing and consequences of each impact and for the identification of affected threatened entities.

6.1.1 Clearing of Native Vegetation

The proposed development will require the removal of approximately 0.51ha of native vegetation. The vegetation in the development footprint is highly degraded as a result of fragmentation, edge effects and on-going disturbance through vehicle and human traffic, vegetation trampling, the spread of high threat weeds and an influx of waste blown or carried in (birds and rats) from the landfill located to the north of the development area. Taking into consideration the sites limited connectivity, poor condition and overall low potential for regeneration, the impact of native vegetation clearing is expected to have minimal impacts on the surrounding biodiversity and ecosystem functioning within the region. However, the loss of local vegetation would equate to a minor disruption of established home ranges and a minor loss of potential sheltering, foraging and breeding habitat for any fauna utilising the site.

6.1.2 Clearing of an Endangered Ecological Community

The native vegetation onsite is consistent with the BC Act Listed EEC *Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions.* In 2006 the remaining community was estimated to span approximately 18,300ha, having reduced by approximately 29% since European settlement. Mapped occurrences of the EEC included 34 remnant patches greater then 100ha and over 1000 occurrences spanning less then 10ha, indicating a high level of fragmentation (Peake 2006). According to the TBDC, more recent estimates suggest the remaining area of the EEC is now just 14,818 ha. The area proposed to be cleared to facilitate the proposed development accounts for approximately 0.0034% of the remaining EEC. While the clearance of such a portion of the Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions, might have regional-scale implications, taking into consideration the sites poor condition, limited connectivity, and overall low potential for regeneration suggests that the overall impact would be relatively minor. Owing to its limited connectivity, degraded state, and consequent limitations in supporting diversity, the EEC on the Site does not make a substantial ecological contribution within the region. Due to the low potential for regeneration the community has limited potential to persist long-term unless efforts are made to conserve it.

6.1.3 Clearing of Planted Native Vegetation.

The proposed development will require the removal of approximately 0.12ha of a 0.27ha patch of mixed planted native and non-native vegetation located along a soil bund running parallel to Coal Road. As this planted vegetation has been installed for functional (bund stabilisation and screening

and aesthetic purposes. This planted vegetation has been assessed in accordance with *Appendix D – Planted Native vegetation* of the BAM and will not require offsetting through the purchase of credits. However, regardless of offsetting requirements the loss of local vegetation would equate to a minor disruption of established home ranges and a minor loss of potential sheltering, foraging and breeding habitat for any fauna utilising the site.

6.1.4 Clearing of Exotic Vegetation

The proposed development requires the removal of approximately 0.84ha of exotic vegetation, predominantly consisting of exotic grasses and herbaceous weeds, and a small number of ornamental trees. The loss of this vegetation has the potential to contribute to minor losses of potential sheltering, foraging and breeding habitat for any fauna utilising the site.

6.1.5 Removal of Hollow-bearing Trees

The majority of trees on the Site are of a relatively young age class (approx. 10-60 years) due to a history of clearing at the site. One of the more mature trees on site, a *Eucalyptus crebra* contains a small sized hollow, and dead branches with small cavities. This tree has the potential to support roosting for microbats, as well as sheltering and breeding for small mammals, and a range of small hollow dependant birds. The proposed development would require the removal of this hollow bearing tree, resulting in a loss of available habitat to the fauna which inhabit the site.

The proposed mitigation measures in **Section 7** of this BDAR include the installation, maintenance, and monitoring of artificial nest boxes, to replace any removed hollows.

6.1.6 Removal of Coarse Woody Debris and Bush Rocks

Coarse woody debris is a limited and important resource. Although minimal course woody debris (i.e., fallen logs) were observed within the Site, the removal of woody debris within this area would result in a net loss of potential breeding, foraging and refuge habitat, as well as biological processes associated with woody decay (e.g., nutrient cycling).

The proposed mitigation measures in **Section 7** of this BDAR include plans to salvage important habitat features in the development footprint and redistribute them in areas of retained native bushland within the Site.

6.2 Indirect Impacts

Indirect impacts are described below. See **Table 6-1** for information on nature, extent, frequency, duration, timing and consequences of each impact and for the identification of affected threatened entities.

6.2.1 Impacts from Artificial Light

Light pollution can alter the behaviour of nocturnal fauna. To minimise any unnecessary disturbance to the behaviour of local populations of nocturnal species, no light should be directed towards these areas of retained bushland at any time after sunset. As the operational hours of the Waste Management Facility are restricted to the daylight hours (8am-4pm) the impact of artificial light on the surrounding bushland is expected to be marginal.

6.2.2 Reduced Viability of Adjacent Habitat due to Edge Effects

Vegetation clearing increases the edge:core habitat ratio, resulting in edge effects such as light and noise pollution, weed invasion and altered moisture, wind and temperature encroaching deeper into core bushland. This may reduce habitat quality or affect habitat use or movements of some species. The Site contains fragmented patches of vegetation, already exposed to significant human disturbance and edge effects. In this instance, it is not considered that the proposal will have a significant impact.

6.2.3 Indirect impacts on an Endangered Ecological Community

A portion of the vegetation to be retained on site is consistent with the BC Act listed EEC Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions. This retained patch of vegetation will be exposed to increased edge effects increasing exposure to light, variation in moisture levels and human disturbance. As the EEC on site is already exposed to significant human disturbance and edge effects, it is not considered that the proposal will have a significant impact on the retained EEC.

6.2.4 Loss of Habitat Connectivity

Vegetation clearing can result in the isolation of suitable habitat patches or reduction in wildlife corridor width, not only from the loss in vegetation, but also from an increase in edge effects (such as light, and noise pollution). Some species may avoid edge habitat, increasing competition for resources and disrupting home ranges. Gene flow may be restricted to sub-populations no longer connected by suitable habitat to facilitate dispersal, this includes movement of floristic genes by pollinators and seed dispersers.

Due to the already fragmented and highly disturbed nature of the vegetation on the Site, the proposed development is expected to have minimal impact on habitat connectivity within the region.

6.2.5 Impacts on Water Quality, Water Bodies and Hydrological Processes

There is potential for impacts on water quality, water bodies and hydrological processes during both the construction phase and operational phase of any project. Construction phase impacts can include

erosion and sedimentation (i.e., movement of soil to adjacent/downstream aquatic habitats, particularly during rain events). Operational phase impacts can include an increased runoff from non-permeable surfaces (e.g. roofs and pavements). Overall, increased sedimentation and turbidity in neighbouring waterbodies may decrease water quality downstream of the development, which may impact pollution-sensitive species.

It is not considered that the proposal would have significant impacts on water quality, water bodies and hydrological processes. Standard erosion control methods will be implemented during construction and standard stormwater management measures will be implemented for the operational phase.

6.2.6 Fertiliser, Pesticide and Herbicide Drift

Fertilisers, herbicides and pesticides used by occupants (during the operational phase of the Project) may be washed or blown into adjacent bushland. This can cause pollution of neighbouring terrestrial and aquatic habitats. Fertiliser drift may affect biological nitrogen fixation which can degrade habitat. Herbicide and pesticide drift can directly harm plant / invertebrate populations. The Project is not likely to result in a significant impact resulting from the application of fertilisers, herbicides and pesticides.

6.2.7 Other Impacts from Anthropogenic Disturbance

The proposed development may result in a range of other impacts related to human occupation such as altered fire regime, increase in pest animals, weeds and pathogens and trampling of flora species. It is considered that such impacts were already existing at the site as it forms part of an operational Waste Management Facility and the proposal is unlikely to introduce, or significantly increased them.

6.3 Prescribed Impacts

Prescribed impacts are described below. See **Table 6-1** for the nature, extent, frequency, duration, timing and consequences of each impact and for identification of affected threatened entities.

6.3.1 Impacts on Hydrological Processes

The site contains a small, constructed drainage line, running parallel to the northern fence line adjacent to the development footprint, which may provide available water to the fauna who occupy the site. There is potential for impacts on water quality, and hydrological processes during both the construction phase and operational phase of the Project. Construction phase impacts can include erosion and sedimentation. Operational phase impacts can include an increased runoff from non-permeable surfaces (e.g., rooves and pavements).

It is not considered that the Project would have significant impacts on hydrological processes. Standard erosion control methods will be implemented during construction and standard stormwater management measures will be implemented for the operational phase.

See **Figure 2-2** for the watercourses / wetlands within the assessment area.

6.3.2 Vehicle Strike

The Project includes the installation of parking spaces for light and heavy vehicles and ancillary access roadways. All access roads and carparks would be restricted to a very low speed limit (<20km/h) and are unlikely to be used passed the operational hours of the Water Management facility. Threat of vehicle strike to fauna occupying the Site is therefore considered low.

Table 6-1: Summary of Impacts

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
DIRECT IMPACTS					
Clearing of Native Vegetation	Listed Key Threatening Process (KTP). All strata and growth form groups, plus leaf litter.	0.51ha.	Once. Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3.** No species credit species affected	Loss of local vegetation, a minor disruption of established home ranges and a loss of potential sheltering, foraging and breeding habitat. Future VI score for VZ 3431_1 is assumed to be 0.
Clearing of an EEC	Clearing of Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions. All strata and growth form groups, plus leaf litter.	0.51ha	Once. Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3.** No species credit species affected	Loss of 0.51ha (0.0034%) from the remaining 14,818 ha of the EEC
Clearing of Planted Native Vegetation.	Clearing of planted native vegetation. All strata and growth form groups, plus leaf litter.	0.12ha	Once. Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3.** No species credit species affected	Marginal loss of local vegetation, a disruption of established home ranges and a loss of potential sheltering, foraging and breeding habitat.

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
Clearing of Exotic Vegetation	Limited to exotic grasses and herbaceous weeds, and a small number of ornamental trees.	0.84ha	Once. Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: *Pomatostomus temporalis temporalis, Chthonicola sagittata, Climacteris picumnus victoriae, Petroica phoenicea,* and *Stagonopleura guttata* No species credit species affected	Marginal loss of local vegetation, a disruption of established home ranges and a loss of potential sheltering, foraging and breeding habitat.
Removal of Hollow-bearing Trees	Clearing of one HBT	Limited to one HBT containing one small hollow, and dead wood branches.	Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: *Saccolaimus flaviventris, Miniopterus orianae oceanensis, Miniopterus australis, Micronomus norfolkensis, Climacteris picumnus victoriae, Glossopsitta pusilla, Neophema pulchella,*and *Petroica phoenicea.* No species credit species affected	A loss of potential sheltering, and breeding habitat.
Removal of Coarse Woody Debris and Bush Rocks	Listed KTP. Removal of hollow and non-hollow logs. Bush rocks are limited in the Development footprint.	1.47ha of habitat containing scattered coarse woody debris.	Once. Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: *Pomatostomus temporalis temporalis, Chthonicola sagittate, Climacteris picumnus victoriae, Dasyurus maculatus, Petroica phoenicea, and Stagonopleura guttata* No species credit species affected.	Marginal loss of potential breeding, foraging and refuge habitat, as well as biological processes associated with woody decay (e.g., nutrient cycling).

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
INDIRECT IMPACTS					
Impacts from Artificial Light	Light pollution affecting adjacent habitat, during nocturnal hours.	Within approx. 100 m of adjacent vegetation/habitat.	Ongoing, during the operational phase.	Ecosystem credits species potentially affected: *Dasyurus maculatus, Pteropus poliocephalus, Micronomus norfolkensis, Miniopterus australis,* and *Miniopterus orianae oceanensis.* No species credit species affected	Has the potential to alter the behaviour of nocturnal fauna. However, as the facility's operational hours are restricted to 8am-4pm, impact is expected to be minimal.
Reduced Viability of Adjacent Habitat due to Edge Effects	Increase in edge:core habitat ratio, resulting in edge effects such as light and noise pollution, weed invasion and altered moisture, wind and temperature.	Within approx. 100 m of adjacent vegetation/habitat.	Ongoing and permanent, during the operational phase.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3.** No species credit species affected	May reduce habitat quality or affect habitat use or movements of some species.
Loss of Habitat Connectivity	Isolation of suitable habitat patches, and increase in edge effects (such as light, and noise pollution).	Removal of 0.51ha native and 0.12 ha of mixed native and non-native plantings.	Undertaken prior to and/or during construction. Permanent.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3**. No species credit species affected	Further fragmentation of retained vegetation and increased edge effects on retained native and planted native vegetation.
Impacts on Water Quality, Water Bodies and Hydrological Processes	Construction phase: Erosion and sedimentation (i.e., movement of soil to adjacent/downstream aquatic habitats, particularly during rain events).	Uncertain, although likely to be minimal - standard erosion control methods will be used during construction, and	During rainfall events in the construction phase. Ongoing and permanent during the operational phase.	No Ecosystem credits species are likely to be impacted. No species credit species affected	May decrease downstream water quality, which may impact pollution-sensitive species.

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
	Operational phase: increased runoff from non-permeable surfaces (e.g., rooves and pavements).	standard stormwater management measures will be implemented.			
Fertiliser, Pesticide and Herbicide Drift	Fertilisers, herbicides and pesticides used in gardens may be washed or blown into adjacent bushland	Within approx. 100 m of adjacent vegetation/habitat.	Ongoing and permanent, during the operational phase.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3**. No species credit species affected	Potential to pollute neighbouring terrestrial and aquatic habitats. Fertiliser drift may affect biological nitrogen fixation which can degrade habitat. Herbicide and pesticide drift can directly harm plant / invertebrate populations.
Other Impacts from Anthropogenic Disturbance	Various other impacts related to human occupation, such as collection of wood (e.g., for firewood) and bush rocks, rubbish dumping, altered fire regime, increase in pest animals, weeds and pathogens and trampling of threatened flora species.	Within approx. 100 m of adjacent vegetation/habitat.	Ongoing and permanent, during the operational phase.	No Ecosystem credits species are likely to be impacted. No species credit species affected	Such impacts were already existing at the site and the project is unlikely to have introduced, or significantly increased them.

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
PRESCRIBED IMPACTS					
Impacts on Hydrological Processes	Construction phase: Erosion and sedimentation (i.e., movement of soil to adjacent/downstream aquatic habitats, particularly during rain events). Operational phase: increased runoff from non-permeable surfaces (e.g., rooves and pavements).	Uncertain, although likely to be minimal - standard erosion control methods will be used during construction, and standard stormwater management measures will be implemented.	During rainfall events in the construction phase. Ongoing and permanent during the operational phase.	No Ecosystem credits species are likely to be impacted. No species credit species affected.	May decrease downstream water quality, which may impact pollution-sensitive species.
Vehicle Strike	The installation of parking spaces for light and heavy vehicles and ancillary access roadways.	Parking spaces and ancillary access roads.	Ongoing and permanent during the operational phase.	Ecosystem credits species potentially affected: All ecosystem credit species listed in **Table 4-3**. No species credit species affected.	Potential for death or injury to fauna while crossing roads.

7. MITIGATION AND MANAGEMENT OF IMPACTS

7.1 Mitigating and Managing Impacts

In accordance with the BAM, the proponent must identify measures to mitigate and manage impacts in accordance with the guidelines for mitigating and managing impacts on biodiversity values in Subsections 8.4.1 and 8.4.2 of the BAM. **Table 7-1** details the proposed measures to mitigate and manage impacts.

7.2 Adaptive Management for Uncertain Impacts

In accordance with Section 8.4 of the BAM, adaptive management is to be used to address impacts that are infrequent or difficult to measure., such as indirect or prescribed impacts, or other remaining biodiversity impacts. The principles of adaptive management have been incorporated in the proposed measures in **Table 7-1**.

Table 7-1: Measures to Mitigate and Manage Impacts

Impact	Measure	Outcome	Timing	Responsibility
Clearing of Native Vegetation; **Potential Injury and Death of Fauna;** **Removal of Coarse Woody Debris and Bush Rock;**	The following vegetation clearing protocols will be implemented: • The boundaries of vegetation removal are to be clearly defined (signposted and fenced) to prevent unauthorised clearing and vehicular and/or foot traffic. 'No go' zones should include areas of retained vegetation. • Relocate ground timber, bushrock and any salvaged felled trees should be retained onsite within the native bushland.	This will limit disturbance and impact on vegetation / habitat to the minimum necessary for construction works. It will also limit injury and death of fauna and ensure that important habitat features (e.g., ground logs) are salvaged and retained onsite.	During the clearing and construction phase.	Project ecologist and site manager.
Clearing of Native Vegetation; **Clearing of a Threatened Ecological Community**	Vegetation management is to be undertaken in accordance with the landscape plan prepared by RFA Landscape Architects to provide replacement vegetation consistent with PCT 3431 - Central Hunter Ironbark Grassy Woodland. Refer to **Appendix G** for the Landscape Plan	The implementation of a VMP will improve the future biodiversity values of the Site, provide habitat for local fauna, and ensure the longevity of the TEC within the site.	Prior to the clearing and construction phase and ongoing during the occupation phase.	Project ecologist and site manager.
Removal of Hollow Bearing Tree	A total of ten artificial nest boxes will be selected and installed (by a suitably qualified ecologist) within the bushland beyond the development footprint. The nest box types installed must target the species impacted by the proposal (such as microbats, arboreal mammals and birds). Maintenance of monitoring of nest boxes will be undertaken for a period of at least 10 years.	This will minimise the impact from the removal of hollow-bearing trees by providing compensatory habitat for hollow-dependent fauna.	Nest boxes to be installed at least one month prior to vegetation clearing. Monitoring and maintenance to occur once annually for at least 10 years and results reported to Muswellbrook Shire Council or BioNET.	Project ecologist and site manager.
Indirect Impacts on a Threatened Ecological Community; **Reduced Viability of Adjacent Habitat due to Edge Effects; and** **Other Impacts from Anthropogenic Disturbance**	Appropriate weed management protocol will be implemented. All equipment, vehicles and machinery wheels and tracks of excavators and other tracked machinery should be cleaned so that they are completely free of soil, seeds and plant material before entering the site to prevent the introduction of further exotic plant species and pathogens.	This will prevent the introduction and spread of weeds in the Site.	During the clearing and construction phase.	Site manager.
Impacts on Water Quality,	Appropriate sediment and erosion controls will be installed. No	This will prevent impacts on water	During the clearing and	Site manager.

Water Bodies and Hydrological Processes; **Indirect Impacts on a Threatened Ecological Community**	excavated material or fill to be placed in flood prone areas. All stockpiles and material to be secure from a one in ten-year flood level and have effective sediment control works to contain run-off.	quality in downstream wetlands.	construction phase.	

8. IMPACT SUMMARY

8.1 Serious and Irreversible Impacts

Species and ecological communities with a 'very high' biodiversity risk weighting are potential serious and irreversible impact (SAII) entities. One potential SAII entity was identified in the BAM-C as potentially being associated with the Site / Project: *Acacia pendula* (Endangered population in the Hunter catchment). A targeted flora search was undertaken (see previous **Section 4** of this BDAR), confirming that the species does not occur within the Site.

8.2 Identification of Impacts Requiring Offset

Impacts requiring offset include the direct impact on native vegetation through vegetation clearing (i.e., 0.51 ha of PCT 3431). The area and location of impacts requiring offset is depicted in **Figure 8-1**.

8.3 Identification of Impacts Not Requiring Offset

Impacts not requiring offset include the indirect impacts on adjacent areas of vegetation / habitat (within approx. 100 m of the impact area), that are listed in previous **Table 6-1**. The impacts / areas not requiring offset are depicted in **Figure 8-1**.

Hunter Ecology

Figure 8-1: Impact Summary

Community Infrastructure Depot
252 Coal Road, Muswellbrook, 2333

Legend

- Development Footprint
- Impact requiring offset (0.51 ha)
- Impact not requiring offset

Date: 05/12/2024
Map Version: 1.1
CRS: GDA 2020 Zone 56
Imagery: NearMap

8.4 Ecosystem Credits Required

Table 8-2 outlines the ecosystem credits that measure the impact of the development on biodiversity values. No species credits have been generated by the proposal.

Table 8-1: Ecosystem Credits Required

PCT	Offset Trading Group	Vegetation Zone	Area	Total VI Loss	No. of Ecosystem Credits Required
PCT 3431 Central Hunter Ironbark Grassy Woodland	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	3431_1	0.51	32.6	**8**

9. BIODIVERSITY CREDIT REPORT

The biodiversity credit report, including credit classes and matching credit profiles for required ecosystem and species credits, is provided in the following pages.

10. ASSESSMENT UNDER OTHER LEGISLATION AND PLANNING INSTRUMENTS

10.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act requires approval for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES). The MNES determined to be potentially associated with the Project included several potentially occurring threatened and migratory species. Assessments in accordance with the Department of Environment (2013) *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* were undertaken for each species. These assessments concluded that it is unlikely that any MNES would be significantly impacted by the proposal and thus referral to the Commonwealth DCCEEW is not necessary. The full EPBC Act assessment is provided in **Appendix E**.

11. CONCLUSION & RECOMMENDATIONS

11.1 Conclusion

The proposed development has been designed to comply with avoidance and minimisation requirements under the BOS. This has been achieved through the strategic placement of the proposed development footprint within an area that is significantly degraded and primarily dominated by exotic vegetation, consisting of exotic ground covers and the occasional ornamental shrub. Due to the strategic placement of the proposed development footprint, minimal native vegetation clearing will be required to facilitate the proposal.

The native vegetation to be cleared to facilitate the proposed development is consistent with the BC Act listed EEC *Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions.* According to the TBDC the remaining area of the EEC is now 14,818 ha, based on this estimate the proposed development would result in the removal of approximately 0.0034% of the remaining EEC. While the clearance of such a portion of the Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions, might have regional-scale implications, taking into consideration the sites poor condition, limited connectivity, and overall low potential for regeneration suggests that the overall impact would be relatively minor. Owing to its limited connectivity, degraded state, and consequent limitations in supporting diversity, the EEC on the Site does not make a substantial ecological contribution within the region.

An assessment of direct, indirect and prescribed impacts was undertaken, and several mitigation measures have been proposed to address any unavoidable impacts.

It is concluded that the Project will generate the following offset obligation:

- **Ecosystem Credits:**
  - 8 Credits - *Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions*.

The Project was assessed under the requirements of the EPBC Act; assessments of significance for several potentially occurring threatened and migratory species were undertaken. It was concluded that the Project is unlikely to significantly impact on any MNES and thus referral to the Commonwealth DCCEEW is not required.

11.2 Recommendations

It is recommended that the following measures are conditioned as part of any Project consent:

- **The following vegetation clearing protocols will be implemented:**

  - The boundaries of vegetation removal are to be clearly defined (signposted and fenced) to prevent unauthorised clearing and vehicular and/or foot traffic. ‘No go’ zones should include areas of retained vegetation and any retained trees within the footprint.
  - Relocate fallen timber and bushrock from areas of vegetation clearing into retained vegetation

- **Vegetation Management**

  - Vegetation management is to be undertaken in accordance with the landscape plan prepared by RFA Landscape Architects, to provide replacement vegetation consistent with PCT 3431 - Central Hunter Ironbark Grassy Woodland.
    Refer to **Appendix G** for the Landscape Plan

- **Installation of replacement habitat**

  - A total of ten artificial nest boxes will be selected and installed (by a suitably qualified ecologist) within the bushland beyond the development footprint.
  - The nest box types installed must target the species impacted by the proposal (such as microbats, arboreal mammals and birds).
  - Maintenance of monitoring of nest boxes will be undertaken for a period of at least 10 years.

- **Implementation of a weed management protocol**

  - All equipment, vehicles and machinery wheels and tracks of excavators and other tracked machinery should be cleaned so that they are completely free of soil, seeds and plant material before entering the site to prevent the introduction of further exotic plant species and pathogens.

- **Implementation of sediment and erosion controls.**

  - No excavated material or fill to be placed in flood prone areas.
  - All stockpiles and material to be secure from a one in ten-year flood level and have effective sediment control works to contain run-off.

12. BIBLIOGRAPHY

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APPENDIX A – BAM PLOT DATA & QUADRATS

APPENDIX B – BAM PLOT & QUADRAT PHOTOS

Plot 1 (0 m)

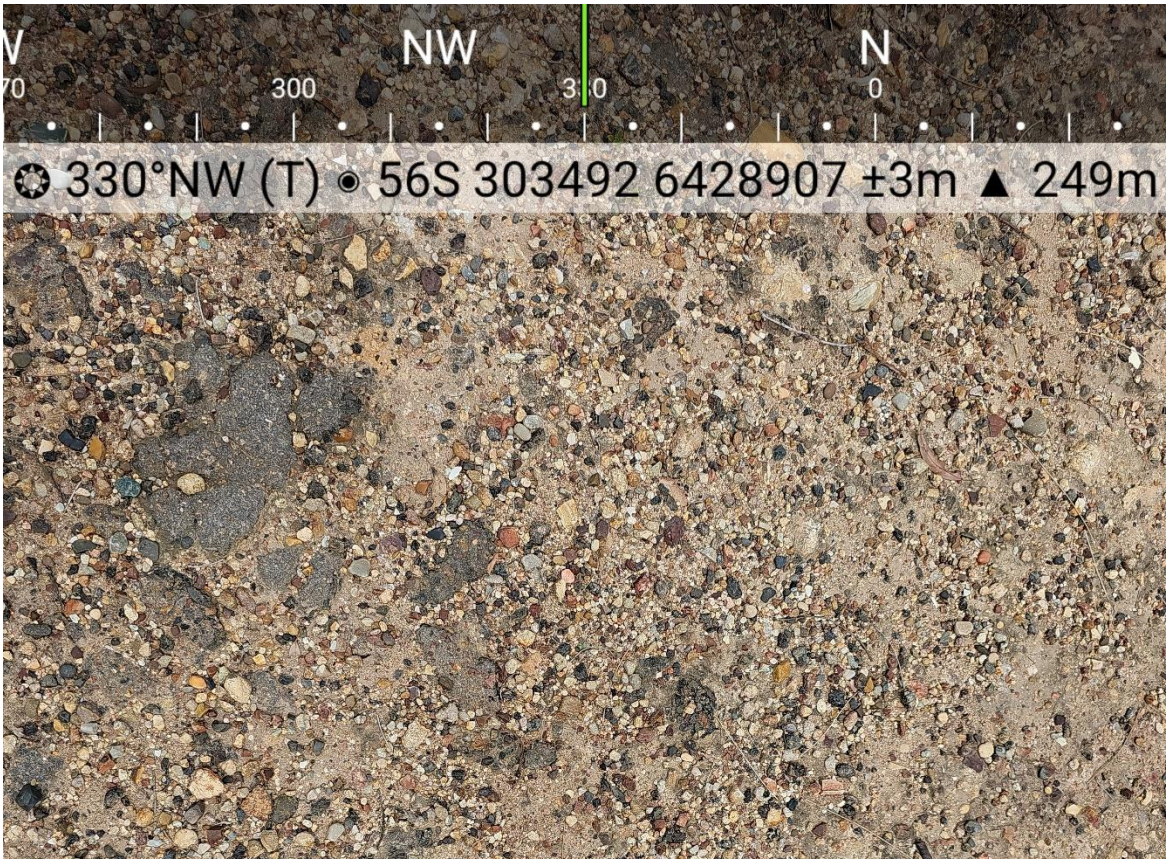
Plot 1 (50 m)

Plot 2 (0 m)

Plot 2 (50 m)

Quadrat 01

Quadrat 02



Quadrat 03

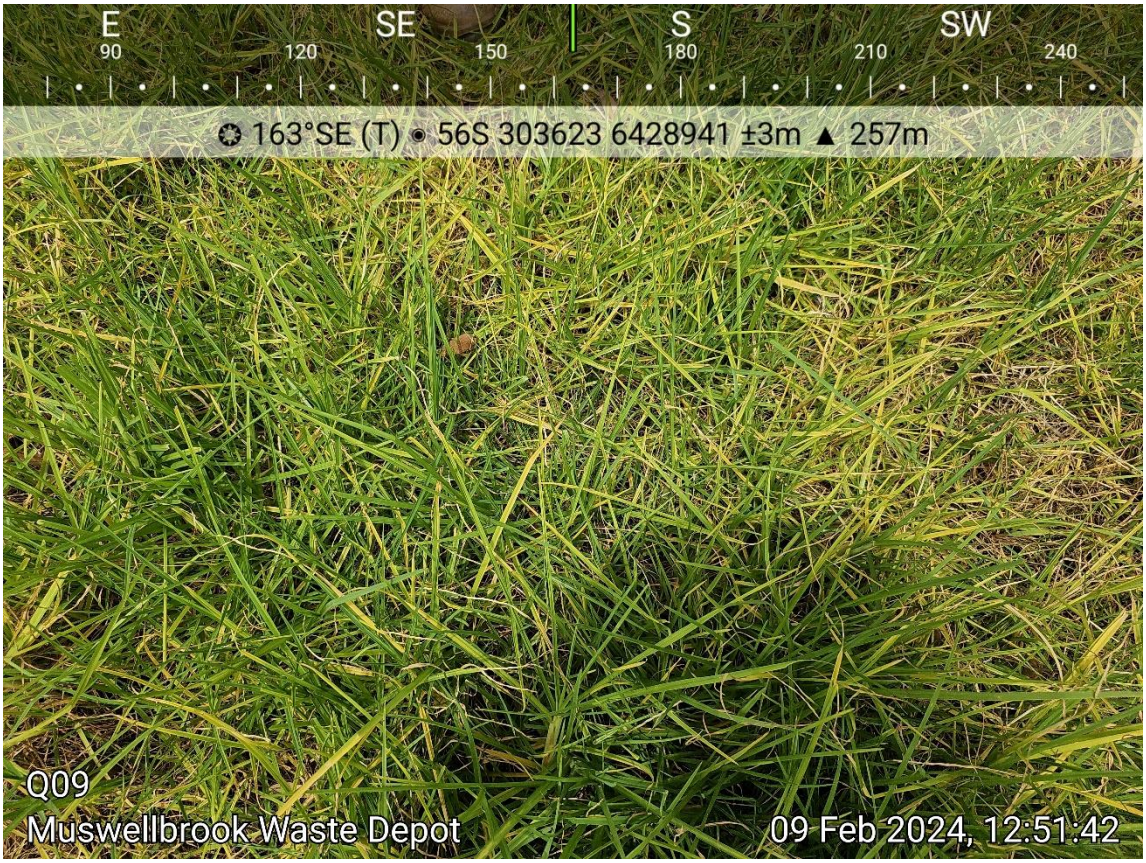
Quadrat 04

Quadrat 05

Quadrat 06

Quadrat 07

Quadrat 08



Quadrat 09

Quadrat 10

APPENDIX C – RECORDED FLORA SPECIES

Flora

Aizoaceae	
*Galenia pubescens**	Spatulate Galenia
Arecaceae	
*Phoenix canariensis**	Canary Island Date Palm
Amaranthaceae	
Einadia nutans	Nodding Saltbush
Asteraceae	
*Bidens pilosa**	Hairy Beggarticks
Calotis lappulacea	Yellow Burr-daisy
Chrysocephalum apiculatum	Common Everlasting
Sida corrugata	Corrugated Sida
Casuarinaceae	
Allocasuarina littoralis	Black Sheoak
Commelinaceae	
Commelina cyanea	Scurvy Weed
Convolvulaceae	
Dichondra repens	Kidney Weed
Fabaceae	
Acacia falcata	Sickle Wattle
Acacia longifolia	Sydney Golden Wattle
Acacia paradoxa	Kangaroo Thorn
Desmodium varians	Variable Tick-trefoil
Liliaceae	
Geitonoplesium cymosum	Scrambling Lily
Malvaceae	
Brachychiton populneus	Kurrajong
*Sida rombifolia**	Arrowleaf Sida
Sida corrugata	Corrugated Sida
Myrtaceae	
Callistemon viminalis	Weeping Bottlebrush
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus moluccana	Grey Box
Melaleuca decora	White Feather Honey-myrtle
Melaleuca styphelioides	Prickly-leaved Paperbark
Oleaceae	
Notelaea longifolia	Large Mock-olive

Notelaea microcarpa	Native Olive
Phyllanthaceae	
Breynia oblongifolia	Coffee Bush
Poaceae	
Austrostipa scabra	Rough Speargrass
*Chloris Gayana**	Rhodes Grass
*Hyparrhenia hirta**	Coolatai Grass
*Megathyrsus maximus**	Guinea Grass
Plantaginaceae	
*Plantago lanceolata**	Ribwort Plantain
Plantago varia	Native Plantain
Rosaceae	
*Photinia serratifolia**	Chinese Photinia
Rutaceae	
Geijera salicifolia	Willow Bottlebrush
Solanaceae	
Lycium ferocissimum	African Boxthorn
*Salanum nigrum**	Black Nightshade
Verbenaceae	
Verbena bonariensis	Purpletop Vervain

*** Denotes non-endemic / introduced species**

APPENDIX E – SIGNIFICANT IMPACT ASSESSMENTS UNDER THE EPBC ACT

The Commonwealth EPBC Act requires approval for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES). There are seven MNES that are triggers for Commonwealth assessment and approval. The MNES and study area-specific responses are as follows:

World Heritage Areas – The Site is not within or near a World Heritage Area.

National Heritage Places – The Site is not within or near a National Heritage Place.

Wetlands of International Importance (declared Ramsar wetlands) – No Wetlands of International Importance occur within 10 km of the Site.

Listed Threatened Species and Ecological Communities – The Site does not contain any TECs listed under the EPBC Act. Several threatened species listed under the EPBC Act may occur in the area (see the EPBC Protected Matters Search Tool results in **Appendix F**). Of these, the Site may provide potential habitat for the following species (based on a review of the species predicted to occur in the area and the site's habitat potential).

- ***Calyptorhynchus lathami lathami*** South-eastern Glossy Black-Cockatoo
- ***Hirundapus caudacutus*** White-throated Needletail
- ***Pteropus poliocephalus*** Grey-headed Flying-fox

Impact assessments under the EPBC Act, in accordance with the DoE (2013) *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (which are provided in full below), were undertaken for these species; these impact assessments concluded that the proposal would not have had a significant impact on the assessed species.

Listed Migratory Species – One listed migratory species has the potential to occur within the Site (based on a review of the species predicted to occur in the area and the site's habitat potential). This includes

- ***Hirundapus caudacutus*** White-throated Needletail

Impact assessments under the EPBC Act, in accordance with the DoE (2013) *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (which are provided in full below), were undertaken for these species; these impact assessments concluded that the proposal would not have a significant impact on the assessed species.

Commonwealth Marine Area – The Site does not occur near any Commonwealth marine areas.

Commonwealth Land – The Proposal would not impact on any Commonwealth lands.

The Great Barrier Reef Marine Park – Not applicable

Overall, it is considered unlikely that any MNES would be significantly impacted by the Proposal and thus referral to the Commonwealth DoE is not necessary.

VULNERABLE SPECIES SIGNIFICANT IMPACT CRITERIA – *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo)

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- ***Lead to a long-term decrease in the size of an important population of a species***

Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo) is uncommon although widespread throughout suitable forest and woodland habitat from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW.

C. lathami lathami typically occur in open forests and woodlands of the coast and Great Dividing Range where strands of Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important food sources. The species feeds almost exclusively on species of Sheoak (*Casuarina* and *Allocasuarina* species), shredding the cones with their massive bill. The species is dependent on large hollow-bearing eucalypts for nest sites, where a single egg is laid between March and May.

The site contains one hollow bearing tree, however due to its size, it would be unsuitable to support breeding for the species. The site contains *Allocasuarina* sp, recognised as important food resources for the species, however, this is limited to a small stand of stunted trees within a degraded patch of remnant vegetation. The site has the potential to provide marginal foraging habitat for the species, however, *C. lathami lathami* has not be recorded within 10km of the site and considered unlikely to use the site on a regular basis, if at all. Therefore, the Project is highly unlikely to lead to a long-term decrease in the size of an important population of *C. lathami lathami.*

- ***Reduce the area of occupancy of an important population***

For the reasons stated above, the Project is unlikely to reduce the area of occupancy of an important population.

- ***Adversely affect habitat critical to the survival of a species***

For the reasons stated above, the Project is unlikely to adversely affect habitat critical to the survival of a species.

- ***Disrupt the breeding cycle of an important population***

For the reasons stated above, the Project is unlikely to disrupt the breeding cycle of an important population.

- ***Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***

For the reasons stated above, the Project is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- ***Result in invasive species that are harmful to a vulnerable species becoming established in the species' habitat***

For the reasons stated above, the Project is unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the species' habitat.

- ***Introduce disease that may cause the species to decline***

There are no known diseases that present a threat to *C. lathami lathami* that may be introduced on the site.

- ***Interfere substantially with the recovery of the species***

For the reasons stated above, the Project is unlikely to interfere substantially with the recovery of the species.

VULNERABLE SPECIES SIGNIFICANT IMPACT CRITERIA – *Hirundapus caudacutus* (White-throated Needletail)

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- ***Lead to a long-term decrease in the size of an important population of a species***

Hirundapus caudacutus breeds in Asia and spends the non-breeding season in Australasia, mainly in Australia. It is widespread throughout eastern and south-eastern Australia. In NSW, it occurs in all coastal regions and extends inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains.

H. caudacutus is an aerial species (where it forages for aerial insects) and because of this, conventional foraging habitat descriptions are inapplicable. It is however, mostly recorded above wooded areas including open forest and rainforest, and may also fly between trees or in clearings below the canopy. It can also occur over heathland, and sometimes (but less often) over grasslands, swamps, sandy beaches and around coastal cliffs. *H. caudacutus* typically roosts in trees in forests and woodlands, amongst dense foliage and occasionally hollows. It breeds in Asia, in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests.

Due to the small scale of the development and the clearing of minimal native vegetation (0.51ha), potential habitat loss is considered marginal. The Project is unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the species.

- ***Reduce the area of occupancy of an important population***

For the reasons stated above, the Project is unlikely to reduce the area of occupancy of an important population.

- ***Adversely affect habitat critical to the survival of a species***

For the reasons stated above, the Project is unlikely to adversely affect habitat critical to the survival of a species.

- ***Disrupt the breeding cycle of an important population***

For the reasons stated above, the Project is unlikely to disrupt the breeding cycle of an important population.

- ***Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***

For the reasons stated above, the Project is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- ***Result in invasive species that are harmful to a vulnerable species becoming established in the species' habitat***

For the reasons stated above, the Project is unlikely to result in invasive species that are harmful to a *H. caudacutus* becoming established,

- ***Introduce disease that may cause the species to decline***

There are no known diseases that present a threat to *H. caudacutus* that may be introduced on the site.

- ***Interfere substantially with the recovery of the species***

For the reasons stated above, the Project is unlikely to interfere substantially with the recovery of the species.

VULNERABLE SPECIES SIGNIFICANT IMPACT CRITERIA – *Pteropus poliocephalus* (Grey-headed Flying-fox)

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- ***Lead to a long-term decrease in the size of an important population of a species***

Pteropus poliocephalus (Grey-headed Flying-foxes) are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. However, in times of natural resource shortages, they may be found in unusual locations.

P. poliocephalus is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops and introduced tree species in urban areas. The primary food source is the blossom from Eucalyptus and related genera. The species roosts in aggregations on exposed branches in vegetation including rainforest patches, stands of Melaleuca, mangroves and riparian vegetation, typically near water such as lakes, rivers or coast.

The closes flying fox camp is located along the Hunter River >2.5km to the West of the Site. The site contains *Eucalyptus* and *Melaleuca* species which has the potential to contribute to foraging and roosting habitat to the local population. No camps were observed at the site.

Due to the small scale of the development and the clearing of minimal native vegetation (0.51ha) and mixed native /non-native plantings (0.12ha) potential habitat loss is considered marginal. The Project is highly unlikely to lead to a long-term decrease in the size of an important population of *P. poliocephalus*.

- ***Reduce the area of occupancy of an important population***

For the reasons stated above, the Project is unlikely to reduce the area of occupancy of an important population.

- ***Adversely affect habitat critical to the survival of a species***

For the reasons stated above, the Project is unlikely to adversely affect habitat critical to the survival of a species.

- ***Disrupt the breeding cycle of an important population***

For the reasons stated above, the Project is unlikely to disrupt the breeding cycle of an important population.

- ***Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***

For the reasons stated above, the Project is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- ***Result in invasive species that are harmful to a vulnerable species becoming established in the species' habitat***

For the reasons stated above, the Project is unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the species' habitat.

- ***Introduce disease that may cause the species to decline***

P. poliocephalus is susceptible to Australian bat lyssavirus and Hendra virus, however, as these diseases are typically spread through other bats/microbats carrying the disease, neither disease has the potential to be introduced to the site through the proposed development.

- ***Interfere substantially with the recovery of the species***

For the reasons stated above, the Project is unlikely to interfere substantially with the recovery of the species.

MIGRATORY SPECIES SIGNIFICANT IMPACT CRITERIA – *Hirundapus caudacutus* (White-throated Needletail)

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- ***Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species***

Hirundapus caudacutus breeds in Asia and spends the non-breeding season in Australasia, mainly in Australia. It is widespread throughout eastern and south-eastern Australia. In NSW, it occurs in all coastal regions and extends inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains.

H. caudacutus is an aerial species (where it forages for aerial insects) and because of this, conventional foraging habitat descriptions are inapplicable. It is however, mostly recorded above wooded areas including open forest and rainforest and may also fly between trees or in clearings below the canopy. It can also occur over heathland, and sometimes (but less often) over grasslands, swamps, sandy beaches and around coastal cliffs. *H. caudacutus* typically roosts in trees in forests and woodlands, amongst dense foliage and occasionally hollows. It breeds in Asia, in wooded lowlands and sparsely

vegetated hills, as well as mountains covered with coniferous forests.

Due to the small scale of the development and the clearing of minimal native vegetation (0.51ha) and mixed native /non-native plantings (0.12ha), potential habitat loss is considered marginal. The Project is unlikely to substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for the migratory species.

Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or

The Project is not likely to result in the establishment of harmful species.

- ***Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.***

For the reasons stated above, the Project is unlikely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

APPENDIX F – EPBC PROTECTED MATTERS SEARCH TOOL RESULTS

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Feb-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	49
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	11
Commonwealth Heritage Places:	1
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	25
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Hunter estuary wetlands	50 - 100km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In buffer area only
Hunter Valley Weeping Myall (Acacia pendula) Woodland	Critically Endangered	Community may occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In buffer area only
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community may occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Aphelocephala leucopsis](#) Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Botaurus poiciloptilus](#) Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Callocephalon fimbriatum](#) Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area	In buffer area only
[Calyptorhynchus lathami lathami](#) South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Climacteris picumnus victoriae](#) Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Erythrotriorchis radiatus](#) Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
[Falco hypoleucos](#) Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Grantiella picta](#) Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor			
Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Melanodryas cucullata cucullata			
South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat known to occur within area	In feature area
Neophema chrysostoma			
Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Polytelis swainsonii			
Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata			
Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only
FISH			
Galaxias sp. nov. 'Hunter'			
Hunter Galaxias, Hunter Upland Galaxias [90728]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
FROG			
Litoria aurea			
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Litoria booroolongensis			
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Notamacropus parma			
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area	In buffer area only
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Androcalva procumbens			
[87153]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat may occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus glaucina Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Ozothamnus tesselatus [56203]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Picris evae Hawkweed [10839]	Vulnerable	Species or species habitat may occur within area	In feature area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area	In buffer area only
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thesium australe			
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis			
[92384]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma impar			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat known to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis			
Black-faced Monarch [609]		Species or species habitat likely to occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Commonwealth Bank of Australia		
Commonwealth Land - Commonwealth Bank of Australia [12536]	NSW	In buffer area only
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [12530]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia [12533]	NSW	In buffer area only
Communications, Information Technology and the Arts - Australian Postal Corporation		

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Postal Commission [12532]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [12537]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12531]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12535]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12534]	NSW	In buffer area only
Defence		
Defence - MUSWELLBROOK GRES DEPOT [11194]	NSW	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [15955]	NSW	In buffer area only
Unknown		
Commonwealth Land - [14106]	NSW	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Muswellbrook Post Office	NSW	Listed place	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Bowmans Creek Wind Farm	2020/8631		Assessment	In buffer area only
Liddell Future Land Use and Enabling Works Project	2022/09330		Assessment	In buffer area only
Maxwell Coal Mine, Hunter Valley, NSW	2018/8287		Post-Approval	In buffer area only
Mount Pleasant Optimisation Project	2020/8735		Approval	In buffer area only
Muswellbrook Solar Farm	2022/09303		Assessment	In feature area
Controlled action				
Continuation of Bengalla Mine	2012/6378	Controlled Action	Post-Approval	In buffer area only
Mount Pleasant Project	2011/5795	Controlled Action	Post-Approval	In buffer area only
Mt Arthur Coal Extension Project Hunter Valley NSW	2011/5866	Controlled Action	Post-Approval	In buffer area only
Mt Arthur Coal open cut mine modification, Muswellbrook, NSW	2014/7377	Controlled Action	Post-Approval	In buffer area only
Queensland Hunter Gas Pipeline, approximately 825 km in length	2008/4483	Controlled Action	Completed	In buffer area only
Thomas Mitchell Drive Upgrade, Muswellbrook, NSW	2012/6533	Controlled Action	Completed	In buffer area only
Not controlled action				
clearing of GWB Woodland for residential development	2004/1771	Not Controlled Action	Completed	In feature area
Construction of a new power line	2011/5930	Not Controlled Action	Completed	In feature area
Dartbrook Mine Bord and Pillar Mining, Hunter Valley, NSW	2018/8295	Not Controlled Action	Completed	In buffer area only
Extension of operations to existing Muswellbrook No 1 Open Cut mine	2002/614	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Industrial Subdivision, Thomas Mitchell Drive	2006/3097	Not Controlled Action	Completed	In buffer area only
Ironbark Ridge Rural Residential Development	2009/5116	Not Controlled Action	Completed	In buffer area only
Kyoto Alternative Energy Farm	2008/3979	Not Controlled Action	Completed	In buffer area only
Production specialty steels for aerospace and machinery industry	2002/554	Not Controlled Action	Completed	In buffer area only
Queensland Hunter Gas Pipeline, approximately 833 km in length	2008/4620	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
N40-Ulan line underbridge replacement, Muswellbrook, NSW	2019/8507	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Clearing for development of rural subdivision	2009/4931	Referral Decision	Completed	In buffer area only
Mount Pleasant Project	2010/5529	Referral Decision	Completed	In buffer area only

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Hunter	Northern Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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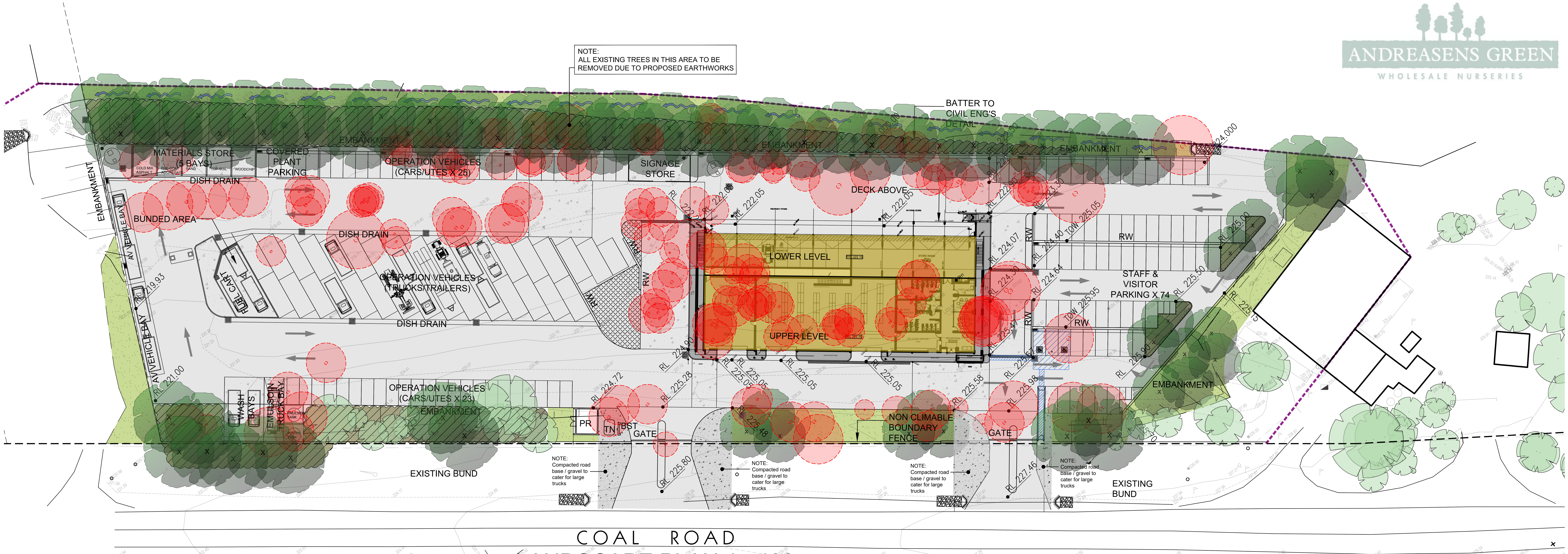
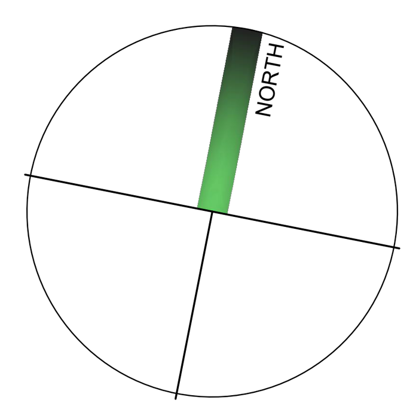
APPENDIX G – LANDSCAPE PLAN



LANDSCAPE PLAN 1 : 400



LEGEND

PROPOSED MASS PLANTING OF INDIGENOUS NATIVE SHRUBS AND GRASSES
This site currently hosts native vegetation which has been identified by the NSW Department of Planning as "*Plant Community Type 3431 - Central Hunter Ironbark Grassy Woodland*". This plant community type is unique and only found in this part of the world. Accordingly it is important that every effort is made to preserve the genetic integrity of each individual species. This can be done quite easily by collecting seeds, taking cuttings etc. prior to clearing the site, and then propagate small seedings at a nursery off site, which can mature during the 12 - 18 month construction period, and be ready for planting back on site, as part of the new landscape works.

The propagation works must be undertaken under by a qualified Bush Regenerator. All plant material is to be locally provenanced from the site and or from native bushland within a 5 kilometre radius of the site. The Builder must coordinate these works to ensure this propagation process is successful. At the completion of the project the bush regenerator is to provide certification that all plant material used in the site landscaping is locally provenanced and that no substitute plants have been used.

Only site topsoil is to be used in the new mass planted areas. The builder is to Excavate and Stockpile site topsoil. The area is to be re-graded in strict accordance with the Engineers documentation, While placing soil, restore the soil profiles with a topsoil layer a minimum of 300mm deep. This topsoil is to be re-used site topsoil placed in two lightly compacted layers, each layer being approximately 150mm deep to achieve the final site levels with little or no soil subsidence.

Upon approval of the final site levels, cover the entire zone with Jute Mat. Jute Mat is to consist of a dense mat of biodegradable jute fibres with a minimum weight of 680 g / m² and approximately 6 mm thick. Jute mat must be pegged with at least 3 x 150 mm pins per m² and each roll overlapped a minimum of 100 mm width on each side.

The entire zone is then to be mass planted with pre-grown, indigenous, native plant species at the density of one shrub per metre and four native grasses / groundcovers per metre. Refer to the ecologists report for a list of plant species that are acceptable for planting

LEGEND

PROPOSED PLANTING OF INDIGENOUS NATIVE TREES
This site currently hosts native vegetation which has been identified by the NSW Department of Planning as "*Plant Community Type 3431 - Central Hunter Ironbark Grassy Woodland*". This plant community type is unique and only found in this part of the world. Accordingly it is important that every effort is made to preserve the genetic integrity of each individual species. This can be done quite easily by collecting seeds, taking cuttings etc. prior to clearing the site, and then propagate small seedings at a nursery off site, which can mature during the 12 - 18 month construction period, and be ready for planting back on site, as part of the new landscape works.

The propagation works must be undertaken under by a qualified Bush Regenerator. All plant material is to be locally provenanced from the site and or from native bushland within a 5 kilometre radius of the site. The Builder must coordinate these works to ensure this propagation process is successful. At the completion of the project the bush regenerator is to provide certification that all plant material used in the site landscaping is locally provenanced and that no substitute plants have been used.

EXISTING TREES TO BE REMOVED
Prior to commencement of any demolition or clearing works on the site. The Builder, all sub-contractors and any workers entering the site, must be inducted and been briefed on the increased emphasis on environmental issues and the specific ecology and bio-diversity of this site. This site currently hosts native plants and animals which will be negatively impacted by the proposed building works. It is imperative that this impact be minimized and that compensatory planting etc is implemented to achieve a nett zero ecological impact. The methods by which this can be achieved during the clearing of the site and removal of trees are detailed in the Ecological report "refer to Ecologists report prepared by HUNTER ECOLOGY"

LEGEND

PROPOSED GRASSED AREAS
Ensure that the area has been graded to the falls and site levels shown on the engineers plans, allow for placement of 100mm of stockpiled site topsoil, Ensure that the finished soil surfaces are smoothed out with no bumps or hollows. Lay cultivated "couch" turf rolls in a stretcher bond pattern with rolls perpendicular to the direction of the fall. The extent of areas to be re-turf as shown on the plans is indicative only, all areas of bare earth adjacent to the areas shown on the plans is to be re-turfed to ensure minimal erosion.

PROPOSED OVERLAND FLOW GRASSED SWALE
Refer to Engineers plans for detail of earthworks for the proposed swale. After the swale has been graded to the correct levels, the entire swale is to be turfed allow for placement of 100mm of stockpiled site topsoil, Ensure that the finished soil surfaces are smoothed out with no bumps or hollows. Lay cultivated "couch" turf rolls in a stretcher bond pattern with rolls perpendicular to the direction of the fall. The extent of areas to be re-turf as shown on the plans is indicative only, all areas of bare earth adjacent to the areas shown on the plans is to be re-turfed to ensure minimal erosion.

EXISTING TREES TO BE RETAINED AND PROTECTED
Prior to commencement of any demolition or clearing works on the site. The Builder, all sub-contractors and all workers entering the site, must be inducted, and have been briefed on the increased emphasis on environmental issues and the specific ecology and bio-diversity of this site. This site currently hosts native plants and animals which will be negatively impacted by the proposed building works. It is imperative that this impact be minimized and then equally compensated for to achieve zero ecological impact The methods by which this can be achieved and how existing trees are to be protected, is detailed in the Ecological report "refer to Ecologists report prepared by HUNTER ECOLOGY"

DATE	AMENDMENT	ISSUE
13.12.24	Revised DA to include new Architects plans	B
28.05.24	DA Issue	A

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Project:
COMMUNITY INFRASTRUCTURE DEPOT

No. 252 Coal Road,
MUSWELLBROOK

Client:
MUSWELLBROOK SHIRE COUNCIL

Drawing Title:
LANDSCAPE PLAN

issue: DA	date: 13/12/24	issue no: B	
file name:	c:\	drawing No:	
drawn: HK	scale: 1:400 @ A1		L-01
checked: RF	project No: 4874b		